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Southchurch High School

Abstract

Students are carefully provided with feedback on their learning to enable them to improve.
They gain the knowledge leading onto the skills that are necessary to enable them to become successful lifelong learners.

Curriculum – Science

Intent, Curriculum Map & Curriculum



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# Whole School INTENT

**Southchurch students embrace learning opportunities.**

# INTENT, IMPLEMENTATION & IMPACT

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| --- |
| **INTENT*** Southchurch students embrace learning opportunities.
* We aim for students to gain a high science capital so our students can flourish into successful adult citizens with a valuable place in society by meeting the demands of growing up in an increasingly technically and scientifically advanced world.
 |
| **Implementation**• Sequencing of the curriculum• Adaptive teaching (to take into account of what the learners know and don't know)• Extending opportunities for extracurricular |
| **Impact**• All students will achieve their potential with altered trajectories |

# KS2 Links

[KS2 National Curriculum](https://assets.publishing.service.gov.uk/media/5a806ebd40f0b62305b8b1fa/PRIMARY_national_curriculum_-_Science.pdf)

|  |  |
| --- | --- |
| UNIT | **KS2 LINKS (PRIOR LEARNING YEAR 5 AND 6)** |
| Working scientifically | * Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
* taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
* recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
* using test results to make predictions to set up further comparative and fair tests
* reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
* identifying scientific evidence that has been used to support or refute ideas or arguments
 |
| Living things and their habitats | * describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
* describe the life process of reproduction in some plants and animals
* describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
* give reasons for classifying plants and animals based on specific characteristics
 |
| Animals, including humans | * describe the changes as humans develop to old age
* identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
* recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
* describe the ways in which nutrients and water are transported within animals, including humans
 |
| Properties and changes of materials | * compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
* know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
* use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
* give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
* demonstrate that dissolving, mixing and changes of state are reversible changes
* explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda
 |
| Earth and space | * describe the movement of the Earth and other planets relative to the sun in the solar system
* describe the movement of the moon relative to the Earth
* describe the sun, Earth and moon as approximately spherical bodies
* use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky
 |
| Forces | * explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
* identify the effects of air resistance, water resistance and friction, that act between moving surfaces
* recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
 |
| Evolution and inheritance | * recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
* recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
* identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
 |
| Light | * recognise that light appears to travel in straight lines
* use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
* explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
* use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
 |
| Electricity | * associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
* compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
* use recognised symbols when representing a simple circuit in a diagram
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# CURRICULUM MAP

