

KS5 Science Subject overview

Subject Rationale (Intent) linked to [whole school curriculum mission](#)

In brief (no more than four sentences)

The Science curriculum at St Edmund's is designed to bring science to everyday life, answering questions like 'why do apples fall from trees' or 'how are vaccines developed'? We want learners to be naturally inquisitive, independent and critical in their thinking. This will enable them to develop the substantive and disciplinary knowledge required to understand the world around them. We want to impart a love of the subject and for our students to use science to improve their own lives and the lives of others.

YEAR 12 Applied Science

| TERM | Topic sequence (What are you teaching?) | Topic sequence rationale (Why are you teaching this? How does it link to prior learning? Any notable links to St Edmund's curriculum mission St Edmund's curriculum mission) | Main method of assessment? |
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| Term 1:1 | Unit 1: Principles and Applications of Science <ul style="list-style-type: none"> ● Structure and bonding in applications in science ● Production and uses of substances in relation to properties ● Cell structure and function ● Cell specialisation ● Tissue structure and function ● Working with waves ● Waves in communication ● Use of electromagnetic waves in communication | <p>Scientists and technicians working in the chemical industry need to have an understanding of atoms and electronic structure. This allows them to predict how chemical substances will react in the production of a wide range of products – anything from fertilisers in the farming industry to fragrances in the perfume industry.</p> <p>Metals play an important role in the construction industry, in providing the structure to buildings, as well as in electrical wiring and the production of decorative features. So understanding the chemical and physical properties of metals is essential when selecting appropriate building materials.</p> <p>Medical professionals need to understand the structure and workings of cells. They build on this knowledge to understand how the body stays healthy as well as the symptoms and causes of some diseases. This allows them to diagnose and treat illnesses. The study of bacterial prokaryotic cells gives an understanding of how some other diseases are caused and can be treated.</p> | External Assessments in January |
| Term 1:2 | Unit 1: Principles and Applications of Science <ul style="list-style-type: none"> ● Structure and bonding in applications in science ● Production and uses of substances in relation to properties ● Cell structure and function ● Cell specialisation ● Tissue structure and function ● Working with waves ● Waves in communication ● Use of electromagnetic waves in communication | <p>Scientists and technicians in the food industry also need to understand the structure and function of plant cells to enable them to develop food crops that produce greater yields.</p> <p>Knowledge of waves is essential in a wide range of industries and organisations. In the communication industry, scientists and technicians apply their knowledge of the electromagnetic spectrum when designing mobile phone and satellite communication, and fibre optics are used to transmit telephone and television signals. Fibre optics are also used in diagnostic tools in medicine.</p> <p>Most of this content links with units delivered within the GCSE Trilogy</p> | External Assessments in January |

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| | | and Separate Science courses. | |
| Term 2:1 | Unit 2: Practical Scientific Procedures and Techniques <ul style="list-style-type: none"> • Undertake titration and colorimetry to determine the concentration of solutions • Undertake calorimetry to study cooling curves • Undertake chromatographic techniques to identify components in mixtures | <p>This unit introduces you to standard laboratory equipment and techniques, including titration, colorimetry, calorimetry, chromatography, calibration procedures and laboratory safety.</p> <p>Through the practical tasks in the unit, learners develop proficiency in the quantitative analytical techniques of titration and colorimetry, including learning to calculate the concentration of solutions. They use measurement of temperature to study cooling curves and are introduced to paper and thin-layer chromatography (TLC). They also have the opportunity to calibrate equipment and are encouraged to be aware of the safety aspects of given laboratory procedures and techniques.</p> | Internal Assessments |
| Term 2:2 | Unit 2: Practical Scientific Procedures and Techniques <ul style="list-style-type: none"> • Undertake titration and colorimetry to determine the concentration of solutions • Undertake calorimetry to study cooling curves • Undertake chromatographic techniques to identify components in mixtures | <p>While they develop their practical competence, the discussion and analysis of group results allows them to understand their progress in relation to that of others and also helps them to gain an understanding of the reliability, repeatability and reproducibility of various procedures and techniques.</p> | Internal Assessments |
| Term 3:1 | Unit 2: Practical Scientific Procedures and Techniques <ul style="list-style-type: none"> • Undertake titration and colorimetry to determine the concentration of solutions • Undertake calorimetry to study cooling curves • Undertake chromatographic techniques to identify components in mixtures | <p>Learners have the opportunity to use problem-solving skills when they undertake calorimetry work. There is scope throughout the unit to reflect on the skills they have gained and how they may develop further.</p> <p>The fundamental knowledge, practical skills, transferable skills – for example, organisation, self-assessment and problem-solving, and the ability to interpret data – all developed in this unit will give learners confidence when they undertake the more complex practical techniques involved in higher education science courses such as biochemistry, chemistry, forensic science and environmental science.</p> | Internal Assessments |
| Term 3:2 | Unit 2: Practical Scientific Procedures and Techniques <ul style="list-style-type: none"> • Undertake titration and colorimetry to determine the concentration of solutions | <p>The experience they gain is invaluable when they begin their career as a trainee laboratory technician in industries such as contract analysis, oil, biopharmaceuticals, water treatment, and polymers.</p> | Internal Assessments |

