Curriculum Intent of SCIENCE
September 2026

KS3 Science

Intent

At Key Stage 3, our science curriculum, guided by the Big Ideas of Science, aims to ignite curiosity, deepen understanding and prepare students for future scientific learning and real-world applications. Using the AQA Activate programme, students develop a secure foundation across Biology, Chemistry and Physics through key concepts such as cells, energy, particles, forces and ecosystems.

Through a carefully sequenced and knowledge-rich curriculum, students build essential disciplinary knowledge alongside developing core scientific skills, including enquiry, analysis and evaluation. We emphasise the use of scientific language, practical work and critical thinking to enable students to explain phenomena and engage with the world scientifically.

Our inclusive KS3 curriculum ensures that all learners, regardless of background or ability, are supported and challenged to succeed, fostering confidence and curiosity while preparing them for the demands of GCSE study and a lifelong engagement with science.

Knowledge

It is vitally important that students develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage.

Students should be able to describe key processes and key characteristics in common language, and also be familiar with, and use, scientific terminology accurately and precisely. They will apply their mathematical knowledge to their understanding of Science, including collecting, presenting and analysing data. The social and economic implications of Science will be explored through the use of different contexts that maximise students' engagement with and motivation to study science.

Students will develop a deeper understanding of a range of scientific ideas in the subject disciplines of Biology, Chemistry and Physics and begin to see the connections between these subject areas and become aware of some of the big ideas underpinning scientific knowledge and understanding.

Skills

Students will develop the attitudes of a Scientist and so be able to:

• Pay attention to scientific skills showing accuracy, precision, repeatability and reproducibility
• Understand that scientific methods and theories develop as earlier explanations that are modified to take account of new evidence and ideas, together with the importance of publishing results and peer reviewing work.
• Evaluate risks and identify anomalies.

Students will build experimental skills and become adept at conducting investigations. As a result they will:

• Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.
• Make predictions using scientific knowledge and understanding.
• Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate.
• Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety with a clear risk assessment in place.
• Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.
• Apply sampling techniques

Students will become confident in the analysis and evaluation of Science, so that they can:

• Apply mathematical concepts and calculate results
• Present observations and data using appropriate methods, including tables and graphs
• Interpret observations and data, including identifying patterns/trends and using observations, measurements and data to draw conclusions.
• Present reasoned explanations, including explaining data in relation to predictions and hypotheses
• Evaluate data, showing awareness of potential sources of random and systematic error
• Identify further questions arising from their results.

Students will develop a range of skills around measurement practice in Science, therefore they will:

• Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature.
• Use and derive simple equations and carry out appropriate calculations
• Undertake basic data analysis including simple statistical techniques

‘Working scientifically’ is described separately at the beginning of the programme of study but must always be taught through and clearly related to substantive science content in the programme of study. Teachers should feel free to choose examples that serve a variety of purposes, from showing how scientific ideas have developed historically to reflecting modern developments in Science.

KS4 Science

Intent

At Key Stage 4, our science curriculum, guided by the Big Ideas of Science, aims to ignite curiosity, deepen understanding and prepare students for future scientific learning and real-world applications. Building on the core ideas developed at Key Stage 3, students extend and deepen their knowledge across Biology, Chemistry and Physics through the AQA GCSE Combined Science Trilogy and Separate Sciences courses.

The curriculum introduces new content that is carefully sequenced and responsive to students' ability and cultural diversity, ensuring all learners are appropriately supported and challenged. Students progress from learners of science to developing the mindset and skills of scientists, recognising the role of science in their future pathways, whether progressing to advanced study or applying scientific understanding in an increasingly technological society.

All students are taught essential knowledge, methods, processes and uses of science. Key ideas are explored through conceptual models and theories that explain the diversity of natural phenomena, including the principles that every effect has one or more causes, that change arises from interactions between objects and systems, and that many interactions occur over time and at a distance. Students also develop an understanding of how science advances through cycles of hypothesis, experimentation, observation, theory development and review, with quantitative analysis embedded as a central element of scientific enquiry.

Through a strong emphasis on practical work and real-world contexts, students develop their ability to apply knowledge, analyse evidence and evaluate scientific claims. They build confidence in observational, practical, modelling, enquiry, problem-solving and mathematical skills across a range of settings, including the laboratory, fieldwork and wider environments.

Our inclusive curriculum ensures all students develop scientific literacy, curiosity about the natural world, and an appreciation of the relevance of science in everyday life. By fostering critical thinking and independent enquiry, we equip students with the knowledge and skills necessary for further study, employment and informed participation in a world increasingly shaped by science and technology.

Knowledge

Biology is the study of living organisms, including animals, plants, fungi and microorganisms, and their interactions with each other and their environment. Through the study of biology, students develop an understanding of how life processes operate at a range of scales, from cells to ecosystems.

Students learn to collect, analyse and interpret data to identify patterns, relationships, and cause-and-effect in the natural world. They explore how biological knowledge is applied to improve human health, support sustainability and address global challenges.

Through key ideas such as organisation, interdependence, variation, adaptation and evolution, students are supported to understand how complex and diverse living systems can be explained through a set of fundamental, unifying principles.

Chemistry is the study of the composition, structure, properties and reactions of matter, explained through models of atoms, ions and molecules and the interactions between them. It focuses on how substances are formed, how they behave and how they can be transformed.

