

Science Curriculum Intent		Year 7
	In the Science Department at New Line Learning Academy, our intent is to develop confident, curious and resilient scientists by equipping every student with the knowledge, practical skills and scientific understanding needed to make sense of the world around them. Through an engaging curriculum that integrates practical investigation with scientific theory, students develop a secure foundation in biology, chemistry and physics whilst learning how science explains the natural and physical world. Our curriculum is carefully sequenced to build upon students' prior learning, taking account of their individual starting points, strengths and learning needs. Students develop the ability to think scientifically by asking questions, planning investigations, analysing evidence and drawing informed conclusions. They learn to communicate scientific ideas accurately using appropriate vocabulary, mathematical skills and scientific models, enabling them to become confident readers, writers and speakers within science. Science is taught as a subject that connects directly to everyday life. Students explore how scientific knowledge supports developments in medicine, engineering, environmental sustainability, technology and industry, whilst recognising the important role science plays in addressing global challenges. Opportunities to develop mathematical thinking, digital literacy, practical skills and critical thinking are woven throughout the curriculum, enabling students to interpret data, evaluate evidence and make reasoned judgements. Through studying Science at New Line Learning Academy, students will: • Develop secure knowledge and understanding of key biological, chemical and physical concepts. • Apply scientific knowledge to explain the world around them and solve problems. • Plan, carry out and evaluate practical investigations safely and effectively. • Analyse qualitative and quantitative evidence to reach justified conclusions. • Communicate scientific ideas confidently using accurate scientific vocabulary. • Understand how science supports a wide range of careers and future opportunities. • Develop curiosity and a lifelong interest in science and the world around them.	
	Term 1 Enquiry	 What role do particles play in science?
 Big Picture <i>What are the main ideas and big questions in this topic?</i>		

Students develop their understanding of particles and the structure of matter by investigating how the arrangement and movement of particles explains the properties of solids, liquids and gases. They explore changes of state, diffusion, dissolving, pressure and density whilst developing the practical skills needed to plan investigations, collect evidence and communicate scientific findings.

Throughout the topic, students discover that matter is made from tiny particles whose movement and interactions explain many of the everyday phenomena they observe. By combining practical investigation with scientific theory, students begin to understand how particle science underpins manufacturing, engineering, medicine and environmental science.

Through this topic, students will explore:

- How particles are arranged in solids, liquids and gases.
- How particle theory explains changes of state.
- How diffusion provides evidence for particle movement.
- How temperature affects dissolving, diffusion and density.
- How to plan investigations safely, record observations and interpret scientific evidence.



Zoom In

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

Students begin by exploring the particle model, developing their understanding that all matter is made from tiny particles whose arrangement and movement determine the properties of solids, liquids and gases. They investigate how particle behaviour explains changes of state, diffusion, dissolving and density, using practical investigations to observe scientific phenomena and collect evidence.

As the topic progresses, students apply the particle model to explain increasingly complex scientific observations, making links between temperature, particle movement and changes in state. Through practical enquiry, they learn to make careful observations, identify patterns within data and communicate scientific explanations using appropriate evidence.

Students develop substantive knowledge by understanding:

- that all matter is made from particles
- how particles are arranged in solids, liquids and gases
- how particle movement explains changes of state, diffusion and dissolving
- how temperature affects particle movement and energy
- how particle theory explains everyday scientific phenomena.

Students develop disciplinary knowledge by:

- planning and carrying out practical investigations safely
- making accurate observations and recording results
- identifying patterns and interpreting scientific evidence
- constructing scientific explanations using evidence
- communicating ideas using accurate scientific vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including particle, solid, liquid, gas, diffusion, density, evaporation, condensation, sublimation, kinetic energy, pressure and state change.