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year Group** | **Half-term 1** | **Half-term 2** | **Half-term 3** | **Half-term 4** | **Half-term 5** | **Half-term 6** |
| **Year 7** | **Scientific Skills***Students will have an introduction to key scientific skills such as equipment, mathematical skills, graphs and methods needed to enhance their practical experiences and takeaways.*Feedforward assessment**Organisms 1***Students study the skeleton and movement in the human body. They also start their learning of cells and specialized cells, including the movement of substances between cells..*Feedforward assessment | **Forces 1***Students learn about forces and how they can be balanced or unbalanced. They also study speed and distance-time graphs and gravity.*Feedforward assessment**Matter 1***Students learn about how particles move and how they change when they change state. They will learn how they move through diffusion. Students will also understand how to separate mixtures using filtration, evaporation and distillation and chromatography.*Feedforward assessment | **Ecosystems 1***Students focus on food chains and webs, they learn about dependence and disruption within these. They also learn about ecosystems and competition. They also focus on flowers, pollination and how seeds are dispersed.*Feedforward assessment**Energy 1***Students will learn about different energy resources. They will also know what power is and how energy can dissipate.*Feedforward assessment | **Earth 1***Students focus their learning on two strands: the earths structure and the rock cycle, and the universe including the Earth and moon.*Feedforward assessment**Electromagnets 1***Students study basic principles of circuits including potential difference, resistance and series and parallel circuits. They will also learn what current is.*Feedforward assessment | **Reactions 1***Learners develop their understanding of how substances react together, they will know what an acid is and an alkali, and how to use pH scale to identify them. They will know what a neutralization reaction is and understand a variety of reactions of metals with acids, oxygen and water.*Feedforward assessment**Waves 1***Students study sound waves including their loudness, amplitude, frequency and pitch. They learn about the ear and how we hear. They also learn about how light travels, reflection and refraction and the eye.*Feedforward assessment | **Genes 1***Students look at variation and how organisms adapt to change. They also take their first look at adolescence and reproductive systems, they learn what fertilization is and the menstrual cycle.*Feedforward assessment**Science Project***Students will use their scientific skills and produce a project on a specific topic, deepening their understanding and consolidating their skills***Scientific skills** *Students will deepen their knowledge of key scientific skills such as equipment, mathematical skills, graphs and methods, through practical experiences.*Feedforward assessment |
| **Year 8** | **Scientific skills***Students will deepen their knowledge of key scientific skills such as equipment, mathematical skills, graphs and methods, through practical experiences.*Feedforward assessment**Energy 1***Students will learn about different energy resources. They will also know what power is and how energy can dissipate.*Feedforward assessment**Earth 1***Students focus their learning on two strands: the earths structure and the rock cycle, and the universe including the Earth and moon.*Feedforward assessment | **Matter 2***Students study element, atoms and compounds. They focus on how chemical formulae are written. They also look at the Periodic Table and the main groups (1, 7 and 0).*Feedforward assessment**Organisms 2***Students learn about gas exchange and breathing. They also study the impact of smoking, drugs and alcohol. Learners look at digestion including food tests and enzymes.*Feedforward assessment | **Forces 2***Students study friction and drag forces and squashing and stretching forces. They use turning forces and apply maths skills. They also study pressure in gases and liquids and stress on solids.*Feedforward assessment**Genes 2***Students focus on natural selection and Darwins theory. They study extinction and biodiversity. They also look at DNA and genetics, along with inheritance.*Feedforward assessment | **Earth 2***Students focus on global warming, the carbon cycle and climate change. They then study extracting metals and recycling.*Feedforward assessment**Reactions 2***Students deepen their knowledge of chemicals by looking at how atoms react in chemical reactions. They learn about combustion and thermal decomposition. They also take a look at exothermic and endothermic reactions, the energy released and bond energies.*Feedforward assessment | **Energy 2***Students study work, energy and machines. They learn the difference between heat and temperature and how energy is transferred through particles.*Feedforward assessment**Waves 2***Learners look at sound waves, water waves and energy. They study radiation and how waves are modelled.*Feedforward assessment**Ecosystems 2***Students study aerobic and anaerobic respiration. They compare this to photosynthesis and plant minerals.*Feedforward assessment | **Electromagnets 2***Learners focus on magnets and magnetic fields, the they study electromagnets, what they are and how to use them.*Feedforward assessment**Pathogens and diseases***Students start to understand different diseases and how they are transferred. They take a look at how the human body responds to these.*Feedforward assessment**Introduction to year 9***Students will take a sneak peak at key concepts and knowledge they will develop in year 9 in biology, chemistry and physics.*Feedforward assessment |
