

Science Curriculum Intent

In the Science Department at New Line Learning Academy our intent is to equip pupils with the knowledge, skills, and understanding to integrate 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 knowledge in the contexts of the world. We enhance their understanding of how science fits into every aspect of the world and enable pupils to know which practical knowledge and understanding to encourage them to see how vital science is to their future endeavours.

We develop mathematical thinking and cohesively link mathematical knowledge to their learning. We encourage all pupils to see the importance of science and beyond into the worlds they live, and will work in. Digital skills are developed when necessary, and we use innovative technologies and models. Pupils' reading and writing are supported and developed through analysis of media articles that are relevant to the context they are based in. We 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 endeavours.

Term 1 Topic/Theme/Enquiry



How do scientists ensure that experiments are valid?



Big Picture

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

Big Practical Projects

Pupils use this term to apply knowledge from Year 8 to practical projects. They will draw upon the planning skills they gained in their previous two years to conduct practical work in biology, chemistry and physics. Pupils will further develop their analysis skills and work on identifying trends and improving experiments.

Through this topic, pupils will explore:



Zoom In

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

	Assembly	Diffusion Intro	Examples of Diffusion
	Planning the Investigation	Diffusion Practical	Diffusion Analysis
	Big Write	Dissolving Intro	Examples of Dissolving
	Planning the Investigation	Dissolving Practical	Dissolving Analysis
	Circuits Intro	Circuits 2	Planning the Investigation
	Circuits Practical	Big Write	Assessment
	Nervous System	Senses	Endocrine System
	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>
The prerequisite knowledge for this sequence includes basic practical and laboratory skills, such as working safely, using equipment, taking measurements and understanding variables and fair tests. Pupils should have a basic understanding of the particle model, including that substances are made of tiny, moving particles, as well as simple knowledge of mixtures, dissolving and electricity. They should also be able to record and interpret results, identify patterns and use simple tables and graphs to analyse practical investigations		Pupils will be encouraged to apply their knowledge to unfamiliar vocabulary and explain their ideas using the particle model. From independent practical planning, analysing data, evaluating methods moves pupils from simply describing what happened to explaining findings. <i>Practical activities become more complex and the independent</i>	
	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?</i>
The sequence provides a strong foundation for KS4 Science by developing pupils' understanding of the particle model, diffusion, dissolving, electricity and practical scientific skills. It links to key KS4 concepts including particle movement and concentration, rates of processes, solutions and mixtures, electrical circuits and energy, while also developing the working scientifically skills required at GCSE. The practical investigations support pupils in planning experiments, identifying variables, analysing data, evaluating methods and drawing		Pupils can explore how diffusion and dissolving are essential processes of substances into and out of cells, and how medicines and nutrients also connect to food science, water treatment, cooking, environmental circuits provide a foundation for understanding how electrical sense of why the science matters beyond the classroom and	

evidence-based conclusions, preparing them for the demands of GCSE required practicals and exam questions.			
	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>		
The topic links to real life through everyday processes such as cooking, dissolving medicines, breathing and gas exchange, food preservation and the use of electricity including scientists, laboratory technicians, pharmacists, doctors, nurses, engineers, electricians, food scientists and environmental scientists . Developing practical equipment safely, analysing data and evaluating results also builds transferable skills that are valuable across many STEM careers.			
	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 do?</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.		At New Line Learning Academy, assessment in Year 9 is used to monitor progress, support learning, and prepare pupils for future learning. It ensures that pupils' understanding is checked regularly and that they are appropriately challenged. Formative checks take place in every lesson, including "hands up" questioning, and exit tickets. These tools allow teachers to adjust teaching accordingly. Pupils complete low-stakes online tests throughout the year to consolidate knowledge without the pressure of high-stakes exams. Summative assessments are conducted termly and at the end of the year, assessing both core knowledge and practical skills. Across all Year 9 science topics, pupils engage in various practical activities and scientific skills such as writing methods, drawing and interpreting graphs, evaluating experiments, and commenting on reliability.	

	taught and practised, ensuring pupils can confidently present their findings. Furthermore, extended writing tasks are embedded in the curriculum, including explanations, debating ethical issues, and writing reports. Pupils are encouraged to think critically, articulate their ideas clearly, and engage with real-world issues such as industrial pollution, genetic engineering, renewable energy, and space exploration. This comprehensive and balanced approach ensures that pupils move beyond mere recall, fostering analytical skills, scientific literacy, and critical thinking. This prepares pupils for the increasing demands of Key Stage 4.
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Term 2 Topic/Theme/Enquiry		How does science support my health?
	Big Picture <i>What are the main ideas and big questions in this topic?</i>	
Sexual Education		
Pupils delve into links between science and the PSHEE curriculum.		
Know Your body		
Ever have a doctor visit when you couldn't articulate where the issue was? Pupils learn about their body systems, problems that can occur and how to look after themselves.		
Forensic Science		
CSI, FBI, true crime documentaries – how do they do it? Pupils discover techniques used in forensic science and put them into practice		

	Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>		
Male and Female reproductive systems	Puberty	Menstrual cycle	
Sex and Pregnancy	Birth	contraception	
STIs	Relationships and consent	Drugs	
Peer Pressure	Forced Marriage and FGM	Sex Stereotypes	
Respiratory System	Digestive System	Skeletal System	
Skin	Oral Health	Medicines	
Fingerprint analysis	Decay - maggots	Blood splatter analysis	
	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>
Pupils need a basic understanding of human growth, body systems, cells and healthy living. Pupils should have some prior knowledge of the male and female body, puberty, reproduction, basic anatomy and how the body changes throughout life, alongside an understanding of personal health, hygiene and medicines. They should also have developed an awareness of healthy relationships, respect, personal boundaries and making safe choices. Core knowledge of the respiratory, digestive, skeletal and integumentary systems will support pupils in understanding how the body works together to maintain health.		Staff will facilitate increasing the level of discussion, applying more content. Pupils can be challenged to use accurate scientific knowledge in unfamiliar scenarios, and explain the biological and social context of sources of information, stereotypes and social pressures, consent, and justify their decisions using evidence. In the science of the body systems, hormones, reproduction and health, while higher-attaining pupils compare, explain cause and effect, and challenge misconceptions.	
	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?</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. Pupils moving into Year 9 and beyond will continue to study biology, chemistry and physics in preparation for GCSE science at Key Stage 4.		The curriculum hinterland for this sequence is the wider knowledge of how the body develops, functions and maintains health, alongside the social context. Pupils can explore links between hormones, reproduction, body image, and lifestyle choices, as well as the wider issues of relationships and health. These ideas provide valuable foundations for KS4 Biology and help pupils understand real-world topics such as healthcare, public health, disease and personal wellbeing.	

	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>
This topic connects directly to pupils’ real lives, health and relationships, helping them understand puberty, reproduction, consent, contraception, sexual health, medicine, and provides links to careers such as doctors, nurses, pharmacists, scientists, midwives, dentists, physiotherapists and healthcare professionals, as well as careers involving engineering, technology, and the arts. It also links to important values including respect, equality, consent, personal responsibility, healthy relationships, tolerance and making informed and safe choices, while linking to PSHE and Citizenship.	
	Resources <i>What books, websites, videos and materials will support our learning?</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 <i>How will we show what we know, remember and can do?</i>
At New Line Learning Academy, assessment in Year 8 is used to monitor progress, support learning, and prepare pupils for future learning. It ensures that pupils’ understanding is checked regularly and that learning is appropriately challenged. Formative checks take place in every lesson, including “hands up” questioning, and exit tickets. These tools allow teachers to adjust teaching accordingly. Pupils complete low-stakes online tests throughout the year to consolidate knowledge without the pressure of high-stakes tests. Summative assessments are conducted termly and at the end of the year, assessing both core knowledge and practical skills. Across all Year 8 science topics, pupils engage in various tasks that develop scientific skills such as writing methods, drawing and interpreting graphs, evaluating experiments, and commenting on reliability.	

	taught and practised, ensuring pupils can confidently present their findings. Furthermore, extended writing tasks are embedded in the curriculum, encouraging explanations, debating ethical issues, and writing reports. Pupils are encouraged to think critically, articulate their ideas clearly, and engage with real-world issues such as industrial pollution, genetic engineering, renewable energy, and climate change. This comprehensive and balanced approach ensures that pupils move beyond mere recall, fostering analytical skills, scientific literacy, and the ability to apply knowledge to new contexts, preparing pupils for the increasing demands of Key Stage 4.
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Term 3	
Topic/Theme/Enquiry	 What are the reactions that lead to useable resources?
 Big Picture <i>What are the main ideas and big questions in this topic?</i>	
Forensic Science CSI, FBI, true crime documentaries – how do they do it? Pupils discover techniques used in forensic science and put them into practice Maths in Science Pupils consolidate knowledge of maths skills through calculations and graphing skills	
 Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>	

Mean	Significant figures	DESRUCU
DESRUCU	Graphs - bar chart	Graphs - scatter graphs
	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>
For this sequence, the prerequisite knowledge is a basic understanding of mathematical skills and scientific data handling, including calculating a mean, using significant figures and interpreting measurements and units. Pupils should have prior experience with DESRCU (Data, Equation, Substitute ,Rearrange, Calculate, Units), as well as reading and interpreting bar charts and scatter graphs. They should also understand that graphs are used to identify patterns, relationships and trends in scientific data and be familiar with choosing appropriate ways to present results.		For this sequence, stretch and challenge can come from moving data towards interpreting, evaluating and justifying their decisions. Pupils should choose an appropriate statistical method or graph type, identify and explain the reliability and validity of data. They could also be given unusual data to spot errors, suggest improvements and defend their conclusions. This will develop the skills needed at KS4, particularly analysing data, evaluating evidence in different contexts. <i>Practical activities become more complex and the independence of pupils increases.</i>
	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?</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. Pupils moving into Year 9 and beyond will continue to study biology, chemistry and physics in preparation for GCSE science at Key Stage 4.		The curriculum hinterland for this sequence is the wider application of science in everyday life. Pupils develop an understanding of how scientific trends, patterns and correlations to interpret evidence and make predictions. This is supported by practical work across KS4 Biology, Chemistry and Physics, as well as environmental science, engineering and research. They also develop skills in helping them interpret graphs and statistics they encounter in the media.
	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	
This topic connects to real life through the way data and statistics are used to make decisions, communicate information and judge whether claims are reliable . It links to statisticians, researchers, journalists and data analysts , while also supporting learning in Mathematics, Geography, Computing and Biology . Pupils develop important skills in evaluating evidence , helping them become more confident at interpreting graphs, statistics and information they encounter in everyday life and the media.		
	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 do?</i>

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- 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 New Line Learning Academy, assessment in Year 8 is used to monitor progress, support learning, and prepare pupils for future challenges. This ensures that pupils' understanding is checked regularly and that they are appropriately challenged.

