

Science Curriculum Intent		Year 8
	In the Science Department at New Line Learning Academy our intent is to equip pupils with the knowledge, skills, and understanding to inspire pupils to be confident, resilient scientists by integrating practical discovery into learning. The curriculum considers the individual learning needs, strengths and starting points of all. We develop successful learners who can apply their scientific knowledge and understanding in all contexts of the world. We enhance their understanding of how science fits into every aspect of the world and enable pupils to know which professions and employment routes embody scientific knowledge and understanding to encourage them to see how vital science is to their future endeavors. We develop mathematical thinking and cohesively link mathematical knowledge to their learning. We encourage all pupils to see the importance of their mathematical skills within the context of science and beyond into the worlds they live, and will work in. Digital skills are developed when necessary, and we use innovative technologies to enable pupils to evaluate and refine methods and models. Pupils' reading and writing are supported and developed through analysis of media articles that are relevant to the context they are being taught about. This is furthered as we support and develop oral debate and critical thinking. This means that all pupils leave the science department being able to: • Make links between science and the world they live in • Analyse qualitative and quantitative data • Be confident and competent readers, writers and speakers • Have a thirst for learning more science in their post-16 endeavors.	
	Term 1 Enquiry	 What role do different plants play in the role of energy?
 Big Picture <i>What are the main ideas and big questions in this topic?</i>	Students develop their understanding of plants, electricity generation and variation by investigating how plants obtain and use energy, how electricity is generated to meet society's needs and why living organisms vary within populations. They explore the processes carried out by plants, compare methods of generating electricity and investigate how variation enables organisms to survive and reproduce.	

Throughout the topic, students discover how biology and physics explain many aspects of the natural and human world. By combining practical investigation with scientific theory, they begin to understand how scientific knowledge supports agriculture, energy production, conservation and the study of living organisms.

Through this topic, students will explore:

- How plants obtain and use energy for growth and survival.
- How electricity is generated using different energy resources.
- Why variation exists within species.
- How inherited and environmental factors influence organisms.
- How to investigate biological and physical processes using practical enquiry and scientific evidence.

**Zoom In**

What knowledge, skills and key vocabulary will we learn step by step?

Students begin by investigating plants, building upon their understanding that living things are made of cells. They explore the structures of plants and the processes they carry out, considering how these enable plants to survive, grow and obtain the resources they need.

Students then investigate electricity generation, exploring how electricity is produced using different energy resources and considering the advantages, disadvantages and costs associated with different methods of generation.

The topic concludes with variation, where students investigate why individuals within a species are different and how inherited and environmental factors contribute to these differences. Through practical investigations and scientific enquiry, students continue to develop confidence in planning investigations, interpreting evidence and communicating scientific explanations.

Students develop substantive knowledge by understanding:

- the structures and functions of plants
- how plants obtain and use energy
- different methods of electricity generation
- the advantages and disadvantages of different energy resources
- how inherited and environmental variation occurs within populations.

Students develop disciplinary knowledge by:

- planning and carrying out practical investigations safely
- observing and recording scientific evidence accurately
- interpreting data and identifying patterns
- evaluating scientific evidence
- communicating scientific ideas using accurate scientific vocabulary.

Key vocabulary includes photosynthesis, chlorophyll, leaf, root, stem, xylem, phloem, glucose, electricity, generator, renewable, non-renewable, variation, inherited, environmental, adaptation, species, population

 Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>	 Pitch Up <i>How will we challenge ourselves?</i>
From Key Stage 2, pupils may have encountered: • Basic understanding of the structure of plants. • A basic understanding of electricity • Knowledge that living things have differences and have changes over time. From Year 7, pupils will have encountered: • The internal structures (cells) that make up living things).	Building on the skills established in Year 7, pupils in Year 8 tackle more complex scientific content and tasks that deepen their critical thinking. They encounter a broader range of exam-style questions, tailored to stretch higher ability learners while offering appropriate scaffolding to those needing additional support. Practical activities become more demanding, with a greater emphasis on pupil independence and team-based problem-solving. Teachers continue to uphold high expectations around correct scientific terminology and structured reflection, helping pupils refine their spoken and written responses. This heightened focus on metacognition and rigorous questioning ensures pupils progressively gain the cognitive tools needed for success in Key Stage 4. Practical activities become more complex and the independence of pupils during these activities increases.
 Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	 Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
All practical work throughout our curriculum plan will require the safety aspects and basic lab skills taught during Key Stage 3. Similarly, all future biology, chemistry and physics learning work is attached to pupils' learning from Key Stage 3 to support pupils in building their mental models of science and scientific concepts.	Scientific understanding of plants, energy generation and variation has developed over centuries through observation, experimentation and technological innovation. From early discoveries about how plants grow to modern research into renewable energy and genetics, scientists have

Pupils moving into Year 9 and beyond will continue to study biology, chemistry and physics in preparation for GCSE science at Key Stage 4.

continually refined their understanding of the natural world through evidence.

Learning about variation also helps students appreciate that every individual is unique whilst recognising that inherited and environmental factors contribute to the diversity of life on Earth. Exploring these ideas encourages students to understand how scientific discoveries continue to influence agriculture, conservation, energy production and environmental sustainability.



Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Understanding plants, electricity generation and variation enables students to explain how living organisms survive, how electricity powers modern society and why individuals within a species are different. Scientific knowledge developed through this topic underpins agriculture, environmental science, energy production and conservation, helping students appreciate how science contributes to sustainable development and improvements in quality of life. SMSC is developed through curiosity, responsibility and critical thinking as students evaluate different methods of electricity generation, consider the importance of biodiversity and recognise how scientific understanding supports decisions about sustainability and the environment.

