

Combined Science: Trilogy (double award)

Why is the study of Combined Science important?

Have you ever wondered why the sky is blue? If there are more than 118 elements? Whether there are more undiscovered species of plant or animal? What would the nearest adult answer if you posed these questions? Could they be answered by the brightest minds in science? The curiosity that lies behind these questions and the drive to find the answers is what makes us human and it lies in the heart of Science.

Answering questions is essentially the whole purpose of science and answering these questions simply brings more questions to the surface. Great scientists, those at the very frontier of what we understand as science knowledge, would still declare that the more we understand about the universe, the more there is to find out. How great is that?

The concise Oxford dictionary defines science as 'systematic and formulated knowledge' that is based on mainly observation, experiment and induction'. Science consists of the interrelated discipline of knowledge (substantive knowledge) and skills (disciplinary knowledge) - but those of us who have ever questioned the world around us see it as so much more than that. Through science you can learn to develop your own ideas, attitudes and interpretations and not simply acquire a set of skills and knowledge. Throughout our science curriculum you'll see that science substantive and disciplinary knowledge are important but it's the application of these ideas that lead onto the great discoveries. Let's get to discovering...

Understanding the scientific process is a way of thinking and working. Science begins with curiosity and daring to ask questions, seek answers, work through problems and arrive at conclusions. All of which require logical thought and a systematic way of working. A process that is applicable to most scenarios in life! Want to think like a scientist?

Science is an active process. From Year 7 we have planned a range of relevant and exciting scientific activities that involve the full range of all the aspects of science. We feel that to be able to think like a scientist you must understand the foundations that led us to our current understanding in the 21 century. To support this, we have allowed the opportunity to recreate the investigations of key scientists and to encourage you to try out your own ideas, where the outcomes are unknown and to prove the validity of a scientific fact or idea.

Our 5 year curriculum focuses on intertwining core substantive knowledge with subject specific disciplinary knowledge. It is our conviction that this will make science accessible for all, by enabling students a strong foundation in learning a body of knowledge to the products and practices of science. This will then allow students to understand and appreciate how that knowledge was derived, how it came to be discovered and accepted by the scientific community. In science knowledge is power with it you can unlock scientific thinking and processes.

Curriculum Progression Pathway

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What skills will the study of Combined Science teach you?

You are a citizen in this world and you need to know how the natural and modern world works. It will teach you to...

- Understand theories that explain phenomena
- Apply basic ideas and models that support understanding
- Evaluate models and theories
- Present theories in mathematical form
- Recall quantitative relationships
- Derive quantitative relationships between various measured quantities
- Explain how theories are borne out by experiment.
- Apply experimental procedure and understand that it is a measure of success of a theory
- Present, interpret and evaluate experimental data
- Apply mathematical skills to solve problems
- Develop a deeper understanding of everyday experiences including the natural world and modern devices.

What will you know and understand from your study of Combined Science?

What will you know and understand from your study of Science?

- Develop scientific knowledge and conceptual understanding of science
- Develop understanding of the nature, processes and method involved in science
- Develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills, both in the laboratory, in the field and in other learning environments.
- Develop their ability to evaluate claims linked to biology through critical analysis of the methodology evidence and conclusions, both qualitatively and quantitatively.

Curriculum Progression Pathway

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How can you deepen your understanding of Combined Science?

Study of any subject in our curriculum takes full advantage of links with other subject areas- we term these as interdisciplinary links and we make the most of them because we know that deep learning requires the transference of knowledge and skills from one topic of learning to another. Once you can transfer your learning across topics and subject areas then you are really mastering what you know and how to apply your understanding and skills.

Science encompasses Biology, Chemistry and Physics. You will learn methods of thinking and research that are widely applicable to other subject areas helping your thinking in all subjects. Any science relies heavily upon evidence to test predictions and theories. Through developing mathematical techniques as well as applying reasoning your skills to present and justify information can be applied to most careers and further education.

Across the teaching of subjects, teachers will refer to your learning in other areas such as Biology, Mathematics, Physics and Chemistry and this will help you to develop your understanding.

Our Science departments offer lots of great opportunities for you to really engage with this fabulous subject. Why not look out for the enrichment clubs on offer such as Science Club for KS3 students, with a different theme each half term (e.g. “cool chemistry” or “dissections”). We offer STEM events and activities that may include opportunities to visit local colleges and universities. There may be visits to science museums and events that celebrate great scientists and discoveries. We offer after school support sessions for GCSE students and work with other departments to enhance learning such as maths in science and geography in science. Get involved! Become a STEM researcher and obtain the CREST award; enhance your anatomical and physiological knowledge through enrichments such as dissection club.

