



Curriculum Overview 2025 2026

Science Department

Key Stage 5

Department	Science Department
Head of Department	Mr Rathje-Morris – Head of Science faculty Mrs Easton-White – Head of Chemistry Miss Spinola – Head of Biology Mrs Hewitt – Head of Physics
Department Members	Mr Taylor Mrs Martin Mr Lawore Mrs Thompson Miss Nwama Mr Abbott Mr Mason
Accommodation and Resources	The Science department is situated in G and R block and consists of a combination of 8 practical science labs and 2 classrooms as well as a small intervention room. We also have a dedicated preparation room which is staffed by our committed and experienced Lab Technicians who are responsible for the maintenance and preparation of our practical equipment. As a department we have a mobile IPAD facility allowing the use of ICT in any classroom.

<u>Curriculum Intent</u>	In Science our aim is to foster an environment of discovery and curiosity. Science is everything from how our own bodies work to the formation of the universe and everything in between. The science curriculum is not only designed to give students a basic scientific literacy in the three specific disciplines of Biology, Chemistry and Physics but to also give students the tools to be able to answer the questions they have not even thought of yet. While we will of course prepare our students for external examinations, more importantly we want them to be able to understand the changing world around them so they are better prepared to look after themselves and their planet.
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Curriculum Implementation

Key Stage 5:



What my child will learn in Year 12

Biology	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Unit Title	Unit 1 Biological molecules & Unit 2 Cells			Unit 3 – Organisms exchange substances with their environment Unit 4 Genetic information, variation and relationships between organisms.		
Previous knowledge recalled	<p><u>Unit 1 Biological molecules</u></p> <p>Monomers and Polymers:</p> <p>Understanding that small molecules (monomers) can join together to form very large molecules (polymers). For example, knowing how protein molecules are made up of amino acids linked in long chains.</p> <p>Carbohydrates:</p> <p>Knowledge of monosaccharides (simple sugars) like glucose, and how they combine to form larger carbohydrates such as disaccharides and polysaccharides (starch and glycogen).</p> <p>Lipids:</p> <p>Familiarity with the basic structure of lipids, which consist of glycerol linked to fatty acids. An understanding that lipids play various roles including in the structure of cell membranes and as energy stores.</p> <p>Proteins:</p> <p>An awareness of the general structure of amino acids and how they polymerize to form proteins. Understanding the roles of proteins as enzymes, structural components of tissues, antibodies, and hormones.</p> <p>Enzyme Activity:</p> <p>Basic knowledge of how enzymes function as biological catalysts, including their need for specific conditions related to pH and temperature to function properly.</p> <p>Nucleic Acids:</p> <p>Awareness of nucleic acids (DNA and RNA) as carriers of genetic information.</p> <p><u>Unit 2 Cells</u></p> <p>Basic Cell Structures:</p> <p>Understanding of the basic components of both animal and plant cells, including the nucleus, cytoplasm, cell membrane, mitochondria, ribosomes, and for plants, additional structures like chloroplasts, cell wall, and a permanent vacuole.</p> <p>Cell Types:</p> <p>Knowledge that cells can be specialized to perform</p>			<p><u>Unit 3 – Organisms exchange substances with their environment</u></p> <p>Surface Area to Volume Ratio:</p> <p>Understanding the importance of the surface area to volume ratio in the context of substance exchange and why smaller cells or those with protrusions have more efficient exchange surfaces.</p> <p>Gas Exchange:</p> <p>Basic knowledge of how gases (like oxygen and carbon dioxide) are exchanged in various organisms, including the role of diffusion and the structure of exchange surfaces like alveoli in lungs.</p> <p>Digestion and Absorption:</p> <p>Familiarity with the human digestive system, including the process of digestion of food and absorption of nutrients.</p> <p>Mass Transport:</p> <p>Understanding of the circulatory system in animals, including the heart's role and the structure of blood vessels. Knowledge of how substances are transported within plants, such as the role of xylem and phloem.</p> <p><u>Unit 4 Genetic information, variation and relationships between organisms.</u></p> <p>DNA and Genes:</p> <p>Understanding that DNA is the molecule that carries genetic information and that genes are segments of DNA that code for proteins.</p> <p>Chromosomes:</p> <p>Basic knowledge of chromosomes, including their role in heredity and their behaviour during cell division.</p> <p>Protein Synthesis:</p> <p>Familiarity with the fundamental process of protein synthesis, including transcription and translation, and the role of mRNA.</p> <p>Genetic Variation:</p> <p>Awareness of sources of genetic variation, such as mutation and the processes during meiosis.</p>		



	<p>specific functions. Examples include muscle cells, nerve cells, and blood cells, which have unique structures that suit their roles.</p> <p>Cell Division:</p> <p>Familiarity with how cells divide and multiply, specifically through processes like mitosis and binary fission.</p> <p>Cellular Functions:</p> <p>Basic understanding of how cells fulfill various functions such as protein synthesis, energy production (respiration), and how they interact with their environment.</p> <p>Microscopy:</p> <p>Prior experience in using microscopes to study cells and basic knowledge of how cellular components are visualized and identified.</p> <p>Prokaryotic vs. Eukaryotic Cells:</p> <p>Awareness of the differences between prokaryotic cells (like bacteria) and eukaryotic cells (like those of plants and animals), including structural and functional distinctions.</p>	<p>Evolution and Natural Selection:</p> <p>Understanding the basic principles of evolution and natural selection, and how these processes drive the diversity of life.</p> <p>Classification and Biodiversity:</p> <p>Basic concepts of how organisms are classified into taxa and an understanding of biodiversity at various levels (e.g., species diversity, ecosystem diversity).</p>
<p>New Knowledge</p>	<p><u>Unit 1 Biological molecules</u></p> <p>Biological Molecules:</p> <p>Introduction to the variety and complexity of biological molecules and their roles in cellular processes.</p> <p>Proteins:</p> <p>Detailed exploration of protein structure from primary to quaternary levels, including the significance of these structures for protein function.</p> <p>Enzymes:</p> <p>Study of enzyme action, enzyme inhibition, and the factors affecting enzyme activity.</p> <p>Nucleic Acids:</p> <p>Examination of the structure and function of DNA and RNA, including the processes of replication, transcription, and translation.</p> <p>Carbohydrates and Lipids:</p> <p>Analysis of the structure and role of carbohydrates in energy storage and provision, and lipids in membrane formation and energy storage.</p> <p>Biochemical Techniques:</p> <p>Practical skills development in techniques for studying and analysing biological molecules, including chromatography and spectroscopy.</p>	<p><u>Unit 3 – Organisms exchange substances with their environment</u></p> <p>Gas Exchange: Detailed mechanisms of gas exchange in various organisms, including adaptations of gas exchange surfaces.</p> <p>Circulatory Systems: Advanced study of human and plant transport systems, including the heart, blood vessels, xylem, and phloem.</p> <p>Homeostatic Controls: Understanding the regulation of internal conditions, including temperature and blood glucose levels.</p> <p>Practical Skills in Physiology: Application of experimental techniques to investigate how organisms exchange substances with their environment .</p> <p><u>Unit 4 Genetic information, variation and relationships between organisms.</u></p> <p>Genetic Control of Protein Synthesis: In-depth study of how genes are expressed as proteins, including the roles of various types of RNA.</p> <p>Genetic Diversity and Evolution: Exploration of the sources of genetic variation and their role in evolution.</p> <p>Species and Taxonomy: Detailed examination of the principles of classification and the importance of biodiversity.</p> <p>Relationships between Organisms: Study of how genetic information influences relationships within and between</p>



