



Ark Blacklands Primary Academy

Science Curriculum



Subject Aims

Science at Ark Blacklands **provides children with a strong understanding of the world around them.** Harnessing their natural curiosity, we ensure children learn to explore, discover and use Science to explain what is occurring around them; predict how things might behave and then analyse the cause.

Curriculum Approach

At Ark Blacklands, children's discovery of the world around them and their awareness of place begins in the Early Years Foundation Stage, where children begin to recognise similarities and differences in relation to places, objects, materials and living things. They begin to explain why some things occur and talk about changes.

Our KS1 and KS2 Science curriculum is designed to ensure pupils are achieving the three key aims of the National Curriculum. This states that through science teaching, all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop an understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Science at Ark Blacklands ensures our pupils gain the knowledge they need to discover, understand and begin to explain the world and phenomena around them. In addition, we ensure our pupils are equipped with the skills and knowledge of processes through which science is achieved and applied. We know that pupils need to know how science works in their own lives and in the lives of others. Our pupils have the right to be scientifically literate because science matters in the world.

- **Year 1:** Everyday Materials, Autumn and Winter, Vehicles, Amazing Animals, Plants, Spring and Summer, Seaside
- **Year 2:** Animal Survival, Uses of Materials, Habitats, Plants: Bulbs and Growth. Protecting our Environment
- **Year 3:** Rocks and Fossils, Light and Shadows, Magnets and Forces, Plant Survival, Skeletons and Muscles
- **Year 4:** Teeth and Digestion, States of Matter, Sound, Environments, Electricity, Classification
- **Year 5:** Material Properties and Changes, Earth and Space, Forces, , Life Cycles, Growing Old
- **Year 6:** Light and Perception, Evolution and Inheritance, Electricity and Circuits, Classification, Circulatory System and Lifestyle

The knowledge across the three disciplines of science builds sequentially with pupils often revisiting an idea or concept again in a later unit. In Biology, pupils develop their knowledge of organisms, ecosystems and genes. In Chemistry, pupils develop their knowledge of materials, uses of materials and how materials can change. In physics, pupils develop their knowledge of forces, energy and space.

Developing Skills of Working Scientifically

Science in our school is about developing children's ideas and ways of working which enable them to make sense of the world through investigation, as well as using and applying process skills. The pupils at Ark Blacklands work scientifically in a meaningful way. They gain the necessary knowledge first, before working scientifically to deepen and explore this knowledge further. Scientific enquiry is mapped out against the units to ensure balance and coverage.

Physics

Weather and Seasons
Y1

Forces and Magnets
Y3, Y5

Light
Y3, Y6

Sound
Y4

Electricity
Y4, Y6

Chemistry

Materials
Everyday Materials - Y1
Purpose of Materials - Y2
Rocks - Y3
States of Matter - Y4
Properties & Changes of
Materials - Y5

Biology



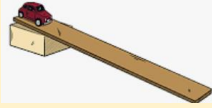




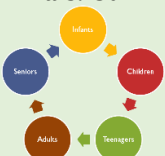
















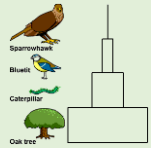


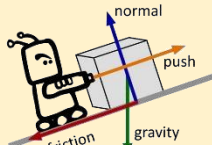





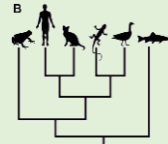

Plants
Wild and Garden Plants - Y1
Bulbs and Growth - Y2
Basic Needs for Survival - Y3

Animals Including Humans
Common Animals - Y1
Basic Needs for Survival - Y2
Skeletons and Muscles - Y3
Digestive System - Y4
Teeth - Y4
Growing and Changing - Y5
Circulatory System - Y6



