



Rationale for our Science Curriculum

Our Intent

Based on the National Curriculum, our Science curriculum strives to nurture our children's creativity, knowledge and awe of God's creation through providing a practical and engaging approach to learning. The curriculum is **ambitious for all** and all pupils are encouraged and supported to develop a sense of curiosity and wonder for the world around them and build these firm foundations into the strands of biology, chemistry and physics. During their time at St Mary's, our pupils will learn to develop their scientific investigation skills through a range of scientific enquiry approaches which help them to approach, question, strategize, investigate, explore, analyse and summarise their findings.

Early Years and Key Stage 1

In **EYFS**, through the umbrella of Understanding the World, children begin engaging in foundational explorations of the natural world. They are encouraged to observe and make drawings of animals and plants, fostering their observational skills. The focus here is on identifying similarities and differences within various environments—an introductory step to recognising biodiversity. Additionally, they learn about processes and changes, such as the seasons and changing states of matter, laying a conceptual groundwork for their future studies.

As students transition into **Year 1**, the curriculum builds on prior learning and places a strong emphasis on seasonal changes and the associated weather patterns. Learners begin to gather data on daylight lengths—an early introduction to scientific observation and data collection. The exploration of animals, encompassing their basic body parts and senses, helps students relate to their own biology and enhances their understanding of the human body. Learning about materials involves comparing physical properties, fostering skills in categorisation and critical thinking.

By **Year 2**, the focus diversifies into living things, habitats, and the concept of life cycles. Students engage in classifying organisms as living, dead, or never lived, emphasising the characteristics of life. The inquiry into healthy living introduces students to the importance of diet and exercise, bolstering their understanding of biological systems while also instilling personal responsibility for health. The study of how materials can be altered and grouped based on specific characteristics encourages further analytical thinking. This year builds crucial connections between personal health, biological concepts, and environmental science.

Key Stage 2

In **Year 3**, students begin to study more complex topics such as rocks and forces. The introduction to soil and fossils extends their understanding of Earth sciences, allowing students to grasp the processes that shape their physical environment. The mechanics of forces, such as movement on different surfaces and the functions of magnets, provide a practical application of physics. With the plant life cycle and the transport of water in plants, learners connect biological processes with physical principles. This year highlights the interplay between different strands of science, emphasising that knowledge in one area can enhance understanding in another.

As we enter **Year 4**, topics such as electricity and sound showcase the transition into more abstract concepts. Students learn to construct circuits, identify their components, and understand conductors and insulators – skills pivotal for future scientific and technological understanding. In discussing sound, students explore waves and vibrations, making connections to physics and auditory perception. The examination of states of matter, particularly changes such as evaporation and condensation,

introduces essential principles that will be foundational for later studies in chemistry. This year fosters critical thinking, allowing students to engage with concepts that will recur in future learning.

Year 5 intensifies the complexity of scientific inquiry, diving deeper into properties and changes in materials, alongside exploring the Earth and space. Students investigate the nature of materials, including reversible and irreversible changes, thus instilling an understanding of chemical processes. In the realm of Earth and space, pupils learn about the solar system's structure, planetary orbits, and the mechanics behind day and night - connections that link astronomy with physics. The cumulative nature of learning becomes evident as students synthesise their knowledge of materials and forces, enriching their scientific literacy.

In **Year 6**, students explore advanced concepts in light and electricity, such as understanding light's linear travel and its interaction with objects. They gain experience in using scientific symbols, drawing circuits, and evaluating their effectiveness - a critical component in developing practical skills for scientific experimentation. Moreover, students reflect on the cumulative nature of their learning, linking it back to their early explorations in earlier years. T

Throughout each year, the curriculum builds upon prior knowledge, necessitating an understanding that scientific concepts are not learned in isolation but are interconnected. This cumulative learning approach ensures that students develop a comprehensive understanding of scientific principles that is not only foundational but also transferable to real-world phenomena. It promotes lifelong curiosity about the natural world, helping children understand their role within it as informed and engaged citizens.

Progression between Year Groups

Some areas of the Science curriculum naturally develop year on year (e.g. animals and humans) where as others may progress across different key stages. An example of this can be seen in **Forces**, which is taught in both Year 3 and Year 5. In Year 3, the children are provided with a base knowledge of push and pull, learning through simple experiments with everyday objects. By Year 5, this understanding deepens as they investigate more complex concepts like friction and gravity, applying their knowledge to real-life scenarios.

Likewise, **Electricity** can be seen in both the Year 4 and 6 curriculum. Where Year 4 introduces students to simple circuits, helping them grasp how components like batteries and bulbs work together, Year 6 helps learners expand this foundation by delving into more intricate systems, understanding the role of conductors and insulators in greater detail.

In addition, in Year 3 students initially learn about sources of **light** and simple reflections, but by Year 6, they engage with more advanced concepts like the behaviour of light, including refraction and the colour spectrum.

The same is true for **Changing Materials**. In Year 2 pupils recognise the differences between solids, liquids, and gases. By Year 5, they are investigating irreversible changes and chemical reactions, enhancing their comprehension of matter transformation. This scaffolding approach ensures a rich and interconnected understanding of scientific concepts across the years.