Cross-curricular links include Geography through renewable resources, sustainability and environmental change, Mathematics through data analysis and graph interpretation, Design Technology through energy systems and sustainable design, and PSHEE through environmental responsibility and informed decision making.

Students explore careers including:

- Botanist – studying plants to improve food production, conservation and biodiversity.
- Power Station Operator – managing systems used to generate electricity safely and efficiently.
- Conservation Officer – protecting habitats and monitoring biodiversity to conserve wildlife and ecosystems.



The topic supports the Skills Builder Universal Framework, particularly:

- Planning through organising practical investigations and selecting appropriate scientific methods.
- Creativity through exploring scientific solutions to environmental and energy challenges.
- Problem Solving through applying scientific knowledge to explain biological and physical processes in unfamiliar contexts.

 Resources <i>What books, websites, videos and materials will support our learning?</i>		 Assessment <i>How will we show what we know, remember and can apply?</i>
At New Line Learning Academy, we are committed to equipping our pupils with high-quality resources that extend learning beyond the classroom and empower them to take ownership of their scientific journey. To enrich and consolidate understanding, pupils have access to a range of carefully selected digital platforms and learning tools: • Cognito (https://cognitoedu.org/home) – Offers engaging video tutorials, concise notes, and practice questions tailored to support mastery of scientific concepts across Key Stage 3 and beyond. • BBC Bitesize (https://www.bbc.co.uk/bitesize/levels/z4kw2hv) – Provides accessible explanations, interactive activities, and revision materials, helping pupils consolidate learning and revisit key topics independently. • Sparx Science – www.sparx-learning.com – the platform used for science homework which will be set each week and provide topics from two weeks previously. The expectation is that pupils will have 100% completion and 100% success • Kerboodle (https://www.kerboodle.com/users/login) – Supports the curriculum with digital textbooks, assessments, and interactive resources aligned to national specifications, offering pupils and teachers a wealth of high-quality materials. These resources not only reinforce classroom learning but also foster curiosity, independence, and confidence, ensuring every pupil can thrive and deepen their scientific understanding at their own pace.		Assessment takes place throughout the unit through questioning, class discussion, retrieval activities, practical investigations and independent application tasks. Students demonstrate their understanding by explaining how plants obtain and use energy, comparing methods of electricity generation, describing variation within species and applying scientific knowledge to unfamiliar contexts using accurate scientific vocabulary. At the end of the unit, students complete an assessment that measures the progress made throughout the teaching sequence. Assessments include a mixture of substantive knowledge and disciplinary knowledge, allowing students to demonstrate both their scientific understanding and their ability to apply this knowledge in practical and unfamiliar contexts. Following assessment, students complete targeted improvement activities to address misconceptions and strengthen areas for development. Practical investigations, extended scientific writing and examination-style questions help students develop confidence in applying scientific knowledge and scientific enquiry skills throughout the curriculum.
Term 2 Enquiry	 Why are magnets useful?	



Big Picture

What are the main ideas and big questions in this topic?

Students develop their understanding of magnetism by investigating the properties of magnets, magnetic fields and electromagnets. They explore how magnetic forces act at a distance, how the Earth's magnetic field supports navigation and how electromagnets are used in a wide range of everyday technologies.

Throughout the topic, students discover how magnetic forces can be harnessed to solve practical problems, from lifting heavy objects to generating electricity and powering modern devices. By combining practical investigation with scientific theory, students begin to understand how physics underpins engineering, transport and technological innovation.

Through this topic, students will explore:

- How magnets attract and repel one another.
- How magnetic fields can be represented and investigated.
- How the Earth's magnetic field is used for navigation.
- How electromagnets are constructed and used in everyday technology.
- How to investigate magnetic forces through practical enquiry and scientific evidence.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students begin by investigating the properties of magnets, exploring magnetic poles, attraction and repulsion, and identifying which materials are magnetic. Through practical investigations, they observe and represent magnetic fields, developing an understanding of how magnetic forces act without physical contact.

As the topic develops, students investigate the Earth's magnetic field, considering its importance in navigation before constructing and testing electromagnets. Through practical enquiry, students evaluate how changing different variables affects the strength of an electromagnet and explore how electromagnets are applied in everyday life and industry.

Students develop substantive knowledge by understanding:

- the properties of permanent magnets
- attraction, repulsion and magnetic poles
- magnetic fields and field patterns

- the Earth's magnetic field
- how electromagnets are constructed and used.

Students develop disciplinary knowledge by:

- planning and carrying out practical investigations safely
- observing and recording scientific evidence accurately
- identifying patterns within experimental results
- evaluating practical methods and drawing conclusions
- communicating scientific explanations using accurate scientific vocabulary.