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| | <ul style="list-style-type: none">• Undertake calorimetry to study cooling curves• Undertake chromatographic techniques to identify components in mixtures | <p>Employers in these industries will appreciate their ability to follow written scientific procedures and their desire to ensure accuracy by using techniques correctly and by checking that equipment – for example, pipettes, balances, pH metres and thermometers – are calibrated correctly and that appropriate standard calibration documentation has been completed.</p> | |
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Unit 9: Human Regulation and Reproduction

| YEAR 13 Applied Science | | | |
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| TERM | Topic sequence (What are you teaching?) | Topic sequence rationale (Why are you teaching this? How does it link to prior learning? Any notable links to St Edmund's curriculum mission) | Main method of assessment? |
| Term 1:1 | Unit 3: Science Investigation Skills <ul style="list-style-type: none"> ● Planning a scientific investigation ● Data collection, processing and analysis/interpretation ● Drawing conclusions and evaluation ● Enzymes in action ● Diffusion of molecules ● Plants and their environment ● Energy content of fuels | <p>Advancement in science and technology has produced great benefits for society. This advancement depends on research and investigative approaches in science and technology.</p> <p>In research, development, analytical and industrial laboratories, laboratory technicians and scientists are employed to safely carry out practical investigations, or follow prescribed laboratory procedures. They repeat measurements to obtain consistent, reliable results. They use investigative skills, including planning, recording and interpreting data, analysing and evaluating findings in order to test a hypothesis to inform further research and development.</p> | External Assessment in January |
| Term 1:2 | Unit 3: Science Investigation Skills <ul style="list-style-type: none"> ● Planning a scientific investigation ● Data collection, processing and analysis/interpretation ● Drawing conclusions and evaluation ● Enzymes in action ● Diffusion of molecules ● Plants and their environment ● Energy content of fuels | <p>In this unit, learners develop the essential skills underpinning practical scientific investigations. Some of these link to skills developed through the GCSE Trilogy and Separate Science courses.</p> <p>As well as drawing on Unit 1 and Unit 2, these skills are delivered through subject themes ranging from enzymes and diffusion to electrical circuits. The subject themes provide different contexts for the development of investigative skills.</p> <p>To complete the assessment task within this unit, learners will need to draw on your learning from across the programme of study.</p> <p>Science investigative skills will help learners in many scientific or enquiry-based learning courses in higher education, as well as preparing them for employment in a science-related industry.</p> | External Assessment in January |

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| Term 2:1 | Unit 2: Practical Scientific Procedures and Techniques <ul style="list-style-type: none"> • Review personal development of scientific skills for laboratory work Unit 9: Human Regulation and Reproduction | <p>The human body is a complex organisation of systems that each needs to be controlled within a well-defined range of parameters.</p> <p>This unit will help learners understand the key homeostatic principles that help provide this stable body environment. There have been many advances in human fertility in recent years, and there are opportunities to consider these and the hormonal control of the reproductive system.</p> | Internal Assessments |
| Term 2:2 | Unit 9: Human Regulation and Reproduction | <p>Learners will investigate the interrelationship and nervous control of the cardiovascular and respiratory systems, the homeostatic mechanisms in the body and the hormonal control of the reproductive system.</p> | Internal Assessments |
| Term 3:1 | Unit 9: Human Regulation and Reproduction | <p>Knowledge of the mechanisms by which the body regulates systems within narrow parameters is an essential part of health and medical science-related occupations and other allied roles, including sport science and fitness, clinical science and veterinary science.</p> <p>Progression to higher education to study reproductive technologies or animal breeding leading to degree level is possible. It is equally possible to gain access to science technician or apprenticeships career pathways.</p> | Internal Assessments |
| Term 3:2 | | | |