	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 solids, liquids and gases. • Simple observations of materials changing state.		Students experience this enquiry through practical investigation, scientific modelling and mathematical evaluation of results. By fostering collaboration, metacognition, and a secure understanding of Tier 3 scientific vocabulary, we equip our most able pupils with the tools, curiosity, and confidence needed to excel, ensuring they are thoroughly prepared for the increasing demands of Key Stage 4 and beyond
	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>
	At New Line Learning Academy, our Year 7 science curriculum sits within a wider framework designed to nurture confident, resilient scientists prepared for the challenges of Key Stage 4 and beyond. The knowledge and skills developed across Year 7 lay the groundwork for deeper study of key scientific principles, practical techniques, and critical thinking essential for GCSE success. Pupils move forward equipped not only with subject knowledge but also with the ability to question, investigate, and connect science to the world around them. Our next steps focus on reinforcing scientific literacy, introducing more complex concepts, and cultivating independence in learning, ensuring that every pupil can thrive and begin to see their potential pathways into scientific careers and contributions to society.		At New Line Learning Academy, we believe that science education should ignite curiosity and reveal the wonder woven through every corner of the natural and technological world. The curriculum hinterland in our Year 7 science programme provides the rich stories, contexts, and connections that elevate learning beyond core facts, helping pupils see the human endeavour and societal impact behind scientific discovery. In Particles, pupils explore not only the arrangement and movement of particles but also delve into the story of Robert Brown and the discovery of Brownian motion, understand how particle theory explains everyday phenomena like perfume diffusing through a room, and consider how materials science shapes industries from technology to construction.

	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	
	Understanding particles and the structure of matter helps students explain many everyday phenomena, from why substances change state and dissolve to how materials behave in different conditions. Scientific knowledge developed through this topic underpins modern developments in medicine, manufacturing, engineering and environmental science, enabling students to appreciate the importance of science in everyday life and future innovation. SMSC is developed through curiosity, logical reasoning and responsibility as students evaluate evidence, carry out practical investigations safely and appreciate how scientific discoveries have improved people's lives whilst also recognising the importance of sustainable use of materials and resources. Cross-curricular links include Mathematics through measurement, calculations, data analysis and graph drawing, Design Technology through material properties and product design, Geography through natural resources and environmental sustainability, and PSHE through discussions surrounding health, safety and the responsible use of scientific knowledge. Students explore careers including: ○ Chemical Engineer – applying knowledge of particles, materials and chemical processes to manufacture products used in everyday life. ○ Materials Scientist – investigating how the structure of materials affects their properties to develop new technologies and products. ○ Environmental Scientist – studying materials, pollution and natural processes to help protect ecosystems and develop sustainable solutions. The topic supports the Skills Builder Universal Framework, particularly: • Listening through following practical instructions and evaluating scientific evidence. • Creativity through planning investigations and considering different scientific explanations. • Problem Solving through applying particle theory to explain observations and solve scientific problems.	
	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) –	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 particles, interpreting observations from practical investigations, describing changes of state and applying the particle model to explain unfamiliar scientific phenomena using accurate scientific vocabulary.



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.

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



Where does our electricity come from?



Big Picture

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

Students develop their understanding of energy and power by investigating how energy is stored, transferred and transformed in different systems. They explore renewable and non-renewable energy resources, fuels, electricity generation and energy efficiency whilst developing the practical skills needed to investigate, measure and evaluate energy changes.

Throughout the topic, students discover that energy cannot be created or destroyed but can be transferred between stores in many different ways. By combining practical investigation with scientific theory, students begin to understand how scientific knowledge supports decisions about energy use, sustainability and the future of electricity generation.

Through this topic, students will explore:

- How energy is stored and transferred in different systems.
- How fuels provide energy and how different energy resources are used.
- The advantages and disadvantages of renewable and non-renewable energy sources.

- How electricity is generated and distributed.
- How to investigate energy changes, analyse evidence and evaluate scientific conclusions.