Key vocabulary includes; magnet, magnetic field, magnetic force, attract, repel, north pole, south pole, compass, Earth's magnetic field, electromagnet, coil, iron core, current, circuit, permanent magnet

 Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>	 Pitch Up <i>How will we challenge ourselves?</i>
Students should already understand that forces can act on objects and that some forces act through direct contact whilst others can act at a distance. They should have experience of carrying out practical investigations safely, making careful observations, recording results and identifying patterns in scientific data. This prior learning provides the foundation for investigating magnets, magnetic fields and electromagnets through practical enquiry.:	Students will be challenged to move beyond identifying magnetic materials by explaining how magnetic fields and magnetic forces produce observed effects. They will predict the outcome of investigations, justify their reasoning using scientific evidence and evaluate the effectiveness of different practical methods. Students will analyse patterns within experimental data, explain how changes to an electromagnet affect its strength and apply their understanding to unfamiliar contexts involving everyday technologies. Students will be expected to communicate their ideas accurately using ambitious scientific vocabulary including magnet, magnetic field, magnetic force, attract, repel, permanent magnet, electromagnet, coil, current, iron core, magnetic poles and compass.
 Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	 Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
Understanding magnetism provides a foundation for future learning about electricity, forces and electromagnetism. Students build upon their understanding of non-contact forces and apply this knowledge when studying electrical systems, motors, generators and other	Magnetism has fascinated scientists for thousands of years, from the discovery of naturally magnetic rocks used for navigation to the development of modern technologies such as electric motors, generators and medical imaging equipment. Understanding how scientists

technologies that rely on magnetic fields. The practical investigations also strengthen students' ability to identify variables, interpret evidence and evaluate scientific methods, skills that are developed throughout the Science curriculum.	investigated magnetic forces demonstrates how scientific knowledge develops through careful observation, experimentation and evidence. The study of electromagnets also highlights how scientific discoveries have transformed communication, transport, healthcare and manufacturing, showing students how ideas developed in laboratories are applied to solve real-world problems.
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Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Understanding magnetism enables students to explain how many everyday technologies operate, from electric motors and loudspeakers to cranes, door locks and transport systems. Scientific knowledge developed through this topic underpins engineering, electronics and renewable technologies, helping students appreciate how physics contributes to technological innovation. SMSC is developed through curiosity, logical reasoning and responsibility as students investigate unseen forces, evaluate scientific evidence and recognise how technological developments have transformed modern society.

Cross-curricular links include Design Technology through electronic systems and product design, Geography through navigation and the Earth's magnetic field, Mathematics through recording, presenting and interpreting scientific data, and Computing through electrical devices and technological systems.

Students explore careers including:

- Electrical Engineer – designing and maintaining electrical equipment that uses magnetic fields and electromagnets.
- Rail Systems Engineer – applying electromagnetism within signalling systems and modern transport networks.
- Medical Imaging Engineer – developing and maintaining equipment that uses magnetic fields to support medical diagnosis.

The topic supports the Skills Builder Universal Framework, particularly:

- Listening through following practical instructions and evaluating scientific evidence.
- Planning through designing and carrying out investigations into magnetic fields and electromagnets.
- Problem Solving through applying knowledge of magnetism to explain observations and real-world technologies.



Resources

What books, websites, videos and materials will support our learning?



Assessment

How will we show what we know, remember and can apply?

At New Line Learning Academy, we are committed to equipping our pupils with high-quality resources that extend learning beyond the classroom and empower them to take ownership of their scientific journey. To enrich and consolidate understanding, pupils have access to a range of carefully selected digital platforms and learning tools:

- Cognito (<https://cognitoedu.org/home>) – Offers engaging video tutorials, concise notes, and practice questions tailored to support mastery of scientific concepts across Key Stage 3 and beyond.
- BBC Bitesize (<https://www.bbc.co.uk/bitesize/levels/z4kw2hv>) – Provides accessible explanations, interactive activities, and revision materials, helping pupils consolidate learning and revisit key topics independently.
- Sparx Science – www.sparx-learning.com – the platform used for science homework which will be set each week and provide topics from two weeks previously. The expectation is that pupils will have 100% completion and 100% success
- Kerboodle (<https://www.kerboodle.com/users/login>) – Supports the curriculum with digital textbooks, assessments, and interactive resources aligned to national specifications, offering pupils and teachers a wealth of high-quality materials. These resources not only reinforce classroom learning but also foster curiosity, independence, and confidence, ensuring every pupil can thrive and deepen their scientific understanding at their own pace.

Assessment takes place throughout the unit through questioning, class discussion, retrieval activities, practical investigations and independent application tasks. Students demonstrate their understanding by explaining the behaviour of magnets, interpreting magnetic field patterns, describing the Earth's magnetic field, explaining how electromagnets work and applying scientific knowledge to unfamiliar contexts using accurate scientific vocabulary.

At the end of the unit, students complete an assessment that measures the progress made throughout the teaching sequence. Assessments include a mixture of substantive knowledge and disciplinary knowledge, allowing students to demonstrate both their scientific understanding and their ability to apply this knowledge in practical and unfamiliar contexts.

Following assessment, students complete targeted improvement activities to address misconceptions and strengthen areas for development. Practical investigations, extended scientific writing and examination-style questions help students develop confidence in applying scientific knowledge and scientific enquiry skills throughout the curriculum.

Term 3

Enquiry



What are the reactions that lead to useable resources?



Big Picture

What are the main ideas and big questions in this topic?

Students develop their understanding of healthy lifestyles, the Earth and chemical reactions by investigating how lifestyle choices affect health, how the Earth's structure and rocks are formed, and how chemical reactions produce new substances and transfer energy. They explore key ideas from biology, geology and chemistry whilst developing the practical skills needed to investigate, analyse evidence and communicate scientific explanations.

Throughout the topic, students discover how science helps us understand our own health, the planet we live on and the chemical changes that occur all around us. By combining practical investigations with scientific theory, students begin to appreciate how scientific knowledge supports healthcare, environmental management and industry.

