

Devon School Science Policy

Introduction

Science is a body of knowledge built up through the systematic experimental testing of ideas and also a practical way of finding reliable answers to questions we may ask about the world around us. Science in our school is designed to develop a student's ideas and ways of working so that they will be able to make better sense of the world in which they live. We believe that a broad and balanced science education is not only of value to all, but is the entitlement of all students.

Aims and Objectives

The importance of science:

Science prepares our students for life in an increasingly scientific and technological world. Everything fits into at least one of the biological, chemical or physical worlds so, the study of science is the study of everything. Science involves a lot of abstract concepts which can be difficult to understand, particularly for young people. We aim to remove the hesitation that students may have in tackling these subject areas, so that they can increase their knowledge and become confident learners.

Science helps our students to acquire a growing understanding of scientific ideas and encourages them to be considerate of the environment. Students are given the opportunity to develop their knowledge of the international and collaborative nature of science.

Attitudes:

- encouraging the development of positive attitudes to science and learning in general.
- building on our students' natural curiosity and developing a scientific and logical approach to problem-solving.
- encouraging creativity, open-mindedness, self-assessment, perseverance and responsibility.
- building self-confidence to enable students to work independently.
- developing our students' social skills to work cooperatively with others.
- providing enjoyable experiences so that students can develop deep and lasting interests and may be motivated to study science further.

Skills:

- giving our students an understanding of scientific processes.
- helping our students to acquire practical scientific skills.
- developing the skills of investigation - including observing, measuring, predicting, hypothesising, experimenting, communicating, interpreting, explaining and evaluating.
- promoting the use of scientific language, recording and techniques.

- expanding the use of ICT in investigating and recording.
- enabling our students to become effective communicators of scientific ideas, facts, skills and data.

Literacy within science:

Every lesson provides students with the opportunity to develop their literacy skills through reading and writing. Additionally, students have the opportunity to earn extra 'House Points' points by correctly using one of the 92 key words (selected at random) in a scientific sentence.

Teaching aims:

Science is taught in ways that are imaginative, purposeful, well managed and enjoyable. Clear, accurate explanations and making use of skilful questioning encourages students to explore the subject matter themselves. Making links between science and other subjects helps students to appreciate that science really is the study of everything. Teachers instil a belief in all of our students that a GCSE qualification in all subjects, including science, is something that can be achieved through hard work and perseverance.

Curriculum Planning

Long-Term Planning:

Students are taught in year groups wherever possible. Each year group, from Year 4 to Year 11, is referred to as a different rainforest animal (eg. tapir, jaguar).

Long-term planning follows the school's long-term planning framework. This outlines the different topics that will be taught over the course of the academic year and is displayed in a student-friendly format in the science learning space.

The overall nature of studies in science is a careful balance between the development of exploration and learning through discovery and play. This encompasses the core curriculum embraced by mainstream schools.

KS2: The structure of the science syllabus at KS2 follows that of the National Curriculum. As such, it looks at a number of topics and uses them to explore, in simple ways, elements of the natural and man-made world that our students live in. Science lessons involve as much practical and physical exploration as possible to engage our students and to instil a love for learning.

KS3: The structure of the syllabus at KS3 also follows the National Curriculum. As such, it covers all of the areas of biological, chemical and physical science that are contained in the AQA KS3 Science Syllabus. New subject areas are introduced in Year 7 and Year 8, whilst other topics from KS2 are revisited and developed.

KS4: Students at KS4 level have the opportunity to follow the AQA GCSE Combined Science Trilogy (8464) syllabus. In order to maximise the amount of teaching time available for our students, this syllabus is followed from the beginning of Year 9 where possible.

Medium and Short term planning:

Each year group follows a detailed Scheme of Work (SOW) and is divided into 6 half-terms. In KS2 and KS3, each half-term follows one module of work. However, in KS4 there may be some overlap due to the high number of varied topics at GCSE level. There are worksheets for each module that cover all of the main learning points. These worksheets are linked directly to custom-written AQA Unit Awards. This means students have the opportunity to achieve 6 AQA Unit Awards each year, all of which directly related to the core curriculum. Each worksheet is linked to associated educational videos and on-line resources. Wherever possible, each lesson will include an element of practical work.

