

Werneth Science Curriculum KS3



		Year 7	Year 8	Year 9
Autumn 1	Content (Why)	This unit builds on KS2 understanding of living things and materials by introducing the fundamental ideas that underpin biology and chemistry. It develops scientific knowledge alongside practical investigative skills, enabling students to explain how living organisms function, how the body moves, and how the behaviour of matter can be explained using scientific models.	This unit develops students' understanding of three important areas of science: sustainability, chemical reactions and respiration. Students explore the importance of conserving Earth's finite resources and the role of renewable resources in creating a sustainable future for coming generations. This unit also develops students' understanding of the fundamental biological processes that sustain life by exploring respiration in plants and animals, representing chemical reactions using equations and formulae, and defining acids and alkalis in terms of neutralisation reactions and using the pH scale (2026-27 only).	This unit builds on previously taught content on cells and transport systems within organisms. Students learn about aseptic techniques to prevent microbial contamination. They explore the role of maths within Science looking at significant figures and analysing data. The unit then moves on to physics, looking at energy stores and how efficient energy transfers are.
	Content (What)	Students study how living things are organised through cells and specialised cells, how the human skeleton, joints and muscles enable movement, and how the particle model explains the properties of solids, liquids and gases. Students will also learn about atomic structure, changes of state and diffusion through practical scientific investigations.	Students investigate the concepts of sustainability, renewable and non-renewable resources, and the importance of resource conservation. They explore how scientific developments can support sustainable living and responsible resource management. Students investigate respiration in animals and yeast, exploring how organisms release energy from food through aerobic and anaerobic respiration. Students also investigate neutralisation using a number of different indicators and indigestion relief tablets. They also learn about the reactions of metals with oxygen and acids.	This unit focuses on the microscopic building blocks of life, starting with the comparison of eukaryotic and prokaryotic cells, exploring sub-cellular structures, and utilising microscopy to observe them. It details the movement of substances across cell membranes through diffusion, osmosis, and active transport. Meanwhile, the energy topic introduces how energy is stored, transferred, and conserved within different physical systems. It covers how to calculate kinetic, gravitational potential, elastic potential, and thermal energy changes and analyses the impact of global renewable and non-renewable energy resources.
	Acquire (Knowledge)	• Living organisms are made of cells, with different cell structures performing specific functions, and specialised cells are adapted to carry out particular roles. • The skeleton, joints and muscles work	• Understand the importance of sustainability, resource conservation and the difference between renewable and non-renewable resources.	• Osmosis: Investigating the effect of different concentrations of salt or sugar solutions on the mass of plant tissue (such as potato cylinders). • The differences between osmosis and active

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		together to support, protect and enable movement through antagonistic muscle pairs. All matter is made of particles, and the particle model explains the properties of solids, liquids and gases, changes of state, atomic structure and diffusion.	- Explain the role of indicators and know some uses. - Complete equations showing the reactions of metals with acids and oxygen.	transport - How to calculate efficiency - How to calculate gravitational potential energy
	Apply (Skills)	Identify, label and explain cell structures, specialised cells, bones, joints and atoms using accurate scientific vocabulary. Prepare microscope slides and use a microscope safely to observe cells. Plan and carry out investigations, collect and present data using appropriate graphs and charts, interpret results, draw evidence-based conclusions, and use scientific models to explain movement, changes of state and diffusion.	Applying knowledge by evaluating the sustainability of different resources and using scientific evidence to justify decisions about resource management. Using a range of indicators to experimentally demonstrate understanding of the pH scale.	Applying knowledge of aseptic technique by carrying out a practical using antiseptic discs. Students also carry out an osmosis practical using carrots. Students use a range of mathematical techniques to calculate efficiency and gravitational potential energy.
Autumn 2	Content (Why)	This unit develops understanding of the physical processes that shape our universe and the biological processes that enable human life. Building on prior knowledge from KS2, students develop scientific explanations for natural phenomena and gain an understanding of reproduction as a key life process.	This unit introduces students to how electrical energy is transferred through physical circuits and static charges. Alongside this, they develop their understanding of contact forces and Newton's Laws, building the foundations for more advanced study of mechanics at GCSE. Through practical investigation, students gain first-hand experience of how scientific theories are developed and tested using evidence.	This unit builds on student understanding of matter and living organisms by introducing the particle model of substances and the role of transport systems in sustaining life. It strengthens the ability to apply mathematical skills, analyse evidence and communicate scientific explanations, providing essential foundations for later study in chemistry and biology.
	Content (What)	Study space physics by exploring gravity, the Earth–Sun–Moon system, stars, galaxies, seasons and astronomical distances. Learn about human reproduction, including the male and female reproductive systems, fertilisation, pregnancy and birth.	The curriculum is divided into core study areas: static electricity (electrostatics), identifying standard circuit components, comparing the structures of series and parallel layouts, and defining the relationship between current, potential difference (voltage), and resistance. The unit also introduces contact forces and Newton's Laws of Motion, with students carrying out a practical investigation using springs to explore Hooke's Law and the relationship between force and extension.	Develop understanding of atoms, elements and compounds, including chemical symbols, formulae and conservation of mass in chemical reactions. Students also explore transport systems in multicellular organisms, focusing on the structure and function of the human circulatory system, while developing practical and analytical scientific enquiry skills.