| **Year 9** | **Cells and organisation** *Students will learn about cell structure and functions depending on the specialised cell and how we can observe these using a microscope.*Feedforward assessment**Nutrition and digestion** *Students will develop their understanding of how organisms can be complex systems,* Feedforward assessment**Gas exchange systems***Students will take a closer look at how oxygen is absorbed into the blood from gas exchange in alveoli.* Feedforward assessment**Photosynthesis***Students study the process of photosynthesis and how plants use glucose.* Feedforward assessment**Cellular respiration***Students study aerobic and anaerobic respiration. They focus on the effect this has in humans and metabolism.*Feedforward assessment**Relationships in an ecosystem***Students focus on communities and how organisms interact with their environment. They look at competition in animals and plants and how they have adapted.*Feedforward assessment**Inheritance, chromosomes, DNA and genes***Students will learn what evidence there is for evolution, study fossils and extinction..*Feedforward assessment | **Atoms, elements and compounds***Learners will delve into knowledge of atom structure and electronic structure.* Feedforward assessment**Pure and impure substances***Learners will develop their knowledge on separating techniques.*Feedforward assessment**Chemical reactions***Students deepen their knowledge of chemicals by looking at how atoms react in chemical equations and a variety of reactions with metals.* Feedforward assessment**Energetics***Students deepen their knowledge of exothermic and endothermic reactions, the energy released and reaction profiles.*Feedforward assessment**The Periodic Table***Students will focus their learning on groups and periods of the Periodic table. They will also understand how it grew to be the Periodic table we know today.*Feedforward assessment**Materials***Learners develop their understanding of the reactivity series and how to extract metals from metal oxides.*Feedforward assessment**The Earth and atmosphere***Learners will study which resources are available to us and how the carbon cycle works.*Feedforward assessment | **Energy changes and transfers***Students will learn about how energy is transferred by conduction and radiation*Feedforward assessment**Changes in systems** *Students focus their learning on the different energy stores and how to calculate these. They also understand the different physical processes that can occur.*Feedforward assessment**Describing motion***Students will delve into speed and relative motion in greater depth.*Feedforward assessment**Sound waves***Students study different characteristics of waves and some uses (loud speakers).*Feedforward assessment**Current electricity***Learners are going to focus on circuits and their components, they will also be able to calculate potential difference and resistance.*Feedforward assessment | **Reproduction***Students develop an understanding of the different reproductive systems and menstrual cycle including the hormones involved. They also look at plant reproduction and carry out a practical including quadrats*Feedforward assessment**Calculation of fuel uses and costs in the domestic context***Students learn about different energy values, power and fuels. They delve into the different energy resources.* Feedforward assessment | **C1: Atomic structure***Learners will delve into knowledge of atom structure and electronic structure. They will also develop their knowledge on separating techniques.*Feedforward assessment**P1: Conservation and dissipation of energy** *Learners focus their learning on the different energy stores and how to calculate these including gravitational potential, kinetic energy and elastic potential energy. They will also use maths skills to calculate efficiency and power.*Feedforward assessment | **B1: Cell structure and transport***Students will learn about cell structure and functions depending on the specialised cell and how we can observe these using a microscope.*Feedforward assessment**B2: Cell division***Students will learn about how a cell divides in organisms and how stem cell research can be used*Feedforward assessment**B3: Organisation and digestive system***Students will develop their understanding of how organisms can be complex systems, they will delve further into the digestive system understanding the function of different enzymes used to digest different foods.* Feedforward assessment |
