

## KS3 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.

**Additional details**

**[Science programmes of study: key stages 1 and 2](#)**

**KS2:**

**Science skills:** Working scientifically - practical scientific skills including asking relevant question, using scientific enquiry; setting up practical investigations; comparative and fair testing, taking and recording measurements using a range of equipment and in a variety of ways (tables / graphs / labelled diagrams); reporting on findings, drawing conclusions and suggest improvements; use scientific evidence to answer questions.

**Physics:** Forces, Electricity, Light, Sound, Magnetism, Earth and Space

**Chemistry:** Rocks, states of matter (solid, liquid, gas, changes of state, water cycle, rate of evaporation), properties and changes of materials (physical properties, separation of materials, chemical changes)

**Biology:** Plants, animals, including humans , living things and their habitats, evolution and inheritance.

## YEAR 7

| TERM     | Topic sequence<br>(What are you teaching?)                                                                                                                                                                                                                                                                                                                                                                                                                                           | Topic sequence rationale<br>(Why are you teaching this? How does it link to prior learning? Any notable links to <a href="#">St Edmund's curriculum mission</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Main method of assessment?           |
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| Term 1:1 | <p><b>Science Skills, dissolving sweets investigation</b></p> <ul style="list-style-type: none"> <li>identifying variables</li> <li>writing a risk assessment and method and identifying equipment</li> <li>taking results</li> <li>concluding and evaluating</li> </ul> <p><b>Cells</b></p> <ul style="list-style-type: none"> <li>Microscopes</li> <li>Plant and animal cells</li> <li>Specialised cells</li> <li>Movement of substances</li> <li>Unicellular organisms</li> </ul> | <p>In KS2 students were introduced to working scientifically, planning, measuring, recording and reporting the outcomes of their investigations. In this unit students are introduced to some of the practical skills, equipment and scientific processes they will need as they progress through the KS3 course, by planning an investigation to find out what affects the rate of a sweet dissolving in hot water.</p> <p>In KS2 there are multiple references to the way that plants and animals function creating a knowledge base that can be built upon in the topic of cells and microbes. There are opportunities to develop mathematical skills when calculating magnification including substituting values into an equation. Students will revisit this knowledge in both year 9 as part of the KS3 curriculum and in KS4 as the start of the GCSE Biology course.</p> | End of topic test and composite task |
| Term 1:2 | <p><b>Particles and their behaviour</b></p> <ul style="list-style-type: none"> <li>The particle model</li> <li>States of matter</li> <li>Density</li> <li>Melting and freezing</li> <li>Boiling</li> <li>More changes of state</li> <li>Diffusion</li> </ul>                                                                                                                                                                                                                         | <p>States of matter is completed at KS2 with more difficult concepts, including particle theory, delivered within Year 7. The particle model underpins all chemistry. Students will develop their mathematical skills, with calculations involving density, mass and volume.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | End of topic test and composite task |