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	Acquire (Knowledge)	• Gravity is a force that acts between masses, giving objects weight, and its strength varies depending on the gravitational field of a planet or star. • The Earth is part of a solar system and galaxy, and the Earth's tilt and orbit around the Sun cause the seasons and changes in day length. • Human reproduction involves specialised reproductive organs and cells, with fertilisation leading to pregnancy, foetal development and birth, and maternal lifestyle influencing foetal development through the placenta.	• Students learn that electric current is the flow of negative electrons, potential difference is the energy "push" provided by the power source, and resistance opposes this flow. • Students master the physical rules of circuit behaviour: in series, current is identical everywhere while voltage is shared; in parallel, voltage remains constant across branches while current splits. • Know Newton's Laws of Motion and how contact forces affect the movement of objects. • Explain how the extension of a spring changes with applied force and how this demonstrates Hooke's Law.	• All substances are made of atoms, which combine to form elements and compounds that can be represented using chemical symbols and formulae, with mass conserved during changes of state and chemical reactions. • Multicellular organisms require transport systems to move substances around the body, with the human circulatory system adapted to transport oxygen, nutrients and waste products efficiently. • Scientific investigations produce evidence that can be analysed using mathematical and graphical methods to identify patterns, draw conclusions and evaluate the quality of results.
	Apply (Skills)	Use scientific models to explain gravity, seasons and the movement of celestial bodies. Calculate weight using gravitational field strength, interpret astronomical distances, identify the structures and functions of the reproductive systems, and explain the stages of human reproduction using accurate scientific vocabulary.	This unit requires students to translate theoretical diagrams into functioning, hands-on circuits. They must develop the practical ability to connect ammeters in series and voltmeters in parallel, troubleshoot broken circuits, and draw neat schematic diagrams using standard symbols. Through practical investigation, they measure, record and analyse data collected from spring experiments, identifying relationships between force and extension and drawing evidence-based conclusions. The unit develops students' practical enquiry skills, data analysis, graph interpretation and the ability to apply scientific knowledge to real-world environmental and physical contexts.	Use chemical symbols and formulae to represent substances, explain changes of state and chemical reactions using the particle model, describe the structure and function of the circulatory system, and plan, carry out, analyse and evaluate investigations by applying mathematical skills, presenting data appropriately and drawing evidence-based conclusions.
Spring 1	Content (Why)	This unit develops students' understanding of human growth and reproduction, enabling them to explain how reproductive systems function and how	In this unit, students explore the structural hierarchy of genetic material, moving from the cell nucleus down to the chemical level.	This unit provides the biological foundations required for GCSE by developing an understanding of infection, immunity and disease prevention. It enables students