Formative checks take place in every lesson, including "hands up" questioning, and exit tickets. These tools allow teachers to adjust teaching accordingly.

Pupils complete low-stakes online tests throughout the year to consolidate knowledge without the pressure of high-stakes exams.

Summative assessments are conducted termly and annually to monitor progress, assessing both core knowledge and practical skills.

Across all Year 8 science topics, pupils engage in various practical activities, developing scientific skills such as writing methods, drawing and interpreting graphs, evaluating experiments, and commenting on reliability. These skills are taught and practised, ensuring pupils can confidently present their findings.

Furthermore, extended writing tasks are embedded in lessons, encouraging pupils to explain their understanding, debate ethical issues, and write reports. Pupils are encouraged to critically evaluate information, articulate their ideas clearly, and engage with real-world issues such as industrial pollution, genetic engineering, renewable energy, and climate change.

This comprehensive and balanced approach ensures more recall, fostering analytical skills, scientific literacy for pupils for the increasing demands of Key Stage 4.

Science Curriculum Intent

P1

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:

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- Have a thirst for learning more science in their post-16 endeavors.

P1
Energy



What can we do to reduce the impact of global warming?



Big Picture

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

The concept of energy emerged in the 19th century. The idea was used to explain the work output of steam engines and then generalised to understand other heat engines. It also became a key tool for understanding chemical reactions and biological systems. Limits to the use of fossil fuels and global warming are critical problems for this century. Physicists and engineers are working hard to identify ways to reduce our energy usage.



Zoom In

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

A system is an object or group of objects.

Describe, for common situations, the changes involved in the way energy is stored when a system changes. For example:

- an object projected upwards
- a moving object hitting an obstacle
- an object accelerated by a constant force
- a vehicle slowing down
- an electric kettle boiling water.

Calculate how energy is redistributed in a system when it changes.

Work is done when charge flows in a circuit.

Calculate the kinetic energy of a moving object, stored by a stretched spring and an object raised above ground level.

The kinetic energy of a moving object can be calculated using the equation:

$$K.E. = 0.5 \times mass \times (speed)^2$$

$$[EK = \frac{1}{2} m v^2]$$

Kinetic energy, E_k , in joules, J Mass, m , in kilograms, kg Speed, v , in metres per second, m/s

The amount of elastic potential energy stored in a stretched spring can be calculated using the equation:

$$\begin{aligned} \text{Elastic potential energy} &= \\ &0.5 \times \text{spring constant} \times \\ &\quad (\text{extension})^2 \\ [Ee &= \frac{1}{2} k e^2] \end{aligned}$$

The amount of gravitational potential energy gained by an object raised above the ground level can be calculated using the equation:

$$\begin{aligned} g.p.e &= \text{mass} \times \\ &\text{gravitational field strength} \\ &\quad \times \text{height} \\ [Ep &= m g h] \end{aligned}$$

Calculate changes in the way energy is stored when a system is changed by heating.

Use calculations to show how the overall energy in a system is redistributed when the system is changed.

The amount of energy stored in or released from a system as its temperature changes can be calculated using the equation:

$$\begin{aligned} \text{Change in thermal energy} &= \\ &\text{mass} \times \\ &\text{specific heat capacity} \times \\ &\quad \text{temperature change} \\ [\Delta E &= m c \Delta\theta] \end{aligned}$$

change in thermal energy, ΔE , in joules, J

mass, m , in kilograms, kg

specific heat capacity, c , in joules per kilogram per degree Celsius, J/kg°C

temperature change, $\Delta\theta$, in degrees Celsius, °C

The specific heat capacity of a substance is the amount of energy required to raise the temperature of one kilogram of the substance by one degree Celsius.

Power is defined as the rate at which energy is transferred or the rate at which work is done.

$$\text{Power} = \frac{\text{energy transferred}}{\text{time}}$$

$$[P = E / t]$$

$$\text{Power} = \frac{\text{work done}}{\text{time}}$$

$$[P = W / t]$$

Power, P, in watts, W

Energy transferred, E, in joules, J

Time, t, in seconds, s

Work done, W, in joules, J

An energy transfer of one joule per second is equal to a power of 1 watt.

Energy can be transferred usefully, stored or dissipated, but cannot be created or destroyed.

Where energy transfers in a closed system occur there is no net change to the total energy.

Whenever there are energy transfers in a system only part of the energy is usefully transferred. The rest of the energy is dissipated so that it is stored in less useful ways. This energy is often described as being wasted.

Unwanted energy transfers can be reduced in a number of ways, for example, through lubrication and the use of thermal insulation.

The rate of cooling of a building is affected by the thickness and thermal conductivity of its walls.

The higher the thermal conductivity of a material; the higher the rate of energy transfer by conduction across the material.

The energy efficiency for any energy transfer can be calculated using the equation:

$$\text{efficiency} = \frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$$

Efficiency may also be calculated using the equation:

$$\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$$

Describe ways to increase the efficiency of an intended energy transfer. HT only

Describe the main energy resources available for use on Earth. These include:

- fossil fuels (coal, oil and gas)
- nuclear fuel
- bio-fuel
- wind
- hydro-electricity
- geothermal
- the tides
- the Sun
- water waves.

