

Science Curriculum Intent for Barley Lane School

Introduction

As stated in the National Curriculum:

‘READY. A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics.

RESPECTFUL. Science has changed our lives and is vital to the world’s future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science.

SAFE. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.’

Our science curriculum is designed to provide a comprehensive and engaging educational experience for students across Key Stages 2, 3, and 4. We aim to foster a deep understanding of scientific concepts, develop practical skills, and inspire curiosity about the natural world. Our curriculum aligns with the National Curriculum for Key Stages 2 and 3, and follows the AQA GCSE Combined Science: Trilogy, AQA GCSE Chemistry or AQA Entry Level Certificate Science specifications for Key Stage 4. Pathway 1 for the KS4 Nurture class, explore science through real-world applications including farm visits, beach visits and visits to local science companies.

Key Stage 2 (Years 3-6)

Intent:

- Develop foundational scientific knowledge and conceptual understanding in biology, chemistry, and physics.
- Encourage curiosity and excitement about natural phenomena.
- Introduce basic scientific enquiry skills to answer questions about the world.

Implementation:

- Teach topics such as plants, animals (including humans), rocks, light, forces and magnets, living things and their habitats, states of matter, sound, electricity, properties and changes of materials, Earth and space, and evolution and inheritance.
- Incorporate practical activities and experiments to enhance understanding.
- Use questioning and discussion to promote scientific thinking.

Impact:

- Students will have a secure understanding of key scientific concepts.
- Students will be able to conduct simple experiments and make observations.
- Students will develop a positive attitude towards science and its relevance to everyday life.

Key Stage 3 (Years 7-9)

Intent:

- Build upon knowledge from Key Stage 2 to deepen understanding of scientific ideas.
- Develop proficiency in scientific enquiry and practical skills.
- Introduce more abstract concepts and the relationships between different scientific phenomena.

Implementation:

- Cover topics including cells and organisation, the particulate nature of matter, energy, interdependence, chemical reactions, forces, genetics and evolution, Earth and atmosphere, and waves.
- Engage students in more complex practical experiments and data analysis.
- Encourage critical thinking and the application of mathematical skills in scientific contexts.

Impact:

- Students will demonstrate a deeper understanding of scientific principles and theories.
- Students will be competent in planning and conducting experiments, as well as analysing results.
- Students will appreciate the interconnectivity of scientific disciplines and their applications.

Key Stage 4 (Years 10-11)

Intent:

- Prepare students for either ELC or GCSE examinations in science depending on their pathway.

- Provide a thorough understanding of scientific concepts as outlined in the AQA specifications.
- Develop analytical, evaluative, and practical skills applicable to further education and careers in science.

Implementation:

- Pathway 3 'Apply' follow the AQA GCSE Combined Science: Trilogy specification, covering biology, chemistry, and physics topics. Our current yr10 cohort follow the AQA GCSE Chemistry specification.
- Pathway 2 Discover follow the AQA Entry Level Certificate Science as a complementary course.
- Incorporate required practical's as specified by AQA to enhance hands-on experience, as part of the GCSE course. Relevant practical's are incorporated into the ELC course.
- Utilize a variety of assessment methods, including formative assessments, mock exams, and practical evaluations.

Impact:

- Students will achieve qualifications that reflect their understanding and abilities in science.
- Students will be equipped with the skills necessary for A-level sciences or vocational pathways.
- Students will develop a lifelong interest in science and its impact on the world.

Key Stage 4 (Pathway 1 - Nurture class)

Intent:

Farm visits form a vital component of the KS4 Science curriculum for the nurture class. It is designed to deepen students' understanding of key biological, environmental and chemical principles through real-world application. The overarching intent is to bring science to life by enabling learners to explore the interdependence of living organisms, the impact of human activity on ecosystems, and the scientific processes underpinning modern agriculture.

Through carefully planned visits, students will:

- Develop a secure understanding of applied biology, including plant and animal physiology, life cycles, nutrition, reproduction, animal handling and welfare. Students also take part in creating wildlife habitats and exploring ecosystems.

- Recognise the links between science and sustainability, exploring how farming practices influence biodiversity, conservation work, soil health, river health and climate change.
- Investigate chemical and physical processes in agricultural contexts, such as soil composition, fertiliser chemistry. This is investigated through river dipping and pH testing.
- Understand the role of science in industry and careers, inspiring future pathways in biology, environmental science, food technology, and agricultural engineering. Students look at 'Farm to Fork' and practice making produce direct from the farm.
- Strengthen their cultural capital, experiencing science as a lived, practical and societal discipline that extends beyond the classroom.

Farm visits are supplemented with beach visits, where the students take part in beach combing and rock pooling.

Students also visit local science-based companies including 'Recycle Devon' to help gain a greater understanding of how to create a sustainable future.

The intent is to ensure all students have equitable access to high-quality experiential learning that makes science tangible, relevant and aspirational.

Implementation:

- Students will follow a varied curriculum during their weekly visits to a local farm. Experiencing the day-to-day jobs and routines of farm life, that change with the seasons throughout the year.
- Students are given the opportunity to gain hands on experience in many aspects of farm life.
- Students will take part in teamwork, building on interpersonal skills including communication, empathy, leadership, responsibility and conflict resolution.
- In addition to weekly farm visits, students will also experience science at the beach and in local science-based industry.

Impact:

- Students will achieve UAS qualifications that reflect their understanding and abilities in science.
- Students will develop a lifelong interest in science and its impact on the world.

Cross-Stage Strategies

- Ensure progression and continuity in the curriculum from KS2 through KS4.

- Differentiate instruction to meet diverse learning needs and styles.
- Incorporate real-world applications and contemporary scientific issues to make learning relevant.
- Promote STEM opportunities and extracurricular activities to enrich the curriculum.

By implementing this structured and comprehensive science curriculum, we aim to cultivate knowledgeable, inquisitive, and skilled students who are prepared for the challenges of further education and the evolving scientific landscape.