| **Year 10** | **B1: Cell structure and transport***Students will learn about cell structure and functions depending on the specialised cell and how we can observe these using a microscope.*Feedforward assessment**B2: Cell division***Students will learn about how a cell divides in organisms and how stem cell research can be used*Feedforward assessment**B3: Organisation and digestive system***Students will develop their understanding of how organisms can be complex systems, they will delve further into the digestive system understanding the function of different enzymes used to digest different foods.* Feedforward assessment**B4: Organising animals and plants***Students will take a closer look at how blood circulates around the body including the function of the heart and how oxygen is absorbed into the blood from gas exchange in alveoli. They will also look at transport systems in animals and plants.* Feedforward assessment**B8: Photosynthesis***Students study the process of photosynthesis and how plants use glucose. They also learn what affects the rate of photosynthesis.*Feedforward assessment**B9: Respiration***Students study aerobic and anaerobic respiration. They focus on the effect this has in humans and metabolism.*Feedforward assessment | **C1: Atomic structure***Learners will delve into knowledge of atom structure and electronic structure. They will also develop their knowledge on separating techniques.*Feedforward assessment**C2: The Periodic Table***Students will focus their learning on groups 1 and 7 of the Periodic table. They will also understand how it grew to be the Periodic table we know today.*Feedforward assessment**C3: Structure and bonding***Students deepen their understanding on their knowledge of electronic structures by understanding of how atoms bond together: ionic, covalent and metallic bonding.*Feedforward assessment**C4: Chemical calculations***Students apply their mathematical skills to calculate relative masses, moles and concentrations. They will also develop their skills to balance more complex chemical equations.*Feedforward assessment**C5: Chemical changes***Students study the reactivity series and learn how to produce salts from metals and insoluble bases. Students also learn about displacement reactions and neutralisation.*Feedforward assessment | **P1: Conservation and dissipation of energy** *Learners focus their learning on the different energy stores and how to calculate these including gravitational potential, kinetic energy and elastic potential energy. They will also use maths skills to calculate efficiency and power.*Feedforward assessment**P2: Energy transfer by heating***Students will learn about how energy is transferred by conduction. They will also use specific heat capacity to understand how energy is transferred.*Feedforward assessment**P3: Energy resources***Students learn about renewable energy resources and the demand the population has of the energy on Earth.*Feedforward assessment**P4: Electrical circuits***Learners are going to focus on circuits and their components, they will also be able to calculate potential difference, resistance or current depending on if it is a series or parallel circuit.*Feedforward assessment | **C6: Electrolysis***Students will learn about the electrolysis process and use it to apply this to extraction of aluminium and aqueous solutions.*Feedforward assessment**C7: Energy changes***Students delve into different reactions and how energy is used or released from them. They will develop skills to identify different energies in reaction profiles.*Feedforward assessment**C8: Rates and equilibrium***Students will learn to apply knowledge of speed of reaction to a practical application. They will study the different effects on the rate of reaction and also reactions which are reversible, understanding equilibrium.*Feedforward assessment | **B5: Communicable diseases***Students will be able to delve deeper into what creates infection and what has provoked it. They will study viral, bacterial, fungal and protist diseases. They will also come to know about how the body reacts when exposed to a disease.*Feedforward assessment**B6: Preventing and treating disease***Students are going to think deeply about a variety of treatments for diseases, they will be able to decide which course of treatment is best and explain why. They also learn about how new drugs are developed.* Feedforward assessment**B7: Non-communicable diseases***Students will discover how not all diseases are contagious from other organisms and in fact some depend on lifestyle and genetics. They will study non-communicable diseases such as cancer, how smoking can lead to disease, how lifestyle can lead to obesity and type 2 diabetes, among others.*Feedforward assessment**B10: The human nervous system***Students learn what homeostasis is and the structure of the nervous system. They also will know what makes a reflex action.*Feedforward assessment | **P5: Electricity in the home***Students build on their prior knowledge of circuits to understand how cables and plugs use electricity. They also will apply this to appliances and how efficient they are.*Feedforward assessment**P6: Molecules and matter***Students use their knowledge of the particle model to understand in depth density and changes of state. They learn about internal energy and specific latent heat..*Feedforward assessment**P7: Radioactivity***Learners will learn about different radiation from alpha, beta and gamma particles. They will understand the development of the nucleus after different discoveries.*Feedforward assessment **P8: Forces in balance***Students will be able to differentiate between a vector and a scalar. They will also recognize resultant forces and the centre of mass.*Feedforward assessment**P9: Motion***As students will have learnt about resultant forces, they will have knowledge of increase of speed, they will delve deeper into this by studying speed and distance-time graphs and learn about velocity and acceleration.*Feedforward assessment |
