



Hailey Hall School Science Curriculum Booklet KS4

Science Curriculum - Intent

Introduction:

The new Education Inspection Framework (EIF 2019) includes an enhanced focus on curriculum. This is structured around three pillars:

Curriculum Intent

Curriculum Implementation

Curriculum impact

Curriculum Intent Science: The National Curriculum for Science aims to ensure that all children: develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics develop an understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them are equipped with the scientific skills required to understand the uses and implications of science, today and for the future.

We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this.

Purpose of Study: -To encourage a lifelong passion for Science by engaging pupils in practical activities and discussions. -To encourage curiosity and an awareness of the world around them. - To give pupils a solid conceptual understanding of Biology, Chemistry and Physics as detailed in the National Curriculum for Key Stages 3 and 4. - To ensure all pupils make progress to the best of their ability with support and challenge where needed to achieve at ks4 and provide a foundation for further study after Hailey Hall.

The Science subject area aims to inspire discussion, hypothesizing, planning, investigating, implementation and evaluation. We aim to have all pupils working towards developing a deeper understanding of the modern world around us.

We aim to, wherever possible, link work to other disciplines such as mathematics, D&T, computing, PE and art. The pupils are also given opportunities to reflect upon and evaluate their practical work with specific regard to health & safety, reliability and accuracy

The Science curriculum is planned to enable all pupils to develop skills in the following areas:

1. To develop an understanding of health and safety
2. To gain a range of practical science skills
3. To understand the impact humans and natural factors have on the environment.
4. To gain a wider understanding of the world around us, to understand the science behind modern living.
5. Nurture and develop pupils' passions and interests to help them understand the science around them.

Throughout our programs of study, every attempt is made to make explicit links to careers and the world of work. In addition to subject-specific links, we aim to explicitly reinforce the skills and aptitudes which support what employers say are important in the workplace;

1. This is especially prevalent in the KS4 BTEC Applied Science program of study.
2. Aiming high, staying positive and resilience
3. Communication skills (listening, speaking, presenting)
4. Teamwork and problem solving,
5. Creativity and thinking skills.
6. Self-management and leadership
7. The British values of democracy, the rule of law, individual liberty, and mutual respect of those with different faiths and beliefs are taught explicitly and reinforced in the way in which the school operates.

Underpinning all the learning aims is the school ethos is the understanding and development of pupils social, emotional, and behavioural needs. Every lesson has a strong focus on the four target areas for a specific focus. – see behaviour policy for full details.

In addition to this, through the schools' soft skills data capture, specific targets are developed for each pupil. All teaching staff are made aware of these and each lesson is an opportunity to work on and focus on these individual targets, ensuring realistic learning and progression.

Year 10 & 11 Science

Why this subject is important:

The study of science fires pupils' curiosity about the world and helps them to find explanations. It links practical experience with scientific ideas. Pupils learn that science enhances knowledge and understanding in science is rooted in evidence. Pupils discover how science

and technology affects industry, business and medicine and how science improves the quality of life. Pupils appreciate science worldwide and discover how it relates to their own culture. Pupils also gain confidence to question and discuss issues that may affect their own lives, their immediate community and the world.

What you will learn:

Unit name	Topics	Skills and understanding	Skills Curriculum links
Year 10 Autumn 1 + 2 Unit 2: Chemistry and our Earth.	Controlling Industrial Reactions.	Analyse how different factors affect the rate and yield of an industrial reaction. Explain how different factors affect the rate of industrial reactions. Explain the terms 'yield' and 'atom economy' in relation to specific chemical reactions. Describe the factors that can affect the rates of chemical reactions. Identify the number and types of atoms in balanced chemical equations.	Progression into A-Level Sciences or level 3 BTEC Science. Links to Unit 1 principles of Science. Links to Unit 1: Principles of Applied Science.
	Useful Chemical Products.	Describe how chemical substances are used based on their physical properties. Explain how the physical and chemical properties of chemical substances make them suitable for their uses.	Links to Unit 1: Principles of Applied Science.
	Chemical Reactivity and Bonding.	Assess the suitability of different types of substances for a specified use.	Links to Unit 1: Principles of Applied Science.
	Chemical Reactivity and Bonding.	Explain the trends in chemical properties of group 1 and 7 elements in terms of electronic structure. Describe trends in the physical and chemical properties of group 1 and 7 elements.	

