Science – Aims/Intent Science follows the National Curriculum

www.gov.uk/government/publications/national-curriculum-in-england-science-programmesofstudy/national-curriculum-in-england-science-programmes-of-study

A high-quality science education provides students with a strong foundation for understanding the world through the disciplines of **Biology**, **Chemistry**, and **Physics**. Science plays a central role in shaping modern society and is essential to future global prosperity. For this reason, our curriculum ensures that students develop a deep understanding of key scientific knowledge, methods, processes and applications. Through the systematic development of core concepts and foundational knowledge, students are encouraged to appreciate the power of rational explanation and to cultivate a sense of curiosity and excitement about the natural world. They learn how scientific principles can be used to explain phenomena, predict outcomes, and analyse causes with increasing sophistication.

Aims of the Science Curriculum

Our science curriculum is designed to ensure that all students are taught:

Scientific knowledge and conceptual understanding — developing secure understanding across the three disciplines of Biology, Chemistry and Physics.

Understanding of scientific processes — learning about the nature, methods and processes of science through a range of enquiry types that support students in answering scientific questions about the world around them.

Application of science in society — gaining the scientific knowledge required to understand the uses, implications and relevance of science today and in the future.

Technical and disciplinary vocabulary — reading, using and applying precise scientific terminology with confidence.

Strong progress for all learners — ensuring that every student, including those with EAL, SEND and those who are more able, makes sustained and meaningful progress.

How cultural capital is enhanced through Science:

Personal Development

Studying science opens pathways to a wide range of careers across both traditional and emerging sectors. These include fields such as Medicine, Veterinary Science, Engineering, Biotechnology, and Environmental Science, as well as roles within the beauty, pharmaceutical, healthcare, and film and media industries, among many others. Students are encouraged to explore how scientific knowledge and skills can lead to diverse and rewarding future opportunities. https://www.sciencebuddies.org/science-engineering-careers Students also receive information about further and higher education pathways, helping them understand where science can lead beyond school. They build confidence by talking with their peers and discussing how what they learn in lessons connects to real jobs and future opportunities.

Social Development

Political and current affairs events and news for example the recent Boeing aircrafts grounding and natural disasters.

Understanding that the social context of the formation of scientific ideas and laws causes social change.

Physical Development

Developing students' ability to use, manipulate and record raw data from scientific experimentation. Reflecting on their work through evaluation of their results versus the expected outcomes.

Spiritual Development

Through assemblies and collective worship. Through the studying of scientists who confronted religious points of view even to their own detriment.

Cultural Development

Cultural development of our way of thinking and working based around scientific discovery.

Moral Development

Through deep thought and discussion students are posed numerous moral questions. We explore these and hope that students can use evidence that they have obtained to form an opinion.

How students' vocabulary is developed through Science:

- Students demonstrate an understanding of key words and vocabulary through their analysis of their experimental work in lessons.
- Students are encouraged to use technical vocabulary and understand what it means in relation to scientific processes and different applications of these words.
- Key vocabulary is encouraged in lessons and when answering exam style questions.

https://filestore.aqa.org.uk/resources/science/AQA-SCIENCE-GCSE-SUBJECT-VOCAB.PDF

Implementation

Key stage 3:
In Year 7, every student is introduced to a sequence of 'Super Safe Science' lessons for the first two weeks. Here they look at how to handle apparatus for various experiments, as well as the level of caution required. Some of the other topics that are taught in Year 7 include Cells (Biology), Mixing, Dissolving and Separating (Chemistry) and Forces and their Effects (Physics). At the end of each unit, there is a test or a graded assessment piece, so that students and parents know how much progress is being made. There is also an end of year test.

In Year 8, students look at units, such as Getting the Energy your Body Needs (Biology), Explaining Chemical Changes (Chemistry) and Magnetism and Electricity (Physics). As in Year 7, all topics covered will have an end of unit and an end of year test or a graded assessment piece. Students are assessed throughout the year, using peer and self-assessment and a set success criterion that is shared with the students in each lesson, based on taught content. Teachers will follow their long-term planning to ensure the curriculum is well sequenced and students can build on their knowledge skills and understanding.