Students develop an understanding of key concepts such as atomic structure, bonding, chemical reactions, energetics and the periodic table, enabling them to explain both natural phenomena and industrial processes. They also learn how chemists synthesise, analyse and evaluate substances and materials.

Through these ideas, students appreciate how the complexity of both natural and human-made materials can be understood through a small number of fundamental principles, and how chemistry plays a crucial role in addressing issues such as energy use, resource management and environmental sustainability.

Physics is the study of the fundamental principles that govern the universe, including forces, energy, waves, electricity, fields and the structure of matter. These concepts are interconnected and used to develop models that describe and predict the behaviour of physical systems.

Students learn to apply mathematical and conceptual models to explain phenomena ranging from everyday processes to the large-scale structure of the universe. They develop an understanding of how interactions, often acting over distance and time, lead to change within systems.

Through core ideas such as conservation of energy, forces and motion, and wave behaviour, students explore how physics underpins technological developments and shapes our understanding of the material world. They are supported to recognise the power of scientific models in explaining complex phenomena through a set of universal principles.

Skills

Scientific enquiry develops the skills in science which are essential to the understanding of concepts in science and the development of new ideas. The areas are detailed as below:

1. The development of scientific thinking
2. Experimental skills and strategies
3. Analysis and evaluation
4. Vocabulary, units, symbols and nomenclature

KS5 Science

Intent

At Key Stage 5, our science curriculum, rooted in the Big Ideas of Science, aims to ignite curiosity, deepen understanding and prepare students for advanced scientific study and real-world applications. Across Biology, Chemistry and Physics, students develop a more specialised and rigorous understanding of the disciplines, building on their prior knowledge to engage with complex concepts, abstract models and sophisticated scientific thinking.

Through an emphasis on analysis, evaluation and independent enquiry, students refine their ability to apply knowledge critically, interpret data and construct evidence-based arguments. Practical work remains central, enabling students to develop precision, confidence and resilience in scientific investigation.

Our inclusive curriculum supports all learners in becoming scientifically literate individuals who appreciate the role of science in shaping the modern world. It equips students with the knowledge, skills and intellectual curiosity required for higher education, STEM careers and lifelong engagement with science.

The **Biology** curriculum develops students' understanding of living systems and the dynamic processes that sustain life. Students explore biological organisation across multiple levels, from molecular mechanisms within cells to the interactions of organisms within ecosystems.

The course emphasises the application of knowledge to unfamiliar contexts, alongside the critical evaluation of data and scientific claims. Students engage with contemporary issues such as genetics, disease, conservation and sustainability, developing an awareness of the ethical and societal implications of biological research.

Through practical investigation and analytical thinking, students become confident in interpreting evidence and constructing reasoned arguments, preparing them for further study and careers in the life sciences and related fields.

The **Chemistry** curriculum enables students to develop a deep understanding of the principles that govern the behaviour of matter. Through the study of physical, inorganic and organic chemistry, students connect abstract concepts such as atomic structure and bonding to observable chemical phenomena and real-world applications.

A strong focus is placed on problem solving, mathematical reasoning and the accurate interpretation of experimental data. Students develop practical competence alongside the ability to think logically and systematically when approaching complex chemical problems.

By exploring the role of chemistry in areas such as energy, materials and pharmaceuticals, students gain insight into its importance in addressing global challenges, equipping them for progression into higher education and STEM-related careers.

The **Physics** curriculum supports students in developing a coherent understanding of the fundamental laws that govern the universe. Students use key concepts such as forces, energy, waves, electricity and fields to construct and apply models that explain a wide range of physical phenomena.

Mathematical fluency is central, with students developing the ability to analyse systems, solve multi-step problems and interpret quantitative data with confidence. Practical work strengthens understanding by allowing students to test theories and refine experimental techniques.

By examining how physics underpins technological innovation and our understanding of the universe, students gain an appreciation of its significance in both scientific advancement and everyday life, preparing them for further study and careers requiring strong analytical and problem-solving skills.

Knowledge

The **Biology** course covers areas of Biological Molecules, Cells, Organisms exchange substances with their environment, Genetic information, variation and relationships between organisms, 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

The **Chemistry** course covers topics in areas of Physical, Inorganic and Organic Chemistry. Specific topics in Physical Chemistry may include atomic structure, amount of substance, bonding, energetics, kinetics, thermodynamics, rate equations, electrode potentials and electrochemical cells. For Inorganic chemistry Periodicity, Group 2 the alkaline earth metals, Group 7 the halogens, properties of Period 3 elements and their oxides, transition metals. For Organic chemistry Alkanes, halogenoalkanes, alkenes, alcohols, organic analysis, aldehydes and ketones, carboxylic acids and derivatives, amino acids and DNA.

The **Physics** course covers specific in-depth study of Measurements and their errors Particles and radiation Waves Mechanics and energy Electricity Further mechanics and thermal physics Fields Nuclear physics. The students can then choose on option from Astrophysics, Medical physics, Engineering physics, Turning points in physics or Electronics

Skills

An imperative part of the course is developing practical common practical skills in science. Students carry out practical tasks which are then assessed according the 5 main competency areas. These areas include the ability to follows written procedures, apply investigative approaches and methods, safely use a range of practical equipment and materials, make, and record observations and carry out research. Students must demonstrate consistent competencies in these areas in order to be given a pass in their practical skill