

Science Curriculum: Year 10

Science provides a key foundation for students to understand the world around us. Science affects our daily lives, stimulates curiosity and broadens student's horizons, both in the understanding of wider scientific issues and providing access to a range of job opportunities. The science curriculum provides students with the opportunity to develop a love and appreciation of science and realise their full potential through the breadth and depth of scientific knowledge and skills. Students are naturally curious, by stimulating this curiosity, through scientific ideas, practical investigation and the studying the wider implications of science, we can ensure they are motivated to reach their full potential.

KS4 continues the process of deepening scientific knowledge and understanding. Students study all three science disciplines throughout the year as shown below

	Autumn term	Spring	Summer
Biology	<p>B2 Organisation Students study how organ systems work together to carry out specific functions in the body including circulation, digestion in humans and nutrition in plants</p> <p>B4 Bioenergetics Students deepen their knowledge of how energy is provided through respiration and how plants produce their own food through photosynthesis</p>	<p>B1 Cells Students study the similarities and differences in plant and animals cells. They also investigate how substances enter and leave cells.</p> <p>B3 Disease and Health Students study how both lifestyle and communicable diseases can affect our health and how they body can protect itself.</p>	<p>B7 Ecology Students investigate a range of factors that influence the species that live in a particular habitat before looking at human impact on the environment.</p>
	<p>Important vocabulary: Structure, function, exchange, surface area, exothermic, limiting factor, optimum, denatured.</p>	<p>Important vocabulary: Diffusion, osmosis, active transport, immunity, pathogen, communicable,</p>	<p>Important vocabulary: Abiotic, biotic, biodiversity, ecosystem, biomass</p>
Chemistry	<p>C1 Atomic structure and the periodic table Students study the development of both the atomic model, before investigating the patterns found in the properties and reactions of groups in the periodic table</p> <p>C2 Ionic bonding and reactions of acids and alkalis Students study ions and ionic bonding before moving on to look at salts and how there are formed – including the nature of acids and alkalis</p>	<p>C3 Covalent bonding and redox reactions. Students study the structure and properties of covalent molecules and compounds before moving on to investigate redox reactions in detail</p> <p>C4 Metals The unit covers metallic bonding and properties of metals, before looking at extraction of metals and reactivity and finishes with an in depth study of electrolysis.</p>	<p>C5 Energy changes Students study energy changes in reactions including calculating bond energies and drawing reaction profiles.</p> <p>C10 Using resources Students look at the impact of using finite resources on the environment and how we treat waste water to limit pollution.</p>
	<p>Important vocabulary: Subatomic, structure, function, isotope, reactivity, electrostatic, base, neutralisation,</p>	<p>Important vocabulary: Reduction, oxidation, valence, electrolysis, reactivity, extraction, intramolecular, intermolecular</p>	<p>Important vocabulary: Exothermic, endothermic, bond energy, activation energy, finite, life cycle assessment, potable</p>
Physics	<p>P3 Particle model of matter Students apply ideas of states of matter and internal energy to density and changes of states of materials</p> <p>P4 Atomic structure Building on their first Chemistry unit students revisit the atomic model and develop ideas further in the study of radioactive materials</p>	<p>P1 Energy Students build on KS3 knowledge of energy stores and transfers before developing ideas of how to reduce energy loss. The unit is completed by study of a range of energy resources used for electricity production</p>	<p>P2 Electricity Student investigate the relationship between current, voltage and resistance in series and parallel circuits before studying electricity in the home.</p> <p>(Triple students also study the P8 Space covering lifecycle of stars, red shift and the Big Bang)</p>
	<p>Important vocabulary: Subatomic, density, latent heat, specific heat capacity, internal, isotope, half-life, contamination, irradiation</p>	<p>Important vocabulary: Conservation. Efficiency, potential, transfer, renewable, evaluate</p>	<p>Important vocabulary: Resistance, parallel, series, national grid, component, current, charge, electron</p>

These topics will also help students to understand:

- the use of conceptual models and theories to make sense of the observed diversity of natural phenomena
- the assumption that every effect has one or more cause
- that change is driven by interactions between different objects and systems
- that many such interactions occur over a distance and over time
- that science progresses through a cycle of hypothesis, practical experimentation, observation, theory development and review
- that quantitative analysis is a central element both of many theories and of scientific methods of inquiry.