Distinguish between energy resources that are renewable and energy resources that are non-renewable.

Compare the ways that different energy resources are used. The uses to include transport, electricity generation and heating.

Understand why some energy resources are more reliable than others.



Pre-Requisite Knowledge

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

*Energy cannot be created or destroyed
When an object gets hotter its particles vibrate
Very little else, most content here is new and is presented as the first time learning any of it as it is a fairly abstract concept.*



Pitch Up

How will we challenge ourselves?

To stretch pupils in Energy in Physics, teachers can challenge students to think critically, apply concepts creatively, and connect learning to real-world contexts. This can be achieved by posing thought-provoking questions such as “How could energy conservation shape future technologies?” or “What are the trade-offs between different energy sources in terms of efficiency and ethics?” Encouraging pupils to analyse real data—like energy usage in homes or efficiency ratings of appliances—develops analytical skills and scientific reasoning. Independent inquiry tasks, such as designing an energy-efficient building or comparing renewable energy systems, foster curiosity and ownership. Differentiated activities like tiered calculations, debates on energy policy, and creative challenges (e.g. writing a manifesto for sustainable energy use) cater to varied abilities while promoting depth.

	Wider Framework How does this learning connect to future topics and bigger goals?		Curriculum Hinterland What wider knowledge will deepen our understanding of this topic?
	ext required a little at A level physics. Will be most useful to those looking to progress into engineering or STEM degrees/apprenticeships. Safety elements crucial for home living.		Historical context: stories of James Joule, Thomas Edison, and the development of energy concepts • Real-world applications: how energy efficiency affects household appliances, transport, and building design • Ethical debates: balancing energy needs with climate change and sustainability • Global perspectives: how different countries generate and use energy, and the politics of energy access • Cross-curricular links: geography (energy distribution), economics (cost-benefit of energy sources), and citizenship (responsible energy use)
	Authentic connections How does this topic connect to real life, careers, other subjects and important values?		
	Spiritual • Sparks awe at the universality of energy and its role in powering life and technology. • Encourages reflection on the elegance of physical laws like conservation of energy and the interconnectedness of systems. Moral • Raises ethical questions about energy consumption, climate change, and the environmental impact of different energy sources. • Prompts debate on fairness in global energy access and the responsibility of individuals and nations to reduce carbon footprints. Social • Promotes teamwork through collaborative experiments and energy audits. • Builds awareness of how energy choices affect communities, especially in areas facing fuel poverty or energy insecurity. Cultural • Explores how different cultures and countries approach energy generation and sustainability. • Highlights historical and global contributions to energy science—from steam engines to solar panels. Careers: • Energy Engineer: Designs systems for efficient energy use in buildings, transport, and industry. • Renewable Energy Specialist: Develops and implements technologies like solar, wind, and hydro power. • Power Systems Engineer: Works on electricity generation, transmission, and distribution networks.		

- **Applied Physicist:** Uses physics principles to solve practical problems in energy, materials, or electronics.
- **Sustainability Consultant:** Advises organisations on reducing energy consumption and carbon emissions.
- **Fusion Researcher:** Explores cutting-edge energy sources like nuclear fusion (e.g. at UKAEA).

 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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	Finally, pupils are assessed through an end of unit exam paper. Each assessment is approximately 40 minutes in length and there are two tiers of entry for every assessment Higher and Foundation. Students should use their CGP revision guides or BBC Bitesize: combined - https://www.bbc.co.uk/bitesize/examspecs/z8r997h
Science Curriculum Intent	B1
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	- 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.	
B1 Cell Biology		How have we understood this?
	Big Picture <i>What are the main ideas and big questions in this topic?</i>	
Cells are the basic unit of all forms of life. In this section we explore how structural differences between types of cells enables them to perform specific functions within the organism. These differences in cells are controlled by genes in the nucleus. For an organism to grow, cells must divide by mitosis producing two new identical cells. If cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a range of different types of cells. This phenomenon has led to the development of stem cell technology. This is a new branch of medicine that allows doctors to repair damaged organs by growing new tissue from stem cells.		
	Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>	
Label diagrams of animal and plant cells. Describe the function of the main organelles. Prepare slides of plant and animal cells and describe the procedure.		

Correctly use a microscope to observe cells under different magnifications.

Describe the order of size of: cell, nucleus, chromosome and gene.

Explain the need for differentiation in a multicellular organism.

Describe the differences between differentiation in plants and in animals.

Explain how specialised cells are adapted for their function.

Define the term 'stem cell'.

Describe where stem cells can be found in animals and plants.

Describe in simple terms how nerve cells genetically identical to a patient could be obtained.

Describe how stem cells could be used to help treat some medical conditions.

Evaluate risks and benefits, as well as the social and ethical issues concerning the use of stem cells from embryos in medical research and treatments.

Stem cells in plants – see 4.6.2.5 Cloning.

Identify plant, animal and bacterial cells and classify them as eukaryotic or prokaryotic cells.

Label diagrams of bacterial cells.

Describe the differences between eukaryotic and prokaryotic cells in terms of structure and size.

Describe the differences in magnification and resolution of light and electron microscopes.