	<p>Unit 2 Cells</p> <p>Cell Structure and Function: Study of the structure and functions of cellular components, including detailed knowledge of organelles like mitochondria, Golgi apparatus, and ribosomes.</p> <p>Transport Mechanisms: Understanding of how substances are transported across cell membranes, including diffusion, osmosis, and active transport mechanisms.</p> <p>Cell Recognition and the Immune System: Exploration of how cells recognize and respond to pathogens using cell-surface molecules and receptors, integrating knowledge of immune responses.</p> <p>Cell Communication: Detailed coverage of signal transduction pathways, how cells communicate using hormones and neurotransmitters, and the role of receptors in these processes .</p>	<p>species, including ecological relationships and speciation processes .</p>
<p>Key Knowledge Assessment</p>	<p>All students will be receiving in class assessments including retrieval practice, low stakes testing and exam practice. End of topic tests covering both prior and new learning will be conducted each term. Students will also sit a full A-level paper 1 as a PPE in Term 6.</p> <p>Some students only taking the AS Level Biology will be assessed as below.</p> <p>Key Knowledge Assessed:</p> <p>AS Level Biology covers the content from topics 1-4, which includes Biological molecules, Cells, Organisms exchange substances with their environment, and Genetic information, variation, and relationships between organisms.</p> <p>Assessment Method:</p> <p>Paper 1:</p> <p>Duration: 1 hour 30 minutes</p> <p>Structure: 75 marks total, with 65 marks for short answer questions and 10 marks for a comprehension question.</p> <p>Weight: 50% of AS</p> <p>Paper 2:</p> <p>Duration: 1 hour 30 minutes</p> <p>Structure: 75 marks total, with 65 marks for short answer questions and 10 marks for extended response questions.</p> <p>Weight: 50% of AS</p>	
<p>Links to literacy and numeracy</p>	<p>Literacy Links</p> <p>Unit 1: Biological Molecules</p> <p>Reading and Interpreting Scientific Texts: Students engage with complex descriptions of biochemical processes and structures, enhancing their scientific literacy.</p> <p>Writing Scientific Explanations: Tasks include writing</p>	<p>Literacy Links</p> <p>Unit 3: Organisms Exchange Substances with their Environment</p> <p>Critical Reading: Students read and interpret scientific texts related to physiological processes such as gas exchange, mass transport, and homeostasis.</p> <p>Writing Detailed Explanations: Writing tasks involve</p>



detailed explanations of molecular interactions and biochemical pathways, requiring precise use of scientific language.

Discussion and Argumentation: Students discuss and defend their understanding of topics such as enzyme function and genetic coding, developing their ability to articulate scientific arguments clearly.

Unit 2: Cells

Technical Vocabulary: Understanding and use of specific terminology related to cell biology and cellular processes.

Interpretation of Scientific Diagrams: Reading and interpreting diagrams of cell structures and transport mechanisms.

Communication of Experimental Results: Students are expected to present findings from microscopy and other cell studies, requiring clear and structured scientific communication.

Numeracy Links

Unit 1: Biological Molecules

Concentration Calculations: Activities involving the calculation of solution concentrations which are crucial for preparing and analysing biochemical reactions.

Graphical Analysis: Interpreting and creating graphs to analyse relationships between different biological molecules and their functions.

Unit 2: Cells

Measurement and Scale: Use of microscopy involves calculating magnification and sizing cellular components, requiring accurate measurement and conversion skills.

Data Analysis: Students analyse quantitative data from experiments on membrane permeability and transport mechanisms, which involves statistical calculations and graphical interpretations.

explaining the mechanisms of how organisms exchange substances with their environments, requiring clarity and accuracy in using scientific terminology.

Debates and Discussions: Engaging in discussions about different adaptations in various organisms for efficient substance exchange, fostering skills in argumentation and critical thinking.

Unit 4: Genetic Information, Variation, and Relationships between Organisms

Interpretation of Genetic Data: Students analyse genetic data and research studies to understand genetic diversity and evolutionary relationships.

Scientific Reporting: Writing detailed reports on experiments and studies related to genetics, requiring coherent structuring of information and ideas.

Ethical Considerations in Genetics: Discussing the implications of genetic engineering and biotechnology, which enhances students' ability to evaluate and articulate complex ethical issues.

Numeracy Links

Unit 3: Organisms Exchange Substances with their Environment

Calculations of Rates: Calculating rates of transpiration and gas exchange, which involve understanding and applying principles of physics and mathematics to biological systems.

Graphical Interpretation: Interpreting and plotting data related to the rates and efficiency of transport systems in plants and animals, requiring skills in handling scientific data and graphical analysis.

Unit 4: Genetic Information, Variation, and Relationships between Organisms

Statistical Analysis: Applying statistical methods to analyse genetic variation and population genetics, which is crucial for understanding evolutionary biology.

Modelling Genetic Relationships: Creating models and simulations to predict genetic outcomes, enhancing skills in quantitative reasoning and application of mathematical concepts in biology.

Extra-Curricular opportunities

Virtual Lab Simulations:

[Labster](#) or [PraxiLabs](#): These platforms offer virtual lab simulations in biology, allowing students to perform experiments online that they might not be able to do in school.



Webinars and Online Lectures:

[Royal Society of Biology](#) Webinars: Engaging webinars on various topics that align with the A-Level curriculum, such as genetics, ecology, and biotechnology.

[FutureLearn](#) Courses: Free online courses on topics like antimicrobial resistance or food production, led by university experts.

Field Trips:

[Wildwood Trust, Kent](#): A wildlife park offering educational visits focused on British wildlife, conservation, and biodiversity, great for studies on ecology and environmental science.

[Kent Wildlife Trust](#): Participate in conservation projects and workshops that teach about local ecosystems and species conservation.

University Workshops:

[University of Kent](#): Offers workshops and summer schools in biosciences which could provide hands-on experiences in areas like molecular biology and environmental science.

Museum Visits:

[Natural History Museum](#): Offers workshops, talks, and behind-the-scenes tours that can enhance understanding of genetics, human biology, and evolution.

[Science Museum, London](#): Engage with interactive exhibits and educational sessions in areas like human biology, medicine, and technology.

Research Institution Open Days:

[Francis Crick Institute](#): Occasionally holds open days where students can learn about cutting-edge research in genetics and biomedicine.

[Royal Botanic Gardens, Kew](#): Explore plant science and conservation through guided tours and workshops.

Science Competitions and Fairs:

[The Big Bang Fair](#): Participate in this UK-wide competition where students can present their own scientific projects, which can be an excellent opportunity to explore research methods and scientific presentation skills.

