

# St Mary's CE High School Curriculum Map 2022-23



## Subject: Science Year: 9

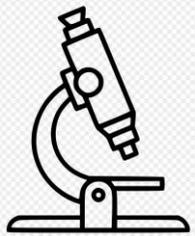
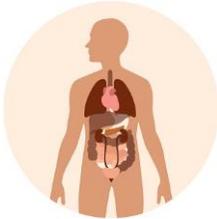
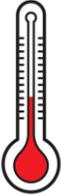
### GREEN = CROSS CURRICULAR LINKS TO EXPLORE

The understanding of scientific thinking is fundamental to making decisions in society that affect us all. This enables students to broaden their minds to make informed decisions about all aspects of the world in which we live. We are passionate about the subject as a way of understanding the universe and the excitement and enjoyment it can bring to how we view the world around us. We encourage the study of Biology, Chemistry and Physics equally and separately but recognise the common skills required by all three.

We believe the study of Science give students the skills they need that are useful to them for later learning and decision making for any subjects they study in the future. The study of Science also paves the way for a vast array of careers and job opportunities whether they require pure scientific knowledge or an application of the skills and understanding gained through the study of the subjects.

Fundamental skills essential for Science include analysis of data, communication of ideas through speech and writing, application of knowledge to explain natural phenomena and make predictions, use of evidence to come to conclusions and the use of practical skills to carry out experiments.

**Year 9 Science** - Learners study Biology, Chemistry and Physics following the AQA Combined Science Trilogy or AQA Separate Sciences. Ideas are introduced within relevant and interesting settings which help learners to anchor their conceptual knowledge of the range of scientific topics required at GCSE level. Practical skills are embedded within the specification and learners are expected to carry out a range of practical work in preparation for a written examination, in which these skills will be tested.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
						
<b>CONTENT</b>	Atomic Structure and the Periodic Table <ul style="list-style-type: none"> <li>Structure of an atom</li> </ul>	Cell Biology <ul style="list-style-type: none"> <li>Eukaryotes and prokaryotes</li> </ul>	Energy <ul style="list-style-type: none"> <li>Energy stores and transfers</li> <li>Efficiency</li> </ul>	Organisation <ul style="list-style-type: none"> <li>The workings of the digestive system</li> </ul>	Chemistry of the Atmosphere <ul style="list-style-type: none"> <li>The composition of</li> </ul>	Particle Model of Matter <ul style="list-style-type: none"> <li>Density of materials</li> </ul>

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<p><i>Declarative Knowledge – 'Know What'</i></p>	<ul style="list-style-type: none"> <li>• Writing chemical formulae</li> <li>• Mixtures and separation</li> <li>• Models of the atom over time</li> <li>• Electronic Configuration</li> <li>• Development of the Periodic Table</li> </ul>	<ul style="list-style-type: none"> <li>• Structure of animal and plant cells.</li> <li>• Specialised cells.</li> <li>• The use of microscopy in Scientific advancement s.</li> </ul>	<ul style="list-style-type: none"> <li>• Use of formulae and equations to calculate energy quantities.</li> <li>• Sources of energy (renewable and non-renewable).</li> </ul>	<ul style="list-style-type: none"> <li>• Qualitative testing for biological molecules</li> <li>• Structure and function of the circulatory system</li> <li>• Communicable heart disease and health issues</li> <li>• The impact of lifestyle choices on health</li> <li>• Cancer diagnosis and treatment</li> </ul>	<p>the atmosphere</p> <ul style="list-style-type: none"> <li>• Earth's early atmosphere</li> <li>• Greenhouse gases</li> <li>• Global warming</li> <li>• Climate change</li> <li>• Reducing our carbon footprint</li> <li>• Atmospheric pollutants</li> <li>• Using Earth's resources sustainably</li> <li>• Potable water</li> <li>• Life Cycle Assessment and recycling</li> </ul>	<ul style="list-style-type: none"> <li>• Changes of state</li> <li>• Internal Energy and temperature changes</li> <li>• Specific heat capacity and specific latent heat.</li> <li>• Particle model and pressure.</li> </ul>
<p><b>Skills</b> <i>Procedural Knowledge – 'Know How to'</i></p>	<ul style="list-style-type: none"> <li>• Understand how scientific theories and methods develop over time.</li> <li>• Use a range of equipment to separate mixtures</li> <li>• Visualise and represent 2D and 3D forms.</li> <li>• Explain how testing a prediction can support or refute a new Scientific idea.</li> <li>• Recognise, draw and interpret images of cells</li> <li>• Evaluate the practical risks and benefits, as well as social and ethical issues, of the use of stem cells in medical research and treatments.</li> <li>• Recognise, draw and interpret diagrams that model diffusion and osmosis.</li> </ul>	<ul style="list-style-type: none"> <li>• Recall, rearrange and apply equations.</li> <li>• Observe and draw blood cells seen under a microscope.</li> <li>• Evaluate methods of treatment for diseases bearing in mind benefits and risks.</li> <li>• Interpret data about risk factors for specified diseases.</li> <li>• Measure the rate of transpiration by the uptake of water.</li> </ul> <p><u>Maths Skills</u> Students may be required to calculate or use efficiency values as a decimal or as a percentage. Develop an understanding of size and scale in relation to cells, tissues, organs and tissues.</p>	<ul style="list-style-type: none"> <li>• Explain what is meant by 'random error' and 'systematic error' and how to reduce these errors.</li> <li>• Perform an experiment to measure the latent heat of fusion.</li> </ul> <p><u>Maths Skills</u> Using ratios, fractions and percentages. Translate information between graphic and numeric form. Make estimates of the results of simple calculations. <u>Cross curricular links</u> English – use of Tier 2 and 3 vocabulary.</p>			

