

Key Stage 3: Science Curriculum Map 2023-24

Prior Learning:

- Understand how to work scientifically, asking simple questions and recognising that they can be answered in different ways by observing closely, using simple equipment, performing simple tests, identifying and classifying, using their observations and ideas to suggest answers to questions, gathering and recording data to help in answering questions.
- Understand and explain how plants, living things and everyday materials may identify patterns in the natural environment and ways to manage the impact of this.
- Identify, classify, and describe living things and materials using the correct terminology.
- Possess a secure understanding of the world around them including how to plan different types of scientific enquiry.
- Develop ways in recognising and controlling variables, using scientific equipment with an increasing level of accuracy and precision, recording and presenting data.
- Become increasingly critical and analytical thinkers.
- Use scientific vocabulary with confidence and understanding.

Make cross-curricular links with geography, maths, technology and history - for example scientific inventions or discoveries.

Curriculum Intent:

The curriculum will provide opportunities within the classroom and beyond, for students to build upon their prior experiences within science. It is the intention to develop resilience, independence, numeracy, oracy and literacy skills, that can be transferred to lifelong learning. Whilst nurturing these critical skills, we aim to enhance each student's understanding of science in the real world, incorporating SMSC and cross-curricular links, paving the way for improved life experiences. Furthermore, there will be a continued development of the understanding as to how science can be used as a conduit to a plethora of careers and professions.

Our curriculum is based on the ten 'Big Ideas' in science. From Year 7 through to Year 11, students will study modules that continually link into these Big Ideas and build their understanding year upon year. The sequencing of the curriculum, transitions from simpler, concrete modules to more abstract topics.

Big Ideas



Year 7

	Autumn Term 1 7 weeks	Autumn Term 2 7 weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
Module Title	Speed Gravity Particle Model	Particle Model Movement Cells	Cells Separating mixtures	Energy costs Energy transfer Acids and Alkalis	Acids and Alkalis Variation Human Reproduction	Human Reproduction Sound Universe
Learning Focus	<ul style="list-style-type: none"> • Introduction to forces • Balanced and unbalanced forces • Speed • Distance-time graphs • Gravity • The particle model • States of matter • Melting and freezing • Boiling • More changes of state 	<ul style="list-style-type: none"> • Diffusion • Gas pressure • Inside particles • Levels of organisation • The skeleton • Movement: joints • Movement: muscles • Observing cells • Plant and animal cells 	<ul style="list-style-type: none"> • Specialised cells • Movement of substances • Uni-cellular organisms • Pure substances and mixtures • Solution • Solubility • Filtration • Evaporation and distillation • Chromatography 	<ul style="list-style-type: none"> • Food and fuels • Energy resources • Energy and power • Energy adds up • Energy dissipation • Chemical reactions • Acids and alkalis • Indicators and pH • Acid strength 	<ul style="list-style-type: none"> • Neutralisation • Making salts • Variation • Continuous and discontinuous • Adapting to change • Adolescence • Reproductive systems • Fertilisation and implantation 	<ul style="list-style-type: none"> • Development of a foetus • The menstrual cycle • Sound waves and speed • Loudness and amplitude • Frequency and pitch • The ear and hearing • The night sky • The Solar System • The Earth • The Moon and changing ideas
Careers Focus	Links to careers are continually made across all modules. Med-Tech Challenge Science Club		Links to careers are continually made across all modules. British Science week Science Club		Links to careers are continually made across all modules. Royal Institute show Science Club	
Assessment	1		2		3	
	GL tests Vocabulary tests Glossary Quiz Webquest Progress quiz		Vocabulary tests Glossary Quiz Webquest Progress quiz		Vocabulary tests Glossary Quiz Webquest Progress quiz GL tests	

Yr7 Secure Descriptors

Year 7

At this stage, students will have a solid foundation in scientific knowledge and can apply it to various contexts, understanding the core scientific concepts and principles of the topics studied. Students will be able to articulate scientific explanations in a clear and coherent manner. They will show a good level of confidence in working scientifically. They will be able to design and conduct controlled experiments, make predictions, analyse data, and draw conclusions based on evidence.