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|          | <b>Forces</b> <ul style="list-style-type: none"> <li>• what is a force?</li> <li>• squashing and stretching</li> <li>• drag forces and friction</li> <li>• non-contact forces</li> <li>• balanced and unbalanced forces</li> </ul>                                                                                                                                                                  | <p>Students are exposed to the concept of forces in Year 5 by being introduced to the idea of friction and gravity and gaining an understanding that magnetic forces are non-contact. In Year 7 we start from the idea of non-contact and contact forces then introduce the concepts of mass, weight and gravity, Hooke's Law and resultant forces. We revisit friction, linking it to drag forces in air and water. The mass, weight and gravity equation links to section 3.5 and 4.2 of the maths Year 7 scheme of work where students use a calculator efficiently, use a simple formula written in words and substitute numbers into an algebraic formula. Plotting a force-extension graph for Hooke's Law links to section 5.2 of the Year 7 maths scheme of learning where students understand that all the points on a graph together represent a relationship</p>                                                                                                                                                                                                                                                |                                      |
| Term 2:1 | <b>Elements, atoms and compounds</b> <ul style="list-style-type: none"> <li>• Elements</li> <li>• Atoms</li> <li>• Compounds</li> <li>• Chemical formulae</li> </ul><br><b>Structure and function of body systems</b> <ul style="list-style-type: none"> <li>• Levels of organisation</li> <li>• Gas exchange</li> <li>• Breathing</li> <li>• The skeleton</li> <li>• Muscles and joints</li> </ul> | <p>Having covered particle theory, Elements. Atoms and Compounds builds on this by introducing the concept of atoms, molecules, compounds, the Periodic Table of Elements and formulae. These are the building blocks of all materials and essential knowledge to progress with chemical reactions. This topic clarifies potential misconceptions between cells and atoms.</p> <p>In Yr3 students should have covered the skeleton and muscles, as well as the digestive system. They will have also been introduced to key processes of living organisms in the cells topic from term 1. The body systems topic builds on this knowledge and links directly to topics covered both later on in the KS3 curriculum in year 8 and 9 and at KS4 as part of the B2 section of the GCSE specification, which rely on them having studied the organisation of organisms and the need for transport systems at KS3. Misconceptions between respiration and breathing can be addressed. This topic provides opportunities to develop mathematical skills including plotting a simple bar chart and designing a results table.</p> | End of topic test and composite task |

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| Term 2:2 | <p><b>Sound</b></p> <ul style="list-style-type: none"> <li>• transverse and longitudinal waves</li> <li>• what is sound</li> <li>• loudness and pitch</li> <li>• detecting sound</li> <li>• ultrasound</li> </ul> <p><b>Reproduction</b></p> <ul style="list-style-type: none"> <li>• Adolescence</li> <li>• Reproductive systems</li> <li>• Fertilisation and the development of the foetus</li> <li>• The menstrual cycle</li> </ul>                         | <p>This builds on Year 4 work where students studied sound and should understand it is caused by vibrations. In Year 7 students are introduced to longitudinal and transverse waves and the frequency, wavelength and amplitude of a wave before studying how we hear sounds of different pitch and loudness and what ultrasound is.</p> <p>In Yr5 students are expected to describe the life process of reproduction in some plants and animals which is linked to the life cycles of a range of different organisms; including human development. The topic of reproduction builds upon these concepts in order to develop understanding of the processes behind reproduction and introduce scientific terminology. It also allows misconceptions related to reproduction to be addressed such as the mother's and baby's blood mix at the placenta. Aspects of this topic including adolescence, the role of hormones, the menstrual cycle and contraception will also be revisited at KS4 as part of Paper 2 content. This topic provides opportunities to develop mathematical skills including taking measurements and using a formula.</p> | End of topic test and composite task |
| Term 3:1 | <p><b>Separating techniques</b></p> <ul style="list-style-type: none"> <li>• Pure substances</li> <li>• Mixtures</li> <li>• Solutions</li> <li>• Solubility</li> <li>• Filtration</li> <li>• Evaporation and distillation</li> <li>• Chromatography</li> </ul> <p><b>Light</b></p> <ul style="list-style-type: none"> <li>• what is light</li> <li>• reflection</li> <li>• refraction</li> <li>• comparing the eye and the camera</li> <li>• colour</li> </ul> | <p>In KS2 they learn simple methods to separate substances in a mixture and we develop this to cover more sophisticated techniques, knowledge of which will be required for KS4. The topic builds upon knowledge of compounds and clarifies misconceptions on the difference with mixtures. Students will develop their skills in drawing and analysing graphs, comparing solubilities at different temperatures.</p> <p>In Year 6 students were introduced to the idea of light travelling in straight lines , how we see things and the formation of shadows. In Year 7 we build on the introduction to transverse waves at the start of the sound module. Students will then investigate reflection, refraction and colour.</p>                                                                                                                                                                                                                                                                                                                                                                                                                | End of topic test and composite task |