Explain how electron microscopy has increased understanding of organelles.

Calculate the magnification of a light microscope.

Carry out calculations using the formula:

$$real\ size = \frac{image\ size}{magnification}$$

Rearrange the equation to calculate image size or magnification.

Convert values for the units: cm, mm, μm and nm.

Know that bacteria multiply by simple cell division.

Know how bacteria can be grown.

Know procedure to prepare an uncontaminated culture.

Explain why cultures are incubated at a maximum temperature of 25°C.

Describe why uncontaminated cultures are necessary in research.

Describe what a chromosome is and where chromosomes are found in the cell.

Describe simply how and why body cells divide by. Knowledge and understanding of the stages in mitosis are **not** required.

Draw simple diagrams to describe mitosis.

Draw a simple diagram to describe the cell cycle in terms of:

- cell growth, when the number of organelles increases
- replication of chromosomes, so the genetic material is doubled
- separation of the chromosomes: division of the nucleus

division of the cell to form two identical cells.

Define the term 'diffusion'.

Explain how temperature, concentration gradient and surface area affect the rate of diffusion.

Give examples of substances that diffuse into and out of cells.

Calculate and compare surface area: volume ratios.

Explain how the small intestine and lungs in mammals, and roots and leaves in plants, are adapted for exchange of substances.

Describe and explain how an exchange surface is made more effective.

Define the term 'osmosis'.

Apply knowledge of osmosis to unfamiliar situations and make predictions.



Pre-Requisite Knowledge

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



<i>Plant and Animal cells are different in appearance and contents.</i> <i>Bacteria cells do not have a nucleus</i> <i>A basic understanding that a cell has a membrane and a nucleus.</i>	<i>To stretch students through higher-order thinking in cell biology, teachers can move beyond surface-level facts by asking “why” and “how” questions that encourage pupils to unpack underlying processes and predict scientific outcomes. Real-world case studies—such as applications of stem cell therapy or breakthroughs in cancer research—offer meaningful contexts for applying complex concepts and promoting analytical thinking. Additionally, introducing ethical debates around topics like cloning, stem cells, and genetically modified organisms invites students to form and defend opinions, deepening both their reasoning skills and understanding of broader implications in biological science.</i>
	Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>
<i>Moving in to A level Biology ideas about cellular function and adaptations of cells are required, as well as a knowledge of heart and lung anatomy and structure. A level Biology, BTEC Level 3 Applied Science or T Level Science has a focus on cells and organelles as well as their functions. Calculating magnification is a skill required for these qualifications..</i>	• Historical breakthroughs: ○ Robert Hooke’s discovery of cells using a microscope. ○ The development of cell theory by Schleiden and Schwann. ○ The race to understand DNA structure—Watson, Crick, Franklin. • Scientific intrigue: ○ How stem cells are revolutionising medicine. ○ The ethical debates around cloning and genetic modification. ○ The story of Henrietta Lacks and HeLa cells—immortal cells that changed science. • Real-world relevance: ○ How cancer arises from uncontrolled cell division.



	○ The use of microscopy in forensic science and diagnostics. ○ Applications of cell biology in biotechnology and agriculture. Cross-curricular links: ○ History: timeline of scientific discoveries. ○ Ethics: dilemmas in stem cell research and genetic engineering. ○ Art: drawing cells and using microscopy images in design.	
	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	
Sense of enjoyment and fascination in learning about themselves, others and the world around them Willingness to reflect on their experiences. Careers Cell Biologist: Investigate how cells function, interact, and respond to stimuli—often in disease contexts like cancer or neurodegeneration. Genetic Counsellor: Help patients understand genetic conditions, often using cellular and molecular data. Cell Culture Technician: Grow and maintain cell lines for research or product development. Science Communicator: Translate complex cell biology concepts for public understanding.		
	Resources <i>What books, websites, videos and materials will support our learning?</i>	
At New Line Learning Academy, we are committed to equipping our pupils with high-quality resources that extend learning beyond	At New Line Learning Academy, assessment in Year 7 science is thoughtfully designed to monitor progress, support learning,	

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.	and prepare pupils for future academic success. A wide variety of strategies ensures that pupils’ understanding is checked regularly and that all learners, including the most able, are appropriately challenged. Formative checks take place in every lesson, including rapid recall quizzes, whiteboard checks, “no hands up” questioning, and exit tickets. These tools help teachers quickly identify gaps in knowledge and adjust teaching accordingly. Pupils complete low-stakes online tests throughout the year, helping them build confidence and consolidate knowledge without the pressure of high-stakes exams. Furthermore, extended writing tasks are embedded into the curriculum, with pupils practising scientific explanations, debating ethical issues, and writing reports. These tasks encourage pupils to think critically, articulate their ideas clearly, and engage with complex scientific and societal topics such as industrial pollution, genetic engineering, renewable energy, and climate change policies. Finally, pupils are assessed through an end of unit exam paper. Each assessment is approximately 40 minutes in length and there are two tiers of entry for every assessment Higher and Foundation. Students should use their CGP revision guides or BBC Bitesize: combined - https://www.bbc.co.uk/bitesize/examspecs/z8r997h
Science Curriculum Intent	C1

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.