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	hormones regulate reproductive processes. It provides essential biological knowledge that supports future learning in genetics, inheritance and human health.	Students connect genetics to survival by exploring how organisms adapt to their habitats and how characteristics are passed to the next generation.	to explain how microorganisms affect health, evaluate methods of controlling disease, and apply practical techniques used in microbiology. It also provides an introduction to the fundamental concepts of motion in physics and how forces and movement can be described mathematically.
Content (What)	Continue the study of human reproduction by exploring the male and female reproductive systems in greater depth, including the menstrual cycle, the role of hormones, fertilisation, pregnancy and birth.	Introduces students to how characteristics are passed from parents to offspring, how genetic material is structured, and how variation drives survival.	Study microorganisms and pathogens, how communicable diseases spread, the body's defence systems, vaccination and disease prevention, and investigate the growth of microbes through practical scientific enquiry. In physics, students investigate how motion is described by calculating average speed, using the relationship between speed, distance and time, interpreting distance-time graphs and exploring relative motion through everyday examples such as trains and cars passing one another.
Acquire (Knowledge)	• The male and female reproductive systems contain specialised organs, each with specific structures and functions that enable reproduction. • The menstrual cycle is regulated by hormones, which control ovulation, the preparation of the uterus and the timing of the cycle. • Fertilisation, pregnancy and birth are coordinated biological processes, with the placenta supporting the developing foetus throughout gestation.	• Heredity as the process by which genetic information is transmitted from one generation to the next • A simple model of chromosomes, genes and DNA in heredity, • Differences between species • The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation • the variation between species and between individuals of the same species meaning some organisms compete more successfully, which can drive natural selection	• Microorganisms include bacteria, viruses and fungi, and some act as pathogens that cause communicable diseases. • The human body has defence systems that help protect against infection, and vaccinations stimulate the immune system to provide protection against disease. • The spread of infectious diseases can be reduced through effective hygiene, vaccination and other methods of disease prevention and control. • Explain the relationship between speed, distance and time, and interpret motion using distance-time graphs and examples of relative motion.
Apply (Skills)	Identify and label the male and female reproductive organs, explain the stages of the menstrual cycle and the role of key hormones, and use accurate scientific	Students develop vital data-handling skills by identifying whether variations are continuous or discontinuous . scientific reasoning,	Classify different types of microorganisms, explain how communicable diseases are transmitted and prevented,

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		vocabulary to describe fertilisation, pregnancy and birth.	predicting how environmental shifts can lead to extinction, and using fossil evidence to track changes over time.	describe how the body's defence systems respond to infection, and carry out investigations into microbial growth while safely recording, analysing and evaluating scientific evidence.
Spring 2	Content (Why)	This unit builds on prior knowledge of elements and compounds, helping them recognise patterns within the periodic table and understand how these can be used to predict properties. It also introduces wave behaviour, providing the foundation for key concepts in physics that are developed throughout Key Stage 3 and GCSE Combined Science.	This unit introduces students to the concept of pressure in fluids, developing their understanding of how forces act in liquids and gases. Building on prior learning about forces, students explore how pressure varies in different environments and how these principles explain everyday phenomena such as floating, sinking and changes in atmospheric pressure. Students also learn about how human dependencies on fossil fuels disrupt this natural balance, enhancing the greenhouse effect and driving global climate change, while also touching upon the localized environmental impacts of atmospheric pollutants like acid rain and soot.	This unit introduces students to electromagnetism, one of the key concepts in physics that underpins many everyday technologies. Building on prior learning about electricity and magnetism, students explore how electric current can produce magnetic fields and how electromagnets can be controlled and applied in real-world contexts. The unit provides an essential foundation for GCSE Physics topics on electromagnetism, motors, generators and transformers.
	Content (What)	Develop understanding of the periodic table by exploring the properties and reactivity of different groups of elements. Students also study light and sound, investigating the properties and behaviour of waves through scientific models and practical enquiry.	Students investigate atmospheric pressure and how it decreases with increasing altitude due to the reduction in the weight of air above. They explore pressure in liquids, examining how pressure increases with depth and how upthrust affects whether objects float or sink. Students also learn how pressure is calculated as the force acting per unit area and apply this concept to a range of real-life situations. In defining the roles of primary greenhouse gases (such as carbon dioxide and methane) in trapping thermal radiation to insulate the planet, they must grasp the scientific distinction between short-term weather fluctuations and long-term global climate patterns.	Students investigate the relationship between electricity and magnetism by exploring how electromagnets are produced and how their strength can be varied. They examine the factors that affect the strength of an electromagnet, including the number of coil turns and the size of the electric current, and investigate practical applications such as scrapyard cranes, electric bells, relays and door locks. Students also compare permanent magnets and electromagnets and explore the advantages and limitations of each.
	Acquire	The periodic table is organised into groups	Understand how atmospheric	Understand how an electric current produces