KS4 planning - qualification pathways

We aim to enable all students to sit the GCSE exam at the end of Year 11, or later depending on individual student's needs. The department aims to complete the GCSE syllabus by February half-term in Year 11, allowing plenty of time for revision and exam practice.

Assessing and recording progress

Each half-term's work has a dedicated AQA Unit Award to be achieved and a custom-written ARE (Age Related Expectation) test which sits alongside the AQA Unit. In each Year's age group, throughout KS2, KS3 and KS4, each student's progress is recorded on a custom-made Core Tracker, which shows their progress through the syllabus and their attainments within it. In detail, this means that a student has the chance to make a maximum of 16% progress through the syllabus each half-term; their success at achieving this is recorded as a 1,2 or 3 level of attainment for each individual piece of subject matter/skill, on the Core Tracker. The mark awarded depends on their attendance, focus, recall and comprehension for each section.

Social, Moral, Spiritual and Cultural

It is not always easy to see how individual science topics fit into the SMSC guidelines but every effort is made to include opportunities for the students to reflect upon subject matter in a wider context. Examples include:

Spiritual Development: When studying volcanoes in Year 8, students are asked to consider why people might have chosen to settle right next to one

known to erupt, such as Pompeii. Did they have beliefs which seem alien to us today? In Year 5, when studying space, students are invited to consider what people in the past may have believed the celestial bodies to be and how this affected their understanding of the science of space.

Moral Development: Students are encouraged to understand how the idea of 'fair testing', the bedrock upon which all scientific experiments are founded, is applied to their behaviour towards other people and life in general. Honesty, reliability and accuracy are values to be treasured. Principles such as this are taught in the first half-terms of Years 4, 5 and 6, under the heading 'Working Scientifically', and these values are built upon throughout later studies.

Social Development: All year groups spend much of their science lessons carrying out practical tasks. This invariably means working collaboratively with peers or staff. Students are encouraged to develop confidence and find enjoyment in working with others. In Year 7, when studying density and how it relates to floating or sinking, students compete to design the best boat and then work together to decide upon how to test which one is 'best'. In Year 9, when studying physical energy changes, students work together to record the time taken to lift a dumbbell (using video) and then work cooperatively to calculate each other's power.

Cultural Development: Britain has played a significant part in the development of science over the past 500 years. Students are made aware of this country's contributions, such as the work of Watt, Newton, Darwin and Jenner and are also educated on the science developments from other nations. In Year 6, when studying electricity, students are made aware of the work of Ampere. Year 8 students studying sound also learn about the work of Hertz and in Year 10 we discuss the work of Curie in nuclear physics. Students are encouraged to consider how the work of these people has enhanced the lives of everyone.

We ensure that all our students have the opportunity to gain scientific knowledge and understanding regardless of gender, race, class, physical or intellectual ability.

Our expectations do not limit pupil achievement and assessment does not involve cultural, social, linguistic or gender bias.

We aim to teach in a broad, global and historical context, using the widest possible perspective and including the contributions of people from many different backgrounds. Relevance is drawn between current/recent events eg. Jenner's pioneering work on vaccinations is related to the Covid pandemic.

We draw examples from other cultures and time-periods, recognising that simple technology may be superior to complex solutions.

Visits and Trips:

We aim to make science meaningful and relevant to our students by referencing local industries and facilities. Curriculum trips/visits are tied into particular learning modules or topics. Examples include:

Year 4 Summer 2 - Torquay Beach (Identify man-made environmental changes)

Year 5 Summer 2 - Paignton Zoo (Identify animals in vertebrate and arthropod classes)

Year 6 Spring 2 - Lyme Regis Beach (Searching for fossils and rock types)

Year 7 Summer 2 - Exmoor Zoo (Identify animals in vertebrate and arthropod classes and the characteristics which place them there)

Year 8 Summer 2 - Broadsands Beach, Paignton (Survey of fauna and flora in a habitat)

Year 9 Summer 1 – Newcomen Steam Engine museum, Dartmouth (Learning about one of man-kind's first large-scale machines, which was used to pump water out of mines)

Year 10 Summer 2 - Hinkley Point Nuclear Power Station (Learning about a nuclear power station)

Year 11 Summer 1 - Harling Farm, Yelverton (Discovering more about selective breeding and conservation)