

Unit	Topics covered	Intent
7A Cells, Tissues, Organs and systems	a) Life processes b) Organs c) Tissues d) Cells e) Organ systems	The unit begins with a reminder of what an organ is and how scientists look at evidence from which to draw conclusions. The topic then goes on to explore what makes an organism. It revises plant and animal organs, before introducing the idea of tissues. Finally the unit formally introduces the idea of cells and the differences between plant and animal cells.
7B Reproduction in Animals	a) Animal sexual reproduction b) Reproductive organs c) Becoming pregnant d) Gestation and birth e) Becoming pregnant	This unit explores sexual reproduction in animals, in the context of efforts being made by zoos to prevent endangered species becoming extinct. However, the central focus for learning is the human reproductive system and sexual reproduction in humans.
7C Muscles and bones	a) Muscles and breathing b) Muscles and blood c) The skeleton d) Muscles and moving e) Drugs	This unit uses a 'fitness' theme to cover three important organ systems: the gas exchange system, the circulatory system and the locomotor system. The various effects of drugs on these systems are also considered, together with their effects on the nervous system.
7D Ecosystems	a) Variation b) Adaptations c) Effects of the environment 1 d) Effects of the environment 2 e) Transfers in food chains	With a general theme about explorers, this unit looks at ecosystems and the factors that affect them. This includes the impact of human activity and the importance of biodiversity.
7E Mixtures and separation	a) Mixtures b) Solutions c) Evaporation d) Chromatography e) Distillation	This unit revises and builds on work from Key stage 2 on materials, specifically on mixtures, solutions and separation techniques using the context of providing clean drinking water.
7F Acids and alkalis	a) Hazards b) Indicators c) Acidity and alkalinity d) Neutralisation e) Neutralisation in daily life	This unit looks at acids and bases and how they are described using a pH number. It looks at neutralisation reactions and some of their uses and also introduces standard hazard symbols.
7G The Particle model	a) Solids, liquids and gases b) Particles c) Brownian motion d) Diffusion e) Air pressure	This unit develops an understanding of the different properties of solids, liquids and gases within the context of waste management and disposal. Scientific method and ideas on experiment, observation, hypotheses and theories are discussed, leading to an understanding of the particle theory of matter. Further applications of the particle theory are investigated using the context of waste and waste disposal.
7H Atoms, Elements and Molecules	a) the air we breathe b) Earth's resources c) Metals and non-metals d) Making compounds e) Chemical reactions	This unit uses the context of resources from the Earth and atmosphere to introduce ideas about the make-up of matter. It expands on particle theory and explains the differences between atoms and molecules, elements and compounds. The involvement of chemical reactions in the formation and decomposition of compounds is also covered. It links these with the more abstract ideas of particle models, naming compounds and word equations.
7I Energy	a) Energy from food b) Energy transfers and stores c) Fuels d) Other energy resources e) Using resources	This unit uses a theme park to introduce the idea that stored energy is needed to make most things happen. It looks at food, energy stores and transfers, and energy resources in terms of non-renewable fuels and renewable resources.
7J Current electricity	a) current b) Models for circuits c) Series and parallel d) Voltage and resistance e) Using electricity	This unit looks at the measurement of current and how it behaves in series and parallel circuits, and at voltage and resistance. Various models for thinking about what is happening in circuits are explored, and the unit concludes by looking at how we use electricity safely.
7K Forces	a) Forces b) Springs c) Friction d) Pressure e) Balanced and unbalanced	This unit revises the concepts of forces and their effects and extends students' knowledge of friction, gravity and springs. These ideas are presented using a theme of outdoor sports, such as climbing and mountain biking to link to ideas about forces, friction and pressure.
7L Sound	a) Animal sounds b) Moving sounds c) Detecting sounds d) Using sounds e) Comparing waves	This unit looks at how sounds are made, transmitted and detected, including the role of the ear in hearing. Uses of sound are covered and sound waves are compared to waves in water.