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	(Knowledge)	and periods, and elements within the same group have similar properties and patterns of reactivity. • Light and sound are forms of energy that travel as waves, with different properties and behaviours that can be modelled and investigated. • The behaviour of waves can be explained using scientific models, including how waves are reflected, transmitted and absorbed by different materials.	pressure changes with height and explain why pressure decreases as altitude increases. • Know how pressure in liquids increases with depth and how upthrust determines whether objects float or sink. • Explain pressure as the force acting per unit area and apply this concept to different situations involving solids, liquids and gases. • Analyse complex environmental data trends • Consider renewable energy adaptation and recycling, to promote a sustainable future	a magnetic field and how an electromagnet is created. • Know the factors that affect the strength of an electromagnet and how its magnetic field can be controlled. • Explain the uses of electromagnets in everyday technology and compare them with permanent magnets.
	Apply (Skills)	Identify and interpret patterns in the periodic table to predict the properties of elements, use scientific models to explain the behaviour of light and sound waves, and carry out practical investigations to collect, analyse and interpret evidence using appropriate scientific equipment and vocabulary.	Students apply their knowledge by carrying out practical investigations into pressure and buoyancy, measuring and comparing the effects of force, area and depth on pressure. They interpret experimental results, perform calculations involving pressure, and use scientific evidence to explain everyday phenomena such as floating, sinking and changes in atmospheric pressure. Think critically about evidence, evaluate the validity of arguments surrounding climate change.	Students apply their knowledge by constructing and testing simple electromagnets, investigating how changing different variables affects magnetic strength. They record and interpret experimental data, identify patterns and draw evidence-based conclusions about the relationship between electricity and magnetism. The unit develops practical investigation skills, scientific reasoning and the ability to apply scientific concepts to explain the operation of everyday electrical devices, providing a strong foundation for GCSE Physics.
Summer 1	Content (Why)	This unit builds on prior learning about life cycle changes, living things and forces from KS2, developing understanding of how organisms vary, interact and survive, and how forces affect the world around them. It strengthens scientific enquiry, mathematical skills and the use of scientific models, providing secure foundations for future study at Key Stage 3 and GCSE.	This unit develops students' understanding of how the human body obtains and uses energy through nutrition and digestion. We also learn about the structure and functions of the gas exchange system in humans, including adaptations to function, and the mechanism of breathing to move air in and out of the lungs.	This unit prepares students for GCSE Science by developing the investigative, analytical and communication skills needed for scientific enquiry. We will carry out practical investigations around particles and Collision Theory. It also broadens an understanding of space science, demonstrating how advances in space exploration have contributed to life on Earth while strengthening scientific literacy and extended writing.

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	Content (What)	Explore variation and inheritance in living organisms, interdependence within ecosystems, and the effects of forces on objects. Students investigate patterns in nature, food webs, adaptations and forces through scientific enquiry and practical investigation.	Students investigate the components of a healthy diet, including carbohydrates, proteins, lipids, vitamins, minerals, dietary fibre and water, and calculate daily energy requirements. They explore the consequences of an unbalanced diet, including obesity, starvation and deficiency diseases, before studying the structure and function of the human digestive system and the role of enzymes as biological catalysts. Students use a pressure model to explain the movement of gases, including simple measurements of lung volume, the impact of exercise, asthma and smoking on the human gas exchange system	Develop practical scientific enquiry skills through planning, carrying out and evaluating investigations, while exploring space and the universe, including the impact of space exploration on scientific and technological developments.
	Acquire (Knowledge)	• Variation exists within and between species, and evidence from fossils and extinction helps explain how life on Earth has changed over time. • Living organisms depend on one another and their environment, with adaptations enabling survival within food chains and food webs. • Forces affect the motion of objects, and their effects can be measured, investigated and explained using scientific models and mathematical relationships.	• Understand the components of a healthy diet, the role of the digestive system and how enzymes enable the digestion of food. • Know the consequences of an unbalanced diet and how energy requirements vary to maintain a healthy lifestyle. • Explain the mechanism of breathing to move air in and out of the lungs • Have knowledge of the impact of asthma and smoking on breathing.	• Scientific investigations require careful planning, including identifying aims, variables, risks, hazards, safety measures and appropriate methods for collecting reliable data. • Collision Theory - rates of reaction • Scientific evidence is used to draw valid conclusions, evaluate methods and identify improvements to investigations. • Space exploration has increased our understanding of the universe and driven scientific and technological developments that benefit society on Earth.
	Apply (Skills)	Interpret and present scientific data using appropriate graphs, explain variation, adaptation and interdependence using accurate scientific vocabulary, and plan, carry out and evaluate investigations into forces while applying mathematical skills to analyse and interpret results.	Carry out calculations of energy requirements in a healthy daily diet. Plan and carry out food tests. Investigate enzyme activity.	Plan and carry out practical investigations safely, draw and label appropriate apparatus diagrams, write clear scientific methods, analyse and evaluate data to reach evidence-based conclusions, and communicate scientific ideas about space exploration through effective information retrieval and extended scientific writing.
Summer 2	Content	This unit develops students' understanding of the	This unit further develops students' knowledge	This unit develops understanding of how ecosystems