Through this topic, students will explore:

- How healthy lifestyle choices influence the body.
- The structure of the Earth and the formation of different rock types.
- How metals react with oxygen, water and acids.
- How the reactivity series helps us predict chemical reactions.
- How chemical reactions transfer energy and produce new substances.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students begin by investigating healthy lifestyles, exploring the importance of a balanced diet and the effects of obesity, anorexia, drugs, alcohol and smoking on the body. They use scientific evidence to understand how lifestyle choices influence health and wellbeing.

Students then investigate the Earth, learning about its structure before exploring how sedimentary, igneous and metamorphic rocks are formed through the rock cycle. They develop an understanding of how Earth's materials are continually recycled through natural processes.

The topic concludes with chemical reactions, where students investigate the differences between metals and non-metals, explore how metals react with oxygen, acids and water, and study the reactivity series. They then investigate metal displacement reactions, exothermic and endothermic reactions, and thermal decomposition, using practical investigations to observe chemical change and energy transfer.

Throughout the topic, students develop confidence in planning scientific enquiries, making careful observations, identifying patterns within results and using evidence to communicate accurate scientific explanations.

Students develop substantive knowledge by understanding:

- the importance of a healthy diet and the effects of lifestyle choices on health
- the structure of the Earth and the formation of sedimentary, igneous and metamorphic rocks
- the properties of metals and non-metals
- how metals react with oxygen, acids and water
- the reactivity series, displacement reactions, exothermic and endothermic reactions, and thermal decomposition.

Students develop disciplinary knowledge by:

- planning and carrying out practical investigations safely
- making careful observations and recording results accurately
- identifying patterns within scientific evidence
- interpreting results and drawing justified conclusions
- communicating scientific ideas using accurate scientific vocabulary.

Key vocabulary this term includes; healthy diet, obesity, anorexia, drugs, alcohol, smoking, Earth, crust, mantle, core, sedimentary, igneous, metamorphic, rock cycle, metal, non-metal, oxygen, acid, water, reactivity series, displacement, exothermic, endothermic, thermal decomposition

	Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>		Pitch Up <i>How will we challenge ourselves?</i>
	Students should already understand that living organisms require nutrients to survive, that rocks and materials have different properties and that chemical reactions produce new substances. They should have experience of carrying out practical investigations safely, making observations, recording results and identifying patterns in scientific data. This prior learning provides the foundation for exploring healthy lifestyles, Earth's structure and chemical reactions in greater depth.		Students will be challenged to explain how scientific evidence supports healthy lifestyle choices, interpret the processes involved in the formation of different rock types and predict the outcome of chemical reactions using the reactivity series. They will justify their conclusions using evidence gathered through practical investigations and apply their understanding to unfamiliar scientific contexts. Students will communicate their ideas accurately using ambitious scientific vocabulary including healthy diet, sedimentary, igneous, metamorphic, reactivity series, displacement, exothermic, endothermic and thermal decomposition.
	Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>		Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>

Understanding healthy lifestyles, Earth's structure and chemical reactions provides a foundation for future learning across biology, chemistry and geology. Students build upon their understanding of living organisms, materials and scientific change whilst developing practical enquiry skills that prepare them for more advanced study at Key Stage 4. The investigative skills developed throughout the topic also strengthen students' ability to interpret evidence, evaluate scientific methods and communicate scientific explanations.

Understanding healthy lifestyles, the Earth's structure and chemical reactions demonstrates how scientific knowledge has transformed our understanding of both the human body and the planet we live on. Medical research has enabled scientists to understand how lifestyle choices influence health, whilst geological investigations have revealed how rocks are continually formed and recycled over millions of years.

The development of the reactivity series illustrates how scientists classify materials by observing patterns in experimental evidence. Students recognise that scientific ideas are continually refined through investigation, helping society develop new materials, medicines and technologies.



Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Understanding healthy lifestyles, the Earth and chemical reactions enables students to explain how lifestyle choices affect wellbeing, how Earth's materials are continually recycled and how chemical reactions are used throughout everyday life and industry. Scientific knowledge developed through this topic underpins healthcare, environmental science, geology and chemical manufacturing, helping students appreciate how science contributes to society and sustainable development. SMSC is developed through curiosity, responsibility and critical thinking as students evaluate evidence relating to healthy lifestyles, consider the responsible use of Earth's natural resources and appreciate how scientific discoveries improve people's lives.

Cross-curricular links include Geography through Earth's structure, rocks and natural resources, Physical Education through healthy lifestyles, fitness and the effects of exercise, Mathematics through analysing practical data and presenting results graphically, and PSHEE through informed lifestyle choices and personal wellbeing.

Students explore careers including:

- Geologist – investigating rocks, minerals and the structure of the Earth.
- Public Health Practitioner – using scientific evidence to improve health and wellbeing within communities.

- Industrial Chemist – applying knowledge of chemical reactions to develop and manufacture products safely and efficiently.
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The topic supports the Skills Builder Universal Framework, particularly:

- Speaking through communicating scientific explanations using accurate scientific vocabulary.
- Planning through organising practical investigations and selecting appropriate scientific methods.
- Problem Solving through applying scientific knowledge to explain unfamiliar biological, geological and chemical phenomena.