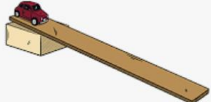




**Living Things in their
Habitats**
Habitats - Y2
Conservation - Y2, Y4
Classification - Y4, Y6
Life Cycles - Y5

Evolution and Inheritance
Y6



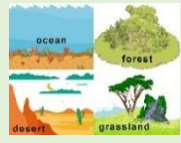



Science Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	<p>Throughout their Reception year, children are exposed to core scientific principles, they are encouraged to question the world around them and talk about the observations they make. For example, in Term 1 during their 'All About Me' topic, they look closely at their own features, they learn about their body and the amazing things it can do. During Term 3, as part of their 'Out of this World' topic children learn about, and are encouraged to ask question the moon, the planets and stars as they become astronauts in their own space station. In Term 5 the children become Zoologists as they classify different animals as part of their 'Amazing Animals' topic. Finally, in Term 6 the children become young Botanists when they grow plants from a seed and they develop their observational skills as they closely watch butterflies develop from larvae into fully-grown butterflies and tadpoles hatching from frogspawn.</p>					
Year 1	Everyday Materials 	Autumn & Winter 	Vehicles (forces) 	Amazing Animals 	Plants 	Spring & Summer  Seaside 
Year 2	Animals: Survival 	Uses of Materials 	Habitats 	Plants: Bulbs & Growth 	Protecting Our Environment 	Mirco-Habitats 
Year 3	Rocks & Fossils 	Light and Shadow: Sun 	Light and Shadow: Eyes 	Magnets and Forces 	Plants: Needs for Survival 	Skeletons & Muscles 
Year 4	Teeth & Digestion 	States of Matter 	Sound 	Environments 	Electricity 	Classification 
Year 5	Materials: Properties & Changes 		Earth and Space 	Forces 	Life Cycles 	Growing Old 
Year 6	Light and Perception 	Evolution and inheritance 		Electricity 	Classification 	Circulation & Lifestyle 







Year I Science

	Autumn Term		Spring Term		Summer Term		
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	
Overview	Everyday Materials 	Autumn and Winter 	Vehicles (forces) 	Amazing Animals 	Plants 	Spring and Summer 	Seaside 
Suggested Content	<p>Distinguish between an object and the material from which it is made.</p> <p>Identify and group a variety of everyday materials, including wood, plastic, glass, metal, water and rock.</p>	<p>Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p> <p>This unit focuses on Autumn and Winter.</p> <p><i>*unit runs throughout the year</i></p>	<p>To identify how different vehicles move – land , air, and sea.</p> <p>To recognise the forces of push and pull and how different surfaces affect how vehicles move</p>	<p>To distinguish between living and non-living.</p> <p>Identify and name a variety of common animals including amphibians, reptiles, and mammals.</p> <p>Recognise and name a variety of common animals that are carnivores, herbivores and omnivores.</p>	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p>	<p>Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p>	<p>Identify and name a variety of common animals including fish and birds found at the seaside.</p> <p>To investigate microhabitats found at the seaside</p>
Key Vocabulary	<ul style="list-style-type: none"> object material hard soft stretchy stiff bendy rough 	<ul style="list-style-type: none"> humidity cloudy pouring droplet crystal blizzard shiver clear 	<ul style="list-style-type: none"> land air sea push pull surface height 	<ul style="list-style-type: none"> carnivore omnivore herbivore identify predator construct responsibility grouping non-living living 	<ul style="list-style-type: none"> warmth evergreen deciduous bud leaf branch root stem 	<ul style="list-style-type: none"> bloom blossom bright vegetation newborn flower swelter rays 	<ul style="list-style-type: none"> grouping identify microhabitat shoreline shells plants
Observing over time		<p>What do we observe as the seasons change?</p>				<p>What do we observe as the seasons change?</p>	
Pattern Seeking							
Research	<p>How does manipulating materials change their properties?</p>	<p>What impact do the seasons have on plants and animals?</p>	<p>How do vehicles move?</p>	<p>Where do these different groups of animals live?</p>	<p>Why are the different parts of a plant important and what parts do we eat?</p>	<p>What impact do the seasons have on humans?</p>	<p>What do we find in the microhabitats?</p>
Identifying & classifying	<p>Which material will be good for your homes?</p>		<p>What do we push and pull?</p>	<p>How can we organise animals into the different categories?</p>	<p>Which are wild plants and which are garden plants?</p>	<p>How can we organise animals into the different categories?</p>	
Comparative tests	<p>Which materials are waterproof?</p>		<p>Which material makes the best ramp for a car to travel the furthest?</p>	<p>What do dinosaurs eat?</p>	<p>How does water travel in plants?</p>		