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(Why)	fundamental biological processes that sustain life by exploring respiration and photosynthesis. This unit also includes representing chemical reactions using equations and formulae. Defining acids and alkalis in terms of neutralisation reactions and using the pH scale. Building on prior learning about cells and organisms, students investigate how living things obtain and use energy, and how plants produce the food that supports almost all life on Earth. These concepts are central to GCSE Biology, underpinning topics such as ecosystems, energy transfer, plant biology and metabolism.	of chemical reactions including: combustion, thermal decomposition, oxidation and displacement reactions. Building on prior learning, the formation of equations both word and symbol should now be possible. Students should be able to predict the products of a reaction.	function and the importance of biodiversity in maintaining environmental stability. Alongside this, students strengthen the practical, mathematical and analytical skills needed for GCSE required practicals, enabling them to plan investigations, process data and evaluate scientific evidence independently.
Content (What)	Students investigate respiration in animals and yeast, exploring how organisms release energy from food through aerobic and anaerobic respiration. They study photosynthesis, examining how plants produce glucose using light energy, carbon dioxide and water, and investigate how leaves are adapted to maximise this process. Practical investigations allow students to explore the factors affecting these biological processes and appreciate their importance in living organisms.	Students investigate how chemical reactions involve a transfer of energy between the chemicals and their surroundings. Practical investigation allows students to see the products and identify what has been produced.	Explore ecosystems by investigating the interactions between organisms and their environment, including energy transfer, food webs and biodiversity. Students further develop their practical scientific enquiry skills through planning, carrying out and evaluating investigations into chemical reactions.
Acquire (Knowledge)	• Understand the processes of aerobic and anaerobic respiration in animals and yeast and their importance for releasing energy. • Know how photosynthesis enables plants to produce glucose and the conditions required for the process to occur. • Explain how the structure of a leaf is adapted to maximise the rate of photosynthesis.	• Combustion, thermal decomposition, oxidation and displacement reactions • Exothermic and endothermic chemical reactions	• Organisms in an ecosystem depend on one another and their environment, with energy transferred through food chains and food webs and biodiversity contributing to ecosystem stability. • Human activities can affect ecosystems, disrupting natural balances and influencing biodiversity and environmental sustainability. • Reliable scientific investigations require careful planning, including identifying hazards, selecting appropriate methods, collecting accurate data and evaluating the validity of conclusions.

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	Apply (Skills)	Students apply their knowledge by carrying out practical investigations into respiration and photosynthesis, collecting, presenting and interpreting scientific data. They use biological models and observations to explain how organisms obtain and transfer energy, analyse factors affecting the rate of photosynthesis and respiration, and communicate scientific explanations using accurate biological terminology. The unit develops students' practical enquiry, data analysis and evidence-based reasoning skills, providing a secure foundation for GCSE Biology.	Students apply their knowledge by carrying out simple lab techniques. When studying chemical reactions, students are expected to: Use thermometers to measure energy changes (exothermic vs. endothermic). Use limewater to test for carbon dioxide (e.g., when observing thermal decomposition of metal carbonates). Students carry out flame tests or gas tests (like the "squeaky pop" test for hydrogen).	Explain interactions within ecosystems using scientific vocabulary, analyse the impact of human activity on biodiversity, independently plan and carry out practical investigations safely, identify hazards and risks, process and present data using appropriate graphs, and evaluate evidence to draw valid scientific conclusions.
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