Volunteering:

[London Wildlife Trust](#): Volunteering here could be an excellent way for students to get involved in environmental



	conservation projects and learn more about local biodiversity.
Links to careers/ aspirations	<p><u>Healthcare and Medicine</u></p> <p>Doctor or Surgeon: Understanding human physiology, genetics, and diseases is crucial for medical practice. NHS Health Careers - Becoming a Doctor</p> <p>Nursing: Knowledge of cellular processes and human biology supports patient care and medical treatments. NHS Health Careers - Nursing</p> <p>Pharmacology: Insight into how biological molecules interact can lead to careers in drug development and testing. British Pharmacological Society - Careers</p> <p><u>Research and Academia</u></p> <p>Biological Researcher: Investigating fundamental biological processes, often at cellular or molecular levels, in various organisms. Royal Society of Biology - Careers</p> <p>Academic Professor or Lecturer: Teaching and guiding the next generation of biologists while conducting independent research. Royal Society of Biology - Careers</p> <p>Biotechnologist: Applying cellular and biomolecular processes to develop technologies that enhance people's lives, such as in genetics, agriculture, and pharmaceuticals. Prospects - Biotechnologist</p> <p><u>Environmental Sciences</u></p> <p>Conservation Biologist: Using knowledge of species diversity and ecosystems to manage and protect natural environments. Environmentjob.co.uk - Conservation Jobs</p> <p>Ecologist: Studying the relationships between organisms and their environment, often focusing on conservation efforts and biodiversity. CIEEM - Careers in Ecology</p> <p><u>Agriculture and Food Science</u></p> <p>Agronomist: Studying plant science and genetics to improve agricultural practices and crop production. Agriculture and Horticulture Development Board</p> <p>Food Scientist: Applying biological and chemical knowledge to develop and improve food products, processing, and safety. IFST - Food Science and Technology Careers</p> <p><u>Genetics and Genomics</u></p> <p>Genetic Counsellor: Providing information and support to individuals and families concerning genetic disorders. Association of Genetic Nurses and Counsellors (AGNC)</p> <p>Genomic Researcher: Exploring the genetic basis of diseases and traits to develop targeted treatments or interventions. Genomics England - Genomics Careers</p> <p><u>Forensic Science</u></p>



	<p>Forensic Biologist: Applying biological principles to solve crimes, such as analysing DNA evidence from crime scenes.</p> <p>Prospects - Forensic Scientist</p> <p>Biomedical Engineering</p> <p>Biomedical Engineer: Combining biological knowledge with engineering principles to design and create equipment, devices, computer systems, and software used in healthcare.</p> <p>Engineering Council UK - Biomedical Engineering</p> <p>Policy and Ethics</p> <p>Bioethics Consultant: Addressing the ethical questions that arise in the relationships among life sciences, biotechnology, medicine, politics, law, and philosophy.</p> <p>UK Clinical Ethics Network</p>
<p>Links to our Fulston FAMILY values</p>	<p>Fortitude</p> <p>Perseverance in Experiments: Biology often requires lengthy and complex experiments, where students must show resilience and persistence, even when results are unexpected or experiments fail. This fosters a sense of fortitude as students learn to handle challenges and setbacks in the lab.</p> <p>Dealing with Complex Concepts: Grasping intricate topics like genetic mutations or physiological processes demands mental strength and determination.</p> <p>Ambition</p> <p>Career Aspirations: The diverse range of topics covered encourages students to aim high in various career paths, from medicine and research to environmental conservation.</p> <p>Advancing Knowledge: Students are often motivated to contribute to scientific breakthroughs and innovations, aiming to solve real-world problems such as diseases, environmental issues, and improving quality of life.</p> <p>Mindfulness</p> <p>Ethical Considerations: The curriculum encourages students to consider the ethical implications of genetic engineering, conservation efforts, and medical technologies, promoting thoughtful and informed decision-making.</p> <p>Impact of Science on Society and the Environment: Students learn to think critically about how biological sciences affect ecosystems and human communities, fostering a mindful approach to scientific application.</p> <p>Integrity</p> <p>Accurate Data Reporting: Biology teaches students the importance of honesty in recording and analysing experimental data, a critical part of scientific integrity.</p> <p>Reliability of Scientific Communication: Students learn to present information truthfully and accurately, whether in writing lab reports or presenting findings, upholding high standards of integrity in all scientific endeavours.</p> <p>Leadership</p> <p>Group Projects and Presentations: Collaborative tasks encourage students to take leadership roles, guiding discussions, and experiments.</p> <p>Problem-Solving Skills: Students develop leadership qualities by tackling complex problems, making decisions, and innovating solutions within the scope of biological studies.</p> <p>Young Citizens</p> <p>Understanding Global Challenges: Topics like global pandemics, biodiversity, and genetic diseases help students understand global challenges, preparing them as informed citizens.</p> <p>Community Involvement: Engaging in community and school projects related to health, environment, and education promotes active citizenship among young people.</p>



Chemistry	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Unit Title	Atomic Structure, Amount of Substance	Bonding, Energetics & Alkanes	Energetics, Kinetics and Alkenes	Periodicity, Group 2, Redox and Alcohols	Group 7, Alcohols, Optical Isomers & Organic Analysis	Aldehydes and Ketones, Rate Equations, Revision, PPEs & start Year 13 content
Previous Knowledge Recalled	Atomic structure (protons, neutrons, electrons, isotopes). Relative mass, empirical/molecular formula, balanced equations.	Covalent, ionic and metallic bonding basics from GCSE. Simple exothermic/endo thermic reactions. Crude oil, hydrocarbons, combustion.	Reaction profiles, energy changes from GCSE. Simple collision theory. Basic knowledge of unsaturated hydrocarbons.	Trends in properties of elements (GCSE Periodic Table). Metals, halogens, acids and bases. Oxidation and reduction (GCSE). Alcohols as fuels.	GCSE tests for gases/ions. Structures of simple organic molecules.	Oxidation of alcohols to aldehydes/ketones (from Term 4). GCSE basics on reaction rates.
Key Knowledge Assessment	<p>All Year 12 students will complete regular in-class assessments, including retrieval practice, low-stakes testing, and exam-style questions. End-of-topic tests covering both prior and new content will be conducted each term. Students will also sit a Year 12 PPE exam at the end of the year based on the whole year's work.</p> <p>Key Knowledge Assessed:</p> <p>In Year 12, students cover the first half of the A-level course. This includes topics from Physical, Inorganic, and Organic Chemistry:</p> <ul style="list-style-type: none"> ● Physical Chemistry: Atomic structure, amount of substance, bonding, energetics, kinetics, chemical equilibria and Le Chatelier's principle, redox reactions ● Inorganic Chemistry: Periodicity, Group 2 (alkaline earth metals), Group 7 (the halogens) ● Organic Chemistry: Introduction to organic chemistry, alkanes, halogenoalkanes, alkenes, alcohols, organic analysis 					
Links to literacy and numeracy	<p>Unit 3.1.1: Atomic Structure</p> <p>Analysing historical developments in atomic models and scientific theories.</p> <p>Calculating relative atomic masses using isotopic data and interpreting mass spectra data.</p> <p>Unit 3.1.2: Amount of Substance</p> <p>Describing and explaining concepts such as the mole and Avogadro's constant.</p> <p>Conducting calculations involving moles, molar masses, concentrations, and using the ideal gas equation.</p> <p>Unit 3.1.3: Bonding</p> <p>Writing explanations of different types of bonding (ionic, covalent, metallic) and their properties.</p> <p>Visualizing and predicting molecular shapes and bond angles using VSEPR theory.</p> <p>Unit 3.1.4: Energetics</p> <p>Interpreting reaction profiles and discussing exothermic and endothermic processes.</p>					