How are you assessed in Combined Science?

Throughout the 5 year Science course you are assessed using the assessment objectives below which ensure that you can cumulatively build your subject understanding in preparation for future GCSE and A Level study. There are half term assessment points each year that we term Praising Stars©. For years 7, 8 and 9 we base our assessment on our subject mapping of the age-related expectations across the curriculum, assessing students' performance at their current stage of study against expectation. At GCSE we make informed predictions informed by our holistic assessment of their progress against the key assessment objectives and their aspirational GCSE targets. These are also the basis for any appropriate support and intervention.

KS3 Assessments

Each unit in KS3 will be assessed with a summative test that is split into 4 sections; (a and b) substantive knowledge of the learnt unit in the form of short answer and MCQ's; (c) disciplinary knowledge related to the learnt unit and (d) substantive knowledge of previous learnt units.

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Key Assessment Objectives for AQA GCSE Combined Science

AO1: Demonstrate knowledge and understanding of:

- Scientific ideas
- Scientific techniques
- Scientific procedures

AO2: Apply knowledge and understanding of:

- Scientific ideas
- Scientific enquiry
- Scientific techniques and procedures

AO3: Analyse information and ideas to:

- Interpret and evaluate
- Make judgements and draw conclusions
- Develop and improve experimental procedures.

Curriculum Progression Pathway

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| 2024-25 SCIENCE CURRICULUM PROGRESSION PATHWAY | | | | | |
|--|---|--|---|---|--|
| | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 |
| Autumn 1 | Unit 1 - Introduction to Science Unit 2 - Matter and Energy | Unit 6 - Plants, Ecology and Climate change Unit 7 – Forces | Unit 11 - Electricity and Magnetism Unit 12 - Patterns and Materials Unit 13 - Health | P1- Energy P2- Electricity C2 - Bonding and Structure C3 - Quantitative Chemistry B2 - Organisation | P5 - Forces B5 - Homeostasis and Response B6 - Inheritance C6 - Rates of reaction C7 - Organic Chemistry |
| Autumn 2 | Unit 2 - Matter and Energy Unit 3 - Chemical Substances | Unit 7 – Forces Unit 8 - Chemical Reactions | C1 - Atomic Structure B1 - Cell Biology | B2 - Organisation C3 - Quantitative Chemistry C4 - Chemical changes P3 - Particle model B3 - Infection and Response (F) | P6 - Waves B6 - Inheritance B7- Ecology C8 - Chemical analysis C9 - Chemistry of the atmosphere P7 - Magnetism and Electromagnetism |
| Spring 1 | Unit 3 - Chemical Substances Unit 4 - Animal Organ Systems | Unit 8 - Chemical Reactions Unit 9 - Cells, Evolution and Inheritance | B1 - Cell Biology C1 - Atomic Structure P1 - Energy | B3 - Infection and Response C4 - Chemical changes P4 - Atoms and Radiation B4 - Bioenergetics (F) | P6 - Waves P7 - Magnetism and Electromagnetism B7 - Ecology C10 - Using Resources |
| Spring 2 | Unit 4 - Animal Organ Systems Unit 5 - Space, Earth and Sustainability | Unit 9 - Cells, Evolution and Inheritance Unit 10 - Waves | P1 - Energy C2 - Bonding and Structure | B4 - Bioenergetics B5 - Homeostasis and Response C5 - Energy Changes P5 - Forces (F) C6 - Rates of Reaction (F) | Paper 2 Consolidation |
| Summer 1 | Unit 5 - Space, Earth and Sustainability Unit 6 - Plants, Ecology and Climate Change | Unit 10 - Waves Unit 11 - Electricity and Magnetism | B2 - Organisation P2 - Electricity | B5 - Homeostasis and Response C6 - Rates of Reaction P5 - Forces Paper 1 Consolidation | Masterclasses, Revision and Exams |
| Summer 2 | Unit 6 - Plants, Ecology and Climate Change | Unit 11 - Electricity and Magnetism Unit 12 - Patterns and Materials | B2 - Organisation P2 - Electricity B3- Infection and response | Paper 1 Consolidation and Revision P7 - Magnetism and Electromagnetism C7 - Organic Chemistry (F) | Exams |