

The Science curriculum

Science curriculum vision			
<p>Throughout a Barr's Hill scientist's seven-year journey students will have the opportunity to become exceptional and confident leaders of science. They will have gained a deep understanding of all three sciences and be able to make informed links between a wide range of topics. Students will have a comprehensive understanding of scientific techniques and procedures and be able to link this to their knowledge. They will be able to analyse and, interpret and evaluate scientific information, ideas and evidence. They will have high level oracy and literacy skills, so that they are able to accurately and effectively communicate their comprehensive scientific knowledge to challenging and unfamiliar concepts. Students will be well-read and able to confidently apply their wider contextual knowledge, of science and its application in everyday life, in both their written and oral work, giving them a competitive edge over their peers. They will be highly numerate and able to apply their mathematical skills to a variety of scientific concepts supporting them in being highly effective problem solvers. Students will be well-equipped with the knowledge, skills and experience required to allow them to reach the next step in their aspiration for a career in science.</p>			
Key stage 3 – Units of study			
Term	Year 7	Year 8	Year 9
1	Matter Periodic Table	Space Reactions	Ecosystems Electricity
2	Cells	Photosynthesis Motion	Reactions II DNA
3	Energy	Separation techniques	Biology key concepts Cells (CB1) Chemistry key concepts Atomic Structure (CC3-4)
4	Particles British Science Week	Reproduction	Motion (CP1) Biology key concepts Cell transport (CB1)
5	Gas Exchange	Waves	States of matter and mixtures (CC1-2) Conservation of energy (CP3)
6	Forces	Nutrition Acid and Alkali	Biology key concepts Enzymes (CB1) Cells and control (CB2)

Key stage 4 – Units of study Combined Sciences (9-1) Edexcel (1SC0)		
Term	Year 10	Year 11
1	Genetics (CB3) Chemistry key concepts Bonding (CC5-7) Forces (CP2)	Exchange and transport in animals (CB8) Groups in the Periodic Table (CC13) Electricity and circuits (CP9)
2	Natural selection and genetic modification (CB4) Waves, Light and the electromagnetic spectrum (CP4-5)	Animal coordination, control and homeostasis (CB7) Rates of reaction and energy changes (CC14-15)
3	Extracting metals and equilibria (CC10-12) Health, disease and the development of medicines (CB5)	Energy – Forces (CP7-8) Ecosystems and material cycles (CB9)
4	Electrolytic processes (CC10-12) Radioactivity (CP6)	Fuels and Earth Science (CC16-17) Magnetism and the motor effect (CP10-11)
5	Chemical change (CC8) Plant structures and their functions (CB6)	
6	Particle models, forces and matter (CP12-13)	

Key stage 4 – Units of study Triple science: Biology (1BI0), Chemistry (1CH0), Physics (1PH0)		
Term	Year 10	Year 11
1	Cells and control (SB2) Genetics (SB3) Chemistry key concepts Bonding (SC5-7) Forces (SP2)	Exchange and transport in animals (SB8) Rates of reaction (SC18-19) Electricity and circuits (SP10)
2	Genetics (SB3) Natural selection and genetic modification (SB4) Extracting metals and equilibria (SC11,13) Waves, Light and the electromagnetic spectrum (SP4-5)	Animal coordination, control and homeostasis (SB7) Fuels (SC20) Hydrocarbons, alcohols and polymers (SC22-24) Static electricity (SP11) Energy and forces (SP8-9)

3	Natural selection and genetic modification (SB4) Health, disease and the development of medicines (SB5) Electrolytic processes (SC10,12) Radioactivity (SP6)	Ecosystems and material cycles (SB9) Earth science (SC21) Hydrocarbons, alcohols and polymers (SC22-24) Qualitative analysis and nanoparticles (SC25-26) Magnetism and the motor effect (SP12) Electromagnetic induction (SP13)
4	Health, disease and the development of medicines (SB5) Chemical changes (SC8) Astronomy (SP7)	Revision
5	Health, disease and the development of medicines (SB5) Plant structures and their functions (SB6) Chemical changes (SC8) Separate chemistry 1 (SC17) Particle model, forces and matter (SP14-15)	Revision
6	Plant structures and their functions (SB6) Groups of the Periodic Table (SC17) Particle model, forces and matter (SP14-15)	

Key stage 5 – Units of study A Level Biology B Edexcel (9Bi0)