	<p>Calculating enthalpy changes using calorimetry data and Hess's Law.</p> <p>Unit 3.1.5: Kinetics</p> <p>Explaining reaction mechanisms and factors affecting reaction rates.</p> <p>Applying collision theory and Maxwell-Boltzmann distributions to predict and calculate reaction rates.</p> <p>Unit 3.1.6: Chemical Equilibria, Le Chatelier's Principle, and Kc</p> <p>Discussing the dynamic nature of equilibria and the effects of external changes.</p> <p>Calculating equilibrium constants (Kc) and understanding shifts in equilibrium positions.</p> <p>Unit 3.1.7: Oxidation, Reduction, and Redox Equations</p> <p>Explaining oxidation and reduction in terms of electron transfer.</p> <p>Determining oxidation states and balancing redox equations.</p>
<p>Extra-Curricular opportunities</p>	<p>Online Activities</p> <ol style="list-style-type: none"> Royal Society of Chemistry Webinars and Workshops <p>Engage in a range of online webinars and workshops offered by the Royal Society of Chemistry, tailored for A-Level students to deepen their chemical knowledge and skills.</p> <p>Royal Society of Chemistry Events</p> <ol style="list-style-type: none"> Coursera Chemistry Courses <p>Enroll in online courses that cover various aspects of chemistry, including organic chemistry, chemical kinetics, and thermodynamics, offered by universities worldwide.</p> <p>Coursera - Chemistry</p> <p>Activities in Kent</p> <ol style="list-style-type: none"> Discovery Park Science Workshops, Sandwich <p>Participate in science workshops focused on practical chemistry applications and innovations at one of Europe's leading science parks.</p> <p>Discovery Park Events</p> <ol style="list-style-type: none"> Kent Science Festival <p>Attend the annual Kent Science Festival, which features lectures, workshops, and activities that allow students to explore various scientific fields, including chemistry.</p> <p>Kent Science Festival</p> <p>Activities in London</p> <ol style="list-style-type: none"> Science Museum, London <p>Visit the Science Museum to engage with chemistry through interactive exhibits and educational sessions in the Wonderlab, which explores real-life applications of chemistry.</p> <p>Science Museum - Schools</p> <ol style="list-style-type: none"> Royal Institution Chemistry Masterclasses <p>Attend masterclasses on chemistry topics offered by the Royal Institution in London, designed to enrich and extend</p>



	<p>students' knowledge beyond the classroom.</p> <p>Royal Institution - Masterclasses</p> <p>3. Imperial College London Outreach</p> <p>Engage with outreach activities offered by Imperial College London, including lectures and lab tours that give insights into cutting-edge chemical research.</p> <p>Imperial Outreach</p>
<p>Links to careers/ aspirations</p>	<p>1. Chemical Engineering</p> <p>Career Path: Designing processes to convert raw materials into products like drugs, fuels, and food.</p> <p>https://www.prospects.ac.uk/job-profiles/chemical-engineer</p> <p>2. Pharmacology</p> <p>Career Path: Developing and testing new pharmaceuticals, understanding drug interactions in the human body.</p> <p>https://www.healthcareers.nhs.uk/explore-roles/life-sciences/roles-life-sciences/pharmacologist</p> <p>3. Forensic Science</p> <p>Career Path: Analysing chemical substances in criminal investigations.</p> <p>https://www.prospects.ac.uk/job-profiles/forensic-scientist</p> <p>4. Environmental Science</p> <p>Career Path: Studying environmental impacts, pollution control, and sustainable practices.</p> <p>https://www.environmentjob.co.uk/</p> <p>5. Teaching and Academia</p> <p>Career Path: Teaching Chemistry at various levels or conducting research in a university setting.</p> <p>https://getintoteaching.education.gov.uk/</p> <p>6. Biotechnology</p> <p>Career Path: Using biological systems to develop technologies for healthcare, agriculture, and industry.</p> <p>https://jobs.newscientist.com/en-gb/jobs/biotechnology/</p> <p>7. Quality Control and Assurance</p> <p>Career Path: Ensuring product and process quality in manufacturing industries, including food and drink, pharmaceuticals, and more.</p> <p>https://www.careersinfoodanddrink.co.uk/</p>
<p>Links to our Fulston FAMILY values</p>	<p>Fortitude</p> <p>Resilience in Experimentation: Chemistry often involves complex experiments that may not always yield expected results. Persisting through these challenges, troubleshooting, and refining techniques demonstrate and develop fortitude.</p> <p>Understanding Challenging Concepts: Mastery of difficult topics such as quantum mechanics in atomic structure or dynamic equilibria requires perseverance and resilience, crucial aspects of fortitude.</p> <p>Ambition</p> <p>Striving for Advanced Knowledge and Innovation: The curriculum's depth prepares students for ambitious roles in cutting-edge fields like biotechnology, pharmaceutical development, and environmental science, encouraging them to</p>



aspire to significant scientific advancements and innovations.

Career Goals: The detailed study and potential for impactful careers foster ambition among students to achieve excellence and leadership in their chosen fields.

Mindfulness

Ethical Considerations and Impacts: Topics such as the environmental impact of chemical processes and sustainability in chemical engineering instill a sense of responsibility and mindfulness about the broader impacts of scientific work.

Conscientious Chemical Handling: Safe handling and ethical considerations in laboratory practices promote mindfulness about personal and environmental safety.

Integrity

Honesty in Reporting: Accurate reporting and ethical experimentation are stressed throughout the curriculum, emphasizing the importance of integrity in scientific documentation and communication.

Adherence to Ethical Standards: Upholding strict standards in chemical testing and environmental compliance also reinforces this value.

Leadership

Project Leadership: Group projects and laboratory work provide opportunities for students to take leadership roles, overseeing experiments, and guiding discussions.

Mentorship and Support: Older students or those with more experience can lead by mentoring peers, fostering a supportive and collaborative learning environment.

Young Citizens

Global and Community Engagement: Understanding the global challenges like climate change and pollution and how chemistry can solve these issues prepares students as informed citizens ready to contribute to community and global well-being.

Public Science Communication: Opportunities to engage with the public through science fairs or community projects help develop students into young citizens who are able to communicate complex ideas clearly and effectively.

What my child will learn in Year 13

Biology	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Unit Title	Unit 5 - Energy transfers in and between organisms Unit 6 - Organisms respond to changes in their internal and external environments		Unit 7 - Genetics, populations, evolution and ecosystems Unit 8 - The control of gene expression		Revision and exams.	
Previous	<u>Unit 5 - Energy transfers in and</u>		<u>Unit 7 - Genetics, populations,</u>		During this time students will be	