Year 2 Science

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Animals: Survival 	Uses of Materials 	Habitats 	Plants: bulbs and Growth 	Protecting Our Environment 	Mirco-Habitats 
Suggested Content	<p>Find out about and describe the basic needs of animals, including humans, for survival (water food and air).</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.</p>	<p>Identify and compare the suitability of a variety of materials for particular uses.</p> <p>Find out how the shapes of solid objects made from some materials can be changed e.g., by squashing, bending, twisting and stretching.</p>	<p>Explore and compare the differences between things that are living, dead, and things that have never been alive.</p>	<p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>	<p>Consider the environment and their role in protecting it.</p> <p>Expand pupils' subject knowledge of habitats through the lens of how and why habitats should be protected.</p> <p>Support pupils in understanding why the environment is important and what they can do to make a difference on a local scale.</p>	<p>Identify and name a variety of plants and animals in their habitats including micro-habitats.</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain.</p>
Key Vocabulary	exercise vitamins portion balanced carbohydrate proteins fats sugars	Solid absorbent waterproof man-made suitable properties forces material push/pull/ twist/bend/squash/stretch	suitable habitat shelter continents classification offspring organism	germinate require dormant shade condition moist produce photosynthesis	protect planet environment habitat impact conserve difference role changes	suitable micro-habitat food-chain classification offspring organism
Observing over time		Which glove is warmer?		Which condition is best for growing plants? How does a sunflower change over time?		What happens in a wormery over time?
Pattern Seeking	What happens to your heartbeat when you exercise?			What makes a plant, a plant?		
Research			Am I suited to my habitat?		Why are trees important for the environment?	
Identifying & classifying	Which food should I put in my healthy lunchbox? (Different food types)	Which material can be changed by a force?	How would you group things to show which are living, dead or have never been alive?			How many different Mini beasts can you find in our grounds?
Comparative tests		Is it best to push or pull the playdough? Which material is best for a castle's wall?	How does the habitat of the artic compare to the habitat of the rainforest?		How much water could you save by turning off the tap when you brush your teeth?	What does a worm like to eat?



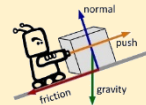


Year 3 Science

	Autumn Term		Spring Term		Summer Term							
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2						
Overview	Rocks and Fossils 	Light and Shadow: Sun 	Light and Shadow: Eyes 	Magnets and Forces 	Plants: Needs for Survival 	Skeletons & Muscles 						
Suggested Content	<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks.</p>	<p>Recognise that they need light in order to see things & that dark is the absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by a solid object.</p> <p>Find patterns in the way that the size of shadows change.</p> <p>This unit focuses on the sun.</p>	<p>Recognise that they need light in order to see things & that dark is the absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous & that there are ways to protect their eyes.</p> <p>This unit focuses on the eyes.</p>	<p>Compare how things move on different surfaces.</p> <p>Describe magnets as having two poles. Notice that magnetic forces can act at a distance.</p> <p>Observe how magnets attract or repel each other and attract some materials and not others.</p> <p>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet.</p>	<p>Explore the requirements of plants for life & growth (air, light, water, nutrients from soil, & room to grow) & how they vary from plant to plant.</p> <p>Identify & describe the functions of different parts of flowering plants: roots, stem/trunk, leaves & flowers.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation & seed dispersal.</p>	<p>Identify that animals, including humans, need the right types and amounts of nutrition and that they cannot make their own food.</p> <p>Recognise that humans & some other animals have skeletons & muscles for support, protection & movement.</p>						
Key Vocabulary	fossil sedimentary rock metamorphic rock igneous rock	permeable decay durable absorb	proximity ultraviolet concave convex reflect	transparent translucent opaque	protect absence reflect enter	signal brain detect	iron attract repel magnetic needle	pendulum force Poles Gravity	vascular phloem spore sucrose	starch fertilisation transpiration respiration	bone x-ray tendon cartilage	ligament reflex joint hollow
Observing over time						What is the impact of fertiliser on a growing plant?						
Pattern Seeking					Does the size and shape of a magnet affect how strong it is?							
Research	Who was Mary Anning?			Who was Thomas Edison and why was he important? How can I build my own periscope?	How are magnets used in real-life situations?	Investigate the life cycle of a dandelion	What does a human skeleton look like?					
Identifying & classifying	What are rocks and how can they be identified?	Are the sources of light natural or man-made?			What types of objects are magnetic?		What are the different types of muscle found within our bodies?					
Comparative tests	How do rocks change? - Which type of rock is most durable? Permeable?	Does light travel through all materials? Are all mirrors the same?		What can you see when the light source is moved?	How do objects move on different surfaces?	Which fertiliser shows the best results when growing plants?						
Fair Tests	Which type of soil absorbs the most water?	How can you vary the position, shape and size of a shadow?										