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8A Food and nutrition	<ul style="list-style-type: none"> a) Nutrients b) Uses of nutrients c) Balanced diets d) Digestion e) Absorption 	This unit looks at the main components in the human diet and why they are needed. The digestive system is also covered in detail and the idea of enzymes is introduced.
8B Plant reproduction	<ul style="list-style-type: none"> a) Classification and biodiversity b) Types of reproduction c) Pollination d) Fertilisation and dispersal e) Germination and growth 	This unit covers reproduction in plants: asexual and sexual. Classification and biodiversity are also covered. The topics are linked by the various uses we have for plants.
8C Breathing and Respiration	<ul style="list-style-type: none"> a) Aerobic respiration b) Gas exchange system c) Getting oxygen d) Comparing gas exchange e) Anaerobic respiration 	Under the broad theme of watersports, this unit covers gas exchange in humans and other organisms. It also includes details of the processes and comparison of aerobic and anaerobic respiration.
8D Unicellular organisms	<ul style="list-style-type: none"> a) Unicellular or multicellular b) Microscopic fungi c) Bacteria d) Protoctists e) Decomposers and carbon 	Under the broad theme of diseases, this unit takes a detailed look at what unicellular organisms are, the differences between different types, their problems and their uses.
8E Combustion	<ul style="list-style-type: none"> a) Burning fuels b) Oxidation c) Fire safety d) Air pollution e) Global warming 	This unit uses the context of combustion engines to cover combustion and oxidation reactions, including those of hydrocarbons, metals and non-metals. The idea of an exothermic reaction is introduced and links are also made between combustion of fossil fuels and pollution. There are opportunities to discuss the impact of global warming and methods for controlling carbon dioxide emissions.
8F The periodic table	<ul style="list-style-type: none"> a) Dalton's atomic model b) Chemical properties c) Mendeleev's table d) Physical trends e) Chemical trends 	This unit uses the context of fireworks to develop students' understanding of matter, atoms and chemical and physical change. Students then look at using the trends in the periodic table to make predictions about physical and chemical properties of elements and their compounds.
8G Metals and their uses	<ul style="list-style-type: none"> a) Metal properties b) Corrosion c) Metals and water d) Metals and acids e) Pure metals and alloys 	This unit uses the context of metals used in building to review common physical properties of metals and to introduce their main chemical properties. The idea that reactions can occur at different speeds is also illustrated and this leads to the introduction of the general reactivity series of metals.
8H Rocks	<ul style="list-style-type: none"> a) Rocks and their uses b) Igneous and metamorphic c) Weathering and erosion d) Sedimentary rocks e) Materials in the Earth 	This unit examines different types of rock and the processes bringing about their formation, leading to the idea of a rock cycle that operates within a huge geological timescale. It also looks at the Earth as a source of resources and the advantages of recycling metals. The unit is set in the context of natural disasters.
8I Fluids	<ul style="list-style-type: none"> a) The particle model b) Changing state c) Pressure in fluids d) Floating and sinking e) Drag 	This unit looks at changes of state and then goes on to look at fluids and some of their effects, including pressure, floating and sinking, and drag.
8J Light	<ul style="list-style-type: none"> a) Light on the move b) Reflection c) Controlling transfers d) Power and efficiency e) Paying for energy 	This unit revises and builds on work covered in Key stage 2 on light. Knowledge is extended to consider how light travels and what happens when it meets an object. This unit is set in the context of stage, film and illusions.
8K Energy transfers	<ul style="list-style-type: none"> a) Temperature changes b) Transferring energy c) Controlling transfers d) Power and efficiency e) Paying for energy 	This unit looks at energy transfers by heating in the context of homes.
8L Earth and space	<ul style="list-style-type: none"> a) Gathering the evidence b) Seasons c) Magnetic Earth d) Gravity in space e) Beyond the solar system 	This unit builds on work from KS2 on the solar system and looks at the Earth, including the seasons and the Earth's magnetic field and gravity. It also looks at the solar system and what is beyond the solar system. The theme is exploring the solar system - in terms of observations and the use of models as well as via astronauts and space probes.

Unit	Topics	Intent
9A Genetics and Evolution	a) Environmental variation b) Inherited variation c) DNA d) Genes and extinction e) Natural selection	This unit recaps ideas about the causes of variation and then looks at inherited variation in more detail. DNA is introduced before students consider how inherited genes can affect an organism's survival. The unit ends with coverage of natural selection.
9B Plant growth	a) Reactions in plants b) Plant adaptations c) Plant products d) Growing crops e) Farming problems	The unit looks at photosynthesis and aerobic respiration in plants in more detail, and then considers plant adaptations. The products we get from plants are then explored before studying farming methods and their problems.
9C Making materials	a) About ceramics b) Polymers c) Composite materials d) Problems with materials e) Recycling materials	This unit looks at the manufacture, properties and uses of different types of materials. The first three topics introduce examples of ceramic, polymer and composite materials. In each case, the properties of the materials are linked to their uses. The unit continues by looking at some of the problems caused by synthetic materials and possible solutions to these problems. In the last topic, the importance of recycling materials is explored.
9D Reactivity	a) Types of explosions b) Reactivity c) Energy and reactions d) Displacement e) Extracting metals	This unit looks at metals through the theme of demolition. Physical changes and gas pressure are reviewed, and then the reactivity series and a chemical method of preventing rusting are covered. Exothermic and endothermic reactions are introduced, followed by displacement reactions. The method of extracting a metal is related to its position in the reactivity series. Calculation of percentage change is related to oxidation and thermal decomposition reactions.
9E Forces and motion	a) Forces and movements b) Energy for movement c) Speed d) Turning forces e) More machines	This unit starts by revising some aspects of forces and their effects, energy stores and transfers. It then looks at calculations of speed and relative speed, and representing journeys on distance-time graphs. The final topics look at simple machines (pulleys, lever and ramps).
9F Force fields and electromagnets	a) Force fields b) Static electricity c) Current electricity d) Resistance e) Electromagnets	The unit starts by revising previous work on magnetic and gravitational fields, then introduces static electricity and the idea of electric field. Work on current electricity is revised then extended to look at the concept of resistance and associated calculations. It ends with use of electromagnets.

All students will be given the opportunity to review the core content of the key stage 3 curriculum and develop their knowledge, understanding and practical skills further to ensure they are fully prepared for GCSE Science.

GCSE Unit	Topic	Intent
B1	Cell Biology	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.
C1	Atomic structure and the periodic table	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.
P1	Energy	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.