| **Year 11****Combined** | **B13: Reproduction***Students develop an understanding of the different types of reproduction. They will be able to describe cell division in sexual reproduction and DNA, how it is inherited and how some disorders are inherited.*Feedforward assessment**B14: Variation and evolution***Learners will describe variation and learn about natural selection. They will have a focus on selective breeding and genetic engineering and its ethics.*Feedforward assessment**B15: Genetics and evolution***Students will learn what evidence there is for evolution, study fossils and extinction. They will also study antibiotic resistant bacteria and classification of organisms.*Feedforward assessment**B16: Adaptations, interdependence and competition***Students focus on communities and how organisms interact with their environment. They look at competition in animals and plants and how they have adapted.*Feedforward assessment**B17: Organising an ecosystem***Students study feeding relationships and the carbon cycle.*Feedforward assessment**B18: Biodiversity and ecosystems***Students will study pollution on land, water and in the air. They will learn more about deforestation and global warming.*Feedforward assessment | **P12: Wave properties***Students study the different waves that exist and their properties. They focus on reflection and refraction of waves.*Feedforward assessment**P13: Electromagnetic waves***Students will study the electromagnetic spectrum and the uses of different waves such as UV waves, X-rays and gamma rays.*Feedforward assessment**P15: Electromagnetism***Building on their knowledge of electromagnetic waves, students study magnetic fields and those of electric currents. They study the motor effect as well.*Feedforward assessment | **C14: The Earth’s resources***Students build on their knowledge of the Earth’s atmosphere and pollutants, they will apply this knowledge to treating water and extracting metals including recycling.*Feedforward assessment | **Revision****Required practicals** | **Revision** **Required practicals****GCSE’s** | **GCSE’s** |
| **Year 11****Biology** | **B12: Homeostasis in action***Students will learn about how homeostasis controls the core body temperature, how waste is removed and also learn about kidneys: function and treatment options for faulty kidneys.*Feedforward assessment**B13: Reproduction***Students develop an understanding of the different types of reproduction: sexual and asexual. They will be able to describe cell division in sexual reproduction and DNA, how it is inherited and how some disorders are inherited.*Feedforward assessment**B14: Variation and evolution***Learners will describe variation and learn about natural selection. They will have a focus on selective breeding and genetic engineering and its ethics.*Feedforward assessment | **B15: Genetics and evolution***Students will learn what evidence there is for evolution, study fossils and extinction. They will also study antibiotic resistant bacteria and classification of organisms.*Feedforward assessment**B16: Adaptations, interdependence and competition***Students focus on communities and how organisms interact with their environment. They look at competition in animals and plants and how they have adapted.*Feedforward assessment | **B17: Organising an ecosystem***Students study feeding relationships and the carbon cycle.*Feedforward assessment**B18: Biodiversity and ecosystems***Students will study pollution on land, water and in the air. They will learn more about deforestation and global warming.*Feedforward assessment | **Revision****Required practicals** | **Revision** **Required practicals****GCSE’s** | **GCSE’s** |
| **Year 11****Chemistry** | **C12: Chemical analysis***Students will apply prior knowledge of separating mixtures to deepen their learning on chromatograms and learn different tests for gases.*Feedforward assessment**C13: The Earth’s atmosphere***Learners will study how the atmosphere has evolved and what greenhouse gases are, climate change and atmospheric pollutants.*Feedforward assessment**C14: The Earth’s resources***Students build on their knowledge of the Earth’s atmosphere and pollutants, they will apply this knowledge to treating water and extracting metals including recycling.*Feedforward assessment | **C15: Using our resources***Triple chemistry learners will study rusting, alloys and the Haber process. They will also learn about fertilisers in the lab and industry.*Feedforward assessment | **Revision****Required practicals** | **Revision****Required practicals** | **Revision** **Required practicals****GCSE’s** | **GCSE’s** |
| **Year 11****Physics** | **P11: Force and pressure***Students learn about the effect pressure has on surfaces and liquids. They will also understand atmospheric pressure, upthrust and flotation.*Feedforward assessment**P12: Wave properties***Students study the different waves that exist and their properties. They focus on reflection and refraction of waves.*Feedforward assessment**P13: Electromagnetic waves***Students will study the electromagnetic spectrum and the uses of different waves such as UV waves, X-rays and gamma rays.*Feedforward assessment | **P14: Light***Triple Physics students learn more deeply about reflection and refraction of light, they also learn about lenses and colour.*Feedforward assessment**P15: Electromagnetism***Building on their knowledge of electromagnetic waves, students study magnetic fields and those of electric currents. They study the motor effect as well.*Feedforward assessment | **P16: Space***Triple physics students apply their knowledge to learn about the Solar system and stars. They focus on the universe and what it consists of.*Feedforward assessment | **Revision****Required practicals** | **Revision** **Required practicals****GCSE’s** | **GCSE’s** |

