

CURRICULUM OVERVIEW

SUBJECT: SCIENCE

INTENT

Our vision is to engage all young people in STEM and develop scientists for the future. We aim to create knowledgeable, scientifically literate, and technologically capable problem solvers. By fostering a spirit of inquiry, nurturing our students' curiosity, and incorporating current, relevant, and real-world science into the classroom, we prepare our students to become educated citizens capable of comprehending and analysing global issues.

We will create a stimulating and exciting learning environment where the teaching is challenging, enjoyable, and supportive. We hope to provide learning experiences that develop each student's appreciation, understanding, and critical awareness of the nature of science and its effects on the world.

We understand that our young people may face challenging circumstances that can make learning difficult. We aim to re-engage them in the science curriculum, fostering confidence and providing a safe place for them to learn at their own pace.

IMPLEMENTATION

We provide meaningful learning experiences based on schemes of work that:

1. Fulfil National Curriculum requirements.
2. Monitor the progress of all pupils.
3. Recognize the equality of entitlement for all pupils.

The objectives are to:

- Arouse interest in scientific processes, how scientists work, and the applications of science.

- Encourage an investigative approach to learning by stimulating and maintaining curiosity, interest, and enjoyment in Science.
- Develop experimental skills such as planning, observing, measuring, recording, processing data, and evaluating, while emphasizing safety considerations in practical work. These skills are relevant to the study of Science and useful in everyday life.
- Develop social skills for communicating and working with others.
- Emphasize the application of Science to solve problems.
- Highlight both the beneficial and detrimental environmental implications of scientific developments, recognising that applied Science must consider social, economic, technological, ethical, and cultural limitations.
- Promote an appreciation of the historical progression of scientific ideas and the ongoing development of scientific concepts.
- Establish and maintain the identities of Biology, Chemistry, and Physics within a framework of broad and balanced courses.

IMPACT

All students can succeed by finding a skill, interest, or topic that highlights their capabilities regardless of their additional needs. All students will progress in their knowledge and understanding of scientific principles and concepts. All students will have the opportunity to gain a qualification in Science during KS4.

KS3

KS3 Science aims to build the key foundations of scientific knowledge and ideas about 'how science works'. We also aim to develop our students' natural curiosity about Science and excitement about understanding natural phenomena.

At KS3, we follow the National Curriculum for Science and teach topics so that the curriculum can be spiral, providing the foundation for the same topics covered at GCSE in more detail. A spiral curriculum revisits the same topics over time but with increasing complexity, allowing pupils to master topics by reviewing them repeatedly while honing critical and analytical skills.

Students at KS3 are taught in mixed-ability groups and will have 3x 50-minute lessons per week from the next academic year (2024/2025).

The curriculum is divided into six topics for each subject (Biology, Chemistry, and Physics) and is taught over two and a half years (Year 7 to half of Year 9). Students will start the GCSE curriculum - AQA GCSE Combined Science: Trilogy (8464) - in the summer term of Year 9. The topics are divided as follows:

	Year 7	Year 8	Year 9
Biology	Cells and Organisation Reproduction Health and the Human body	Photosynthesis and Respiration Ecosystem and Interdependence	Genetic Inheritance and Evolution
Chemistry	State of Matter and Separating Mixtures Atoms and the Periodic Table Chemical Reactions	Earth and the Atmosphere Acids and Alkalis	Materials and Recycling
Physics	Energy Changes and Transfers Forces Electricity and Magnetism	Space Waves	Motion and Pressure
Others			GCSE Transition Topics: Transition math Start GCSE AQA Science Trilogy: Biology: Cell Biology Chemistry: The Atom and the Periodic Table Physics: Energy
<u>Working Scientifically:</u> Experimental Skills and Investigation; Scientific Attitudes; Analysis and Evaluation; Measurement - embedded throughout the syllabus for all the three subjects.			

Working Scientifically: Experimental skills and investigation, scientific attitudes, analysis and evaluation, and measurement are embedded throughout the syllabus for all three subjects.

Assessment is primarily through regular assessments focusing on recall and understanding of scientific knowledge, literacy, and numeracy skills. Students also complete various assessment tasks (such as graph drawing, research activities, ICT) aimed at teaching and consolidating key scientific skills.

KS4 Science

Students follow the AQA GCSE Combined Science: Trilogy syllabus.

From the next academic year (2024/2025), Year 10 and Year 11 students will be taught in two groups of different abilities: a higher group (Science 1) and a foundation group (Science 2). The groups are flexible, allowing movement based on academic and socio-emotional needs. Both groups will have parallel science lessons to facilitate these changes without impacting students' timetables. We aim to guide students to make a final choice for a Foundation or Higher Tier exam that is evidence-based using data from assessments while also considering the emotional needs and wellbeing of our learners.

Students will have 4x 50-minute lessons per week and will be taught by two teachers sharing different parts of the syllabus.

Assessment and exam structure:

Students will take six exams, divided into two papers for each science subject: Biology, Chemistry, and Physics.