C1 Atomic Structure and the Periodic Table		How did early scientists organise elements based on their limited knowledge?
	Big Picture <i>What are the main ideas and big questions in this topic?</i>	
The periodic table provides chemists with a structured organisation of the known chemical elements from which they can make sense of their physical and chemical properties. The historical development of the periodic table and models of atomic structure provide good examples of how scientific ideas and explanations develop over time as new evidence emerges. The arrangement of elements in the modern periodic table can be explained in terms of atomic structure which provides evidence for the model of a nuclear atom with electrons in energy levels.		
	Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>	
Be able to use the names and symbols of the first 20 elements in the periodic table, the elements in Groups 1 and 7, and other elements in this specification Name compounds of these elements from given formulae or symbol equations Write word equations for the reactions in this specification Write formulae and balanced chemical equations for the reactions in this specification. Be able to describe, explain and give examples of the specified processes of separation Suggest suitable separation and purification techniques for mixtures when given appropriate information. Describe why the new evidence from the scattering experiment led to a change in the atomic model. Describe the difference between the plum pudding model of the atom and the		

nuclear model of the atom.

Be able to use the nuclear model to describe atoms.

Be able to calculate the numbers of protons, neutrons and electrons in an atom or ion, given its atomic number and mass number.

Be able to relate size and scale of atoms to objects in the physical world.

Be able to calculate the relative atomic mass of an element given the percentage abundance of its isotopes.

Be able to answer questions in terms of either energy levels or shells.

Be able to explain how the position of an element in the periodic table is related to

the arrangement of electrons in its atoms and hence to its atomic number.

Be able to predict possible reactions and probable reactivity of elements from their positions in the periodic table.

Be able to describe these steps in the development of the periodic table.

Be able to explain the differences between metals and non-metals on the basis of their characteristic physical and chemical properties.

Explain how the atomic structure of metals and non-metals relates to their position in the periodic table

Explain how the reactions of elements are related to the arrangement of electrons in their atoms and hence to their atomic number.

Be able to explain how properties of the elements in Group 0 depend on the outer shell of electrons of the atoms

Be able to predict properties from given trends down the group.

Be able to explain how properties of the elements in Group 1 depend on the outer

shell of electrons of the atoms Be able to predict properties from given trends down the group. Be able to explain how properties of the elements in Group 7 depend on the outer shell of electrons of the atoms Be able to predict properties from given trends down the group	
	Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>
<i>Atoms, elements and compounds, atomic structure – KS3 curriculum</i>	<i>Pupils are expected to attend science lessons on time, well equipped, ready to take risks and be active learners.</i> <i>Teachers use layered questioning alongside practical activities—such as “Why do elements in the same group react similarly?” or “How does atomic structure influence an element’s position on the periodic table?”—supporting pupils in moving beyond memorisation and into reasoning about patterns and properties while allowing them to visualise abstract concepts easily.</i> .
	Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>
<i>Moving in to A level Chemistry, BTEC Level 3 Applied Science or T Level Science understanding of atoms, atomic structure, ions and the fundamentals of chemistry are expanded upon and form significant components of these further courses which pupils may choose as part of their Post-16 Science education.</i>	Historical breakthroughs: • Dalton’s solid sphere model and the birth of atomic theory. • Thomson’s discovery of the electron and the plum pudding model. • Rutherford’s gold foil experiment and the nuclear model. • Bohr’s energy levels and quantum leaps. • Mendeleev’s genius in predicting undiscovered elements.



	Scientific intrigue: • How atomic models changed with new evidence—science as a self-correcting process. • The role of isotopes in medicine and archaeology (e.g. carbon dating). • How electron configuration explains trends in reactivity and bonding. • Real-world relevance: ○ Use of noble gases in lighting and medicine. ○ Alkali metals in batteries and fireworks. ○ Transition metals in construction, electronics, and catalysis. ○ How periodic trends help predict properties of new elements. Cross-curricular links: ○ History: scientific revolutions and the evolution of models. ○ Maths: interpreting data, calculating relative atomic mass. ○ Art: visualising atomic models and designing periodic table posters.
	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>
Spiritual • Inspires awe at the complexity and elegance of atomic structure and the natural order of elements. • Encourages reflection on the invisible building blocks of matter and	

the vastness of scientific knowledge.

- Promotes curiosity about the universe and our ability to uncover its secrets through human ingenuity.

Moral

- Raises ethical questions about the use of atomic knowledge—e.g. nuclear energy vs. nuclear weapons.
- Explores the responsibility of scientists when applying discoveries that can impact society and the environment.
- Encourages integrity in scientific research and the importance of evidence-based thinking.

Social

- Highlights the collaborative nature of scientific progress—how discoveries build on others across generations.
- Promotes teamwork through practical investigations and peer learning.
- Encourages respect for diverse contributions to science, including underrepresented scientists and global perspectives.

Cultural

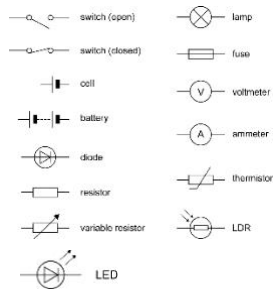
- Examines how different cultures contributed to the development of atomic theory and the periodic table.
- Reflects on how scientific ideas were received in different historical and cultural contexts.
- Considers the global impact of chemistry—from medicine to materials—and how it shapes modern life.