Zoom In

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

Students investigate energy and power, exploring different forms of energy, how energy is stored and transferred, and the role of fuels as sources of energy. Through practical investigations, including measuring the energy content of fuels and investigating insulation, students learn to collect data, interpret results and evaluate scientific evidence.

As the topic develops, students compare renewable and non-renewable energy resources, consider how electricity is generated and explore the environmental and economic implications of different energy choices. They apply their scientific understanding to explain energy transfers and evaluate how energy can be used more efficiently.

Students develop substantive knowledge by understanding:

- different energy stores and energy transfers
- how fuels release energy
- renewable and non-renewable energy resources
- electricity generation
- energy efficiency and conservation.

Students develop disciplinary knowledge by:

- planning practical investigations
- measuring and recording scientific data
- presenting and interpreting graphs
- evaluating scientific evidence
- communicating scientific explanations using accurate terminology.

Key vocabulary for this term includes; energy, energy store, energy transfer, fuel, renewable, non-renewable, electricity, efficiency, insulation, power station, conservation, fossil fuel, biomass, solar, wind



Pre-Requisite Knowledge

What have we already learned that will help us with this topic?



Pitch Up

How will we challenge ourselves?

Prior Knowledge from KS2: Pupils may have learnt about simple forms of energy, observed changes linked to heating and cooling, and discussed basic comparisons of energy sources, including the idea that some are sustainable. However, they are unlikely to have explored energy calculations, efficiency, or the environmental consequences of energy choices in detail.	Students experience this enquiry through practical investigation, scientific modelling and mathematical evaluation of results. By fostering collaboration, metacognition, and a secure understanding of Tier 3 scientific vocabulary, we equip our most able pupils with the tools, curiosity, and confidence needed to excel, ensuring they are thoroughly prepared for the increasing demands of Key Stage 4 and beyond.
 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>
At New Line Learning Academy, our Year 7 science curriculum sits within a wider framework designed to nurture confident, resilient scientists prepared for the challenges of Key Stage 4 and beyond. The knowledge and skills developed across Year 7 lay the groundwork for deeper study of key scientific principles, practical techniques, and critical thinking essential for GCSE success. Pupils move forward equipped not only with subject knowledge but also with the ability to question, investigate, and connect science to the world around them. Our next steps focus on reinforcing scientific literacy, introducing more complex concepts, and cultivating independence in learning, ensuring that every pupil can thrive and begin to see their potential pathways into scientific careers and contributions to society.	In Energy and Power, hinterland knowledge includes how historical inventions like the steam engine transformed society, the global debates about sustainable energy, and how engineers and environmental scientists work today to create a greener future. Pupils connect abstract concepts of energy transfers to real-world contexts such as renewable technologies, sports science, and domestic energy efficiency.
 Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	
Understanding energy and power enables students to explain many aspects of everyday life, from generating electricity and powering transport to making informed decisions about energy efficiency and sustainability. Scientific knowledge developed through this topic underpins modern engineering, environmental science and the transition towards low-carbon technologies. SMSC is developed through curiosity, responsibility and critical thinking as students evaluate different energy resources, consider the environmental impact of energy production and appreciate the role of science in addressing global challenges such as climate change and sustainability. Cross-curricular links include Mathematics through calculations, graph interpretation and data analysis, Geography through natural resources, sustainability and climate change, Design Technology through energy-efficient product design, and PSHEE through environmental responsibility and informed decision making. Students explore careers including: ○ Renewable Energy Technician – installing and maintaining technologies such as wind turbines and solar panels to generate sustainable electricity.	

- Power Systems Engineer – designing and maintaining electricity generation and distribution networks.
- Environmental Consultant – evaluating energy use, reducing environmental impact and supporting sustainable development.

The topic supports the Skills Builder Universal Framework, particularly:

- Planning through organising practical investigations and selecting appropriate scientific methods.
- Leadership through working collaboratively during investigations and supporting others in scientific enquiry.
- Problem Solving through applying scientific knowledge to explain energy transfers and evaluate different energy resources.