Term	Year 12	Year 13
1	Introduction Topic 1 Biological molecules Topic 2 Cells, Viruses and Reproduction of living things	Topic 5 Energy for biological processes Topic 7 Modern Genetics Topic 8 Origins of genetic variation Topic 10 Ecosystems
2	Topic 1 Biological molecules Topic 2 Cells, Viruses and Reproduction of living things Topic 4 Exchange and transport	Topic 5 Energy for biological processes Topic 6 Microbiology and pathogens Topic 9 Control systems
3	Topic 2 Cells, Viruses and Reproduction of living things Topic 4 Exchange and transport	Topic 5 Energy for biological processes Topic 6 Microbiology and pathogens Topic 9 Control systems
4	Topic 3 Classification and biodiversity Topic 4 Exchange and transport	Topic 6 Microbiology and pathogens Topic 9 Control systems
5	Topic 4 Exchange and transport Topic 8 Origins of genetic variation	Topic 6 Microbiology and pathogens Topic 9 Control systems Revision
6	Revision	

Key stage 5 – Units of study A Level Chemistry Edexcel (9CH0)

Term	Year 12	Year 13
1	Organic Chemistry I Formulae, Equations and amounts of substance	Organic Chemistry II Acid-base equilibria Transition metals
2	Organic Chemistry I Formulae, Equations and amounts of substance Atomic structure and the Periodic Table	Acid-base equilibria Organic chemistry III Redox II
3	Organic Chemistry I Bonding and structure	Redox II Energetics II Kinetics II
4	Organic Chemistry I Modern Analytical techniques Inorganic chemistry and the Periodic Table	Energetics II Kinetics II
5	Energetics I Equilibrium I Kinetics I	Revision
6	Schools Analyst competition Revision CREST Award	

Key stage 5 – Units of study A Level Physics Edexcel (9PH0)

Term	Year 12	Year 13
1	Waves and particle nature of light Uncertainties Electrical circuits Mechanics	Electric and magnetic fields Further Mechanics Gravitational fields
2	Waves and particle nature of light Mechanics Electrical circuits	Electric and magnetic fields Nuclear and particle physics Thermodynamics
3	Waves and particle nature of light Materials Electrical circuits	Thermodynamics Nuclear and particle physics Nuclear radiation Oscillations
4	Waves and particle nature of light Materials Electrical circuits	Nuclear radiation Revision
5	Space Further mechanics	Revision
6	Revision CREST Award	

Supporting your child with their learning?

The following links will support additional learning to your child.

Year 7 Unit	Additional Learning
Matter	The particle model of matter - KS3 Chemistry - BBC Bitesize
Periodic Table	Periodic table - KS3 Chemistry - BBC Bitesize
Cells	Living organisms - KS3 Biology - BBC Bitesize
Energy	Energy - KS3 Physics - BBC Bitesize
Particles	Atoms, elements and compounds - KS3 Chemistry - BBC Bitesize
Gas exchange	Respiration and gas exchange - KS3 Biology - BBC Bitesize
Forces	Forces and movement - KS3 Physics - BBC Bitesize

Year 8 Unit	Additional Learning
Space	Space - KS3 Physics - BBC Bitesize
Reactions	Chemical reactions - KS3 Chemistry - BBC Bitesize
Photosynthesis	Respiration and gas exchange - KS3 Biology - BBC Bitesize
Motion	Forces and movement - KS3 Physics - BBC Bitesize
Separation techniques	Pure and impure substances - KS3 Chemistry - BBC Bitesize
Reproduction	Reproduction - KS3 Biology - BBC Bitesize
Waves	Waves - KS3 Physics - BBC Bitesize
Nutrition	Nutrition, digestion and excretion - KS3 Biology - BBC Bitesize
Acid and alkali	Acids and alkalis - KS3 Chemistry - BBC Bitesize

Year 9 Unit	Additional Learning
Ecosystems	Ecosystems and habitats - KS3 Biology - BBC Bitesize
Electricity	Electricity - KS3 Physics - BBC Bitesize
Reactions II	The reactivity series - KS3 Chemistry - BBC Bitesize
DNA	Inheritance and genetics - KS3 Biology - BBC Bitesize
Biology Key concepts: cells	Key concepts in biology - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Chemistry key concepts: atomic structure	Key concepts in chemistry - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Motion	Motion and forces - GCSE Combined Science Revision - Edexcel - BBC Bitesize

Biology key concepts cell transport	Key concepts in biology - GCSE Combined Science Revision - Edexcel - BBC Bitesize
States of matter and mixtures	States of matter and mixtures - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Conservation of energy	Conservation of energy - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Biology key concepts Enzymes	Key concepts in biology - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Cells and control	Cells and control - GCSE Combined Science Revision - Edexcel - BBC Bitesize