Research Chemist: Investigates atomic properties and reactions to develop new materials or medicines Chemical Engineer: Applies atomic principles to create efficient chemical processes and products Mining or Metallurgy Specialist: Extracts and processes elements based on their atomic properties.	
	Resources What books, websites, videos and materials will support our learning? 
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/z4kw2hy) – 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	At New Line Learning Academy, assessment in Year 7 science is thoughtfully designed to monitor progress, support learning, and prepare pupils for future academic success. A wide variety of strategies ensures that pupils’ understanding is checked regularly and that all learners, including the most able, are appropriately challenged. Formative checks take place in every lesson, including rapid recall quizzes, whiteboard checks, “no hands up” questioning, and exit tickets. These tools help teachers quickly identify gaps in knowledge and adjust teaching accordingly. Pupils complete low-stakes online tests throughout the year, helping them build confidence and consolidate knowledge without the pressure of high-stakes exams. Furthermore, extended writing tasks are embedded into the curriculum, with pupils practising scientific explanations, debating ethical issues, and writing reports. These tasks encourage pupils to think critically, articulate their ideas clearly, and engage with complex scientific and societal

pupil can thrive and deepen their scientific understanding at their own pace.	topics such as industrial pollution, genetic engineering, renewable energy, and climate change policies. Finally, pupils are assessed through an end of unit exam paper. Each assessment is approximately 40 minutes in length and there are two tiers of entry for every assessment Higher and Foundation. Students should use their CGP revision guides or BBC Bitesize: combined - https://www.bbc.co.uk/bitesize/examspecs/z8r997h
Science Curriculum Intent	P2
	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.	
P2 Electricity		What mix of power stations can promise a sustainable future?
	Big Picture <i>What are the main ideas and big questions in this topic?</i>	
Electric charge is a fundamental property of matter everywhere. Understanding the difference in the microstructure of conductors, semiconductors and insulators makes it possible to design components and build electric circuits. Many circuits are powered with mains electricity, but portable electrical devices must use batteries of some kind. Electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing and control. The fundamentals of electromagnetism were worked out by scientists of the 19th century. However, power stations, like all machines, have a limited lifetime. If we all continue to demand more electricity this means building new power stations in every generation but what mix of power stations can promise a sustainable future?		
	Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>	

Circuit diagrams use standard symbols:



For electrical charge to flow through a closed circuit the circuit must include a source of potential difference.

Electric current is a flow of electrical charge. The size of the electric current is the rate of flow of electrical charge. Charge flow, current and time are linked by the equation:

charge flow =

current x time

$$[Q = I t]$$

charge flow, Q , in coulombs, C

current, I , in ampere, A

time, t , in seconds, s

The current at any point in a series circuit has the same value as the current at any other point in the same circuit..

The current through a component depends on both the resistance of the component and the potential difference across the component. The greater the resistance of the component the smaller the current for a given potential difference (p.d.) across the component.

Current, potential difference or resistance can be calculated using the equation:

$$\begin{aligned}\text{potential difference} &= \\ \text{current} \times \text{resistance} \\ [V &= IR]\end{aligned}$$

potential difference, V, in volts, V

current, I, in amperes, A

resistance, R, in ohms, Ω

Explain the design and use of a circuit to measure the resistance of a component by measuring the current through, and potential difference across, the component.

Students should set up and use a circuit to investigate a factor/ the factors that affect the resistance of an electrical component(s).

The current through an ohmic conductor (at a constant temperature) is directly proportional to the potential difference across the resistor. This means that the resistance remains constant as the current changes.

The resistance of components such as filament lamps, diodes, thermistors and LDRs is not constant; it changes with the current through the component.

The resistance of a filament lamp increases as the temperature of the filament increases.

The current through a diode flows in one direction only. The diode has a very high resistance in the reverse direction.

The resistance of a thermistor decreases as the temperature increases.

The resistance of an LDR decreases as light intensity increases.

There are two ways of joining electrical components, in series and in parallel. Some circuits include both series and parallel parts.

For components connected in series:

- there is the same current through each component
- the total potential difference of the power supply is shared between the components.
- the total resistance of two components is the sum of the resistance of each component.

$$R_{\text{total}} = R_1 + R_2$$

resistance, R, in ohms, Ω

For components connected in parallel:

- the potential difference across each component is the same
- the total current through the whole circuit is the sum of the currents through the separate components

the total resistance of two resistors is less than the resistance of the smallest individual resistor.

Students should be able to explain qualitatively why adding resistors in series increases the total resistance, while adding resistors in parallel decreases the total resistance.

The potential difference across cells and batteries is always in the same direction. The potential difference does not change polarity.

The potential difference of mains electricity changes direction. The potential difference changes polarity.

Mains electricity is an a.c. supply. In the UK it has a frequency of 50 Hz and is about 230 V.

Most electrical appliances are connected to the mains using three-core cable.

The insulation covering each wire is colour coded for easy identification:

live wire – brown

neutral wire – blue

earth wire – green and yellow stripes.

The live wire carries the alternating potential difference from the supply.

The neutral wire completes the circuit. The earth wire is a safety wire to stop the appliance becoming live.

The potential difference between the live wire and earth (0 V) is about 230 V. The neutral wire is at or close to earth potential (0 V). The earth wire is at 0 V, it only carries a current if there is a fault.