Term 1

Speed

Illustrate a journey with changing speed on a distance-time graph, and label changes in motion. Describe how the speed of an object varies when measured by observers who are not moving or moving relative to the object.

Gravity

Explain unfamiliar observations where weight changes. Draw a force diagram for a problem involving gravity. Deduce how gravity varies for different masses and distances. Compare your weight on Earth with your weight on different planets using the formula.

Particle Model

Explain unfamiliar observations about gas pressure in terms of particles. Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles. Explain changes in states in terms of changes to the energy of particles. Draw before and after diagrams of particles to explain observations about changes of state, gas pressure and diffusion.

Movement

Explain how a physical property of part of the skeleton relates to its function. Explain why some organs contain muscle tissue. Explain how antagonistic muscles produce movement around a joint. Use a diagram to predict the result of a muscle contraction or relaxation.

Cells

Explain why multi-cellular organisms need organ systems to keep their cells alive. Suggest what kind of tissue or organism a cell is part of, based on its features. Explain how to use a microscope to identify and compare different types of cells. Explain how uni-cellular organisms are adapted to carry out functions that in multi-cellular organisms are done by different types of cell.

Term 2

Working Scientifically: Students at the secure level will be able to demonstrate a more advanced ability to work scientifically. They can design and conduct controlled experiments, make predictions, analyse data, and draw conclusions based on evidence.

Knowledge: At this stage, students have a solid foundation in scientific knowledge and can apply it to various contexts. They will understand the core scientific concepts and principles related to their grade level.

Demonstration: Students will be able to independently plan and conduct experiments, record and interpret data, and articulate scientific explanations in a clear and coherent manner. They will show a good level of confidence in their scientific skills.

Separating Mixtures

Explain how substances dissolve using the particle model. Use the solubility curve of a solute to explain observations about solutions. Use evidence from chromatography to identify unknown substances in mixtures. Choose the most suitable technique to separate out a mixture of substances.

Energy Costs

Compare the amounts of energy transferred by different foods and activities. Compare the energy usage and cost of running different home devices. Explain the advantages and disadvantages of different energy resources. Represent the energy transfers from a renewable or non-renewable resource to an electrical device in the home.

Energy Transfer

Describe how the energy of an object depends on its speed, temperature, height or whether it is stretched or compressed. Calculate the useful energy and the amount dissipated, given values of input and output energy. Explain how energy is dissipated in a range of situations.

Acids and alkalis

Identify the best indicator to distinguish between solutions of different pH, using data provided. Use data and observations to determine the pH of a solution and explain what this shows. Explain how neutralisation reactions are used in a range of situations. Describe a method for how to make a neutral solution from an acid and alkali.

Term 3

Working Scientifically: Students at the secure level will be able to demonstrate a more advanced ability to work scientifically. They can design and conduct controlled experiments, make predictions, analyse data, and draw conclusions based on evidence.

Knowledge: At this stage, students have a solid foundation in scientific knowledge and can apply it to various contexts. They will understand the core scientific concepts and principles related to their grade level.

Demonstration: Students will be able to independently plan and conduct experiments, record and interpret data, and articulate scientific explanations in a clear and coherent manner. They will show a good level of confidence in their scientific skills.

Variation

Explain whether characteristics are inherited, environmental or both. Plot bar charts or line graphs to show discontinuous or continuous variation data. Explain how variation helps a particular species in a changing environment. Explain how characteristics of a species are adapted to particular environmental conditions.

Human Reproduction

Explain whether substances are passed from the mother to the foetus or not. Use a diagram to show stages in development of a foetus from the production of sex cells to birth. Describe causes of low fertility in male and female reproductive systems. Identify key events on a diagram of the menstrual cycle.

Sound

Explain observations where sound is reflected, transmitted or absorbed by different media. Explain observations of how sound travels using the idea of a longitudinal wave. Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture. Use drawings of waves to describe how sound waves change with volume or pitch.