 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 describing energy transfers, comparing renewable and non-renewable energy resources, interpreting scientific data and explaining how energy is generated, transferred and conserved 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 living things made of?
 Big Picture <i>What are the main ideas and big questions in this topic?</i>	Students develop their understanding of cells and organ systems by investigating how living organisms are built from specialised cells that work together to form tissues, organs and organ systems. They explore the differences between plant and animal cells, the organisation of living things and the role of major organ systems whilst developing the practical skills needed to observe cells, analyse evidence and communicate scientific explanations. Throughout the topic, students discover that all living organisms are made from cells and that the structure of these cells is closely linked to their function. By combining practical investigation with scientific theory, students begin to understand how biological knowledge supports developments in medicine, healthcare and scientific research. Through this topic, students will explore: • How plant and animal cells are structured and how they differ. • How specialised cells are adapted to carry out specific functions. • How cells are organised into tissues, organs and organ systems. • How major organ systems work together to keep organisms alive. • How to observe cells, interpret scientific evidence and communicate biological ideas accurately.
 Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>	Students explore cells and organ systems, beginning with the characteristics of living organisms using MRS GREN (Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, Nutrition). They investigate plant and animal cells, learning to use microscopes safely and accurately to observe and draw cells whilst identifying the functions of different cell structures. As the topic progresses, students investigate unicellular organisms, osmosis and diffusion, before exploring how specialised cells work together within tissues, organs and organ systems. Practical investigations and scientific observation help students develop an understanding of how living organisms function. Students develop substantive knowledge by understanding: • the characteristics of living organisms • the structure and function of plant and animal cells

- specialised cells and their adaptations
- osmosis and diffusion
- how cells are organised into tissues, organs and organ systems.

Students develop disciplinary knowledge by:

- using microscopes safely and accurately
- observing and drawing scientific specimens
- interpreting evidence from practical investigations
- explaining biological processes using scientific evidence
- communicating ideas using accurate biological vocabulary.

Key vocabulary this term includes; cell, nucleus, cytoplasm, cell membrane, cell wall, chloroplast, vacuole, specialised cell, tissue, organ, organ system, microscope, diffusion, osmosis, MRS GREN

 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>
Prior Knowledge from KS2: Pupils may have learnt the basic idea that living things have life processes in common and can name major body organs such as the heart, lungs, and brain. However, they are unlikely to have detailed knowledge of cells, microscopic structures, or how substances move into and out of cells	Students experience this enquiry through practical investigation, scientific modelling and mathematical evaluation of results. By fostering collaboration, metacognition, and a secure understanding of Tier 3 scientific vocabulary, we equip our most able pupils with the tools, curiosity, and confidence needed to excel, ensuring they are thoroughly prepared for the increasing demands of Key Stage 4 and beyond.
 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>
This topic lays the groundwork for KS4 biology, forming a direct foundation for units on Cell Biology, Organisation, Bioenergetics (Respiration), Infection and Response, and Homeostasis. Skills developed here, such as microscopy, experimental planning, and data analysis, are crucial for practical work and understanding complex biological concepts in GCSE science.	In Cells and Organ Systems, the hinterland encompasses the pioneering scientists who first revealed the microscopic world, the life-changing advances in medical science driven by cellular research, and current ethical debates around stem cells and genetic technologies. Pupils discover not just how their bodies function but why understanding biology shapes modern medicine and healthcare.



Authentic connections

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

Understanding cells and organ systems enables students to explain how living organisms function, grow and survive. Biological knowledge developed through this topic underpins modern medicine, healthcare, biotechnology and medical research, helping students appreciate how scientific discoveries continue to improve human health and wellbeing. SMSC is developed through curiosity, empathy and critical thinking as students explore how scientific research improves quality of life, consider the ethical use of biological knowledge and appreciate the importance of evidence when developing scientific understanding.