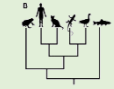

Year 4 Science

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Teeth & Digestion 	States of Matter 	Sound 	Environments 	Electricity 	Classification 
Suggested Content	<p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans & their simple functions.</p>	<p>Compare & group materials together, according to whether they are solids, liquids or gases.</p> <p>Observe that some materials change state when they are heated or cooled, & measure or research the temperature at which this happens in degrees Celsius (°C).</p> <p>Identify the part played by evaporation & condensation in the water cycle & associate the rate of evaporation with temperature.</p>	<p>Identify how sounds are made, associating them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Look for patterns in the pitch of a sound.</p> <p>Find patterns between the volume of a sound & the strength of vibrations.</p> <p>Recognise that sounds get fainter as the distance from the sound source increases.</p>	<p>Recognise that environments can change & that this can sometimes pose dangers to living things.</p> <p>Construct & interpret a variety of food chains and webs, identifying producers, predators & prey.</p>	<p>Identify common appliances that run on electricity.</p> <p>Construct a simple series circuit, identifying & naming its basic parts, including cells, wires, bulbs, switches & buzzers.</p> <p>Identify whether a lamp will light in a simple series circuit.</p> <p>Recognise that a switch opens & closes a circuit.</p> <p>Recognise some common conductors & insulators.</p>	<p>Recognise that living things can be grouped in a variety of ways.</p> <p>Explore & use classification keys to help group, identify & name a variety of living things in their local & wider environment.</p>
Key Vocabulary	decay digestion enamel plaque stomach intestine omnivore oesophagus	solid liquid gas melting freezing evaporation / condensation transpiration / precipitation	eardrum sound waves decibel frequency muffle vibration vocal chords pitch	food chain/web consumer producer prey predator environment ecosystem interdependent	electricity electron battery motor bulb circuit switch insulator / conductor	habitat ecology bacteria reintroduce emission pesticide woodland
Observing over time	How does an egg shell or tooth change over time when left in liquid?		When is our classroom the quietest and the loudest?			
Pattern Seeking	Is there a pattern between human diet and health?	Is there a pattern in how long it takes to melt an ice cube using different methods?	Is there a relationship between an instrument's echo chamber size and the sound created?			
Research				How is our local environment polluted?	What effect does changing the construction of a circuit have on the light produced in a bulb?	Can we find other organisms to add complexity to our classification key?
Identifying & classifying	What are the names for all of the organs in the digestive system?			Can we identify food chains in our local environment?	How can we identify if a material is a conductor or an insulator of electricity?	Can we use the classification keys to identify all the animals that we caught in our traps?
Comparative tests		Which method is most efficient in melting an ice cube? Do all liquids freeze at the same time?	Which material is best to use for muffling sound in ear defenders?	What would happen to the food chains if there was less water in a reservoir?	Which material is the best conductor of electricity?	
Fair Tests	How does an eggshell or tooth change over time when left in different liquids?		How does the volume of something change as you move further away from it?			