Universe

Describe the appearance of planets or moons from diagrams showing their position in relation to the Earth and Sun. Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year. Describe how space exploration and observations of stars are affected by the scale of the universe. Explain the choice of particular units for measuring distance.

Year 8						
	Autumn Term 1 7 weeks	Autumn Term 2 7 weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
Module Title	Light Potential difference and resistance Current	Earth structure Interdependence	Plant reproduction Elements Periodic Table	Elements Contact Forces Metals and non-metals	Metals and non-metals Breathing	Digestion Work Heating and Cooling Respiration
Learning Focus	<ul style="list-style-type: none"> • Light • Reflection • Refraction • The eye and vision • Colour • Potential difference • Resistance • Series and parallel circuits • Current • Charging up 	<ul style="list-style-type: none"> • The structure of the Earth • Sedimentary rocks • Igneous and metamorphic rocks • The rock cycle • Ceramics • Food chains and webs • Disruption to food chains and webs • Ecosystems • Competition 	<ul style="list-style-type: none"> • Flowers and pollination • Fertilisation and germination • Seed dispersal • Elements • Atoms • Compounds • The Periodic Table • The elements of Group 1 • The elements of Group 7 • The elements of Group 0 	<ul style="list-style-type: none"> • Chemical formulae • Polymers • Friction and drag • Squashing and stretching • Turning Forces • More about elements • Chemical reactions of metals and non-metals 	<ul style="list-style-type: none"> • Metals and acids • Metals and oxygen • Metals and water • Metal displacement reactions • Gas exchange • Breathing • Drugs • Alcohol • Smoking 	<ul style="list-style-type: none"> • Nutrients • Food tests • Unhealthy diet • Digestive System • Bacteria and enzymes in digestion • Work, energy and machines • Energy and temperature • Energy transfer: particles • Energy transfer: radiation and insulation • Aerobic respiration • Anaerobic respiration • Biotechnology
Careers Focus	Links to careers are continually made across all modules. Med-Tech Challenge Science Club		Links to careers are continually made across all modules. British Science week Science Club		Links to careers are continually made across all modules. Royal Institute show Science Club	
Assessment	1		2		3	
	Vocabulary tests Glossary Quiz Webquest Progress quiz Close the gap tasks		Vocabulary tests Glossary Quiz Webquest Progress quiz Close the gap tasks		Vocabulary tests Glossary Quiz Webquest Progress quiz Close the gap tasks	

Yr8 Secure Descriptors

Year 8

At this stage, students will have a solid foundation in scientific knowledge and can apply it to various contexts, understanding the core scientific concepts and principles of the topics studied. Students will be able to articulate scientific explanations in a clear and coherent manner. They will show a good level of confidence in working scientifically. They will be able to design and conduct controlled experiments, make predictions, analyse data, and draw conclusions based on evidence.

Term 1

Light

Use ray diagrams of eclipses to describe what is seen by observers in different places. Explain observations where coloured lights are mixed or objects are viewed in different lights. Use ray diagrams to describe how light passes through lenses and transparent materials. Describe how lenses may be used to correct vision.

Potential Difference, Resistance and Current

Draw a circuit diagram to show how voltage can be measured in a simple circuit. Use the idea of energy to explain how voltage and resistance affect the way components work. Given a table of voltage against current. Use the ratio of voltage to current to determine the resistance. Use an analogy like water in pipes to explain why part of a circuit has higher resistance.

Describe how current changes in series and parallel circuits when components are changed. Turn circuit diagrams into real series and parallel circuits, and vice versa. Describe what happens when charged objects are placed near to each other or touching. Use a sketch to describe how an object charged positively or negatively became charged up.

Earth Structure

Explain why a rock has a particular property based on how it was formed. Identify the causes of weathering and erosion and describe how they occur. Construct a labelled diagram to identify the processes of the rock cycle.

Interdependence

Describe how a species' population changes as its predator or prey population changes. Explain effects of environmental changes and toxic materials on a species' population. Combine food chains to form a food web. Explain issues with human food supplies in terms of insect pollinators.