Cross-curricular links include Mathematics through measurement, data analysis and microscopy calculations, Physical Education through the study of body systems and healthy lifestyles, PSHEE through health and wellbeing, and Design Technology through biomimicry and the development of medical technologies inspired by nature.

Students explore careers including:

- Biomedical Scientist – investigating cells and tissues to diagnose disease and support medical treatment.
- Histology Technician – preparing and analysing tissue samples to help identify illness and support scientific research.
- Biotechnologist – applying knowledge of cells to develop medicines, vaccines and new biological technologies.

The topic supports the Skills Builder Universal Framework, particularly:

- Speaking through communicating scientific explanations using accurate biological vocabulary.
- Teamwork through collaborating during practical investigations and scientific discussions.
- Problem Solving through applying knowledge of cells and organ systems to explain biological processes and investigate scientific questions.



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 identifying and comparing plant and animal cells, explaining how specialised cells are adapted to their function, describing levels of organisation and interpreting evidence from scientific observations 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 4

Enquiry



How is water purified for drinking?



Big Picture

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

Students develop their understanding of separating substances by investigating how mixtures can be separated and purified using a range of scientific techniques. They explore the differences between pure substances and mixtures, applying methods such as filtration, evaporation, distillation and chromatography whilst developing the practical skills needed to plan investigations, analyse evidence and communicate scientific conclusions.

Throughout the topic, students discover how separation techniques are used to produce clean drinking water, manufacture medicines, analyse substances and protect the environment. By combining practical investigation with scientific theory, students begin to understand how chemistry contributes to solving real-world challenges and improving people's lives.

Through this topic, students will explore:

- The difference between pure substances and mixtures.
- How filtration, evaporation, distillation and chromatography separate substances.
- How different separation techniques are selected for different mixtures.
- How separation processes are used to provide clean water and support industry.
- How to carry out practical investigations, analyse results and communicate scientific explanations.



Zoom In

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

Students investigate pure substances and mixtures, exploring how different separation techniques can be used to separate materials. Through practical investigations they use filtration, evaporation, distillation and chromatography, applying these methods to a range of scientific problems including purifying water and separating pigments.

As the topic develops, students evaluate which separation method is most appropriate for different mixtures and consider how these techniques are used in industry, environmental science and everyday life. Practical investigations enable students to plan methods, record observations and evaluate the effectiveness of different approaches.

Students develop substantive knowledge by understanding:

- the difference between pure substances and mixtures
- filtration, evaporation, distillation and chromatography
- how different separation techniques work
- how separation methods are selected for different mixtures
- how separation techniques are applied in everyday life and industry.

Students develop disciplinary knowledge by:

- selecting appropriate practical methods
- carrying out investigations safely
- recording observations accurately

- evaluating the effectiveness of different techniques
- communicating scientific conclusions using accurate scientific vocabulary.

Key vocabulary this term includes; mixture, pure substance, filtration, residue, filtrate, evaporation, distillation, chromatography, solvent, solute, solution, soluble, insoluble, pigment, purification

	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>
Prior Knowledge from KS2: Pupils may have learned how to classify materials as solids, liquids, or gases, observed changes of state, and recognised that some changes are reversible or irreversible. However, they are unlikely to have encountered detailed techniques for separating mixtures or the scientific principles behind these processes.		Students experience this enquiry through practical investigation, scientific modelling and mathematical evaluation of results. By fostering collaboration, metacognition, and a secure understanding of Tier 3 scientific vocabulary, we equip our most able pupils with the tools, curiosity, and confidence needed to excel, ensuring they are thoroughly prepared for the increasing demands of Key Stage 4 and beyond.	
	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>
Progression towards KS4: This topic forms a critical foundation for KS4 chemistry, linking directly to Mixtures and Separation Techniques, Chemical Analysis, and environmental chemistry topics. Skills such as designing experiments, interpreting chromatograms, and understanding concepts like purity and solubility are vital for future study in both science and related practical subjects.		Separating Substances is enriched with stories of forensic science solving crimes, the global challenge of providing clean drinking water, and the industrial significance of processes like distillation and chromatography in food, pharmaceuticals, and environmental testing.	
	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>		
Understanding how substances are separated enables students to explain how clean drinking water is produced, medicines are manufactured and unknown substances are identified. Scientific knowledge developed through this topic underpins modern chemistry, environmental science and industrial processes, demonstrating how separation techniques improve health, safety and quality of life. SMSC is developed through curiosity, responsibility and critical thinking as			

