

Curriculum Intent - Science

The overarching aim of the Science Department is to engage and enthral students in scientific education, developing lifelong STEM learners but also developing scientifically literate individuals who are equipped to tackle the issues of the future and make life changing decisions from an informed and knowledgeable standpoint. This is by developing their ability to approach an issue scientifically but also by ensuring fluency in the fundamental scientific knowledge they will need to inform their choices.

In Key Stage 3 they will be taught by (wherever possible) the same teacher across all 3 scientific disciplines to provide a consistent approach to their studies. The curriculum interleaves Biology, Chemistry and Physics based topics, commensurate with the National Curriculum and closely matching to the AQA KS3 programme of study. Each of these topics are taught in a 3-week block including assessment followed by target work which identifies and addresses gaps in learning and misconceptions. Each of the learning blocks in KS3 have lessons that are specifically focused on the Working Scientifically Skills that are further developed at KS4. These are Development of Scientific Thinking, Experimental Skills and Strategies, Analysis and Evaluation, and Scientific Vocabulary, Quantities Units' Symbols and Nomenclature. Our schemes have considered learning from KS2 programmes of study and alongside our work with primaries in our MAT, established the most appropriate starting points, ensuring learning starts from the first lesson and progresses appropriately to KS4. Alongside our curricular work KS3 students have 3 weeks of STEM based learning each year, exploring a detailed scientific investigation, a world issue at depth and looking at Science Careers. This is to enable our students to greater grasp the relevance of science in the modern world. On top of this we fully embrace science week and its themes are incorporated into our curriculum each year.

In Key Stage 4 most students study the AQA trilogy combined science course, with a selected group taking separate GCSE's in Biology, Chemistry and Physics. Each student has a different teacher for each of the sciences in order to receive specialist exposition of new material and to allow our teachers to hone their pedagogical approaches for the demands of the science that they teach. Practical science and scientific skills are embedded through the course and clearly identified on our schemes of learning. Work has been done to ensure that skills used from other curriculum areas (for example maths) have been studied before they are used in science or given greater emphasis to ensure fluency. The sequence that students study the different aspects of each course has also been adapted from the AQA programme of study to ensure that the sciences dovetail and that the skills we incorporate from other areas of the curriculum at the right time to make them most effective.

As well as creating scientifically literate adults, our aim is to prepare students for further scientific study at post 16. Encouraging students wherever possible to investigate A-level sciences and using our teachers who have experience of teaching this key stage to deliver our most able classes where our future scientists will most likely come from.

Modelling is a core strategy across the department, we use visualisers to show process and model thinking and expect students to mirror these processes. We are developing the use of colour in modelling, as well as "I do, you do, we do", exploding questions, text marking exam questions ('HUGing') these strategies are used particularly to develop numeracy and science specific calculations. The department has a consistent focus for equations which are aims to develop students' confidence in approaching mathematical problems and leading to them securely accessing mathematical problems in assessment. Similarly, in subject areas where there are less numeracy demands and more science specific vocabulary, we are increasing our drive on 'talking like an expert' ensuring that teachers expect the frequent use of this vocabulary to increase fluency.

Every lesson in science starts with retrieval and low stakes quizzing, connecting students with previous learning, bringing relevant prior knowledge to the fore to lower the cognitive load expected and enable focus on new learning and application. We use AfL and hinge questioning to inform progression routes and every lesson involves opportunities to challenge every learner, every day through progress+ routes. Underpinning these progression routes are effective scaffolds that enables all students to access the curriculum irrespective of starting point. Throughout lessons, teachers use their expert questioning skills to both randomly select respondents and to target deeper questioning at key individuals, using all the information at their disposal to adapt progression through the lesson to the needs of individuals and groups of students they teach.

To ensure that students are reaching the required level, we check students' progress every 6-8 lessons and carry out summative assessments at least 3 times per year. These build in terms of breadth as students progress through KS3 and KS4, ensuring that assessments are truly summative, and give us the greatest indication of student learning and retention across the key stage. When assessing, we use lessons immediately following the assessment to target gaps and to look at the metacognitive approaches that students used within and in preparation for the assessment, helping students to assess their effectiveness to better apply them in future.

We are currently developing metacognitive strategies to help students evaluate their own approaches to learning and help them to become more reflective learners and increase their accountability for their own learning. This is developing in progress checks and summative assessments where students are encouraged to reflect on preparation work. This evaluation of learning and targeting of future learning is also moving into home learning and the low stakes quizzing that accompanies it.

All the pedagogical approaches currently being implemented in science are driven towards the whole school core values of Pride, Engagement, Independence, Organisation and Resilience. We are striving to develop students who seek feedback and are self-reflective, to address gaps and further improve their scientific knowledge and understanding. Ultimately helping us achieve our primary goal of developing scientifically literate students who can make relevant and informed decisions over the scientific issues that affect their futures.