Term 2

Plant Reproduction

Describe the main steps that take place when a plant reproduces successfully. Identify parts of the flower and link their structure to their function. Suggest how a plant carried out seed dispersal based on the features of its fruit or seed. Explain why seed dispersal is important to survival of the parent plant and its offspring.

Elements

Name compounds using their chemical formulae. Given chemical formulae, name the elements present and their relative proportions. Represent atoms, molecules and elements, mixtures and compounds using particle diagrams. Use observations from chemical reactions to decide if an unknown substance is an element or a compound.

Periodic Table

Use data to describe a trend in physical properties. Describe the reaction of an unfamiliar Group 1 or 7 element. Use data showing a pattern in physical properties to estimate a missing value for an element. Use observations of a pattern in chemical reactions to predict the behaviour of an element in a group.

Contact Forces

Explain whether an object in an unfamiliar situation is in equilibrium. Describe factors which affect the size of frictional and drag forces. Describe how materials behave as they are stretched or squashed. Describe what happens to the length of a spring when the force on it changes.

Metals and Non-metals

Describe an oxidation, displacement, or metal acid reaction with a word equation. Use particle diagrams to represent oxidation, displacement, and metal-acid reactions. Identify an unknown element from its physical and chemical properties. Place an unfamiliar metal into the reactivity series based on information about its reactions.

Term 3

Breathing

Explain how exercise, smoking and asthma affect the gas exchange system. Explain how the parts of the gas exchange system are adapted to their function. Explain observations about changes to breathing rate and volume. Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.

Digestion

Describe possible health effects of unbalanced diets from data provided. Calculate food requirements for a healthy diet, using information provided. Describe how organs and tissues involved in digestion are adapted for their role. Describe the events that take place in order to turn a meal into simple food molecules inside a cell.

Work

Draw a diagram to explain how a lever makes a job easier. Compare the work needed to move objects different distances.

Heating and Cooling

Describe how an object's temperature changes over time when heated or cooled. Explain how a method of thermal insulation works in terms of conduction, convection and radiation. Sketch diagrams to show convection currents in unfamiliar situations.

Respiration

Use word equations to describe aerobic and anaerobic respiration. Explain how specific activities involve aerobic or anaerobic respiration.

Year 9						
	Autumn Term 1 7 weeks	Autumn Term 2 7weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
Module Title	Evolution Types of Reaction Magnetism Electromagnets	Inheritance Chemical Energy Pressure	Photosynthesis Climate Earth's Resources Wave Effects Wave Properties	Photosynthesis Climate Earth's Resources Wave Effects Wave Properties	Biology Chemistry Physics	Biology Chemistry Physics
Learning Focus	<ul style="list-style-type: none"> Natural selection Charles Darwin Extinction Preserving biodiversity Atoms in chemical reactions Combustion Thermal decomposition Conservation of mass Magnets and magnetic fields Electromagnets Using Electromagnets 	<ul style="list-style-type: none"> Inheritance DNA Genetics Genetic modification Exothermic and endothermic Energy level diagrams Bond energies Pressure in gases Pressure in liquids Stress on solids 	<ul style="list-style-type: none"> Photosynthesis Leaves Global Warming The carbon cycle Climate change Sound waves, water waves and energy 	<ul style="list-style-type: none"> Investigating photosynthesis Plant minerals Extracting metals Recycling Radiation and energy Modelling Waves 	Students will engage in several projects across all three strands of science, that encompass a range of the Big Ideas.	Students will engage in several projects across all three strands of science, that encompass a range of the Big Ideas.
Careers Focus	Links to careers are continually made across all modules. Med-Tech Challenge Science Club		Links to careers are continually made across all modules. British Science week Science Club		Links to careers are continually made across all modules. Science Club	
Assessment	1		2		3	
	Vocabulary tests Glossary Quiz Webquest Progress quiz Close the gap tasks		Vocabulary tests Glossary Quiz Webquest Progress quiz Close the gap tasks		Vocabulary tests Glossary Quiz Webquest Progress quiz Close the gap tasks	

Yr9 Secure Descriptors

Year 9

At this stage, students will have a solid foundation in scientific knowledge and can apply it to various contexts, understanding the core scientific concepts and principles of the topics studied. Students will be able to articulate scientific explanations in a clear and coherent manner. They will show a good level of confidence in working scientifically. They will be able to design and conduct controlled experiments, make predictions, analyse data, and draw conclusions based on evidence.