<p>knowledge recalled</p>	<p>between organisms Photosynthesis and Respiration: Knowledge of the fundamental processes of photosynthesis and cellular respiration, including the roles of ATP and various substrates. ATP Production: Understanding the biochemical pathways involved in ATP synthesis, both in photosynthesis and cellular respiration. Energy and Ecosystems: Basic understanding of energy flow in ecosystems, including the concepts of energy transfer through food chains.</p> <p><u>Unit 6 - Organisms respond to changes in their internal and external environments</u> Nervous and Hormonal Coordination: Familiarity with the basic structure and function of the nervous system and hormonal pathways in humans and other organisms. Homeostasis: Knowledge of homeostatic principles and how organisms maintain internal stability in response to external environmental changes.</p>	<p>evolution and ecosystems Genetics and Inheritance: A solid foundation in genetics, including the structure of DNA, gene expression, and Mendelian genetics. Population Genetics: Basic concepts of population genetics, such as the Hardy-Weinberg principle and factors affecting allele frequency.</p> <p><u>Unit 8 - The control of gene expression</u> Molecular Genetics: Understanding of how genes are regulated, the role of different RNA molecules in gene expression, and basic genetic engineering techniques. Biotechnology Applications: Familiarity with the applications of biotechnology in medicine and industry, such as genetic modification.</p>	<p>required to revise for the upcoming exams. There will be a focus on recalling knowledge from all previous learning in preparation for the exam.</p>
<p>New Knowledge</p>	<p><u>Unit 5 - Energy transfers in and between organisms</u> Photosynthesis and Respiration: Students delve into the biochemical processes, focusing on how ATP is produced in both photosynthesis and respiration, linking these to the concept of energy transfer across trophic levels in ecosystems. Energy and Ecosystems: Exploration of how energy flows through an ecosystem, including discussions on food chains, energy efficiency, and ecological pyramids. Nutrient Cycles: Students learn about the recycling of nutrients, particularly the nitrogen and carbon cycles, and the role of microorganisms in these processes .</p> <p><u>Unit 6 - Organisms respond to changes in their internal and external environments</u> Nervous and Hormonal Responses: Detailed study of how animals detect and respond to environmental changes using nervous and hormonal systems. Homeostasis: In-depth look at the mechanisms of homeostasis including temperature regulation and the control of blood glucose levels. Plant Responses: Investigation of how plants respond to environmental stimuli through mechanisms such as</p>	<p><u>Unit 7 - Genetics, populations, evolution and ecosystems</u> Genetics and Inheritance: Advanced concepts in genetics, including the molecular basis of inheritance and the use of Punnett squares and pedigree analysis in predicting phenotypic outcomes. Population Genetics: Understanding the factors affecting allele frequency in populations, the basis of natural selection, and genetic drift. Speciation and Evolution: Comprehensive coverage of how new species arise through mechanisms of reproductive isolation and evolutionary changes over time .</p> <p><u>Unit 8 - The control of gene expression</u> Molecular Genetics: Students learn about the control mechanisms that regulate gene expression at the level of transcription and translation, including the role of epigenetics. Biotechnology: The application of gene technologies, such as recombinant DNA technology and CRISPR, in medical and industrial contexts. Genome Projects: Insights into how genome sequencing projects contribute to our understanding of genetics and the practical applications of this knowledge in</p>	<p>There will be a revision focused on ensuring students are able to answer the 25 mark synoptic essay.</p>



	<p>phototropism and gravitropism, mediated by plant hormones like auxins .</p>	<p>fields like pharmacogenomics and personalized medicine .</p>	
<p>Key Knowledge Assessment</p>	<p>All students will be receiving in class assessments including retrieval practice, low stakes testing and exam practice. End of topic tests covering both prior and new learning will be conducted each term. Students will also sit a full A-level paper 1 and a combination paper including aspects of Paper 2 and 3 as a PPE in Term 3.</p> <p>All students taking the A-Level Biology will be assessed as below.</p> <p>Key Knowledge Assessed: A-Level Biology covers the content from all 8 topics, including the additional topics exclusive to A-Level: Energy transfers in and between organisms, Organisms respond to changes in their internal and external environments, Genetics, populations, evolution, and ecosystems, and the control of gene expression.</p> <p>Assessment Method: Paper 1: Units 1-4 Duration: 2 hours Structure: 91 marks total, with 76 marks for a mixture of short and long answer questions and 15 marks for extended response questions. Weight: 35% of A-Level</p> <p>Paper 2: Units 5-8 Duration: 2 hours Structure: 91 marks total, focusing on topics 5-8, with 76 marks for a mixture of short and long answer questions and 15 marks for a comprehension question. Weight: 35% of A-Level</p> <p>Paper 3: Synoptic – All 8 units Duration: 2 hours Structure: 78 marks total, including 38 marks for structured questions including practical techniques, 15 marks for critical analysis of given experimental data, and 25 marks for an essay from a choice of two titles. Weight: 30% of A-Level</p> <p>These assessments test both theoretical knowledge and practical skills, with a variety of question types designed to evaluate a comprehensive understanding of the subject matter as well as the ability to apply practical and analytical skills.</p>		
<p>Links to literacy and numeracy</p>	<p>Literacy Links</p> <p><u>Unit 5: Energy Transfers in and Between Organisms</u> Scientific Writing and Argumentation: Students will engage in constructing explanations about energy transfers, such as those occurring during photosynthesis and respiration. Interpretation of Scientific Texts and Data: They will interpret complex biological texts and graphical data related to energy flow and nutrient cycles.</p> <p><u>Unit 6: Organisms Respond to Changes in Their Internal and External Environments</u> Technical Reading and Reporting: Reading and discussing mechanisms of homeostasis and responses to environmental stimuli in animals and plants. Presentation Skills: Students may present findings from experiments on</p>	<p>Literacy Links</p> <p><u>Unit 7: Genetics, Populations, Evolution, and Ecosystems</u> Analysing Genetic Research: Students will explore genetics and evolution through current research, requiring them to understand and critique advanced texts and studies. Debating Ethical Issues: Discussing the implications of genetic technology and conservation, fostering skills in ethical reasoning and debate.</p> <p><u>Unit 8: The Control of Gene Expression</u> Research and Synthesis: Students will delve into the topics of gene expression control mechanisms, biotechnology applications, and their societal impacts, requiring comprehensive reading and synthesis of information.</p> <p>Numeracy Links</p>	



	<p>nervous or hormonal responses, developing their ability to communicate complex information clearly.</p> <p>Numeracy Links</p> <p>Unit 3.5: Energy Transfers in and Between Organisms Quantitative Analysis: Calculations involving energy efficiency in ecosystems and stoichiometric computations in biochemical reactions. Graphical Skills: Creating and interpreting graphs that model energy transfers and nutrient cycling.</p> <p>Unit 3.6: Organisms Respond to Changes in Their Internal and External Environments Statistical Analysis: Analysis of data from experiments investigating physiological responses, using statistics to interpret and validate results. Mathematical Modelling: Modelling nerve impulses and hormonal effects quantitatively to understand their dynamics and impacts.</p>	<p>Unit 3.7: Genetics, Populations, Evolution, and Ecosystems Population Genetics Calculations: Using mathematical models to understand population genetics, including calculations of allele frequencies and predictions based on Hardy-Weinberg equilibrium. Statistical Testing: Applying chi-square and other statistical tests to genetic data to analyse variations and evolutionary trends.</p> <p>Unit 3.8: The Control of Gene Expression Data Interpretation: Interpreting quantitative data on gene expression levels from experiments or published research. Bioinformatics: Utilizing numerical and computational methods to analyze gene sequences and expression patterns, particularly in the context of genomics and proteomics.</p>	
<p>Extra-Curricular opportunities</p>	<p>Coursera or EdX Courses: Students can enroll in free courses related to genetics, biotechnology, or ecology to enhance their understanding of these fields. Coursera - Biology EdX - Biology</p> <p>iBiology Seminars: Online seminars by leading researchers on the latest discoveries in biology, perfect for students interested in current research and advancements. iBiology</p> <p>Kent Wildlife Trust: Join conservation projects or attend workshops that teach about local ecosystems and conservation efforts. Kent Wildlife Trust</p> <p>Bedgebury National Pinetum and Forest: Participate in educational programs focused on plant biology and ecology. Bedgebury Forest</p> <p>Natural History Museum, London: Attend workshops or behind-the-scenes tours focusing on genetics, evolution, and ecosystems. Natural History Museum - Learning</p> <p>The Royal Botanic Gardens, Kew: Explore workshops on plant science, conservation, and sustainable biodiversity. Kew Gardens - Learning</p> <p>The Francis Crick Institute: Open days or workshops that provide insights into the latest research in genetics and cellular biology. The Crick Events</p> <p>The British Biology Olympiad: Participate in a challenging competition that tests students' biology knowledge and understanding. British Biology Olympiad</p> <p>Young Scientists Journal: Contribute to or review articles in an international peer-reviewed science journal run entirely by and for young scientists. Young Scientists Journal</p>		
<p>Links to</p>	<p>Doctor, Surgeon, or Pharmacist: Careers in medicine require deep knowledge of human biology, genetics, and physiology.</p>		