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| <b>Term 3:2</b> | <b>Space</b> <ul style="list-style-type: none"> <li>the night sky</li> <li>the solar system</li> <li>the earth</li> <li>the moon</li> </ul> | In Year 6 students would have studied the basics of space, learning that the Earth travels around the Sun. What a day and night is and that the Moon travels around the Earth. The Year 7 topic explores space into greater depth explaining more about the relative movement of the Earth and the Moon around the sun as well as delving deeper into the solar system. | End of topic test and composite task |
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| YEAR 8          |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |
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| TERM            | Topic sequence<br>(What are you teaching?)                                                                                                                                                                                                                                                                                                                                                                                           | Topic sequence rationale<br>(Why are you teaching this? How does it link to prior learning? Any notable links to <a href="#">St Edmund's curriculum mission</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Main method of assessment?           |
| <b>Term 1:1</b> | <b>Acids and alkalis</b> <ul style="list-style-type: none"> <li>What are acids and alkalis</li> <li>Indicators and pH</li> <li>Neutralisation</li> <li>Making salts</li> </ul><br><b>Health and lifestyle</b> <ul style="list-style-type: none"> <li>Nutrients</li> <li>Food tests</li> <li>Unhealthy diet</li> <li>The digestive system &amp; enzymes</li> <li>Bacteria</li> <li>Effects of Drugs, Alcohol &amp; Smoking</li> </ul> | <p>This topic explores the specific reactions of acids and alkalis, as well as introducing key disciplinary skills, before progressing to look at different chemical reactions later in the year. Students will carry out reactions involving acids and alkalis and learn how these are useful in many areas of life.</p> <p>At KS2 students will have been introduced to the concepts of healthy lifestyles including the importance of exercise, a balanced diet and the impact of certain drugs as in Y3 students learn about nutrition and in Yr4 students learn about the digestive system in humans. This module builds on these concepts as well as revisiting the idea of hierarchical organisation of organisms and the role of diffusion covered in year 7. Students are introduced to how to carry out qualitative testing for biological molecules (food tests), the role of enzymes in digestion and the effects of drugs, such as alcohol and nicotine, on the body. This module directly links to topics covered at KS4 in the B2 section of the GCSE specification which relies on student's knowledge and understanding of the digestive system from KS3. This topic provides opportunities to develop mathematical skills including calculating percentage change.</p> | End of topic test and composite task |

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| Term 1:2 | <p><b>Electricity and magnetism</b></p> <ul style="list-style-type: none"> <li>• electrostatics</li> <li>• circuits and current</li> <li>• potential difference</li> <li>• resistance</li> <li>• series and parallel circuits</li> <li>• magnets and magnetic fields</li> <li>• electromagnets</li> <li>• uses of electromagnets</li> </ul><br><p><b>Biological processes</b></p> <ul style="list-style-type: none"> <li>• Photosynthesis</li> <li>• Leaves</li> <li>• Plant minerals</li> <li>• Aerobic and Anaerobic respiration</li> </ul> | <p>In Year 4 students learn how to construct simple circuits with switches, identify basic components and conductors and insulators. In Year 6 they learn how to draw basic series circuits with appropriate symbols and observe the effects of adding more than one component in a circuit. This module expands on these ideas and concepts leading to the introduction of parallel circuits, current charge, potential difference and resistance. The work on magnetism builds on the electricity link and leads to explanations of how electromagnetic devices work. Use of the resistance equation links to sections 3.5 and 4.2 of the maths Year 7 scheme of work where students use a calculator efficiently, use a simple formula written in words and substitute numbers into an algebraic formula. Plotting a graph of resistance against length links to section 5.2 of the Year 7 maths scheme of learning where students understand that all the points on a graph together represent a relationship</p><br><p>This module focuses on the concepts of photosynthesis and respiration. In KS2 students learn about how plants need water, light and a suitable temperature for growth. This is expanded upon in KS3 by looking at the process of photosynthesis and the mineral requirements for healthy growth. Students will have been introduced to respiration in year 7 and will be able to build upon that knowledge providing another opportunity to address the misconception that breathing and respiration are the same thing. These concepts will be revisited in year 9 in B3.2 Cell systems and as part of the KS3 curriculum and again at KS4 as they form the key conception for unit B4 Bioenergetics of the GCSE specification. This topic provides opportunities to develop mathematical skills linked to making estimates and why they are sometimes used in science.</p> | End of topic test and composite task |
| Term 2:1 | <p><b>Periodic Table</b></p> <ul style="list-style-type: none"> <li>• Comparing elements</li> <li>• Physical properties of metals and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              | After the introduction of elements and the Periodic Table in Year 7, students look at trends and patterns which will underpin KS4 studies. The physical and chemical properties of metals and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | End of topic test and composite task |