How parents can help:

-  Review key vocabulary with your child to help them transfer it to their long-term memory.
-  Ask students to explain what they have learnt that week, this also helps build long-term memory.
-  Try watching science / nature programs together and talking about them to encourage them to investigate the world around them.
-  Help them explore science YouTube channels (like Sci show or Minute Physics), to give them a broader knowledge of science in the real world.
-  Research some simple experiments they can do at home.
-  Encourage your child to review learning through the use of knowledge organisers / flashcards or the use of online revision sites (like Quizlet or Seneca learning)

How your child will be assessed:

Assessment of learning takes many forms. Much of this will be informal assessment in lessons through verbal and written responses to questions. Students will have regular opportunity to assess their own progress through the regular quiz reviews.

In Science, we understand that to make progress students need to know and practice the next steps to improve their work. For this reason in each topic, staff assess an identified assessment task. Students will receive feedback that includes some improvement or next steps to complete. This may take a number of forms from short answer correction, answering additional, extension questions, or redrafting sections of longer written work either for correct scientific content or for improving the quality of written English.

To monitor the progress in students' knowledge and skills they will also sit a short standardized assessment for each topic, with time to mark their work and correct mistakes. This provides an important opportunity for students to reflect on their learning and any additional steps to take.

Each term also includes 1 longer formal assessment that covers all three disciplines (Biology, Chemistry and Physics, to give a clear assessment of learning over time across the whole of Science). It is this assessment, along with the ongoing formative assessment that form the basis of the reports each term.

Developing an understanding of the scientific process is an intrinsic part of learning about science. In addition to carry out practical work in lessons where appropriate students understanding of this process will be assessed along with key knowledge in the topic assessment tasks, short unit assessments and the longer formal assessments in line with how these skills are assessed in standard national assessments.

Please feel free to contact us to discuss our assessment policy in depth.

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	Autumn term	Spring	Summer
Biology	B6 Inheritance, variation and evolution Students study the role of DNA and chromosomes in the inheritance of characteristics, learn to predict inheritance using genetic diagrams and how this influences natural selection and artificial selection.	B5 Homeostasis This unit focus on how the body maintains the conditions needed for life through both the nervous and endocrine systems.	Review and exam preparation Classwork develops key exam techniques and incorporates of the review of key concepts and knowledge in preparation for the summer exam series.
	Important vocabulary: Inheritance, dominant, recessive, evolution, variation, mutation, speciation, genetic	Important vocabulary: Nervous, endocrine, negative feedback, fertility, sensor, receptor, effector, stimulus.	Important vocabulary: Explain, Evaluate, compare, contrast, justify
Chemistry	C8 Chemical analysis Looking at specific chemical qualitative tests to identify the presence of individual chemicals. C9 Chemistry of the Atmosphere This unit looks at how the atmosphere first formed, has developed over time and is being altered through human impact. C7 Organic Chemistry Study of crude oil, its separation through distillation and breakdown into useful chemicals in cracking	C6 Rates of Reaction Students investigate the factors that can affect the rate of reaction and explain these in terms of collision theory. This knowledge is then applied to reversible reactions and equilibrium.	Review and exam preparation Classwork develops key exam techniques and incorporates of the review of key concepts and knowledge in preparation for the summer exam series.
	Important vocabulary: Analysis, qualitative, atmosphere, pollutant, distillation, cracking, hydrocarbon	Important vocabulary: Equilibrium, reversible, yield, collision, rate,	Important vocabulary: Explain, Evaluate, compare, contrast, justify
Physics	P5 Forces The unit starts by looking at contact and non-contact forces and the calculation of resultant forces. Students then investigate forces and elasticity before moving on to looking at forces and motion.	P6 Waves The unit investigates the nature and behaviour of waves, including the electromagnetic spectrum. P7 Magnetism and electromagnetism Developing Ks3 ideas about permanent and induced magnets students apply this to the motor effect and how motors work.	Review and exam preparation Classwork develops key exam techniques and incorporates of the review of key concepts and knowledge in preparation for the summer exam series.
	Important vocabulary: Vector, scalar, displacement, tangent, resultant, inertia, momentum	Important vocabulary: Induced, magnetic flux, field, electromagnetism, attraction, repulsion.	Important vocabulary: Explain, Evaluate, compare, contrast, justify

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