<p>careers/ aspirations</p>	<p>NHS Health Careers Biological Researcher: Involves conducting experiments and studies in various biological fields such as genetics, ecology, or molecular biology. Royal Society of Biology Careers Environmental Consultant or Conservation Scientist: Focus on preserving natural habitats and ensuring biodiversity. Environmentjob.co.uk Biotechnologist or Genetic Engineer: Working on the development of drugs, vaccines, or genetically modified organisms. New Scientist Jobs Forensic Biologist: Applying biological knowledge to criminal investigations. Prospects - Forensic Scientist Science Writer or Editor: Conveying scientific information through various media for educational or informational purposes. Association of British Science Writers Agronomist or Plant Scientist: Research and development in plant breeding, crop production, and sustainable agriculture. Agriculture and Horticulture Development Board Epidemiologist: Studying the spread of diseases and developing strategies for disease prevention and control. UK Public Health Register Genetic Counsellor: Providing information and support to individuals or families concerning genetic conditions. Association of Genetic Nurses and Counsellors</p>
<p>Links to our Fulston FAMILY values</p>	<p>Fortitude Resilience in Scientific Research: Biology students often engage in challenging experiments and complex concepts like genetic mutations or ecological balance. Persisting through these challenges builds resilience. Overcoming Academic Challenges: Understanding intricate biological mechanisms requires persistence and dedication, reflecting the value of fortitude. Ambition Pursuing Advanced Studies and Careers: The depth of knowledge in genetics, physiology, and ecology fosters ambition among students to pursue careers in medicine, research, or environmental science. Innovative Projects: Encouraging students to undertake ambitious projects such as genetic research or conservation initiatives reflects this value. Mindful Ethical Considerations: Discussing the ethical implications of genetic engineering, biodiversity conservation, and human impact on ecosystems encourages students to consider the consequences of scientific actions. Reflective Learning: Engaging with complex systems within organisms and the environment promotes a mindful approach to learning and understanding the interconnectedness of natural systems. Integrity Accurate and Honest Reporting: Biology experiments require precise measurement and reporting, fostering integrity in data collection and analysis. Ethical Research Practices: Emphasizing the importance of ethical considerations in scientific research, such as maintaining biodiversity and using biotechnology responsibly. Leadership Leading Projects and Discussions: Opportunities for students to lead group projects or discussions on topics such as ecosystem management or genetic disorders cultivate leadership skills. Mentoring and Teaching: Older students can mentor younger peers in lab techniques or complex topics, fostering leadership and teaching skills. Young Citizens Community Engagement: Encouraging students to participate in community projects related to public health, environmental conservation, or science education helps them act as informed and engaged citizens. Global Awareness: Understanding global challenges like climate change, pandemic responses, or genetic diseases prepares students to be responsible global citizens.</p>

Chemistry	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Unit Title	Thermodynamics & Acids/Bases, Aldehydes, Ketones and Carboxylic acids	Acids/Bases, Period 3, Equilibrium constant, Aromatic	PPEs, Electrochemical Cells, Amino acids and DNA	Transition metals, NMR, chromatography	Transition metals, Organic synthesis	A Level exam



		Chemistry, Amines and Polymers				
Previous Knowledge Recalled	- Year 12 energetics (enthalpy changes, Hess's Law) - Kinetics (rate equations, collision theory)	- Year 12 redox reactions - Organic chemistry: alcohols, haloalkanes, alkenes	- GCSE chemical changes - Year 12 organic chemistry: functional groups, isomerism	- Year 2 organic chemistry: spectroscopy basics - Redox and complex ions	- Year 12 periodicity - Equilibrium and redox concepts	- All prior content
New Knowledge	- Born-Haber cycles - Lattice enthalpy - Enthalpy of solution - Arrhenius equation - Rate-determining step - Aldehydes and ketones: oxidation, reduction, nucleophilic addition - Carboxylic acids: acidity, reactions, derivatives	- Bronsted-Lowry and Lewis acids - pH calculations, K_a , K_w - Period 3 element reactions and oxides - Equilibrium constant K_p - Benzene structure and reactions - Amines: basicity, reactions - Condensation polymers and biodegradability	- Electrochemical cells: electrode potentials, cell notation - Optical isomerism - Amino acids: zwitterions, peptide formation - DNA structure and base pairing	- Transition metals: variable oxidation states, complex ions, ligands - Colorimetry and qualitative analysis - NMR spectroscopy: proton and carbon environments - Chromatography : TLC, GC	- Further transition metal chemistry - Organic synthesis pathways - Reaction mechanisms and multi-step synthesis - Analytical techniques integration	- Exam preparation and application of full specification knowledge
Key Knowledge Assessment	<p>In Year 13, students continue with advanced Physical, Inorganic, and Organic Chemistry content. End-of-topic tests and retrieval practice will remain central to assessment. Students will sit formal PPE exams in Term 3 of two papers which replicate the A level structure.</p> <p>Key Knowledge Assessed:</p> <ul style="list-style-type: none"> ● Physical Chemistry: Thermodynamics, rate equations, equilibrium constant (K_c), electrode potentials & electrochemical cells, acids & bases ● Inorganic Chemistry: Properties of Period 3 elements & their oxides, transition metals, reactions of ions in aqueous solution ● Organic Chemistry: Optical isomerism, aldehydes & ketones, carboxylic acids & derivatives, aromatic chemistry, amines, polymers, amino acids/proteins/DNA, organic synthesis, NMR spectroscopy, chromatography <p>Assessment Method (Year 13 PPEs):</p> <ul style="list-style-type: none"> ● Paper 1: <ul style="list-style-type: none"> ○ 2 hours, 105 marks ○ Mixture of short and long answer questions ○ Assesses Physical Chemistry + Inorganic Chemistry + relevant practical skills ○ 35% of A-level 					



● **Paper 2:**

- 2 hours, 105 marks
- Mixture of short and long answer questions
- Assesses Physical Chemistry + Organic Chemistry + relevant practical skills
- 35% of A-level

● **Paper 3:**

- 2 hours, 90 marks
- 40 marks of questions on practical techniques & data analysis
- 20 marks of questions testing any topic across the specification
- 30 marks of multiple-choice questions
- 30% of A-level

Links to literacy and numeracy

Unit 3.1.8: Thermodynamics

Writing definitions and explanations for thermodynamic terms, interpreting data from Born-Haber cycles.