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|          | <p>non-metals</p> <ul style="list-style-type: none"> <li>• Chemical properties of metals and non-metals</li> <li>• Groups and Periods</li> <li>• The elements of Group 1</li> <li>• The elements of Group 7</li> <li>• The elements on Group 0</li> </ul> <p>Energy</p> <ul style="list-style-type: none"> <li>• energy in fuels and food</li> <li>• energy resources</li> <li>• energy stores and transfers</li> <li>• energy and temperature</li> <li>• conduction, convection and radiation</li> <li>• work done, levers and gears</li> <li>• energy and power</li> </ul> | <p>non-metals and in Groups 1, 7 and 0 of the Periodic Table are covered. Students will carry out practical work and make observations to investigate properties of different elements and materials.</p> <p>During KS2, students have not come across the concept of energy or energy transfers. They have come across similar concepts when learning about light, sound and forces. In Year 8 students are introduced to energy stores, energy transfer mechanisms and energy resources. They then learn about the difference between heat and temperature and the 3 methods of heat energy transfer. Finally the mechanism of energy transfer by forces is introduced by investigating levers, pulleys and gears. Levers, pulleys gears are studied in Year 5 as devices that allow a smaller force to have a greater effect.</p>                         |                                      |
| Term 2:2 | <p>Ecosystems and adaptations</p> <ul style="list-style-type: none"> <li>• Food chains &amp; webs</li> <li>• Disruption to food chains &amp; webs</li> <li>• Ecosystems</li> <li>• Competition</li> <li>• Adaptations</li> </ul> <p>Reactions</p> <ul style="list-style-type: none"> <li>• Chemical reactions</li> <li>• Word equations</li> <li>• Oxidation reactions</li> <li>• Decomposition reactions</li> <li>• Using ratios</li> <li>• Conservation of mass</li> <li>• Exothermic and endothermic</li> </ul>                                                           | <p>In Yr4 students learn about food chains, predators and prey and in Yr6 students learn about classification and adaptation to the environment. This module builds upon their understanding of how environments can change and the importance of photosynthetic organisms, developing understanding of the concepts of interdependence and adaptation in both plants and animals. This provides a foundation for concepts that will be revisited in year 9 in B3.4 Variation as well as at KS4 as part of the B7 section of the GCSE specification This topic provides opportunities to develop mathematical skills linked to calculating energy transfers, calculating percentage change and interpreting graphs.</p> <p>Building on the introduction to chemical reactions, involving acids and alkalis, this takes the concepts of atoms and applies</p> | End of topic test and composite task |