Key stage 4:
Starting In Year 9 all students are taught Biology, Chemistry and Physics units from the AQA Trilogy Double Science GCSE specification.
In Year 10 and Year 11, students continue their GCSE preparation. At the start of Year 10, and with guidance from the school, some students will choose to study Triple Science. These students follow the separate science route and will work towards three individual GCSE grades in Biology, Chemistry and Physics. The majority of students will continue with the AQA Trilogy Double Science pathway, which leads to two GCSE grades awarded at the end of Year 11.
All students will sit their linear examinations at the end of Year 11. In preparation, they will complete several assessments and take part in targeted intervention programmes before their final exams. Students are assessed throughout the year using peer and self-assessment, alongside clear success criteria shared in each lesson based on taught content. Teachers follow well-sequenced long-term plans to ensure the specification is delivered coherently, enabling students to build knowledge progressively and develop strong scientific skills and understanding.

Key stage 5:
In Year 12 and Year 13, students may choose to study one or more of the following A-Level subjects: Biology, Chemistry, and Physics. These courses provide rigorous preparation for a wide range of science-related university degrees and are examined at the end of Year 13.
As in Key Stage 4, students in Key Stage 5 are assessed continuously throughout the year. Assessment approaches include peer and self-assessment, supported by clear success criteria shared in each lesson and aligned with the taught content. Students also participate in structured critique sessions, enabling them to receive constructive feedback from peers and teachers and refine their work to a higher standard.
Teachers follow carefully sequenced long-term plans to ensure that the A-Level specifications are delivered coherently and progressively. This approach allows students to deepen their subject knowledge, strengthen their scientific skills, and develop increasing independence in their learning. As their understanding grows, students are encouraged to take ownership of their academic progress and engage with the subject matter in a rich and meaningful way.

Impact

Through the study of the sciences our students will demonstrate that they have made good progress from their starting points and become well rounded individuals. Work in students' books and in practical experiments show they can observe and explain the world around them. Discussions with students illustrate that they can explain and explore their own personal beliefs and feelings towards science. Through regular monitoring of teacher's long-term sequencing/planning and students' work it will be clear that student's knowledge, understanding of the sciences and their cultural capital have been considerably enhanced.

Students will see the relevance of science in their everyday life and build on their knowledge already acquired in the subject. Some students come to Chiltern Hills Academy already with a wealth of information and experiences in science. Here, they will have the opportunity to observe and participate in many exciting experiments. We also want students to develop the skills to explain and analyse what they are seeing in experiments and their relevance in a wider context. Students will know what it means to be a scientist and the career pathways that are available to them.

In Science we run many opportunities to enrich students' experiences, such as STEM events within school. These help students work collaboratively and solve problems.

CHILTERN HILLS ACADEMY

Create, Aspire and Excel
to 'Live life in all its fullness' (John 10:10)

*This table outlines the key topic areas covered in **Science** across KS3, KS4 and KS5. They are divided into the topics outlined below. A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, so students are taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, students are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. Students are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.*

Curriculum map- subject: Science

Year Group	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
7	Enquiry Processes Working Scientifically Cells & Movement	Ecosystems Atoms & Matter	Forces Electromagnets	Genes Acids & Alkalis	Energy Earth Light	Metals & Non-metals
8	Breathing Digestion	Digestion & Pathogens Matter Forces Energy	Energy Waves & Sound	Periodic Table Climate Earth Resources Respiration Electromagnets	Evolution Inheritance Reactions	Reactions Photosynthesis Practical Work

9 Biology	Biodiversity & Ecosystems	Adaptations, Interdependence & Competition Organising an Ecosystem	Cell Structure & Transport	Cell Division	Organisation & Digestive System	Organising Animals & Plants Required Practicals
9 Chemistry	Earth's Atmosphere Earth's Resources	Atoms & Separation Techniques Chemical Analysis	Atomic Structure Chemical Changes	Chemical Changes Periodic Table	Periodic Table Structure & Bonding	Structure & Bonding Required Practicals
9 Physics	Conservation & Dissipation of Energy Energy Resources	Conservation & Dissipation of Energy Electric Circuits	Electricity in the Home Energy Transfer by Heating	Molecules & Matter	Molecules & Matter Radioactivity	Radioactivity Required Practicals

10 Biology	Communicable Diseases Preventing & Treating Diseases	Organising Animals & Plants Non-Communicable Diseases	Cell Structure Photosynthesis	Respiration Human Nervous System	Hormonal Coordination Reproduction	Variation & Evolution
10 Chemistry	Salts & Chemical Changes Atomic Structure	Periodic Table Electrolysis Energy Changes	Chemical Changes Chemical Calculations	Rates & Equilibrium	Crude Oil & Fuels Chemical Analysis	Structure & Bonding Earth's Atmosphere
10 Physics	Energy Transfer by Heating Energy Resources Electrical Circuits	Forces in Balance Motion	Force & Motion	Wave Properties Electromagnetic Waves	Conservation & Dissipation of Energy	Molecules & Matter Radioactivity Maths Skills for Physics Equations