Year 5 Science

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Materials: Properties and Changes 		Earth and Space 	Forces 	Life Cycles 	Growing Old 
Suggested Content	<p>Compare and group together materials based on their properties.</p> <p>Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. mixing and changes of state are reversible changes.</p>	<p>Continuation from term 1.</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials including metals, wood and plastic.</p>	<p>Describe the movement of the Earth, and other planets, relative to the sun in the solar system</p> <p>Describe the movement of the moon relative to the Earth</p> <p>Describe the sun, Earth and moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and night.</p>	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p>	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p> <p>Describe the life process of reproduction in some plants and animals.</p>	<p>Describe the changes as humans develop to old age.</p> <p>Explain the physical, mental and emotional stages of development.</p>
Key Vocabulary	sieve filter evaporate polymers dissolve distilling separate solution	chemical change physical change particle substance reversible irreversible formation reaction	universe orbit solar system axis spherical revolve / rotate gravitational pull solar / lunar eclipse	air resistance water resistance up thrust friction newton mass lever / pulley fulcrum	gestation sexual asexual pollination lifecycle offspring naturalist fertilisation	puberty reproduce adolescence hormone chromosome dormant development stages
Observing over time		How does a copper sulphate solution change over time?			How does a planted seed change over time? What are the stages in a butterfly's life cycle?	What are the stages in a human lifecycle?
Pattern Seeking				Is there a link between an object's weight (force of gravity) and its mass?	How has the growth of the shoot changed over time? Why?	
Research			What makes up our solar system?	Can you explain the work of Isaac Newton?		
Identifying & classifying	How can we separate alien soup? (water, salt, rice, paperclips, sand)	Reversible or irreversible?	Can you observe and identify the phases in the cycle of the moon?	Can you label and name all the forces acting on the objects? Are the forces balanced/unbalanced?	What are the differences between the life cycle of a bird and a mammal?	How are adults different from children?
Comparative tests	Which separation method is the most appropriate? (sieving, filtering, magnetism, evaporation) Why?			Do all objects fall through water at the same speed?		
Fair Tests	Which type of sugar is the most soluble?			Which shoe has the strongest grip?		

Year 6 Science

	Autumn Term		Spring Term		Summer Term					
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2				
Overview	Light & perception 	Evolution and inheritance 		Electricity 	Classification 	Circulation & Lifestyle 				
Suggested Content	<p>Recognise that light appears to travel in straight lines.</p> <p>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</p> <p>Explain that we see things because light travels from light sources to our eyes or from light sources to objects & then to our eyes.</p>	<p>Recognise that living things have changed over time & that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary & are not identical to parents.</p> <p>Identify how animals & plants are adapted to suit their environment in different ways & that adaptation may lead to evolution.</p>	<p><i>Continuation from Aut 2.</i></p> <p>Explore how living things have changed to suit their environment.</p> <p>Understand why there is variation in living things and how these variations are essential for ensuring survival of the species.</p> <p>Learn that these adaptations are passed onto offspring and see that, without a species passing on these traits, it will begin to eventually die out and become extinct.</p>	<p>Associate the brightness of a lamp or the volume of a buzzer with the number & voltage of cells used in the circuit.</p> <p>Compare & give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers & the on/off position of switches.</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</p>	<p>Describe how living things are classified into broad groups according to common observable characteristics & based on similarities & differences, including microorganisms, plants & animals.</p> <p>Give reasons for classifying plants & animals based on specific characteristics.</p>	<p>Identify & name the main parts of the human circulatory system, & describe the functions of the heart, blood vessels & blood.</p> <p>Recognise the impact of diet, exercise, drugs & lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients & water are transported within animals, including humans.</p>				
Key Vocabulary	light rays distort absorb transmit spectrum	variance obstruct refraction reflection	variation offspring ancestor natural selection fossilisation decompose	sediment inherit adaptation traits evolve species	static electricity charge electron insulator conductor	short circuit fuse electromagnet symbol voltage	classify identify conditions micro-organism kingdom	vertebrate invertebrate vascular non-vascular	circulation blood vessels pulse BPM respiration	plasma blood cells platelets digestion
Observing over time	What time of days it is brightest in our classroom and why?					How does mould grow over time under different conditions?	How does my heart rate change over the day?			
Pattern Seeking		Is there a pattern between the size of a finch's beak and the food that it eats?				What are the best conditions for mould to grow?	What activities throughout the day make your heart rate rise?			
Research	What are some examples of sources of light?	What adaptations do polar bears and cacti have to suit their environments?	What happened when Charles Darwin visited the Galapagos island? What are the principles of inheritance of living things?	Which materials are the best conductors?		What do different micro-organisms do? Are they always harmful?	What are the main systems of the body and what is the main function of the heart?			
Identifying & classifying		Identifying different variations of one species.		Can you identify the scientific circuit symbols?		Can you identify the animals, plants and micro-organisms?				
Comparative tests	How are light rays best reflected?			How does the number of batteries in a circuit affect the brightness of a bulb?		How do locations and condition affect the rate of which mould grows?	How do different forms of exercise affect my heart rate?			
Fair Tests	How does light travel?			What affects the brightness of the bulb?			How does exercise affect my heart rate?			