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	<p><u>Maths Skills</u> Use SI units and the prefix nano. Recognise expressions in standard form. Use of prefixes centi, milli, micro and nano.</p> <p><b>Cross Curricular links</b> English – use of Tier 2 and 3 vocabulary. Geography – the effects of combustion on air quality and the atmosphere. Sustainability. Religious Studies- ethical ideas about conception and when does life begin?</p>	<p>Process data from investigations involving stomata and transpiration by rates to find arithmetic means, understanding the principles of sampling and calculate surface areas and volumes.</p> <p><b>Cross curricular links</b> English – use of Tier 2 and 3 vocabulary. PSHCE – What choices can I make to prevent illness?</p>	<p>Geography – Sustainability Religious Studies – The concept of Stewardship and looking after our planet.</p>
<p><b>Key Questions</b></p>	<p>How was the Periodic Table developed? How is the Periodic Table arranged? How do we know what atoms are like?</p> <p>How do cells perform a specific function within the organism? How do cells divide to produce identical cells? Why are Scientists interested in stem cells? How can scientists help improve the supply of potable water?</p>	<p>How is energy transferred? How is energy conserved? What is meant by efficiency? What are the critical problems faced by Scientists this century? How can Physicists and engineers identify ways to reduce our energy use?</p> <p>How does the human digestive system provide the body with nutrients? How does the respiratory system provide the body with oxygen and remove carbon dioxide? How can people reduce the risk of disease through improved diet and life style? How can we treat coronary heart disease? How is a plant's transport system dependent on it's environment?</p>	<p>What is meant by a 'dynamic' atmosphere? How do Scientists monitor and predict weather and climate change? How do increased levels of air pollutants cause problems? How can scientists and engineers develop solutions to help reduce the impact of human activity?</p> <p>How can we predict the behaviour of solids, liquids and gases? How do Scientists use these observations and principles to design vessels e.g. submarines and spacecraft?</p>

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<p><b>Assessment</b></p>	<p>Formative assessment: weekly low stakes 'progress checks' for students in the form of exit tickets.</p> <p>This will be marked by the class teacher and used as a diagnostic tool. Students will have opportunities to redraft their work.</p>	<p>Summative assessment: Students will sit end of unit tests for each module of 40 marks per test, taking 50 minutes to complete. Sat under exam conditions in class.</p>	<p>Formative assessment: weekly low stakes 'progress checks' for students in the form of exit tickets.</p> <p>This will be marked by the class teacher and used as a diagnostic tool. Students will have opportunities to redraft their work.</p>	<p>Summative assessment: Students will sit end of unit tests for each module of 40 marks per test, taking 50 minutes to complete. Sat under exam conditions in class.</p> <p>YEAR 9 EXAMS – JANUARY date tbc</p>	<p>Formative assessment: weekly low stakes 'progress checks' for students in the form of exit tickets.</p> <p>This will be marked by the class teacher and used as a diagnostic tool. Students will have opportunities to redraft their work.</p>	<p>Summative assessment: Students will sit end of unit tests for each module of 40 marks per test, taking 50 minutes to complete. Sat under exam conditions in class.</p>
<p><b>Extended Learning /Extension Activities</b></p>	<p><b>ALL EXTENDED LEARNING, BLENDED LEARNING TASKS, HOMEWORK and CHALLENGE ACTIVITIES - WILL BE SET VIA GOOGLE CLASSROOM</b></p> <p><b>STEM CLUB – begins in Autumn Term, open to all Year 9 students.</b></p>					