Combined Science

Year 10 Unit	Additional Learning
Genetics	Genetics - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Chemistry Key concepts bonding	Key concepts in chemistry - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Forces	Motion and forces - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Natural selection and genetic modification	Natural selection and genetic modification - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Waves, light and electromagnetic spectrum	Waves - GCSE Combined Science Revision - Edexcel - BBC Bitesize Light and the EM spectrum - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Extracting metals and equilibria	Extracting metals and equilibria - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Health, disease and the development of medicines	Health, disease and the development of medicines - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Electrolytic processes	Extracting metals and equilibria - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Radioactivity	Radioactivity - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Chemical changes	Chemical changes - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Plant structures and functions	Plant structures and their functions - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Particle models, forces and matter	Forces and matter - GCSE Combined Science Revision - Edexcel - BBC Bitesize The particle model - GCSE Combined Science Revision - Edexcel - BBC Bitesize

Year 11 Unit	Additional Learning
Exchange and transport in animals	Exchange and transport in animals - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Groups in the Periodic Table	Groups in the periodic table - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Electricity and circuits	Electricity and circuits - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Animal coordination, control and homeostasis	Animal coordination, control and homeostasis - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Rates of reaction and energy changes	Rates of reaction and energy changes - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Energy – Forces	Forces doing work - GCSE Combined Science Revision - Edexcel - BBC Bitesize

	Forces and their effects - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Ecosystems and material cycles	Ecosystems and material cycles - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Fuels and Earth Science	Fuels and Earth science - GCSE Combined Science Revision - Edexcel - BBC Bitesize
Magnetism and the motor effect	Magnetism and the motor effect - GCSE Combined Science Revision - Edexcel - BBC Bitesize Electromagnetic induction - GCSE Combined Science Revision - Edexcel - BBC Bitesize

Triple Science

Year 10 Unit	Additional Learning
Cells and control	Cells and control - GCSE Biology (Single Science) Revision - Edexcel - BBC Bitesize
Genetics	Genetics - GCSE Biology (Single Science) Revision - Edexcel - BBC Bitesize
Chemistry key concepts Bonding	Key concepts in chemistry - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize
Forces	Motion and forces - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize
Natural selection and genetic modification	Natural selection and genetic modification - GCSE Biology (Single Science) Revision - Edexcel - BBC Bitesize
Extracting metals and equilibria	Extracting metals and equilibria - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize
Waves, Light and the electromagnetic spectrum	Waves - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize Light and the EM spectrum - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize
Health, disease and the development of medicines	Health, disease and the development of medicines - GCSE Biology (Single Science) Revision - Edexcel - BBC Bitesize
Electrolytic processes	Chemical changes - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize
Radioactivity	Radioactivity - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize
Chemical changes	Chemical changes - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize
Astronomy	Astronomy - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize
Plant structures and their functions	Plant structures and their functions - GCSE Biology (Single Science) Revision - Edexcel - BBC Bitesize
Separate chemistry 1	Separate chemistry 1 - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize
Particle model, forces and matter	The particle model - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize Forces and matter - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize
Groups of the Periodic Table	Groups in the periodic table - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize

Year 11 Unit	Additional Learning
Exchange and transport in animals	Exchange and transport in animals - GCSE Biology (Single Science) Revision - Edexcel - BBC Bitesize
Rates of reaction	Rates of reaction and energy changes - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize

Electricity and circuits	<u>Electricity and circuits - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize</u>
Animal coordination, control and homeostasis	<u>Animal coordination, control and homeostasis - GCSE Biology (Single Science) Revision - Edexcel - BBC Bitesize</u>
Fuels	<u>Fuels and Earth science - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize</u>
Hydrocarbons, alcohols and polymers	<u>Separate chemistry 2 - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize</u>
Static electricity	<u>Static electricity - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize</u>
Energy and forces	<u>Forces doing work - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize</u> <u>Forces and their effects - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize</u>
Ecosystems and material cycles	<u>Ecosystems and material cycles - GCSE Biology (Single Science) Revision - Edexcel - BBC Bitesize</u>
Earth science	<u>Fuels and Earth science - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize</u>
Hydrocarbons, alcohols and polymers	<u>Separate chemistry 2 - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize</u>
Qualitative analysis and nanoparticles	<u>Separate chemistry 2 - GCSE Chemistry (Single Science) Revision - Edexcel - BBC Bitesize</u>
Magnetism and the motor effect	<u>Magnetism and the motor effect - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize</u>
Electromagnetic induction	<u>Electromagnetic induction - GCSE Physics (Single Science) Revision - Edexcel - BBC Bitesize</u>