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|          |                                                                                                                                                                                                                                                                                                                                                                                                            | <p>them to chemical reactions. Students will encounter the different types of reactions covered in KS4, with opportunity to further develop their practical chemistry skills. They will develop mathematical skills in using ratios, that will be required to calculate the amounts of substance in a chemical reaction. This is a core skill to develop before studying Quantitative Chemistry in KS4.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |
| Term 3:1 | <p><b>Inheritance</b></p> <ul style="list-style-type: none"> <li>• Variation</li> <li>• Inheritance</li> <li>• Natural selection</li> <li>• Extinction</li> </ul> <p><b>Motion and pressure</b></p> <ul style="list-style-type: none"> <li>• speed</li> <li>• motion graphs</li> <li>• pressure in gases</li> <li>• pressure in liquids</li> <li>• pressure in solids</li> <li>• turning forces</li> </ul> | <p>In Yr6 students learn about variation, inheritance and evolution all of which are built upon into this module by looking at variation that occurs within nature and introducing DNA. genes and chromosomes. These key concepts will be revisited in year 9 in B3.4, Variation &amp; Natural Selection, creating a foundation for further study at KS4 in topic B6, Inheritance, as part of the GCSE Biology specification. This topic provides opportunities to develop mathematical graphing skills by plotting graphs of continuous variation and recording data in tables.</p> <p>This Year 8 topic introduces measurement of speed and distance time graphs and develops numeracy skills through graph work and the calculations. Students go on to learn about pressure in gases and liquids and relate this to floating and sinking. Use of the work done, pressure and moment equations links to sections 3.5 and 4.2 of the maths Year 7 scheme of work where students use a calculator efficiently, use a simple formula written in words and substitute numbers into an algebraic and formula and section 5.4 of the Year 9 scheme of work where students learn to rearrange a formula.</p> | End of topic test and composite task |
| Term 3:2 | <p><b>Metal and other materials</b></p> <ul style="list-style-type: none"> <li>• Metals and acids</li> <li>• Metals and oxygen</li> <li>• The reactivity series</li> <li>• Metal displacement reactions</li> <li>• Extracting metals</li> </ul>                                                                                                                                                            | <p>Students build upon the foundations of chemical reactions to learn about the reactivity series, metal displacement reactions and extracting metals, which prepares them for the chemical changes topic in KS4.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | End of topic test and composite task |



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| YEAR 9   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                      |
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| TERM     | Topic sequence<br>(What are you teaching?)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Topic sequence rationale<br>(Why are you teaching this? How does it link to prior learning? Any notable links to <a href="#">St Edmund's curriculum mission</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Main method of assessment?           |
| Term 1:1 | <p><b>Forces and motion</b></p> <ul style="list-style-type: none"> <li>• forces and their interactions</li> <li>• mass weight and fields</li> <li>• speed and distance time graphs</li> <li>• balanced and unbalanced forces</li> <li>• resultant forces</li> <li>• acceleration and speed-time graphs</li> </ul> <p><b>Cells</b></p> <ul style="list-style-type: none"> <li>• Plant and animal cells</li> <li>• Prokaryotic cells</li> <li>• Cell specialisation</li> <li>• Diffusion</li> <li>• Active transport</li> </ul> <p><b>The Earth</b></p> <ul style="list-style-type: none"> <li>• The Earth and its atmosphere</li> <li>• The carbon cycle</li> </ul> | <p>Forces were introduced early in Year 7 and this module applies concepts students have learnt, such as balanced and unbalanced forces, to more challenging situations, such as a skydiver. In Year 7 (forces) and 8 (motion and pressure) students have begun to quantify motion and physical properties, such as the stiffness of a spring, and have calculated speed and weight. This chapter extends quantification to resultant force and acceleration. Distance-time graphs are reviewed and speed-time graphs are introduced. Instantaneous speeds and accelerations are calculated from tangents.</p> <p>Cells were introduced at the start of Year 7 in a unit that builds upon KS2 knowledge of the functioning of animals and plants. Students have also previously studied the biological process of respiration and the transport of substances between cells. This unit reinforces understanding of the structure of eukaryotic and prokaryotic cells, cell specialisation and transport processes to create a foundation for further study at KS4 in topic B1 of the GCSE Biology specification. This topic provides opportunities to develop mathematical skills linked to making sensible estimates in relation to everyday situations.</p> <p>The Earth module introduces the atmosphere, climate change and recycling. This prepares students for further work in KS4 on Chemistry of the Atmosphere and Using Resources. There are</p> | End of topic test and composite task |

