

Science Department Curriculum Statement

Key message: *“Success is a science, if you have the conditions, you get the result” – Oscar Wilde*

The Science Department aims to deliver a high-quality science education that provides the foundations for understanding the world through the specific disciplines of Biology, Chemistry and Physics. Science has changed our lives and is vital to the world’s future prosperity. Our curriculum has, at its foundation, the belief that students should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, students are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave and analyse causes.

A solid grounding in Science is important to allow students to make informed decisions for themselves and their families in the future. The Cultural Capital they gain from studying Science will be an asset in promoting their social mobility in future life. We work to recognise and harness the talents, strengths and abilities of each student as an individual from Year 7 to 13. We aim to develop their scientific skills, problem solving ability and their awareness of the important place that Science has in their everyday lives.

Sequential Approach:

Students arrive in Year 7 at English Martyrs excited about Science and we aim to foster this interest and curiosity. We begin with an introductory course to introduce students to the laboratory equipment and health and safety to provide students with the skills needed to conduct experiments. Our Key Stage 3 curriculum is based around the AQA syllabus where there are 10 big ideas, broken down into two years. Students progress from simpler knowledge within a topic to more complex knowledge with a deeper understanding, allowing them to apply their knowledge. Scientific enquiry is built into lessons.

Our Key Stage 4 Curriculum begins in Year 9 with a Working Scientifically and Mathematical section to further advance the work completed at Key Stage 3 and prepare students for the skills needed for GCSE. Approximately 2/3 of students will get the opportunity to gain 3 Science GCSE’s and 1/3 will study for Combined Science. We aim to encourage as many students as possible to study Science Post-16 and we offer 4 different courses. Our BTEC Applied Science has been popular and it is a foundation for many degree and career choices such as Midwifery, Nursing and Pharmacy.

Our curriculum describes a sequence of knowledge and concepts, which allows students to make progress. It is vitally important that students develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and misconceptions could impact transition between Key Stages. The development of skills is an important aspect of our Science curriculum at all Key Stages and many of the skills acquired complement and strengthen the skills developed in other curriculum areas.

Teaching Approaches: *“The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires” William Arthur Ward*

Setting: We use a model of two larger Higher groups (Separate Science) and two smaller Foundation groups (who will most likely be entered for Combined Science). This follows feedback from student voice. The rationale behind this is to push as many students as possible to achieve the higher grades. Being in a class with highly motivated students will help to raise the aspirations of others. Movement between groups is a possibility and there is a detailed schedule for every member of the Department to ensure topics are taught in the same order.

Research from the EEF toolkit indicates that students make slightly less progress in sets than students taught in mixed ability classes, with it having a very small negative impact for low and mid-range learners and a very small positive impact for higher attaining students. There does not seem to be the evidence for setting as an effective way to raise attainment. It also causes problems with confidence, engagement. We want every student to want to do well in Science and aspire to study Science at a higher level.

Central to our teaching pedagogy is the research on memory and learning which points to retrieval practice and interleaving being the key to the development of long term memory. Many lesson starter and plenary activities and homework exercises employ these techniques. For example, we use “Do Now” activities at the beginning of lessons, which use a range of questions from different topics to retrieve information and help cement knowledge into long term memory. Our homework uses short tests on Educake which aim to improve the retention of factual material and then allow deep learning to follow. Students are able to take responsibility for their learning by setting themselves additional questions. Students are able to track their progress over time and repeat quizzes in areas where they need to make progress.

Development of Whole Child:

We believe that students should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. Our curriculum aims to promote the development of an extended specialist vocabulary. The Science curriculum reflects the importance of spoken language in students’ development across the whole curriculum – cognitively, socially and linguistically. We believe that the quality and variety of language that students hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely.

Students have plenty of opportunities to develop and apply their mathematical knowledge and numeracy skills to Science. Mathematical skills are embedded into lessons to ensure students are equipped for the demands of the GCSE papers. The science curriculum has many natural links to discuss careers in STEM and we incorporate time in lessons to inform students of these options.

The social and economic implications of science are increasingly important in our modern world and have fundamental links to the Catholic tradition on which our school is based. We aim to increase students appreciation of the need for good stewardship of God’s Earth and its resources. We encourage the use of different contexts by teacher, to maximise their students’ engagement with and motivation to study science. There are opportunities for discussions about complex moral and ethical issues and students are encouraged to ask questions.

Focus for Change:

- Continue to improve the Science Experience with trips, talks, career links, big ideas, debates
- Continue to improve quality and accuracy of assessment – modification of assessment tasks, more moderation and standardisation of work, carefully planned follow up tasks, marking mocks of other teachers
- Improve retrieval of knowledge using various strategies.