# KS5 Links

[GCE AS and A level subject content for biology, chemistry, physics and psychology](https://assets.publishing.service.gov.uk/media/5a807949e5274a2e8ab50599/Science_AS_and_level_formatted.pdf)

# END OF COURSE EXPECTATIONS

**Aims**

GCSE study in combined science provides the foundations for understanding the material world. Scientific understanding is changing our lives and is vital to the world’s future prosperity, and all students should be taught essential aspects of the knowledge, methods, processes and uses of science. They should be helped to appreciate how the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas relating to the sciences which are both inter-linked, and are of universal application. These key ideas include:

* the use of conceptual models and theories to make sense of the observed diversity of natural phenomena
* the assumption that every effect has one or more cause
* that change is driven by differences between different objects and systems when they interact
* that many such interactions occur over a distance and over time without direct contact
* that science progresses through a cycle of hypothesis, practical experimentation, observation, theory development and review
* that quantitative analysis is a central element both of many theories and of scientific methods of inquiry.

GCSE specifications in combined award science should enable students to:

* develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
* develop understanding of the nature, processes and methods of science, through different types of scientific enquiries that help them to answer scientific questions about the world around them
* develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills, both in the laboratory, in the field and in other learning environments
* develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.

Biology, chemistry and physics should be studied in ways that help students to develop curiosity about the natural world, insight into how science works, and appreciation of its relevance to their everyday lives. The scope and nature of such study should be broad, coherent, practical and satisfying, and thereby encourage students to be inspired, motivated and challenged by the subject and its achievements

**Assessment Objectives**

Assessment objectives (AOs) are set by Ofqual and are the same across all GCSE Combined Science:

Trilogy specifications and all exam boards. The exams will measure how students have achieved the following assessment objectives.

* AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.
* AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.
* AO3: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.

# NATIONAL CURRICULUM LINKS

[Science National Curriculum](https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study)

[Department for Education (publishing.service.gov.uk)](https://assets.publishing.service.gov.uk/media/5a7efc65ed915d74e33f3ac9/Science_KS4_PoS_7_November_2014.pdf)

|  |
| --- |
| **Purpose of study** 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, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. 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. |
| **Aims****The national curriculum for science aims to ensure that all pupils:****The national curriculum for science aims to ensure that all pupils:*** develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
* develop 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 knowledge required to understand the uses and implications of science, today and for the future
 |
| **Scientific attitudes*** pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
* understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review
* evaluate
 |
| **Experimental skills and investigations** * ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
* make predictions using scientific knowledge and understanding
* select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate
* use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety
* make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements
* apply sampling techniques.
 |
| **Measurement** * understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature
* use and derive simple equations and carry out appropriate calculations
* undertake basic data analysis including simple statistical techniques.
 |
| **Analysis and evaluation** * apply mathematical concepts and calculate results
* present observations and data using appropriate methods, including tables and graphs
* interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
* present reasoned explanations, including explaining data in relation to predictions and hypotheses
* evaluate data, showing awareness of potential sources of random and systematic error
* identify further questions arising from their results.
 |
| **MATHS:** Science often requires mathematical skills for data analysis, measurement, and problem-solving. Concepts such as algebra, geometry, and statistics are applied in scientific investigations and experiments |
| **TECHNOLOGY:** Science and technology are closely linked, with advancements in one often driving progress in the other. Students may explore the application of technology in scientific research, such as using data logging equipment or simulations |
| **ENGINEERING:** Engineering principles are integral to many scientific fields, especially in areas like robotics, materials science, and environmental engineering. Students may engage in engineering challenges that require scientific knowledge and problem-solving skills. |
| **GEOGRAPHY:** Science and geography intersect in areas like environmental science, climate change, and earth sciences. Students may study the impact of human activities on the environment or analyse geographical data to understand scientific phenomena |
| **LITERACY:** Science requires effective communication skills for writing reports, explaining concepts, and presenting findings. Literacy skills are essential for interpreting scientific texts, writing hypotheses, and communicating scientific ideas accurately |

# PERSONAL DEVELOPMENT CURRICULUM

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| **Aims**The Science curriculum is designed to support and promote the vision of Southchurch High School, “A community of Opportunity, Learning and Aspiration”. The curriculum recognises not only the importance of allowing students to flourish academically but also our wider role in preparing our students for their adult life beyond school. Our Personal Development programme is underpinned by five core pillars; * **Equality and Diversity**
* **Cultural Capital**
* **Community and Wellbeing**
* **Careers and Employability**
* **Character Development.**
 |
| **Equality & Diversity**The Science curriculum aims to develop an understanding through the science theories showing how people of different faiths, convictions, ability, gender, heritage and ethnicity can form a successful, cohesive and happy community that draws from the best in each of us. |
| **Cultural Capital** The Science curriculum supports the school’s vision in ensuring that all students gain the knowledge and cultural capital they need to succeed in life through a wealth of experiences both in and outside the taught curriculum.**Trips & Visits**:STEM KARTS (YEAR 7)Big bang science showZoo trip Science museum**Extra-Curricular:** Stem club for KS3Science projects**British Values:** Mutual Respect: Students are respectful when listening to the opinions and views of other students. The Rule of Law: The classroom rules enable all students to develop their skills in an environment where equipment and each other’s feelings are respected.The classroom rules ensure students are all responsible for the learning environment. Tolerance: Students are tolerant of the opinions and creative ideas of each other. Students value the wide variety of cultures that we explore from all over the world and are tolerant of different faiths and beliefs in the styles we study.Democracy: Students are all part of the learning experience and are listened to. Students assess each other’s work and celebrate each other’s successes.  |
| **Community and wellbeing**The Science curriculum recognises the importance of our students knowing how to care for themselves both mentally and physically, whilst they also develop personal traits and virtues that will motivate and guide students with confidence and resilience. |
| **Careers & Employability** The science curriculum is designed to ensure students have a breadth of opportunities and experiences that our pupils can start to build their own future pathways on. Through science, our students are supported to develop the following skills; CommunicationConfidenceTeamwork and LeadershipListening and RespondingCreativityCritical thinking and problem solvingTime management Research**Events linking to careers:** WEBINARS ON CAREERS IN SCIENCE  NETWORK RAIN LIGHTBULB WORKSHOP (YR 8) |
| **Character Development:**All members of the school community (regardless of background or ability) understand, develop and demonstrate the values that underpin our student mission of a Community of Opportunity, Learning and Aspiration. Community of Opportunity – All students are supported and encouraged to perform Infront of their peers and watched with mutual respect. Students are provided with various, collaborative group tasks each lesson in which all learners are supported to engage equally and freely share their ideas and opinions. Learning – All students have equal opportunity to access the curriculum. Students are taught and placed into mixed ability classes, ensuring all students are supported with adapted practice, where necessary, to ensure curriculum access. All students are invited to an array of enrichment opportunities including; clubs, trips and visits and workshops. Aspiration – Students are encouraged to develop their love of science through careers talks, trips and external speakers. They take every opportunity within lesson to learn and take control over their own personal development.  |