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|          | <ul style="list-style-type: none"> <li>• Global heating</li> <li>• Climate change</li> <li>• Recycling</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | strong links to the whole school curriculum mission around tackling global issues, and it complements work carried out in Geography in KS3 and KS4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |
| Term 1:2 | <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• energy stores</li> <li>• energy transfers</li> <li>• energy resources</li> <li>• conservation and dissipation of energy</li> <li>• work and power</li> <li>• efficiency</li> <li>• elastic energy and Hooke's Law</li> </ul> <p><b>Cell systems</b></p> <ul style="list-style-type: none"> <li>• Cells to organ systems</li> <li>• Digestive enzymes</li> <li>• Respiratory system</li> <li>• Circulatory system</li> <li>• Respiration</li> <li>• Leaf Structure</li> <li>• Photosynthesis</li> <li>• Transpiration</li> </ul> | <p>In this module students engage more fully with the fundamental idea of energy stores introduced in Year 8 (energy) and begin to quantify how much energy is in them and moving between them. Examples of energy stores include the thermal store of a ball or the air in a room and the kinetic store of a moving object. Energy is an abstract concept that can be stored in any of these stores and can move between them but cannot be created or destroyed. When energy moves from one store to another, something changes in the physical world, for example, the temperature of an object goes down or a moving object gets faster. Students then further develop the idea of work and power and efficiency, are introduced The module then links back to apply Hooke's Law from the forces module in Year 7.</p> <p>In Year 7 students learn about the hierarchical organisation of organisms, the structure and functions of different organ systems and the movement of substances then continue to develop their understanding of biological molecules and processes in Year 8. Cell Systems builds on this knowledge to provide a foundation for further study at KS4 in the GCSE topics found in both units B2 and B4 of the GCSE specification in Year 10. This topic provides opportunities to develop mathematical skills linked to calculating surface area to volume ratio and heart rate</p> | End of topic test and composite task |

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|                 | <p><b>Atoms and the Periodic Table</b></p> <ul style="list-style-type: none"> <li>• The particle model</li> <li>• States of matter and changes of state</li> <li>• Atoms and elements</li> <li>• Development of the Periodic Table</li> <li>• Inside atoms</li> <li>• Metals and non-metals in the Periodic Table</li> <li>• Groups of the Periodic Table</li> <li>• Compounds and mixtures</li> <li>• Electronic structure</li> </ul>                                                                                                                                                                                                                    | <p>The module on atoms and the periodic table builds upon the foundation of knowledge from Years 7 and 8 and underpins further study in KS4 on atomic structure and the periodic table. It includes recall of the particle model and changes of state from Year 7. The history of development of the periodic table is introduced which will be further developed in KS4. Electron structure is introduced which will be an important concept at KS4 and help with understanding chemical reactions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                             |
| <b>Term 2:1</b> | <p><b>Waves light and sound</b></p> <ul style="list-style-type: none"> <li>• wave properties</li> <li>• sound and its applications</li> <li>• reflection and refraction</li> <li>• applications of reflection and refraction</li> <li>• light and colour</li> <li>• the electromagnetic spectrum</li> <li>• applications of electromagnetic waves</li> </ul> <p><b>Reproduction (Fertilisation &amp; Implantation)</b></p> <ul style="list-style-type: none"> <li>• Sexual reproduction</li> <li>• Menstrual cycle</li> <li>• Preventing pregnancy</li> </ul> <p><b>Atoms and the Periodic Table cont. (see above)</b></p> <p><b>Chemical changes</b></p> | <p>This unit builds on the Year 7 light and sound units, linking longitudinal and transverse waves and introducing the concepts of period and frequency. We then look at ultrasound and its applications and apply the concepts of reflection and refraction to lenses and telescopes. Colour is revisited as students learn about Newton's recombination experiment and rods and cones. The electromagnetic spectrum and everyday applications of electromagnetic waves are introduced in preparation for the GCSE waves topic.</p> <p>Students have previously encountered key concepts linked to this topic in Year 7 where they will have covered the structure and function of the reproductive systems, gametes, fertilisation, implantation and the menstrual cycle. Some of these concepts will be revisited again at KS4 in topic B6 (Inheritance) of the GCSE specification.</p> <p>The chemical changes topic builds upon Year 8 units on reactions, including chemical equations and exothermic and</p> | <p>End of topic test and composite task</p> |