Calculating enthalpy changes, using Born-Haber cycles for ionic compounds, determining Gibbs free-energy changes.

Unit 3.1.9: Rate Equations

Describing the relationship between reaction rates and concentration changes.

Deduce order of reaction, calculate rate constants, and use the Arrhenius equation to determine activation energy.

Unit 3.1.10: Equilibrium Constant K_p for Homogeneous Systems

Writing expressions for and explaining the concept of equilibrium constants.

Calculating partial pressures, equilibrium constants, and predicting changes in equilibrium conditions.

Unit 3.1.11: Electrode Potentials and Electrochemical Cells

Understanding and describing electrochemical cells, electrode potentials, and their applications.

Using standard electrode potential data to calculate cell potentials and applying Nernst equation.

Unit 3.1.12: Acids and Bases

Explaining the properties and reactions of acids and bases, including buffer solutions.

Calculating pH values, using pK_a data for weak acids, and applying the ionic product of water.

Unit 3.2.5: Transition Metals

Describing properties, complex formation, and reactions of transition metals.

Understanding and applying concepts of ligand exchange and oxidation states in complex ions.

Unit 3.2.6: Reactions of Ions in Aqueous Solutions

Discussing the reactions and identification of metal ions in solution.

Conducting quantitative analysis of metal ions, understanding complex stability, and calculating concentration.

Unit 3.3.15: Nuclear Magnetic Resonance Spectroscopy



	<p>Interpreting NMR spectra and understanding the chemical environment of nuclei.</p> <p>Analysing chemical shifts, spin-spin coupling, and integrating NMR signals to determine molecular structures.</p> <p>Unit 3.3.16: Chromatography</p> <p>Explaining the principles and applications of different chromatographic techniques.</p> <p>Calculating retention times, using calibration curves for quantitative analysis.</p>
<p>Extra-Curricular opportunities</p>	<p>Online Activities</p> <p>1. FutureLearn Courses</p> <p>Students can enroll in chemistry-related courses, such as those on sustainable chemistry or advanced topics in medicinal chemistry.</p> <p>FutureLearn - Chemistry Courses</p> <p>2. Royal Society of Chemistry Webinars</p> <p>A series of webinars and digital events designed to deepen understanding of various chemistry topics.</p> <p>Royal Society of Chemistry - Events</p> <p>Activities in Kent</p> <p>1. University of Kent Public Science Lectures</p> <p>Attend lectures and workshops that delve into current research and advancements in chemistry.</p> <p>University of Kent - Public Lectures</p> <p>2. Kent Science Festival</p> <p>Participate in this festival to engage with interactive science exhibitions and challenges.</p> <p>Kent Science Festival</p> <p>Activities in London</p> <p>1. Science Museum, London - Wonderlab</p> <p>The Wonderlab exhibit allows hands-on experiences with real scientific phenomena including chemistry experiments.</p> <p>Science Museum - Wonderlab</p> <p>2. Royal Institution Chemistry Workshops</p> <p>Engage in workshops that provide practical chemistry experiences and insights into cutting-edge research.</p> <p>Royal Institution - Workshops</p> <p>3. Imperial Festival, Imperial College London</p> <p>Explore live demonstrations, talks, and lab tours focused on the latest science and technology developments at Imperial College.</p> <p>Imperial Festival</p>
<p>Links to careers/aspirations</p>	<p>1. Chemical Engineering</p> <p>Involves designing processes to convert raw materials into valuable products, like medicines and fuels.</p> <p>https://www.prospects.ac.uk/job-profiles/chemical-engineer</p>



2. Pharmacology

Focuses on the discovery and understanding of new medications, including how they interact with the body.

<https://www.healthcareers.nhs.uk/explore-roles/life-sciences/pharmacologist>

3. Forensic Science

Uses chemical techniques to analyze substances and materials found at crime scenes.

<https://www.prospects.ac.uk/job-profiles/forensic-scientist>

4. Environmental Science

Involves studying the impact of human activity on the environment and developing solutions to environmental problems.

<https://www.environmentjob.co.uk/>

5. Academic Research and Teaching

Conducting advanced research in chemistry or teaching at various educational levels.

<https://www.jobs.ac.uk/categories/chemistry>

6. Biotechnology

Applies biological and chemical principles to develop technologies in healthcare, agriculture, and more.

<https://jobs.newscientist.com/en-gb/jobs/biotechnology/>

7. Patent Law (Specializing in Chemistry)

Working at the intersection of chemistry, law, and intellectual property protection.

<https://www.cipa.org.uk/>

8. Quality Control Analyst

Ensuring the quality and safety of chemical products and processes.

<https://www.careersinfoodanddrink.co.uk/>

Links to our Fulston FAMILY values

Fortitude

Persevering Through Complex Topics: Advanced chemistry concepts such as thermodynamics and electrochemistry can be challenging. The curriculum encourages students to persist through difficult topics, developing resilience.

Handling Laboratory Setbacks: Practical experiments often don't go as planned. Students learn to handle and learn from these experiences, reinforcing their fortitude.

Ambition

Pursuing Scientific Excellence: The depth of the curriculum pushes students to aim for high standards in both theoretical knowledge and practical skills, setting the stage for ambitious career goals in chemistry and related fields.

Research and Innovation: Students are encouraged to engage in independent projects or extended essays that foster a spirit of inquiry and innovation.



Mindfulness

Ethical Considerations in Chemistry: Discussions about the environmental impact of chemical waste, the ethical implications of chemical research, and sustainability in chemical production encourage students to consider the broader effects of their actions.

Safe Laboratory Practices: Emphasizing the importance of mindfulness in handling chemicals and conducting experiments safely.

Integrity

Accurate Data Reporting: The importance of honest reporting in experiments and research papers is a key component of the curriculum. Students learn the value of integrity in scientific documentation and communication.

Upholding Standards: Following ethical guidelines in experiments, especially in qualitative and quantitative analysis, promotes integrity.

Leadership

Leading by Example: Senior students often take on leadership roles in laboratory settings, helping to guide younger students through complex procedures.

Collaborative Projects: Team-based projects enhance leadership skills as students manage roles, delegate tasks, and bring projects to successful completion.

Young Citizens

Global and Local Impact: The curriculum connects chemical knowledge to global challenges like climate change and pollution, preparing students to be informed and active participants in solving these issues.

Community Engagement: Encourages students to participate in community outreach programs, science fairs, and public science communication events, fostering their development as engaged young citizens.

Curriculum Impact

The Science curriculum is designed to produce not just students who excel academically but also individuals who view science as a dynamic and integral part of understanding life and solving global challenges. It aims to nurture a generation of scientifically literate individuals who are equipped to deal with future advancements and are motivated to continually expand their knowledge throughout their lives. This is crucial for both personal development and the advancement of society as a whole.

The curriculum seeks to produce life long learners through;

Foundation of Knowledge:

The curriculum lays a robust foundation in key scientific concepts which are essential for any scientific career and further education. By covering both foundational and advanced topics, the curriculum



ensures students have a thorough understanding of scientific processes and systems.