11 Biology	Reproduction & Inheritance Variation & Evolution	Genetics & Evolution Revision	Genetics & Evolution Adaptations, Interdependence & Competition	Adaptations, Interdependence & Competition Organising an Ecosystem	Biodiversity & Ecosystems	Biodiversity & Ecosystems Revision Paper 2 Required Practicals (P1 & P2) Revision Paper 1

11 Chemistry	Earth's Atmosphere	Rates of Reaction & Equilibrium Revision	Rates of Reaction & Equilibrium Chemical Changes & Extracting Metals	Earth's Resources	Crude Oil & Fuels Electrolysis Energy Changes	Revision Paper 2 Required Practicals (P1 & P2) Revision Paper 1
11 Physics	Wave Properties Electromagnetic Waves	Electromagnetic Waves Revision	Electromagnetism	Electromagnetism Forces in Balance	Motion Force and Motion Revision Mock Assessment	Revision Paper 2 Required Practicals (P1 & P2) Revision Paper 1

12 Biology	Biological Molecules Cell Structure	Nucleic Acids Transport Across Cell Membranes	DNA, Genes & Protein Synthesis	Cell Recognition & the Immune System	Genetic Diversity	Exchange
13 Biology	Stimuli & Responses Nervous Coordination Muscle Contraction	Homeostasis Inheritance Populations Evolution & Speciation	Alteration of DNA Gene Expression Gene Expression & Cancer	Using Genome Projects Gene Technologies	Photosynthesis Respiration Energy &	Ecosystems Nutrient Cycles Revision
12 Chemistry	Atomic Structure Amount of a Substance Bonding	Energetics Kinetics Equilibria	Oxidation, Reduction & Redox Reactions Periodicity Group 2: Alkaline Earth Metals Group 7: Halogens	Introduction to Organic Chemistry Alkanes Halogenoalkanes	Alkenes Alcohols Organic Analysis	Thermodynamics
13 Chemistry	Thermodynamics Rate Equations & Kinetics	Equilibrium Constants (Kp) Electrode Potentials & Electrochemical Cells	Acids & Bases Periodicity (Period 3) Transition Metals Reactions of Inorganic Compounds in Aqueous Solutions	Optical Isomerism Aldehydes & Ketones Carboxylic Acids & Derivatives	Aromatic Chemistry Amines Polymers Amino Acids,	Organic Synthesis NMR Spectroscopy Revision

					Proteins & DNA	
12 Physics	Measurements and Errors	Electricity	Force, Energy and Momentum	Particles and Radiation	Waves	Materials
13 Physics	Periodic Motion	Nuclear Physics	Thermal Physics	Astrophysics	Fields and Their Consequences	AS Core & A2 Synoptic Revision

KS3/4/5 National Curriculum Coverage – Colour code for ease
Green
Red/orange
Blue

How do we support SEND students in science?

Modelling – demonstrating experiments to enhance experiences, provide handouts and show videos to demonstrate the various disciplines in science

Scaffolding – Students will be provided with more steps and demonstrations to ensure they fully understand what they have been asked to do. Some may have written prompts so that they can remember key instructions or facts, adaption will be made for all students so that we are being inclusive

Groupings- Students work best when they are in groups, collaboration works best when students can develop their individual skills within a group

Adaptive teaching – Tasks in lessons can be overwhelming, break these up into chunks for all students – individual demonstrations can support students with physical disabilities.

Literacy- provide students with examples of writing and writing frames, prompt word banks with meanings can be on each table or the teacher board. Differentiated success criteria for each lesson. Visual stimulation with key words to support memory and re-call.

Diversity in Science

There is evidence to suggest that women, certain ethnic minorities, people with disabilities and those from disadvantaged socioeconomic backgrounds are underrepresented in education, training and employment related to STEM. While there is significant variation in rates of progression and outcomes across ethnic minority groups, research shows that ethnic minority staff and students have consistently poorer outcomes. We are passionate about diversity and ensure that students through quality teaching are exposed to scientists from all types of back grounds and ethnicities. We welcome the opportunity to learn from these communities and break down barriers to get parents into school from these back grounds to participate in science experiments with their child so that they can be inspired and discuss science and diversity at home.