 Resources <i>What books, websites, videos and materials will support our learning?</i>	 Assessment <i>How will we show what we know, remember and can apply?</i>
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These resources not only reinforce classroom learning but also foster curiosity, independence, and confidence, ensuring every pupil can thrive and deepen their scientific understanding at their own pace

applying scientific knowledge and scientific enquiry skills throughout the curriculum.

Term 4

Enquiry



How do Christmas lights work?



Big Picture

What are the main ideas and big questions in this topic?

Students develop their understanding of the human body and electricity by investigating how body systems work together to keep us alive and how electrical circuits transfer energy to power everyday devices. They explore the structure and function of key organs, investigate electrical circuits and apply scientific knowledge to explain how electricity is used safely and effectively in the world around them.

Throughout the topic, students discover how biology and physics underpin many aspects of everyday life, from understanding their own bodies to explaining how electrical technologies operate. By combining practical investigations with scientific theory, students begin to appreciate how scientific knowledge supports healthcare, engineering and technological innovation.

Through this topic, students will explore:

- How major body systems work together to maintain life.
- How electrical circuits transfer electrical energy.
- How current, voltage and resistance influence electrical circuits.
- How electrical systems are used safely in everyday life.
- How to investigate scientific phenomena through practical enquiry and evidence.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students begin by investigating the human body, exploring how major organs and organ systems work together to carry out essential life processes. They develop their understanding of how different body systems interact to maintain health and enable the body to function effectively.

Students then investigate electricity, constructing and testing electrical circuits whilst exploring the relationships between current, voltage and resistance. Through practical investigations they identify how changes within a circuit affect its behaviour and use scientific evidence to explain their

observations. Throughout the topic, students develop confidence in planning investigations, making careful observations, recording results accurately and communicating scientific explanations using appropriate scientific vocabulary.

Students develop substantive knowledge by understanding:

- the structure and function of major body systems
- how organs work together within the body
- how electrical circuits are constructed
- current, voltage and resistance
- how electricity is transferred through circuits.

Students develop disciplinary knowledge by:

- constructing electrical circuits safely
- planning and carrying out practical investigations
- measuring, recording and interpreting scientific data
- identifying patterns and drawing justified conclusions
- communicating scientific explanations using accurate scientific vocabulary.

Key vocabulary this term includes; organ, organ system, respiration, circulation, electricity, circuit, current, voltage, resistance, conductor, insulator, series circuit, parallel circuit, cell, battery, switch

	Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>		Pitch Up <i>How will we challenge ourselves?</i>
	Students should already understand that living organisms are made from cells organised into tissues and organs, and that electrical energy can be transferred through simple circuits. They should have experience of carrying out practical investigations safely, making observations, recording results and identifying patterns in scientific data. This prior learning provides the foundation for exploring body systems and electrical circuits in greater depth.		Students will be challenged to explain how body systems work together to maintain life, predict the behaviour of electrical circuits when components are changed and justify their conclusions using evidence gathered through practical investigations. Students will interpret circuit diagrams, identify patterns within experimental results and apply their understanding to unfamiliar scientific contexts. Students will communicate their ideas accurately using ambitious scientific vocabulary including current, voltage, resistance, conductor, insulator, circuit, organ system, respiration and circulation.
	Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>		Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>

Understanding body systems and electricity provides a foundation for future learning across biology and physics. Students build upon their understanding of living organisms and energy transfer whilst developing practical enquiry skills that prepare them for more advanced study of physiology, electrical systems and scientific investigation at Key Stage 4.

Our understanding of the human body and electricity has developed through centuries of scientific investigation and technological innovation. Early anatomists transformed knowledge of human biology through careful observation, whilst scientists such as William Gilbert, Michael Faraday and James Clerk Maxwell helped explain electricity and its applications.

Today, scientific understanding of body systems and electricity underpins modern healthcare, communications, engineering and technology. Students appreciate that scientific discoveries continue to improve quality of life and shape the technologies used every day.



Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Understanding the human body and electricity enables students to explain how body systems maintain life and how electrical energy powers the technologies used every day. Scientific knowledge developed through this topic underpins healthcare, engineering and modern technology, helping students appreciate how science improves quality of life and drives innovation. SMSC is developed through curiosity, responsibility and critical thinking as students investigate how the body functions, evaluate evidence from practical investigations and recognise the importance of electrical safety in everyday life.

Cross-curricular links include Design Technology through electrical systems and product design, Mathematics through calculations, graph interpretation and data analysis, Physical Education through body systems and exercise, and PSHEE through health, wellbeing and personal safety.

Students explore careers including:

- Biomedical Engineer – designing medical technologies that monitor and support body systems.
- Electrician – installing, maintaining and testing electrical systems safely.
- Clinical Physiologist – investigating how body systems function to support patient diagnosis and treatment.

The topic supports the Skills Builder Universal Framework, particularly:

- Listening through following practical instructions and evaluating scientific evidence.
- Teamwork through collaborating during practical investigations.
- Problem Solving through applying knowledge of body systems and electrical circuits to unfamiliar scientific contexts.



