



# SCIENCE CURRICULUM MAP

**BIG IDEAS:** Our Science curriculum covers a broad range knowledge and methodology within Biology, Chemistry and Physics that allows students to understand the principles and rationale in Science and make links between the disciplines. This knowledge then enables them to make predictions, draw conclusions and understand how the world around them works. This further enables them to question the uses and implications of Science and make informed contributions to the society they live in a time where Science and Technology is increasingly significant. Working Scientifically underpins how Science is taught and inspires a curiosity and enjoyment of the subject. Opportunities are planned in for students to plan and implement investigations, analyse and present data and make conclusions. Communicating these skills is consistent between each discipline of Science. At Secondary level, many of these concepts and skills, or can seem very abstract to many students and we have built in to our schemes examples of how these link to the other sciences, situations they are familiar with and to other curriculum areas (Design Technology, Food & Nutrition, Geography, PE, Maths included) to enable students to see the relevance and importance of these concepts. Misconceptions and prior knowledge are addressed in each topic as is the vast vocabulary within the Scientific disciplines. Our schemes of learning are reviewed regularly to ensure they remaining challenging and enable our students to reach their full potential. The complex language of Science is considered in every topic and any previous misconceptions students may have is addressed throughout. Teaching of the schemes is personalised by each teacher for students in their class.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<b>KS3</b>	Science in Year 7 and Year 8 is taught in ten themes. These are taught on rotation within two terms and are summatively assessed at the end. The order has been decided taking in to account prior learning of these themes at key stage 2 and the link to later themes. The rotation of teaching provides an equity of experience to all students ensuring resources are available for every class. In addition to these ten themes, Y7 are taught an introductory topic covering the basics of working in a laboratory and skills in science which feed through each topic. Schemes of learning have been designed to be challenging, building on KS2 and Y7 learning, not simply repetition. Practicals are implemented to build skills and inspire students in their learning of Science. Within each topic is an assessment task that addresses one focused area of working scientifically including, planning, implementing, analysing, drawing conclusions, evaluating and communicating their ideas. Homework is used to check understanding in the lessons through Educake. We have supporting textbooks that students can access on their iPads that delivers content in the same ten themes.					
<b>Year 7</b>	<ul style="list-style-type: none"> <li>Welcome to Science</li> <li>Organisms - cells and movement</li> <li>Forces - gravity and speed</li> <li>Waves - light and sound</li> <li>Earth - universe and Earth structure</li> </ul>	<ul style="list-style-type: none"> <li>Electricity: current, voltage, resistance</li> <li>Matter - particle model and separating mixtures</li> <li>Genes - human reproduction, variation</li> </ul>	<ul style="list-style-type: none"> <li>Energy - energy transfers and energy costs</li> <li>Ecosystem - plant reproduction and interdependence</li> <li>Reactions - acids and alkalis; metals and non-metals</li> </ul>			
<b>Year 8</b>	<ul style="list-style-type: none"> <li>Organisms - breathing and digestion</li> <li>Forces - contact forces and pressure</li> <li>Waves - wave properties and effects</li> <li>Earth - climate and Earth resources</li> </ul>	<ul style="list-style-type: none"> <li>Electromagnetism - magnets and electromagnets</li> <li>Matter - Elements, the Periodic Table</li> <li>Genes - evolution and inheritance</li> </ul>	<ul style="list-style-type: none"> <li>Energy - work; heating and cooling</li> <li>Ecosystem - photosynthesis and respiration</li> <li>Reactions - chemical energy, types of reaction</li> </ul>			
<b>Wider/Super Curriculum</b>	CREST awards - Bronze; I'm a scientist, get me out of here: I'm an engineer, get me out of here; Science week - involvement in demo day; Enrichment week opportunities including Euro Space and Disney residential and a visit to Herstmonceux Observatory; Super curricular fortnight; Big Bang Fair at Ardingly; IET Faraday challenge; Race to the Line					