Science – Working Scientifically Skills Progression

	End of EYFS	End of Year 2	End of Year 4	End of Year 6
Observing over time	<ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals/plants 	<ul style="list-style-type: none"> Observe closely, using simple equipment Perform simple tests Select simple equipment to observe 	<ul style="list-style-type: none"> Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers 	<ul style="list-style-type: none"> Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Be able to select appropriate ranges or intervals of measurements
Pattern seeking	<ul style="list-style-type: none"> Understand some important processes and changes in the natural world including changing states of matter 	<ul style="list-style-type: none"> Talk about what they have found out or what they think may happen Begin to recognise links between observations and answers to questions With help, begin to notice patterns and relationships 	<ul style="list-style-type: none"> Use scientific evidence to discuss and notice patterns and relationships Use patterns in their data to draw simple conclusions and answer questions 	<ul style="list-style-type: none"> Look for different causal relationships in their data and identify evidence that refutes or supports their ideas Systematically investigate the relationship between phenomena
Identifying, classifying and grouping	<ul style="list-style-type: none"> Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class 	<ul style="list-style-type: none"> Identify and classify using my observations and ideas to suggest answers to questions Recognise similarities and differences Sorting, matching and grouping objects and living things 	<ul style="list-style-type: none"> Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Using observations to compare objects or living things 	<ul style="list-style-type: none"> Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Suggest reasons for similarities and differences
Comparative and fair testing		<ul style="list-style-type: none"> Using observations and ideas to suggest answers Perform simple fair and comparative tests Identify two variables in an investigation Identify things to observe and measure 	<ul style="list-style-type: none"> Make predictions and conclusions Report on findings from investigations, including oral and written explanations, displays or presentations of results and conclusions Set up simple practical investigation, comparative and fair tests by controlling two variables – measure and observe 	<ul style="list-style-type: none"> Report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Use test results to make predictions to set up further comparative and fair tests Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
Research - using secondary sources		<ul style="list-style-type: none"> Gather and record data to help in answering questions Using simple secondary sources – e.g. books, film, internet 	<ul style="list-style-type: none"> Use straightforward secondary sources to answer questions or to support findings 	<ul style="list-style-type: none"> Identifying scientific evidence that has been used to support or refute ideas or arguments Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact

Key stage 1 programme of study – years 1 and 2 - Working scientifically

Statutory requirements

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- 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.

Notes and guidance (non-statutory) Pupils in years 1 and 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language. These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.

Lower Key stage 2 programme of study – years 3 and 4 - Working scientifically

Statutory requirements

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Notes and guidance (non-statutory) Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.

Upper Key stage 2 programme of study – years 5 and 6 - Working scientifically

Statutory requirements

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:
- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.

Notes and guidance (non-statutory) Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.