Skills Development:

Students develop critical scientific skills, including analytical thinking, problem-solving, data analysis, and experimental techniques. These skills are cultivated through practical experiments, data interpretation tasks, and problem-solving exercises that are embedded throughout the curriculum.

Inquiry-Based Learning:

The curriculum encourages an inquiry-based approach where students are motivated to ask questions, seek out answers, and engage in scientific debates. This approach not only enhances understanding but also promotes a habit of self-initiated learning and curiosity.

Real-World Applications:

By linking scientific concepts to real-world applications, the curriculum helps students see the relevance of their studies. This relevance fosters an ongoing interest in science and its impact on society and the environment.

The curriculum seeks to ignite a passion for science through;

Engaging Teaching Methods:

Innovative and varied teaching methods, including hands-on experiments, interactive simulations, and field trips, are employed to make learning engaging and memorable. These methods help to spark students' interest and enthusiasm.

Interdisciplinary Connections:

The curriculum makes connections between biology, chemistry, physics and other disciplines such as mathematics, highlighting the interdisciplinary nature of scientific inquiry and increasing the breadth of student understanding and interest.

Extracurricular Opportunities:

Participation in science-related competitions, clubs, and events outside the traditional classroom setting, such as visiting the natural history and science museum, provides additional enrichment. These activities offer practical experience and exposure to professional and academic communities.


Career Exploration:

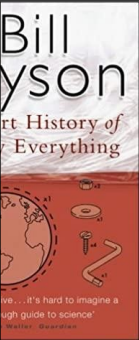
Regular exposure to potential career paths and discussions with professionals in the field help students understand the various opportunities available to them. This not only helps in making informed career choices but also inspires students to pursue their interests in specific areas of science.



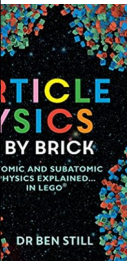


Opportunities for Key Stage 4/5

	Listen	Watch	Explore and visit
<p>panse (Novel Series). Science</p> 	<p>The Infinite Monkey Cage episode “Exoplanets” https://www.bbc.co.uk/programmes/p0dcn51y</p>	<p>(Completing an Egg Drop from Space – Mark Rober) https://www.youtube.com/watch?v=BYVZh5kqaFg</p> <p>Listen to this podcast on the mystery of gravity. https://www.brainson.org/episode/2015/01/09/the-mystery-of-gravity</p>	<p>Visit the mattress factory i apply your understanding</p>
<p>his journal about getting energy ur waste – can we create a greener nment to live in?</p> <p>http://www.sciencejournalforkids.org/waste-to-energy-how-can-we-get-most-from-our-waste/</p>	<p>Listen to the following podcast about heat transfer: Energy: Stop Faking It! Energy, Heat, and Heat Transfer: Thermal https://my.nsta.org/resource/11525/podcast-energy-stop-faking-it-energy-heat-and-heat-transfer-thermal-energy</p> <p>Watch The Fascinating Truth About Energy With Professor Jim Al-Khalili https://www.youtube.com/watch?v=aeaQpuYPsy8</p>	<p>(How Cell Service Actually Works – Wendover Productions) https://www.youtube.com/watch?v=0faCad2kKeg</p> <p>(British Plugs are Better than All Other Plugs, and Here’s Why – Tom Scott) https://www.youtube.com/watch?v=UEfP1OKKz_Q</p> <p>(How Australia’s Most Remote Phone Booths Work – Julian O’Shea) https://www.youtube.com/watch?v=dU7PBXYmyXg</p> <p>Shock and Awe – BBC Horizons https://www.youtube.com/watch?v=Gtp51eZkwol</p>	<p>Investigate the kinetic and energy transferring in a sk https://phet.colorado.edu/skate-park/latest/energy-park_en.html</p>
<p>history of nearly everything</p>	<p>Listen to Melvyn Bragg and guests discuss the science of matter and the states in which it can exist on BBC4.</p>	<p>(World’s Lightest Solid! – Veritasium) https://www.youtube.com/watch?v=AeJ9q45Pfd0</p>	<p>The Science Museum – Lo Visit a Chemistry exhibitio</p>



Physics – Brick by brick



<https://www.bbc.co.uk/programmes/b03zdb4>

Read this journal about how we can make water safe to drink.

<https://www.sciencejournalforkids.org/articles/heavy-metal-pollution-how-can-we-make-water-safe-to-drink/>

(Let's Travel to the Most Extreme Place in the Universe – Kurzgesagt – In A Nutshell) <https://www.youtube.com/watch?v=FfWtIaDtfYk>

(All About Mercury, the Liquid Metal – NileRed)

<https://www.youtube.com/watch?v=ZiWlthrtneU>



<https://ed.ted.com/lessons/solid-liquid-gas-and-plasma-michael-murillo>



<https://www.youtube.com/watch?v=q8Ent5CXhfY>

Watch this video that investigates the periodic table to life.

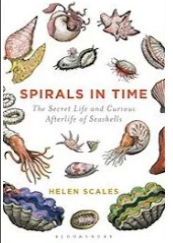
<https://www.youtube.com/watch?v=kqe9tEcZkno>

Museum

<https://www.sciencemuseum.org.uk/objects-and-stories/chemistry>



in Time by Helen Scales (Speak to
her to borrow)



Small Screen Science

<https://podcasts.apple.com/gb/podcast/small-screen-science/id1511181067>

Listen to 'The Science of Your Favourite Foods' with Rob Dunn

<https://radiopublic.com/tumble-science-podcast-for-kids-G4wko8/s1!ef666>

The Poop Collector with Lawrence David

<https://radiopublic.com/tumble-science-podcast-for-kids-G4wko8/s1!02d02>

Watch 'The Hidden Kingdom' The Story of the biological cell, where Adam Rutherford explores how centuries of scientific and religious dogma were overturned by the discovery of the cell.

<https://www.bbc.co.uk/programmes/b00m425d>

Watch a TedEd Talk about the brain

https://www.ted.com/playlists/576/fascinating_ted_ed_lessons_about_the_brain

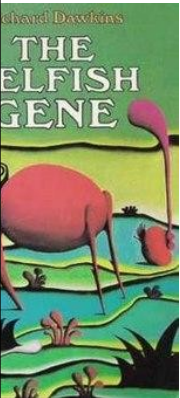
Find out what creatures ha
in your local area using the
<https://records.nbnatlas.org/area>

Use a dichotomous key to
of insects you have seen/d
<https://www.amentsoc.org/bug-is-this/adult-key.html>

The Sea Life Centre – Vari

Take a visit to The Body W
<https://bodyworlds.com/>

elfish Gene



Unnatural selection - Netflix series about genetic engineering.

<https://www.netflix.com/title/80208910>

(Why 90% of Asians are Lactose Intolerant – Half As Interesting)
<https://www.youtube.com/watch?v=jrhVfwPIB0A>

Unnatural selection - Netflix series about genetic engineering.

<https://www.netflix.com/title/80208910>

Join DNA Dan on his Genetics and Genomics podcast

<https://www.scuhs.edu/announcements/introducing-dna-dan-a-genetics-and-genomics-podcast/>

The Natural History Museu

Visit the Science Museum
epidemics

<https://www.sciencemuseum.org.uk/objects-and-stories/epidemics>