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|          | <ul style="list-style-type: none"> <li>• What are chemical changes</li> <li>• Chemical and physical changes</li> <li>• Reactants and products</li> <li>• Writing chemical equations</li> <li>• Conservation of mass</li> <li>• Energy in chemical reactions</li> <li>• Exothermic and endothermic reactions</li> </ul>                                                                                                                                                                                                                                                   | <p>endothermic reactions. It prepares students for further study in KS4 quantitative chemistry (by introducing conservation of mass), energy changes and chemical changes modules. Students will apply mathematical skills in balancing chemical equations and applying the law of conservation of mass to calculate amounts of substance in a reaction.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |
| Term 2:2 | <p><b>Electricity and magnetism</b></p> <ul style="list-style-type: none"> <li>• static electricity and charge</li> <li>• current, potential difference and resistance</li> <li>• series and parallel circuits</li> <li>• magnetism</li> <li>• electromagnetic induction</li> <li>• ac current and the National Grid</li> </ul> <p><b>Inheritance (Fertilisation &amp; Implantation)</b></p> <ul style="list-style-type: none"> <li>• Inheriting characteristics</li> <li>• Asexual reproduction</li> <li>• Cloning</li> </ul> <p>Chemical changes cont. (see above)</p> | <p>The concepts of static electricity, current, potential difference and series and parallel are revisited from the Year 8 electricity and magnetism unit. The ideas are taken further by applying them to sparks, lightning and household applications. Magnetism is revisited and the domain theory introduced. The concept is then applied to motors, generator, ac and the National Grid in preparation for the GCSE electromagnetism topic.</p> <p>Students have previously encountered key concepts linked to this topic in Year 7 and in the previous year 9 module. This topic builds on the concepts of inheritance and further develops their understanding of inheritance of characteristics and the role of genes that were introduced in Year 8 B2.4. These concepts will be revisited again at KS4 in topic B6 of the GCSE specification. This topic provides further opportunities to develop mathematical graphing skills throughout the unit as well as calculating probability based on genetic inheritance.</p> | End of topic test and composite task |
| Term 3:1 | <p><b>Useful chemical reactions</b></p> <ul style="list-style-type: none"> <li>• Chemical reactions</li> <li>• Using metals</li> <li>• The reactivity series</li> <li>• Displacement reactions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                | <p>This module explores further chemical reactions, with a focus on metals and the reactivity series. Students will first cover metals and their properties. They then study the reactivity series and displacement reactions, before concluding the chapter with some more mathematical topics, including relative mass and</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | End of topic test and composite task |

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|          | <ul style="list-style-type: none"> <li>• Extracting metals</li> <li>• Relative mass</li> </ul> <p>Variation &amp; Natural Selection</p> <ul style="list-style-type: none"> <li>• Variation</li> <li>• Adaptation</li> <li>• Natural selection &amp; antibiotic resistance</li> </ul>                        | <p>yields. This chapter provides an excellent opportunity for practical work and applying mathematical skills in science. It prepares students for the KS4 topic on chemical changes.</p> <p>This module builds on the concepts of natural selection and evolution covered in year 8 using the context of antibiotic resistance. This can then be linked to the need to maintain biodiversity and conserve species before extinction in the final year 9 topic. At KS4 students will revisit these concepts in topic B6 of the GCSE Biology specification. This topic provides further opportunities to develop mathematical skills by calculating percentage change, constructing graphs and potentially discussions of exponential growth of bacterial populations.</p> |                                      |
| Term 3:2 | <p>Ecosystems &amp; Biodiversity (Variation &amp; Natural Selection)</p> <ul style="list-style-type: none"> <li>• Ecosystems</li> <li>• Biotic &amp; abiotic factors</li> <li>• Investigating competition</li> <li>• Maintaining biodiversity</li> </ul> <p>Useful chemical reactions cont. (see above)</p> | <p>This module builds on the concepts of adaptations, natural selection and evolution covered in year 8 and the previous year 9 topic which can then be linked to the need to maintain biodiversity and conserve species before extinction. At KS4 students will revisit concepts covered in this module in topic B7 (Ecology) of the GCSE Biology specification including abiotic and biotic factors, competition and adaptations. This topic provides further opportunities to develop mathematical skills by investigating the distribution of organisms within an ecosystem and representing data using suitable tables and graphs.</p>                                                                                                                               | End of topic test and composite task |