The power of a device is related to the potential difference across it and the current through it by the equation:

power =

potential difference x current

$$[P = V I]$$

power =

current squared x resistance

$$[P = I^2 R]$$

power, P, in watts, W

potential difference, V, in volts, V

current, I, in amperes, A

resistance, R, in ohms, Ω

Everyday electrical appliances are designed to bring about energy transfers.

Describe how different domestic appliances transfer energy from batteries or a.c. mains to the kinetic energy of electric motors or the energy of heating devices.

The amount of energy an appliance transfers depends on how long the appliance is switched on for and the power of the appliance.

Work is done when charge flows in a circuit.

The amount of energy transferred by electrical work can be calculated using the equation:

energy transferred =

power x time

$$[E = P t]$$

energy transferred =

charge flow x

potential difference

$$[E = Q V]$$

energy transferred, E, in joules, J

power, P, in watts, W

time, t, in seconds, s

charge flow, Q, in coulombs, C

potential difference, V, in volts, V

The National Grid is a system of cables and transformers linking power stations to consumers.

Electrical power is transferred from power stations to consumers using the National Grid.

Step-up transformers are used to increase the potential difference from the power station to the transmission cables then step-down transformers are used to decrease, to a much lower value, the potential difference for domestic use.

This is done because, for a given power, increasing the potential difference reduces the current, and hence reduces the energy losses due to heating in the transmission cables.

When certain insulating materials are rubbed against each other they become electrically charged. Negatively charged electrons are rubbed off one material and onto the other. The material that gains electrons becomes negatively charged. The material that loses electrons is left with an equal positive charge.

The greater the charge on an isolated object the greater the potential difference between the object and earth. If the potential difference becomes high enough a spark may jump across the gap between the object and any earthed conductor which is brought near it.

When two electrically charged objects are brought close together they exert a force on each other. Two objects that carry the same type of charge repel. Two objects that carry different types of charge attract. Attraction and repulsion between two charged objects are examples of non-contact force.



Pre-Requisite Knowledge

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



<i>Electricity is conducted by electrons in metals. Non metals are not conductors (insulators) of electricity. Circuits won't work if broken, they must be complete.</i> <i>Current flows around a circuit and various items powered by the current use volts.</i> <i>Heat is given off by electrical items.</i> <i>Electrical safety from KS3 and at home.</i>	<i>Teachers can challenge students to think beyond circuit diagrams and calculations by encouraging deeper reasoning, real-world application, and collaborative exploration. This can begin with thought-provoking questions like “Why is the current the same at all points in a series circuit?” or “How would electricity behave on a space station with no gravity?” Analyzing anomalies—such as unexpected changes in bulb brightness or resistance—helps pupils refine their understanding and confront misconceptions.</i> <i>Independent inquiry tasks, like designing a safe electrical system for a tiny home or comparing national grid systems across countries, foster curiosity and ownership.</i>	
	Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	
<i>Moving into A level Physics, BTEC Level 3 Applied Science or T Level Science understanding of the concepts studied can form fundamental aspects of both compulsory and optional units.</i>	Historical stories: The rivalry between Edison and Tesla, the invention of the lightbulb, and the development of the National Grid • Real-world applications: How electricity powers homes, transport, and medical devices • Ethical debates: Energy access, fuel poverty, and the environmental impact of electricity generation • Global perspectives: How different countries generate and distribute electricity, and the politics of energy supply • Cross-curricular links: Geography (energy distribution), economics (cost of electricity), and citizenship (responsible energy use)	
	Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	

Spiritual

- Sparks awe at the invisible forces that govern electricity and the elegance of physical laws like Ohm's Law and energy conservation.
- Encourages curiosity about how electricity powers everything from neurons in the brain to global communication networks.

Moral

- Raises ethical questions about energy access, fuel poverty, and the environmental impact of electricity generation.
- Prompts debate on responsible energy use and the fairness of global electricity distribution.

Social

- Promotes collaboration through practical investigations and circuit-building tasks.
- Builds awareness of how electricity affects communities—especially those facing energy insecurity or relying on off-grid solutions

Cultural

- Explores how different cultures and countries generate and use electricity, from hydropower in Norway to solar grids in Kenya.
- Highlights historical contributions from figures like Edison, Tesla, and Faraday, and the global evolution of electrical technology.

Careers:

Electrical Engineer: Designs and maintains electrical systems for buildings, transport, and industry.

- **Electromagnetic Engineer:** Develops devices like MRI magnets, loudspeakers, and electromagnetic locks.
- **Power Generation Technician:** Operates and maintains equipment in power stations to ensure reliable electricity supply.
- **Energy Systems Analyst:** Evaluates energy usage and efficiency in homes, businesses, and national grids.
- **Electronics Engineer:** Works on circuits and devices in consumer tech, medical equipment, and aerospace.

- **Renewable Energy Specialist:** Develops solar, wind, and hydroelectric systems to reduce carbon emissions.



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- 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.
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 - 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.

Resources

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



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Pupils complete low-stakes online tests throughout the year, helping them build confidence and consolidate knowledge without the pressure of high-stakes exams.

Furthermore, extended writing tasks are embedded into the curriculum, with pupils practising scientific explanations, debating ethical issues, and writing reports. These tasks encourage pupils to think critically, articulate their ideas clearly, and engage with complex scientific and societal topics such as industrial pollution, genetic engineering, renewable energy, and climate change policies.

Finally, pupils are assessed through an end of unit exam paper. Each assessment is approximately 40 minutes in length and there are two

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