<p>Year 10 Spring 1 + 2</p> <p>Unit 3: Energy and</p>	<p>Affecting the Environment</p> <p>Ionising Radiation.</p>	<p>Describe the physical and chemical properties of group 1 and 7 elements. Relate applications of compounds to their properties and their bonding and structure. Explain the properties of ionic and covalent substances. Describe the formation of ionic and covalent substances. Compare properties of ionic and covalent substances. Draw dot-and-cross diagrams of simple ionic and covalent substances.</p> <p>Describe natural factors that have changed the surface and atmosphere of the Earth. Be able to describe the impact of earthquakes, volcanoes and tsunamis on the Earth. Describe the human activities that affect the Earth and its environment including transportation, carbon dioxide and population increase. Discuss the extent to which human activity has changed the environment, in comparison to natural activity. Evaluate possible solutions to changes in the environment, occurring from natural or human activity.</p> <p>Describe half-life in terms of radioactive decay. Describe the different types of ionising radiation. Use graphs to explain radioactive decay and half-life.</p>	<p>Links to Unit 1: Principles of Applied Science.</p> <p>Links to Unit 1: Principles of Applied Science.</p>
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<p>our Universe.</p>	<p>Green Electricity.</p>	<p>Calculate the half-life of radioactive isotopes. Describe the problems associated with the use of radioactive isotopes. Compare the benefits and drawbacks of using radioactive isotopes in the home or workplace. Justify the selection of a radioactive isotope for a given use within the home or workplace.</p> <p>Assess the suitability of different types of substances for a specified use.</p> <p>Use $V = IR$ to predict values in electric circuit investigations. Describe methods of producing a.c. and d.c. electricity. Compare the efficiency and environmental impact of electricity generated by different sources. Describe how electricity is transmitted to the home or industry. Describe methods of producing AC And DC. electricity. Assess, in qualitative terms, ways to minimise energy losses when transmitting electricity. Assess, in quantitative terms, ways to minimise energy losses either when transmitting electricity or when transforming electricity into other forms for consumer applications.</p>	<p>Links to Useful Chemical Products, Green Electricity, Survival in the gene.</p> <p>Links to Unit 1: Principles of Applied Science. Links to Maths Curriculum ks3&4 – using equations / rearranging equations.</p> <p>Links to Useful Chemical Products, Green Electricity, Survival in the gene.</p> <p>Links to Unit 1: Principles of Applied Science. Links to Maths Curriculum ks3&4 – using equations / rearranging equations.</p>
	<p>The Final Frontier.</p>	<p>Describe how the Universe and the Solar System were formed.</p>	

<p>Year 10 Summer 1 + 2</p> <p>Unit 4: Biology and our Environment</p>	<p>Is Survival In The Genes?</p> <p>How Polluted Is The Enviro nment?</p>	<p>Describe the suitability of different methods for observing the Universe. Describe the structure of the Universe and our Solar System. Evaluate the evidence leading to the Big Bang theory of how the Universe was formed. Explain how evidence shows that the Universe is changing. Identify evidence that shows the dynamic nature of the Universe.</p> <p>Describe how characteristics are used to classify organisms. Describe the different ways in which organisms show interdependence. Discuss the factors that affect the relationship between different organisms. Describe the role of genes and the environment in variation. Explain the role of genes and the environment in evolution. Evaluate the impact of genes and the environment on the survival or extinction of organisms.</p> <p>Describe how living and non-living indicators can be used to measure levels of pollutants. Describe the impact that different human activities have on ecosystems. Analyse the effects of pollutants on ecosystems. Explain the long-term effects of pollutants on living organisms and ecosystems.</p>	<p>Links to Unit 1: Principles of Applied Science.</p> <p>Links to Unit 1: Principles of Applied Science.</p>
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<p>Year 11 (All Year)</p>	<p>Prevention Or Cure?</p> <p>Biology</p>	<p>Describe the different methods used to help reduce the impact of human activities on ecosystems. Discuss the advantages and disadvantages of methods used to reduce the impact of human activity on ecosystems. Evaluate the success of methods to reduce the impact of human activity on an ecosystem, for a given scenario.</p> <p>Describe how lifestyle choices can affect human health.</p> <p>Describe how pathogens affect human health.</p> <p>Describe two different treatment regimes: one used to prevent disease and one used to treat disease.</p> <p>Discuss the advantages and disadvantages of vaccination programmes.</p> <p>Explain the use of pedigree analysis.</p> <p>Explain how bacteria can become resistant to antibiotics.</p> <p>Evaluate the use of antibiotics, pedigree analysis and vaccination programmes in the treatment and prevention of childhood illnesses.</p> <p>Cells Organs DNA and chromosomes</p>	<p>Unit 1: Principles of Applied Science.</p> <p>Unit 2: Chemistry and our Environment.</p> <p>Unit 1: Principles of Applied Science.</p>
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Unit 1: Applied Science Revision / Exam Prep. + Developing and improving previous course assignments where necessary.	Chemistry Physics	Inheritance Homeostasis Nervous System Atomic Structure Isotopes Periodic Table Electron Configuration Elements and compounds Neutralisation Acids and Salts Acids and Metals Energy Transformations Energy Transfer Renewable energy Waves- longitudinal & transverse. Electromagnetic spectrum	 Unit 2: Chemistry and our Earth. Unit 3: Energy and our Universe. Unit 4: Biology and our Environment.
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How you will be assessed:

Your coursework will be continually assessed against the criteria throughout the year.

The final (BTEC) grade is calculated in the following way:

75% of the course is assessed by the submission of a portfolio of evidence of work carried out over a period of time. The course is continuously assessed by the external completion of assignments throughout the year.

25% of the course is assessed with an external examination.

How parents/carers can help:

Provide them with a quiet place to do homework and revision.

Useful website and details of course books:

<http://www.bbc.co.uk/schools/gcsebitesize/science/aqa>
www.samlearning.com

Progression routes and career opportunities:

BTEC levels 2 Applied Science progresses to BTEC Level 3 Science / A Level Sciences.

- Electrician
- Geneticist
- Construction
- Environmentalist
- Medical sciences
- Lab technicians
- Life sciences
- Sports Science

Who to contact and how if you have a query regarding your child:

Name	Position	Email Address	Telephone
Mr S O'Sullivan	Science Co-ordinator	Sosullivan@haileyhall.herts.sch.uk	01992 465208