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<b>KS4</b>	<p>The exam board for GCSE is AQA. Approximately 60 students sit three separate Science GCSEs in biology, Chemistry and Physics. Students are selected for this route although this is not simply based on the highest attaining 60 students. All students sit an exam at the end of Y8. This data, along with English and Maths progress data, attendance and attitude learning is combined to identify those capable of completing the three GCSEs successfully. In addition, all students are surveyed on their Science aspirations and their desire to pursue all three to help make the best selection for Y9. All other students follow the AQA Trilogy GCSE. Due to resourcing of the practical lessons at GCSE, each class will be taught the units in different orders. This order is decided between the partner teachers of each group taking in to account the students in the class and their prior attainment and the specialism/s of each teacher.</p> <p>Homework is made up of regular structured revision, exam questions practise and knowledge checking and retrieval practise using Educake.</p>					
<b>Year 9</b> Students study two of three units. Depending on the class and unit, classes may begin Y10 content before the end of term 6 Y9	<b>Skills unit:</b> Students will review key practical skills which will be building them up to beginning GCSE content and carrying out required practicals. Students will revisit key words, practical techniques and skills and begin to explore data analysis methods.	<b>Biology</b> <ul style="list-style-type: none"> <li>Cell Biology - differences in cell structure, cell division and stem cells</li> <li>Organisation - digestive system, heart and circulatory system, coronary heart disease and plant transport systems</li> <li>Infection and response - pathogens, immunity, vaccination, antibiotics and antibiotic resistance</li> <li>Bioenergetics - aerobic and anaerobic respiration in humans and other organisms, photosynthesis</li> </ul>	<b>Chemistry:</b> <ul style="list-style-type: none"> <li>Atomic structure and the Periodic Table - electronic configuration, development of the Periodic Table</li> <li>Bonding, structure and the properties of matter - giant and simple molecules</li> <li>Quantitative Chemistry - balancing equations, mole calculations, yield</li> <li>Chemical changes - predicting patterns, extracting metals</li> <li>Energy changes - exothermic and endothermic reaction, electrolysis</li> </ul>	<b>Physics:</b> <ul style="list-style-type: none"> <li>Energy: stores and transfers, energy resources, calculations</li> <li>Electricity - current, voltage and resistance, components, national grid</li> <li>Particle model of matter - solids, liquids and gases, pressure, density</li> <li>Atomic structure - development of the model of an atom, nuclear radiation</li> </ul>		
<b>Year 10</b> Students study the final 'Year 9' unit not covered with one teacher. The second teacher teaches one of the following:	<b>Biology:</b> <ul style="list-style-type: none"> <li>Homeostasis and response - controlling internal conditions, nerve impulses</li> <li>Inheritance, variation and evolution - genetics, genetic disorders, reproduction, selective breeding, GM, cloning, natural selection</li> <li>Ecology - ecosystems, biodiversity</li> </ul>	<b>Chemistry:</b> <ul style="list-style-type: none"> <li>Rate and extent of chemical change - rates of reaction, yield</li> <li>Organic chemistry - alkanes, alkenes, extraction, polymers, uses</li> <li>Chemical analysis - chromatography, formulations, identification of gases</li> <li>Chemistry of the atmosphere - Earth's atmosphere, greenhouse gases, atmospheric pollutants</li> <li>Using resources: Earth's resources, potable water, life cycle assessment, recycling</li> </ul>	<b>Physics:</b> <ul style="list-style-type: none"> <li>Forces - work done, energy transfers, elasticity, motion, momentum</li> <li>Waves - waves in fluids and solids, Electromagnetic spectrum</li> <li>Magnetism and electromagnetism - permanent and induced magnets, magnetic forces and fields, the motor effect</li> <li>*Space Physics - solar system, orbital motions, satellites, red shift. *Triple Science only</li> </ul> <p>Students begin the Y11 content</p>			
<b>Year 11</b>	Triple Science students complete the third 'Y10' unit started at the end of Y10.			Revision and exams		
	Combined Science students complete the third 'Y10' unit started at the end of Y10.			Revision and exams		
<b>Wider/Super Curriculum</b>	CREST awards - Bronze and silver; Science week - involvement in demo day; Enrichment week opportunities including Euro Space and Disney residential and a visit to Herstmonceux Observatory (Y10); GCSE Science Live!; Super curricular fortnight; Big Bang Fair at Plumpton; Top of the Bench; University taster days					