 Resources	 Assessment
<i>What books, websites, videos and materials will support our learning?</i>	<i>How will we show what we know, remember and can apply?</i>
At New Line Learning Academy, we are committed to equipping our pupils with high-quality resources that extend learning beyond the classroom and empower them to take ownership of their scientific journey. To enrich and consolidate understanding, pupils have access to a range of carefully selected digital platforms and learning tools: • Cognito (https://cognitoedu.org/home) – Offers engaging video tutorials, concise notes, and practice questions tailored to support mastery of scientific concepts across Key Stage 3 and beyond. • BBC Bitesize (https://www.bbc.co.uk/bitesize/levels/z4kw2hv) – Provides accessible explanations, interactive activities, and revision materials, helping pupils consolidate learning and revisit key topics independently. • Sparx Science – www.sparx-learning.com – the platform used for science homework which will be set each week and provide topics from two weeks previously. The expectation is that pupils will have 100% completion and 100% success • Kerboodle (https://www.kerboodle.com/users/login) – Supports the curriculum with digital textbooks, assessments, and interactive resources aligned to national specifications, offering pupils and teachers a wealth of high-quality materials. These resources not only reinforce classroom learning but also foster curiosity, independence, and confidence, ensuring every pupil can thrive and deepen their scientific understanding at their own pace.	Assessment takes place throughout the unit through questioning, class discussion, retrieval activities, practical investigations and independent application tasks. Students demonstrate their understanding by explaining how body systems function, constructing and interpreting electrical circuits, analysing practical results and applying scientific knowledge to unfamiliar contexts using accurate scientific vocabulary. At the end of the unit, students complete an assessment that measures the progress made throughout the teaching sequence. Assessments include a mixture of substantive knowledge and disciplinary knowledge, allowing students to demonstrate both their scientific understanding and their ability to apply this knowledge in practical and unfamiliar contexts. Following assessment, students complete targeted improvement activities to address misconceptions and strengthen areas for development. Practical investigations, extended scientific writing and examination-style questions help students develop confidence in applying scientific knowledge and scientific enquiry skills throughout the curriculum.

Term 5 Enquiry		How do scientists organise things?
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Big Picture

What are the main ideas and big questions in this topic?

Students develop their understanding of the Periodic Table and ecology by investigating how scientists organise elements and how living organisms interact within ecosystems. They explore the structure and organisation of the Periodic Table, investigate relationships between organisms and their environment, and develop the practical skills needed to collect, analyse and interpret scientific evidence.

Throughout the topic, students discover how scientists classify both the chemical elements that make up our world and the living organisms that share it. By combining practical investigations with scientific theory, students begin to appreciate how scientific classification supports environmental management, conservation and future scientific discoveries.

Through this topic, students will explore:

- How the Periodic Table is organised.
- How elements can be classified using their properties.
- How organisms interact within ecosystems.
- How sampling techniques help scientists study habitats.
- How scientific evidence is collected, interpreted and communicated.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students begin by investigating the Periodic Table, exploring how scientists organise elements using patterns in their properties. They learn how information presented within the Periodic Table enables scientists to identify and classify different elements and predict their behaviour. Students then investigate ecology, exploring how plants, animals and other organisms interact within ecosystems. Through fieldwork and sampling activities, they investigate how organisms depend upon one another and the environment, developing an understanding of food chains, food webs and the importance of biodiversity.

Throughout the topic, students develop confidence in planning scientific enquiries, carrying out fieldwork safely, recording observations accurately and interpreting evidence to explain relationships within ecosystems and patterns within the Periodic Table.

Students develop substantive knowledge by understanding:

- how the Periodic Table is organised
- how elements are classified according to their properties

- how organisms interact within ecosystems
- food chains, food webs and biodiversity
- how sampling techniques are used to investigate habitats.

Students develop disciplinary knowledge by:

- planning and carrying out practical investigations safely
- conducting ecological sampling using appropriate techniques
- recording observations and scientific data accurately
- interpreting evidence and identifying patterns
- communicating scientific explanations using accurate scientific vocabulary.

Key vocabulary this term includes; element, Periodic Table, group, period, metal, non-metal, ecosystem, habitat, population, community, biodiversity, food chain, food web, producer, consumer, predator, prey, quadrat, transect, sampling

 Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>	 Pitch Up <i>How will we challenge ourselves?</i>
Students should already understand that materials are made from particles and that living organisms depend upon one another for survival. They should have experience of carrying out practical investigations safely, making careful observations, recording results and identifying patterns within scientific data. This prior learning provides the foundation for exploring the organisation of the Periodic Table and ecological relationships within ecosystems.	Students will be challenged to explain how the arrangement of the Periodic Table helps scientists classify elements and predict their properties, whilst also interpreting ecological evidence to explain relationships within ecosystems. They will analyse sampling data, identify patterns and justify their conclusions using scientific evidence gathered through practical investigations. Students will communicate their ideas accurately using ambitious scientific vocabulary including element, Periodic Table, group, period, ecosystem, biodiversity, habitat, food chain, food web, quadrat, transect and sampling.
 Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	 Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
Understanding the Periodic Table and ecology provides a foundation for future learning in chemistry and biology. Students build upon their understanding of particles, materials and living organisms whilst developing practical enquiry skills that prepare them for more advanced	The Periodic Table is one of the greatest achievements in science, demonstrating how scientists identify patterns to organise knowledge. Dmitri Mendeleev's arrangement of the elements allowed scientists to

study of chemical properties, ecosystems and environmental science at Key Stage 4.

predict the properties of elements that had not yet been discovered, showing the power of scientific thinking and evidence. Ecology reminds students that living organisms exist within interconnected systems, where small changes can have significant consequences for biodiversity and ecosystems. Understanding these relationships helps students appreciate humanity's responsibility for protecting the natural world and managing Earth's resources sustainably.



Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Understanding the Periodic Table and ecology enables students to explain how scientists classify the building blocks of matter and investigate the relationships between living organisms and their environment. Scientific knowledge developed through this topic underpins chemistry, environmental science and conservation, helping students appreciate how science supports sustainable management of natural resources and biodiversity. SMSC is developed through curiosity, responsibility and critical thinking as students investigate ecosystems, consider the importance of protecting biodiversity and appreciate how scientific classification supports our understanding of the natural world.

Cross-curricular links include Geography through ecosystems, habitats and environmental change, Mathematics through sampling techniques, data analysis and graph interpretation, PSHEE through environmental responsibility and sustainability, and Design Technology through understanding the properties of materials.

Students explore careers including:

- Ecologist – studying ecosystems and biodiversity to help protect habitats and wildlife.
- Environmental Consultant – using scientific evidence to support sustainable land management and conservation.
- Analytical Chemist – investigating the properties and classification of elements and materials.

The topic supports the Skills Builder Universal Framework, particularly:

- Creativity through planning ecological investigations and selecting appropriate sampling techniques.
- Teamwork through collaborating during fieldwork and practical investigations.
- Problem Solving through applying knowledge of classification and ecology to explain unfamiliar scientific contexts.



Resources

What books, websites, videos and materials will support our learning?



Assessment

How will we show what we know, remember and can apply?

At New Line Learning Academy, we are committed to equipping our pupils with high-quality resources that extend learning beyond the classroom and empower them to take ownership of their scientific journey. To enrich and consolidate understanding, pupils have access to a range of carefully selected digital platforms and learning tools:

- Cognito (<https://cognitoedu.org/home>) – Offers engaging video tutorials, concise notes, and practice questions tailored to support mastery of scientific concepts across Key Stage 3 and beyond.
- BBC Bitesize (<https://www.bbc.co.uk/bitesize/levels/z4kw2hv>) – Provides accessible explanations, interactive activities, and revision materials, helping pupils consolidate learning and revisit key topics independently.
- Sparx Science – www.sparx-learning.com – the platform used for science homework which will be set each week and provide topics from two weeks previously. The expectation is that pupils will have 100% completion and 100% success
- Kerboodle (<https://www.kerboodle.com/users/login>) – Supports the curriculum with digital textbooks, assessments, and interactive resources aligned to national specifications, offering pupils and teachers a wealth of high-quality materials. These resources not only reinforce classroom learning but also foster curiosity, independence, and confidence, ensuring every pupil can thrive and deepen their scientific understanding at their own pace.

Assessment takes place throughout the unit through questioning, class discussion, retrieval activities, practical investigations, fieldwork and independent application tasks. Students demonstrate their understanding by explaining how the Periodic Table is organised, describing ecological relationships within ecosystems, interpreting evidence collected through sampling activities and applying scientific knowledge to unfamiliar contexts using accurate scientific vocabulary.

At the end of the unit, students complete an assessment that measures the progress made throughout the teaching sequence. Assessments include a mixture of substantive knowledge and disciplinary knowledge, allowing students to demonstrate both their scientific understanding and their ability to apply this knowledge in practical and unfamiliar contexts.

Following assessment, students complete targeted improvement activities to address misconceptions and strengthen areas for development. Practical investigations, extended scientific writing and examination-style questions help students develop confidence in applying scientific knowledge and scientific enquiry skills throughout the curriculum.

Term 6

Enquiry



Where do humans place within larger systems?



Big Picture

What are the main ideas and big questions in this topic?

Students develop their understanding of ecology and space by investigating how living organisms are classified, how they interact within ecosystems and how organisms are adapted to survive in different environments. They also explore the Earth's place within the Solar System, investigating celestial bodies, space exploration and the transfer of energy involved in space travel.

Throughout the topic, students discover how science helps us understand both the living world around us and the universe beyond our planet. By combining practical fieldwork with scientific theory, students develop an appreciation of how scientific knowledge supports conservation, environmental management and advances in space exploration.

Through this topic, students will explore:

- How living organisms are classified.
- How organisms interact within ecosystems.
- How adaptations support survival and natural selection.
- How the Earth fits within the Solar System.
- How scientific enquiry helps us investigate ecosystems and space.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students begin by investigating classification, learning how organisms are grouped using kingdoms, classes and classification keys. They then explore food chains, food webs, predator-prey relationships and competition, developing an understanding of how organisms depend upon one another within ecosystems. Students investigate adaptations and natural selection, considering how organisms become suited to their environments and how these adaptations improve survival. Through sampling practical's using quadrats and transects, students develop fieldwork skills, collecting, recording and interpreting ecological data.

The topic then moves beyond the Earth to explore space, beginning with the Sun, Moon and Earth before investigating day and night, the seasons and the Solar System. Students conclude by exploring black holes, rockets and energy transfers, and the role of satellites and the International Space Station in modern science and technology.

Throughout the topic, students develop confidence in planning scientific enquiries, carrying out ecological fieldwork, interpreting evidence and communicating scientific explanations using accurate scientific vocabulary.

Students develop substantive knowledge by understanding:

- how organisms are classified using scientific systems
- how food chains, food webs and ecosystems function

- predator–prey relationships, competition, adaptations and natural selection
- how quadrats and transects are used to investigate habitats
- the relationships between the Earth, Moon, Sun and the Solar System
- how rockets, satellites and space stations support space exploration.

Students develop disciplinary knowledge by:

- planning and carrying out ecological fieldwork safely
- using quadrats and transects appropriately
- collecting, recording and interpreting scientific evidence
- identifying patterns within ecological data
- communicating scientific explanations using accurate scientific vocabulary.