students evaluate scientific evidence, consider the importance of providing clean water for communities around the world and appreciate the role of chemistry in solving environmental and global challenges.

Cross-curricular links include Geography through water resources and sustainability, Design Technology through manufacturing processes and material selection, Mathematics through measurement, data analysis and graph interpretation, and Food Technology through food production, purification and quality control.

Students explore careers including:

- Water Quality Scientist – testing and monitoring drinking water to ensure it is safe for public use.
- Analytical Chemist – using chromatography and other separation techniques to identify substances and investigate samples.
- Food Quality Technician – applying purification and testing methods to ensure food products meet safety and quality standards.

The topic supports the Skills Builder Universal Framework, particularly:

- Creativity through selecting appropriate separation techniques and planning scientific investigations.
- Planning through organising practical investigations and evaluating scientific methods.
- Problem Solving through applying separation techniques to unfamiliar scientific and real-world 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		Assessment takes place throughout the unit through questioning, class discussion, retrieval activities, practical investigations and independent application tasks. Students demonstrate their understanding by selecting and explaining appropriate separation techniques, interpreting practical results, comparing methods of separating mixtures 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.

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.	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 objects interact?
	Big Picture <i>What are the main ideas and big questions in this topic?</i>
Students develop their understanding of forces and movement by investigating how forces act on objects and influence their motion. They explore gravity, weight, pressure, friction and resultant forces, whilst developing the practical skills needed to measure, calculate and interpret the effects of forces through scientific investigation. Throughout the topic, students discover how forces explain many everyday phenomena, from the movement of vehicles and sporting performance to the design of bridges and machines. By combining practical investigations with scientific theory, students begin to understand how physics supports engineering, transport and technological innovation. Through this topic, students will explore: - What forces are and how they act on objects. - How gravity, weight and pressure affect motion. - How friction and resultant forces influence movement. - How speed can be measured and calculated. - How to investigate forces, analyse evidence and communicate scientific explanations.	
	Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>

Students begin by investigating forces, learning how they act on objects and how they can be represented using force arrows and diagrams. They explore gravity, weight and pressure, using practical investigations to observe how forces affect the movement and behaviour of objects.

As the topic develops, students investigate resultant forces, friction and speed, carrying out practical activities such as measuring the extension of springs and calculating the speed of moving objects. Through these investigations, students develop confidence in planning enquiries, identifying variables, collecting and analysing data, and using evidence to explain scientific observations.

Students develop substantive knowledge by understanding:

- what forces are and how they act on objects
- gravity, weight and pressure
- resultant forces and friction
- how speed is measured and calculated
- how forces influence movement in everyday situations.

Students develop disciplinary knowledge by:

- planning and carrying out practical investigations safely
- identifying variables within investigations
- collecting, recording and analysing scientific data
- interpreting evidence to draw justified conclusions
- communicating scientific explanations using accurate scientific vocabulary.