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<b>KS5 BIOLOGY</b>	<p>The exam board for A Level Biology is AQA. Approximately 45 students sit the exam in each year group.</p> <p>Entry requirements are: Grade 6 in 2 Science Subjects - 6/6 GCSE Combined Science or 6 GCSE Biology and other science, Grade 6 in GCSE Maths. Classes are shared between 2 teachers, content taught is separated equally between the 2 teachers (each teaching 4 of the 6 sections of the course, 2 from each year.)</p> <p>Practical work is carried out in line with AQA guidelines (12 required practicals. Practical skills are also supported by additional practical work.) Homework varies, but regularly are past paper exam questions on subject being covered or retrieval practice. Students use a workbook to support independent study in addition to resources on firefly and tasks set via Seneca learning.</p> <p>All students sit the same assessment at the end of each section.</p>					
<b>Year12</b>	<ul style="list-style-type: none"> <li>• Biological molecules (Carbohydrates, Proteins, Lipids, Enzymes, DNA, ATP, Water)</li> <li>• Cells (Ultra Cell Structure, Movement across membranes, Osmosis, Immunity)</li> </ul>		<ul style="list-style-type: none"> <li>• Organisms exchange substances with their environment (Heart, Lungs, Digestion)</li> <li>• Genetic information, variation and relationships between organisms. (Protein synthesis, mutations, genetic diversity)</li> </ul>		<ul style="list-style-type: none"> <li>• Photosynthesis.</li> <li>• The Environment, Sampling &amp; use of statistical analysis</li> </ul>	
<b>Year13</b>	<ul style="list-style-type: none"> <li>• Energy transfers in and between organisms (Respiration, Energy transfers)</li> <li>• Organisms respond to change in their internal and external environments (Nerves, Muscles, Homeostasis)</li> </ul>		<ul style="list-style-type: none"> <li>• Genetics, populations, evolution and ecosystems (Inheritance, Evolution, Ecosystems)</li> <li>• The control of gene expression. (Gene mutation and expression, Recombinant DNA technology)</li> </ul>		<ul style="list-style-type: none"> <li>• Revision And Exams</li> </ul>	
<b>Wider Super Curriculum</b>	<ul style="list-style-type: none"> <li>• Dissections, students have the opportunity to do dissection after school.</li> <li>• Medical support. Guidance and advice provided for students applying to degrees.</li> <li>• Doctors invited in to college, stimulate interest and offer support and guidance, through applications and interviews.</li> <li>• University taster days.</li> </ul>					

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<b>KS5 CHEMISTRY</b>	<p>The exam board for A level chemistry is OCR B, Salters. Students starting the course have achieved a grade 6,6 in combined science GCSE or a grade 6 in two of the separate sciences (to include chemistry) and a grade 6 in maths GCSE.</p> <p>In year 12 the first unit consolidates learning from GCSE and provides a platform of secure knowledge going forwards. This is taught by both teachers and then subsequent topics are taught by one teacher.</p> <p>Practical assessments for the Practical Endorsement are covered throughout all units.</p>					
<b>Year 12</b>	<ul style="list-style-type: none"> <li>• Elements of Life</li> <li>• Developing Fuels</li> <li>• Elements from the sea</li> </ul>	<ul style="list-style-type: none"> <li>• Elements from the sea continued</li> <li>• The Ozone Story</li> <li>• What's in a medicine?</li> </ul>		<ul style="list-style-type: none"> <li>• Revision</li> <li>• The chemical industry</li> <li>• Polymers and Life</li> </ul>		
<b>Year 13</b>	<ul style="list-style-type: none"> <li>• Oceans</li> <li>• Developing Metals</li> </ul>	<ul style="list-style-type: none"> <li>• Colour by Design</li> <li>• Revision Programme</li> </ul>		<ul style="list-style-type: none"> <li>• Revision and exams</li> </ul>		
<b>Wider Super Curriculum</b>	<ul style="list-style-type: none"> <li>• Student support and display team for open evenings</li> <li>• RSC UK Chemistry Olympiad</li> <li>• University of Sussex Outreach, Spectroscopy in a Suitcase</li> <li>• University Taster Days</li> </ul>					

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<b>KS5 PHYSICS</b>	<p>The exam board for A Level Physics is AQA. Students starting the course have achieved a grade 6,6 in combined science GCSE or a grade 6 in two of the separate sciences (to include physics) and a grade 6 in maths GCSE. In year 12 and 13 The topic units are split based on content and shared between the teachers to allow for consistency of teaching and development of key ideas specific to that topic area.</p> <p>Practical assessments for the Practical Endorsement are covered throughout all units.</p> <p>At A-level the majority of homework is centred around passed exam questions, allowing pupils time to practice the content in class. There are also elements of research, further reading and presentation task to help build independence and study skills needed to help them move beyond A-level. Independent work is developed through LRC lessons where pupils complete workbooks developed in the style of exam questions as well as directions to further reading.</p>					
<b>Year 12</b>	<ul style="list-style-type: none"> <li>• Mechanics and materials</li> <li>• Waves and optics</li> </ul>	<ul style="list-style-type: none"> <li>• Materials and Electricity</li> <li>• Particles and Radiation</li> </ul>		<ul style="list-style-type: none"> <li>• Electricity and further mechanics</li> <li>• Particle physics and radiation and fields</li> </ul>		
<b>Year 13</b>	<ul style="list-style-type: none"> <li>• Further mechanics and thermal physics and Capacitors</li> <li>• Fields</li> </ul>	<ul style="list-style-type: none"> <li>• Fields and Nuclear physics</li> <li>• Astrophysics</li> </ul>		<ul style="list-style-type: none"> <li>• Exam preparation</li> </ul>		
<b>Wider Super Curriculum</b>	<ul style="list-style-type: none"> <li>• Student support and display team for open evenings</li> <li>• CERN visit</li> <li>• In school library of further reading</li> <li>• University Taster Days</li> </ul>					