Biology:

- Paper 1: Cell Biology; Organisation; Infection and Response; Bioenergetics
 - Duration: 1 hour 15 minutes
 - Marks: 70
- Paper 2: Homeostasis and Response; Inheritance, Variation and Evolution; Ecology
 - Duration: 1 hour 15 minutes
 - Marks: 70

Chemistry:

- Paper 1: Atomic Structure and the Periodic Table; Bonding, Structure, and the Properties of Matter; Quantitative Chemistry; Chemical Changes; Energy Changes
 - Duration: 1 hour 15 minutes
 - Marks: 70
- Paper 2: The Rate and Extent of Chemical Change; Organic Chemistry; Chemical Analysis; Chemistry of the Atmosphere; Using Resources
 - Duration: 1 hour 15 minutes
 - Marks: 70

Physics:

- Paper 1: Energy; Electricity; Particle Model of Matter; Atomic Structure
 - Duration: 1 hour 15 minutes
 - Marks: 70

- Paper 2: Forces; Waves; Magnetism and Electromagnetism
 - Duration: 1 hour 15 minutes
 - Marks: 70

Additional Time for Special Needs: Students with special educational needs or disabilities will receive additional time, typically 25% more, making each paper approximately 1 hour and 34 minutes long.

Marking and Final Grades

Each paper is marked out of 70, giving a total of 420 marks across all six papers. Marks are converted into a final grade ranging from 9-9 (highest) to 1-1 (lowest), reflecting the combined nature of the assessment with two numbers representing overall achievement. The two grades awarded can be different, but only by 1 level, e.g. 7-6.

The syllabus topics are taught and allocated as shown in the tables below, aiming to complete Paper 1 topics in year 10 and Paper 2 topics in year 11. The current year 10 starting year 11 in September 2024 are however under a time constrain as they did not complete all the topics from paper 1 in year 10. We aim to implement suitable contingency measures to complete the teaching and learning of the syllabus in time for the students' exams.

Year 10 – Syllabus Topics – Academic Year 2024-2025

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Biology	Organisation	Organisation (continued) Infection and response	Infection and response (continued)	Bioenergetics	Bioenergetics (continued)	
Chemistry	Bonding, structure and properties of matter	Bonding (continued) Quantitative chemistry	Quantitative chemistry (continued)	Chemical changes	Chemical changes (continued)	Energy changes
Physics		Electricity	Electricity (continued)	Particle model of matter (continued)	Atomic structure and radiation	Atomic structure and radiation (continued)

			Particle model of matter			
Year 10 will complete all Paper 2 topics in year 11 in 2024-2025						

Year 11 – Syllabus Topics – Academic year 2024-2025

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Biology	Bioenergetics	Homeostasis	Inheritance, variation and evolution	Ecology	Exams	Exams
Chemistry	Energy changes The rate and extent of chemical changes	Chemical analysis	Chemistry of the atmosphere	Organic chemistry Using resources		
Physics	Particle model of matter Magnetism and electromagnetism	Atomic structure and radiation	Forces			

CULTURAL CAPITAL

Our science curriculum at both KS3 and KS4 is designed to enrich students' cultural capital by exposing them to a wide range of scientific knowledge and experiences. We aim to organize educational visits and activities beyond the classroom, such as trips to science museums, universities, and research institutions. These experiences help students appreciate the relevance of science in the real world and inspire them to explore scientific careers. We know that educational visits outside the classroom can prove difficult for some of our students, so we aim to make all the necessary arrangements to ease and encourage students' participation to the events.

LITERACY

Literacy is a key focus within our science curriculum. We embed visual aids in lessons to promote the learning of subject-specific vocabulary. Learning activities include writing reports, debating scientific issues, and evaluating information from various resources to enhance students' literacy skills and prepare them for their final exams.

A consistent whole-school approach to literacy is embedded in our lessons, supported by specific departments such as English and Therapy and Social Learning. Resources and strategies include keyword booklets with definitions, use of sentence starters and ends to scaffold writing, and regular constructive feedback through methods like WWW (What Went Well) and EBI (Even Better If).

BRITISH VALUES

We incorporate British Values into our science curriculum by:

- **Democracy:** Encouraging students to engage in debates on scientific topics, fostering an environment where all opinions are valued.
- **Rule of Law:** Teaching the importance of safety and regulations in scientific experiments and the broader impact of science on legal frameworks.
- **Individual Liberty:** Supporting students in making informed choices about their studies and encouraging independent research.
- **Mutual Respect and Tolerance:** Promoting respect for different viewpoints in scientific discussions and an appreciation of the diverse contributions to science from people around the world.

LINKS TO SMSC

Our science curriculum contributes to students' SMSC development by:

- **Spiritual:** Encouraging a sense of wonder about the natural world and scientific phenomena.
- **Moral:** Discussing the ethical implications of scientific advancements and their impact on society.
- **Social:** Promoting collaborative work in practical activities and group projects.
- **Cultural:** Highlighting contributions to science from various cultures and promoting an understanding of the global nature of scientific inquiry.

INTEGRATING ICT (INFORMATION AND COMMUNICATION TECHNOLOGY)

Information and Communication Technology is integrated into our science curriculum to enhance learning and prepare students for a technologically advanced world. Students use ICT for:

- **Research:** Accessing scientific databases and online resources to gather information.
- **Data Analysis:** Using software to analyse experimental data and present findings.
- **Simulations:** Engaging with virtual labs and simulations to understand complex scientific concepts.
- **Presentations:** Creating multimedia presentations to communicate scientific ideas effectively.