Key vocabulary includes: force, gravity, weight, pressure, friction, resultant force, speed, distance, time, Newton, force arrow, balanced forces, unbalanced forces, spring, variable

 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>
Prior Knowledge from KS2: Pupils may have learned that some forces require contact while others, like magnetism and gravity, can act at a distance. They may have explored how objects move and how friction affects motion but are unlikely to have applied calculations to describe these effects in depth.	Students experience this enquiry through practical investigation, scientific modelling and mathematical evaluation of results. By fostering collaboration, metacognition, and a secure understanding of Tier 3 scientific vocabulary, we equip our most able pupils with the tools, curiosity, and confidence needed to excel, ensuring they are thoroughly prepared for the increasing demands of Key Stage 4 and beyond.

	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>
This topic establishes essential knowledge for KS4 physics, forming a direct foundation for Forces and Motion, Pressure Calculations, Energy and Work, and Newton’s Laws. Skills developed here, such as analysing graphs, calculating forces, and evaluating practical results, are vital for GCSE physics and for understanding engineering and technological applications.		In Forces and Movement, the hinterland includes tales of innovation in engineering and sports, how the principles of physics underpin bridges, vehicles, and safety equipment, and how the study of motion has transformed everything from athletics to aerospace.	
	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>		
Understanding forces and movement enables students to explain how objects move, why structures remain stable and how engineers design safe and efficient systems. Scientific knowledge developed through this topic underpins modern engineering, transport, construction and sports science, helping students appreciate how physics shapes everyday life.			
SMSC is developed through curiosity, resilience and logical reasoning as students evaluate evidence from practical investigations, apply scientific thinking to solve problems and recognise the importance of precision when measuring and interpreting forces.			
Cross-curricular links include Mathematics through calculations involving speed, distance, time and graph interpretation, Design Technology through structures, mechanisms and product design, Physical Education through movement, forces and sporting performance, and Geography through transport and engineering within the built environment.			
Students explore careers including: ○ Mechanical Engineer – applying knowledge of forces, motion and materials to design machines and mechanical systems. ○ Sports Scientist – investigating movement, forces and performance to improve athletic technique and reduce injury. ○ Structural Engineer – using forces and pressure to design safe buildings, bridges and other structures.			
The topic supports the Skills Builder Universal Framework, particularly: • Leadership through working collaboratively during practical investigations and supporting others to carry out scientific enquiries safely. • Listening through following practical instructions and evaluating scientific evidence. • Problem Solving through applying knowledge of forces and movement to explain observations and solve scientific problems.			
	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 forces affect objects, interpreting data from practical investigations, calculating speed, describing the effects of gravity, friction and pressure, and applying scientific knowledge to unfamiliar situations 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



What do organisms look like inside?



Big Picture

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

Students develop their understanding of organ systems in animals by investigating how specialised cells, tissues and organs work together to keep organisms alive. They explore the structure and function of the skeletal, muscular, respiratory and circulatory systems, whilst developing the practical skills needed to observe biological structures, collect evidence and communicate scientific explanations.

Throughout the topic, students discover how organ systems interact to support movement, gas exchange and the transport of substances around the body. By combining practical investigation with scientific theory, students begin to understand how biology underpins medicine, healthcare and scientific research, whilst appreciating the importance of healthy lifestyle choices in maintaining body systems.

Through this topic, students will explore:

- How the skeleton and muscles work together to produce movement.
- How specialised organs enable gas exchange.
- How the circulatory system transports oxygen, nutrients and waste products.
- How lifestyle choices affect the health of organ systems.
- How to investigate biological systems through practical enquiry, observation and analysis.



Zoom In

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

Students begin by investigating the skeletal and muscular systems, exploring how bones, joints and muscles work together to support movement and protect the body. Through practical activities, they develop an understanding of how the musculoskeletal system enables animals and humans to move efficiently.

As the topic develops, students investigate the respiratory and circulatory systems, learning how specialised organs enable gas exchange and how oxygen and nutrients are transported throughout the body. Practical work, including heart, lung and chicken wing dissections, microscopy of cheek cells and blood smears, and modelling components of blood, allows students to observe biological structures and relate structure to function.