Key vocabulary this term includes; classification, kingdom, class, classification key, ecosystem, habitat, food chain, food web, predator, prey, competition, adaptation, natural selection, quadrat, transect, Sun, Moon, Earth, Solar System, season, satellite, rocket, International Space Station, black hole

	Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>		Pitch Up <i>How will we challenge ourselves?</i>
	Students should already understand that living organisms have different characteristics, that organisms depend upon one another within their environments and that the Earth is part of the Solar System. They should have experience of carrying out practical investigations safely, making careful observations, recording results and identifying patterns in scientific data. This prior learning provides the foundation for investigating ecosystems, classification and space science in greater depth.		Students will be challenged to explain how classification systems help scientists organise living organisms, justify how adaptations improve survival and interpret ecological evidence collected through fieldwork. They will apply their understanding of food webs, natural selection and the Solar System to unfamiliar scientific contexts, using evidence to support their conclusions. Students will communicate their ideas accurately using ambitious scientific vocabulary including classification, ecosystem, adaptation, natural selection, predator, prey, quadrat, transect, orbit, satellite and Solar System.
	Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>		Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>

Understanding classification, ecology and space provides a foundation for future learning across biology, environmental science and physics. Students build upon their understanding of living organisms and the Earth whilst developing scientific enquiry skills that prepare them for more advanced study of evolution, ecosystems, astronomy and environmental science at Key Stage 4.

The classification of living organisms and the exploration of space both demonstrate humanity's desire to understand our place within larger systems. Scientists such as Carl Linnaeus developed classification systems that continue to underpin modern biology, whilst advances in astronomy and space exploration have transformed our understanding of the Earth, the Solar System and the wider universe.

Ecological fieldwork and space exploration both rely upon careful observation, evidence and collaboration. Students appreciate that scientific knowledge continues to develop as new discoveries are made, helping us better understand life on Earth whilst expanding human knowledge beyond our planet.



Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Understanding ecology and space enables students to explain how living organisms interact within ecosystems and how scientific discoveries have expanded our understanding of the universe. Scientific knowledge developed through this topic underpins conservation, environmental science and space exploration, helping students appreciate how science contributes to protecting biodiversity and advancing human knowledge beyond Earth. SMSC is developed through curiosity, stewardship and critical thinking as students consider humanity's responsibility for protecting ecosystems, appreciate the diversity of life on Earth and reflect on the significance of scientific exploration beyond our planet.

Cross-curricular links include Geography through ecosystems, habitats and environmental change, Mathematics through sampling techniques, data interpretation and graph analysis, Computing through satellite technology and space exploration, and PSHEE through environmental responsibility and global citizenship.

Students explore careers including:

- Wildlife Conservation Officer – protecting habitats and monitoring biodiversity using ecological fieldwork.
- Ecological Surveyor – carrying out habitat surveys using quadrats, transects and environmental sampling techniques.
- Spacecraft Systems Engineer – designing satellites and spacecraft that support communication, research and space exploration.

The topic supports the Skills Builder Universal Framework, particularly:

- Planning through organising ecological investigations and selecting appropriate sampling techniques.
- Teamwork through collaborating during fieldwork and practical investigations.
- Problem Solving through applying scientific knowledge to explain ecological relationships and astronomical phenomena.



	Resources <i>What books, websites, videos and materials will support our learning?</i>		Assessment <i>How will we show what we know, remember and can apply?</i>
	At New Line Learning Academy, we are committed to equipping our pupils with high-quality resources that extend learning beyond the classroom and empower them to take ownership of their scientific journey. To enrich and consolidate understanding, pupils have access to a range of carefully selected digital platforms and learning tools: • Cognito (https://cognitoedu.org/home) – Offers engaging video tutorials, concise notes, and practice questions tailored to support mastery of scientific concepts across Key Stage 3 and beyond. • BBC Bitesize (https://www.bbc.co.uk/bitesize/levels/z4kw2hv) – Provides accessible explanations, interactive activities, and revision materials, helping pupils consolidate learning and revisit key topics independently. • Sparx Science – www.sparx-learning.com – the platform used for science homework which will be set each week and provide topics from two weeks previously. The expectation is that pupils will have 100% completion and 100% success • Kerboodle (https://www.kerboodle.com/users/login) – Supports the curriculum with digital textbooks, assessments, and		Assessment takes place throughout the unit through questioning, class discussion, retrieval activities, ecological fieldwork and independent application tasks. Students demonstrate their understanding by explaining how organisms are classified, describing relationships within ecosystems, interpreting data collected through sampling activities and applying scientific knowledge to explain the Earth's place within the Solar System and the role of space technology using accurate scientific vocabulary. At the end of the unit, students complete an assessment that measures the progress made throughout the teaching sequence. Assessments include a mixture of substantive knowledge and disciplinary knowledge, allowing students to demonstrate both their scientific understanding and their ability to apply this knowledge in practical and unfamiliar contexts. Following assessment, students complete targeted improvement activities to address misconceptions and strengthen areas for development. Practical investigations, extended scientific writing and examination-style questions help students develop confidence in

interactive resources aligned to national specifications, offering pupils and teachers a wealth of high-quality materials. These resources not only reinforce classroom learning but also foster curiosity, independence, and confidence, ensuring every pupil can thrive and deepen their scientific understanding at their own pace.

applying scientific knowledge and scientific enquiry skills throughout the curriculum.

