

Buckler's Mead Academy

Science Curriculum: Intent, Implementation and Impact 2022-2023

INTENT – What we teach and why

The curriculum intent for Buckler's Mead Academy takes into account the specific needs of the learners we have the privilege to teach and the local community we serve. We aim to ensure that our pupils learn the knowledge they need not only to become educated and active and healthy citizens in modern society, but to enable them to continue to study the Sciences or to work in a science related field. As such, our curriculum covers and exceeds the National Curriculum requirements and ensures our pupils learn subject content and crucially commit this knowledge to memory.

Whilst we have the full range of Key Stage 2 prior attainment, the majority of our pupils are middle prior attainers, as such our curriculum has been designed not only to support low prior attainers but to challenge all to exceed the national curriculum and achieve their full potential.

Our high-quality Science curriculum is underpinned by three core principles, as defined in Ofsted's research review series for Science (April 2021). Our curriculum is rooted in an authentic understanding of what Science is. We want our pupils to: recognise Science as a discipline of enquiry, underpinned by substantive and disciplinary knowledge, that seeks to explain the material world. Learn about the differences between each Science. Learn about the diversity of approaches used to establish knowledge in Science and knowing that there is not one scientific method. Our curriculum prioritises pupils building knowledge of key concepts in a meaningful way that reflects how knowledge is organised in the scientific disciplines. We want our pupils to: recognise that scientific concepts, and the relationships between them, are the building blocks of scientific knowledge. Our curriculum is planned to take account of the function of knowledge in relation to future learning. We want our pupils to: learn topics in an order that reduces the likelihood of misconceptions forming. Have the necessary prior knowledge to learn from practical activities.

Our curriculum is planned to encourage curiosity and an interest in learning Science and to ensure that our pupils are able to: design and carry out valid scientific investigations in a safe manner. Record, analyse and evaluate the results of investigations.

We aim to ensure that our pupils retain the knowledge they have learned in the long term so that they are able to access the next stage in education or work and are able to apply this knowledge to understand unfamiliar contexts. We aim to develop a reading culture in our school and the Science faculty aims to play its part in this. We want children to love reading and as such our Science curriculum is designed to encourage reading not only the core content but also more widely. We also aim for our pupils to become scientifically literate. We intend for pupils to be able to read and understand scientific articles, whether in the news or in literature. Communicate their understanding effectively and with confidence. Engage with and understand scientific issues and form valid opinions underpinned by knowledge and understanding of the scientific principles involved.

Our curriculum is also designed to ensure that our pupils develop a knowledge of how science relates to moral, social, cultural and spiritual issues as well as the scope and limitations of science in this regard. We also aim to make our pupils aware of the wide array of Science related careers which are available so that they can make more informed decisions about their next steps. The science curriculum is therefore more than a description of the journey towards expertise. It is also the means by which to get there.

IMPLEMENTATION – How we teach and deliver our curriculum so that students know more, remember more and can do more over time.

Our Science Curriculum at Buckler’s Mead Academy exceeds the National Curriculum. The substantive and disciplinary knowledge defined in the National Curriculum is supplemented with additional content from EEF’s ‘Improving Secondary Science’ report. Knowledge is introduced in a way that ensures that pupils have the requisite prior knowledge. Knowledge is revisited and built upon regularly and periodically to improve learning and retention. Topics are organised into ‘big ideas’ which are designed to develop schema.

By the end of year 9 all pupils will have covered the National Curriculum for Science at KS3. Each topic covered over the 5 years has a scheme of learning overview document which is designed to support teachers to deliver knowledge with clear learning objectives, key literacy and numeracy, opportunities for modelling and addressing misconceptions with explicit links to SMSC.

All lessons are delivered through a consistent Learning Cycle. CONNECT tasks focus on retrieval practice through low stakes quizzes and MCQs which test and check that core, substantive and procedural knowledge has been secured. The DESCRIBE section explicitly shares learning intentions and explores the morphology and etymology of tier 2 and 3 vocabulary to develop scientific literacy and support reading for meaning. NEW LEARNING is delivered through direct instruction, student-led investigation or modelled to autonomy by the teacher. CHALLENGE tasks allow all students to apply their ‘New Learning’ with supporting resources and live differentiation from the teacher. DEMONSTRATE tasks are independently completed by students after a body/composite of learning has been delivered to confirm they have secured this knowledge. DIRT allows students to respond to formative and summative feedback from the teacher during Directed Independent Response Time. To ensure pupils remember and know more over time, we formatively assess through targeted questioning, frequent low stakes quizzes and MCQs.

At KS3 we teach in mixed ability classes to ensure that all students have access to the same curriculum. Teachers use inclusion strategies to ensure LPA and SEN learners are scaffolded and supported to reach the same learning outcomes as their peers. We encourage reading for pleasure but including seminal scientific articles within our curriculum and for H/W. We develop a curiosity for scientific enquiry and give KS3 students the opportunity to design their own experiments and engage with STEM programmes.

IMPACT- expected outcomes and what our students will know at specific stages.

All pupils, including pupil premium and SEND pupils, will realise their potential by making better than national average progress enabling them to take their next steps, be they further study or in the world of work.

High proportions of pupils will have the opportunity to choose to continue to study the sciences at A level or Science related vocational courses or work in a science related field.

Pupils will be sufficiently scientifically literate to communicate their understanding, and will be able to understand and engage with and discuss their views on issues reported in scientific literature, for example, making a decision on whether to be vaccinated or their views on the use of STEM cells for research.

Pupils develop sufficient scientific knowledge and retain this long term so that they are able to lead healthy lives and to be able to engage with science in the media.

Pupils develop sufficient disciplinary knowledge and understanding that they are able to: plan investigations which will yield valid results, safely and accurately record observations in a scientific way, present their results graphically, manipulate data, explain results and draw conclusions, evaluate methods being aware of limitations, suggest improvements, work effectively alongside others in a team.

Pupils will be able to describe how scientific inquiry has led to new discoveries over time and shaped not only our view of our place within our ecosystem and how we affect it, but the Earth's place in the solar system and beyond.

Students will also be able to describe the limitations of science so much that some questions cannot be answered by Science alone and other factors, such as economics, beliefs, social and cultural factors may be considered.