Students conclude the topic by considering how exercise, smoking and diet affect the body, using scientific evidence to explain how lifestyle choices influence the health and performance of organ systems.

Students develop substantive knowledge by understanding:

- the structure and function of the skeletal and muscular systems
- how the respiratory system enables gas exchange
- how the circulatory system transports oxygen, nutrients and waste products
- the relationship between specialised cells, tissues, organs and organ systems
- how lifestyle factors influence health and body systems.

Students develop disciplinary knowledge by:

- using microscopes to observe biological specimens
- carrying out dissections safely and respectfully

- collecting, recording and interpreting scientific data
- analysing evidence from practical investigations
- communicating biological explanations using accurate scientific vocabulary.

Key vocabulary this term includes; skeleton, muscle, joint, tendon, ligament, organ, organ system, respiration, gas exchange, lung, heart, artery, vein, capillary, blood, oxygen, carbon dioxide, red blood cell, circulation, exercise

 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>
Prior Knowledge from KS2: Pupils may have learnt the names and basic functions of major body organs and recognised the importance of diet, exercise, and lifestyle on health. However, they are unlikely to have explored organ systems in depth, microscopic structures, or the interconnectedness of body systems.	Students experience this enquiry through practical investigation, scientific modelling and mathematical evaluation of results. By fostering collaboration, metacognition, and a secure understanding of Tier 3 scientific vocabulary, we equip our most able pupils with the tools, curiosity, and confidence needed to excel, ensuring they are thoroughly prepared for the increasing demands of Key Stage 4 and beyond.
 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>
This topic provides essential preparation for KS4 biology, forming direct links to Organisation, Bioenergetics (Respiration), Infection and Response, Homeostasis, and the Cardiovascular System. Practical skills developed here, such as dissections, microscopy, data handling, and experimental evaluation, are crucial for success in GCSE biology and for understanding human health and disease.	Organ Systems in Animals brings in the dramatic advances in medical treatments, the importance of dissection in understanding anatomy, and ethical considerations in modern medicine. Pupils connect classroom learning to real-life medical professions, from surgery to sports science, seeing how biology serves humanity. Across all topics, pupils are immersed in the language of science, inspired by human stories of discovery, and encouraged to see how scientific knowledge can change the world. The curriculum hinterland ensures our pupils leave Year 7 not merely with knowledge, but with a sense of wonder and ambition for the possibilities ahead.
 Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	

Understanding organ systems enables students to explain how the human body functions, how lifestyle choices influence health and how medical science improves quality of life. Biological knowledge developed through this topic underpins modern medicine, healthcare, sports science and biomedical research, helping students appreciate how scientific understanding contributes to healthier lives and advances in medical treatment. SMSC is developed through curiosity, empathy and responsibility as students investigate how body systems work together, consider the impact of lifestyle choices on health and appreciate the role of scientific research in improving wellbeing and treating disease.

Cross-curricular links include Physical Education through movement, fitness and exercise, PSHEE through healthy lifestyles and wellbeing, Mathematics through recording, presenting and analysing biological data, and Design Technology through the development of prosthetics, medical devices and assistive technologies.

Students explore careers including:

- Physiotherapist – applying knowledge of muscles, joints and movement to help patients recover from injury and improve mobility.
- Cardiac Physiologist – investigating heart function and supporting the diagnosis and treatment of cardiovascular conditions.
- Medical Laboratory Technician – analysing blood and tissue samples to support the diagnosis of disease and improve patient care.

The topic supports the Skills Builder Universal Framework, particularly:

- Teamwork through collaborating during practical investigations and scientific enquiry.
- Speaking through explaining biological processes and communicating scientific conclusions using accurate vocabulary.
- Problem Solving through applying knowledge of organ systems to explain unfamiliar biological scenarios and interpret scientific evidence.



	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		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 organ systems work together, describing the functions of specialised cells and organs, interpreting evidence from practical investigations and applying biological 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

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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.

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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.