# SMSC CURRICULUM LINKS

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| **Spiritual development** Spiritual development in science education involves fostering a sense of wonder and curiosity about the natural world and the universe. This can be achieved by: • Exploring Big Questions: Encouraging students to explore profound questions about life, the universe, and our place in it. • Sense of Wonder: Promoting a sense of awe and wonder through lessons on the complexity and beauty of natural phenomena. • Reflection on Impact: Helping students reflect on how scientific advancements impact human life and the natural world. |
| **Moral development**Moral development in science education involves teaching students about ethical considerations and the implications of scientific work. This includes: • Ethical Issues: Discussing the ethical implications of scientific research, such as genetic engineering, cloning, and the use of animals in experiments. • Environmental Responsibility: Educating students about the moral responsibility to protect the environment and promote sustainability. • Scientific Integrity: Emphasizing the importance of honesty and integrity in conducting and reporting scientific research. |
| **Social development**Social development in science education involves promoting teamwork, communication, and an understanding of the role of science in society. This can be fostered through: • Collaboration: Encouraging collaborative projects and experiments that require teamwork and effective communication. • Science in Society: Teaching students about the role of science in addressing societal challenges, such as healthcare, energy, and climate change. • Community Engagement: Involving students in community-based science projects or citizen science initiatives that benefit society.   |
| **Cultural development**Cultural development in science education involves recognizing and celebrating the contributions of diverse cultures to scientific knowledge. This includes: • Historical Contributions: Teaching about the contributions of scientists from different cultures and historical periods. • Global Perspectives: Encouraging a global perspective on scientific issues, understanding how different cultures approach scientific problems and solutions. • Diverse Role Models: Highlighting the achievements of scientists from diverse backgrounds to inspire all students. |
| SMSC IN SCIENCE |
| Incorporating Spiritual, Moral, Social, and Cultural (SMSC) development within science education enriches students' learning experiences and nurtures their holistic development. Science exploration can evoke wonder about the natural world, fostering students' spiritual growth. Ethical discussions on scientific advancements, such as genetic engineering and environmental conservation, help students develop moral reasoning skills. Collaborative scientific inquiry promotes teamwork and communication, enhancing students' social skills. Moreover, studying the cultural perspectives in science, including indigenous knowledge systems and traditional ecological practices, deepens students' appreciation for diversity. By integrating SMSC development within science education, students not only deepen their scientific knowledge and skills but also cultivate values such as curiosity, integrity, empathy, and respect for diverse perspectives. This prepares them to become informed, responsible, and compassionate members of society, equipped to address real-world challenges with empathy and understanding. |

# Equality, Diversity and Inclusivity Links

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| **Aims**Within the different projects we look to ensure that there is a broad range emphasising equality, diversity and inclusivity. We ensure that all students work together within pairs, groups and teams to strengthen professional relationships within the classroom and promote an acceptance for all students and the wider world around them.  |