Term 1

Evolution

Use evidence to explain why a species has become extinct or adapted to changing conditions. Evaluate whether evidence for a species changing over time supports natural selection. Explain how a lack of biodiversity can affect an ecosystem. Describe how preserving biodiversity can provide useful products and services for humans.

Types of Reaction

Explain why a reaction is an example of combustion or thermal decomposition. Predict the products of the combustion or thermal decomposition of a given reactant and show the reaction as a word equation. Explain observations about mass in a chemical or physical change. Use particle diagrams to show what happens in a reaction.

Magnetism and Electromagnetism

Use the idea of field lines to show how the direction or strength of the field around a magnet varies. Explain observations about navigation using Earth's magnetic field.

Use a diagram to explain how an electromagnet can be made and how to change its strength. Explain the choice of electromagnets or permanent magnets for a device in terms of their properties.

Inheritance

Use a diagram to show the relationship between DNA, chromosomes and genes. Use a diagram to show how genes are inherited. Explain how a change in the DNA (mutation) may affect an organism and its future offspring. Explain why offspring from the same parents look similar but are not usually identical.

Chemical Energy

Use experimental observations to distinguish exothermic and endothermic reactions. Use a diagram of relative energy levels of particles to explain energy changes observed during a change of state.

Pressure

Use diagrams to explain observations of fluids in terms of unequal pressure. Explain why objects either sink or float depending upon their weight and the upthrust acting on them. Explain observations where the effects of forces are different because of differences in the area over which they apply. Given unfamiliar situations, use the formula to calculate fluid pressure or stress on a surface.

Term 2

Photosynthesis

Describe ways in which plants obtain resources for photosynthesis. Explain why other organisms are dependent on photosynthesis. Sketch a line graph to show how the rate of photosynthesis is affected by changing conditions. Use a word equation to describe photosynthesis in plants and algae.

Climate

Use a diagram to show how carbon is recycled in the environment and through living things. Describe how human activities affect the carbon cycle. Describe how global warming can impact on climate and local weather patterns.

Earth's Resources

Explain why recycling of some materials is particularly important. Describe how Earth's resources are turned into useful materials or recycled. Justify the choice of extraction method for a metal, given data about reactivity. Suggest factors to take into account when deciding whether extraction of a metal is practical.

Wave Effects

Explain differences in the damage done to living cells by light and other waves, in terms of their frequency. Explain how audio equipment converts sound into a changing pattern of electric current.

Wave Properties

Describe the properties of different longitudinal and transverse waves. Use the wave model to explain observations of the reflection, absorption and transmission of a wave.

Term 3

Biology

Know the main features of plant, animal and prokaryotic cells. Able to describe and explain the correct use of a light microscope to view cell samples. Know the function of specified cell organelles. Describe and explain adaptations of specialised cells. Explain how substances are transported at the cellular level by diffusion, osmosis and active transport.

Chemistry

Using knowledge surrounding metals and non-metals predict where certain elements would be placed within the periodic table. Using data provided for individual elements, infer patterns found within the periodic table. Know the arrangement of electrons within the atom, as well as the arrangement of all subatomic particles. Able to define compounds, mixture and elements as well as recognise them from diagrams. Know how to separate mixtures and explain a number of methods for separating mixtures. Able to identify and calculate isotopes.

Physics

Compare a range of Energy transfers through modelling, identifying how energy is transferred between energy stores in a range of real-life examples. Evaluate analogies and explanations for the transfer of energy. Explain through modelling why processes cannot go on forever, in terms of energy. Undertake investigations to compare energy transfers, working scientifically to analyse the change in variables.