

Science Curriculum 2019_2020 Intent, Implementation and Impact

Curriculum Intent – What we are trying to achieve with our curriculum

Curriculum objectives:

What we want pupils to be able to know and do by the time they leave?

Science teaching at Brooklands School aims to give all students a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of science, today and for the future. Concepts taught should be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

How our curriculum plan sets out the sequence and structure of how we will implement it:

Scientific enquiry skills are embedded in each topic the students study and these topics are revisited and developed throughout their time at school. Topics, such as Plants, Materials and Forces are taught in Key Stage 2 and studied again in further detail throughout Key Stage 3. This model allows students to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this procedural knowledge into the long-term memory. All students are encouraged to develop and use a range of skills including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and built up, and effective questioning to communicate ideas is encouraged.

How our curriculum reflects national policy (for example, British values, or PSHE):

Across all key stages, students have an opportunity to study the different scientists that have brought about our understanding of science during the entire curriculum from year 5 to year 8. Cultural education in science involves thinking of scientific discoveries as much of a part of our culture as great music and films. Credit is given to scientific discoveries of other cultures. Science is also seen as a contemporary activity and developments are made all over the modern world. It is therefore an activity undertaken by a wide range of men and women in many different cultures both now and in the past. The interdependence of the world in environmental issues is central to science. Students are expected to be able to interpret and explain the findings of these key scientists. In addition, there are plenty of opportunities to make links with other areas of the curriculum which include the mathematical, technological and sporting scientific opportunities.

How our curriculum caters for disadvantaged and minority groups:

The science department curriculum approach at Brooklands is “science for all”. We intend to provide all students regardless of ethnic origin, gender, class, aptitude or disability with a broad and balanced curriculum where we have a duty that all students are taught the whole of it. All lessons at Key Stage 2 and Key Stage 3 are differentiated to provide access for all to a rich range of knowledge and skills. We are fully committed to providing opportunities for all to learn in a risk-free climate allowing students to develop basic skills and learn the language and terminology of STEM learning. The staff in the science department believe in high quality teaching and learning experiences, using thinking processes and practices to investigate and solve problems. “Science for all” allows all students access to essential bodies of knowledge without a “watered down” curriculum. We believe students should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. By focussing on STEM literacy we provide a foundation they can use in personal and professional lives whether or not they adopt a STEM career.

How we have ensured our curriculum objectives are clear:

Our curriculum overview for each year group ensures each teacher has clarity on what to cover. These are then broken down in individual lesson plans in the scheme of work. Our curriculum specifies the knowledge and skills that should be taught, provides resources to assist with this and exemplifies successful learning. It leaves the job of bringing knowledge to life, providing context and memorable classroom moments to our teachers. This is because each of them is individually skilled and learning is at best, a personal experience founded on relationships between teachers and students.

Curriculum Implementation – How we intend to deliver our curriculum

How our curriculum matches our intention (as above):

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We ensure that the students are provided with a rich learning experience to prepare them for life in an increasingly scientific and technological world today. We won't constantly amend the curriculum so that the stability of the curriculum will allow expertise to be developed over time and we can constantly build assessments and teaching materials, and maintain more planned experiences such as trips and visits, workshops, topic days and expert speakers. Our approach to teaching and learning supports our curriculum by ensuring that lessons build on prior learning and provide sufficient opportunity to practice scientific enquiry/investigative skills at every opportunity.

How our subject curricula join together with cross-curricular links, in particular in the development of literacy and numeracy:

We are particularly conscious of the role that literacy and vocabulary plays in unlocking the whole science curriculum. Our teachers explicitly teach the meaning of subject-specific language, and we expect lessons to contain challenging reading and writing. Keywords are present in every lesson relating to the current topic. Glossaries of keywords (for different topics) are given to define as homework to emphasise the importance of scientific terminology. Science based reading comprehensions are done once a term to support literacy in science.

How we encourage progression as pupils move through the school:

There is an agreement with all other middle schools in Leighton Buzzard and the two upper schools on what content will be taught at key stage 3 in the middle schools to ensure that between us we give full coverage to "The National Curriculum programmes of study for science". Science is taught as discrete units for each year group to ensure progression between year groups and guarantees topics are covered. At the end of each unit, knowledge is tested through formal written assessments, against grade boundaries agreed with other middle schools to ensure our students' attainment is in line with or exceeding their age related expectations. Not unlike the new GCSE examinations, these assessments contain a percentage of questions based on "How science works" and test knowledge of practical skills. These are recorded and monitored in classroom monitor with assessment totals for each unit to show progression between units across the three disciplines and throughout the academic year.

How we differentiate our curriculum for different ability groups:

We aim to provide educational experiences that take into account the individual needs of students, appropriate to their level of ability. Our scheme of work allow us to do this freely and easily without losing the concepts being taught. Classes are streamed in year 6, 7 and 8 into similar ability levels. Our individual lesson plans at key stage 2 provide writing frames, word cards and word grids with pictures to support lower ability students with challenge cards to extend higher ability learners. At key stage 3 there is scope within each lesson to provide mastery tasks for those less able and extension tasks to stretch higher ability students in each topic.

How our curriculum is resourced (staffing, time etc)

Students at all Key stages are taught by subject specialists. Key Stage 2 students have one single and one double lesson and students at Key stage 3 have two double lessons. This allows theory to be supported by practical application in double lessons where teachers can hone students' investigative and enquiry skills. Because science links direct to practical experience with ideas, it can engage learners at many levels.

Curriculum Impact – The difference our curriculum is making to pupils

How we consolidate key subject knowledge and skills before moving onto the next topic and how we measure this:

Our Science Curriculum is high quality, well thought out and is planned to demonstrate progression. If children are keeping up with the curriculum, they are deemed to be making good or better progress. In addition, we measure the impact of our curriculum through the following methods:

Assessment progress in classroom monitor

Progress through formative marking and feedback in books

Formative feedback sheets on homework

A celebration of learning for each term which demonstrates progression across the school allows us to award our science students, not necessarily for academic ability but for effort and improvement in science

Tracking of knowledge in reports generated by classroom monitor

We have amended our curriculum slightly to allow our students to study fewer topics in greater depth, with an expectation that they will have a more secure understanding of the topic.

How we develop and measure pupil learning habits and learning skills:

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With our current schemes of work we are able to use high quality summative assessments to allow students to demonstrate their growing understanding of their subject knowledge and teachers to assess the impact of their teaching. These summative assessments are taken at the end of each unit, enabling teachers to focus on more formative assessment from lesson to lesson which is presented to students on feedback forms in their books or through homework feedback. Students are expected to respond to this feedback, improving the quality of their work not yet mastered.

How we use evidence of pupil learning to feed into our planning and adaptation of our curriculum:

In some topics across individual disciplines we typically see students grappling with the same challenging content, in these cases we provide additional support for these students and expect higher attainers to produce work of further depth and flair. After each year we reflect on the curriculum and the progression of year 8 through the school. This informs us as to whether we need to adjust the curriculum in light of feedback from students and teachers and experiences.