

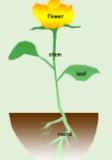
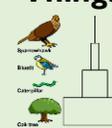
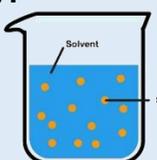
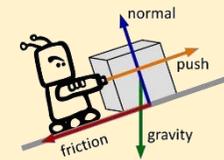
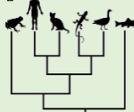
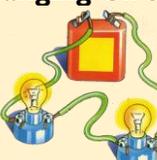


Ark Blacklands Primary Academy

Science Curriculum



Science Overview

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Changing Seasons 	Types of Animals 	Parts of Animals 	Identifying Materials 	Plants 	Comparing Materials 
Year 2	Keeping Healthy 	Habitats 	Changing Materials 	Growing Plants 	Everyday Materials 	Animals 
Year 3	Rocks and Soils 	Magnets and Forces 	Light and Shadow 		Skeletons 	Parts of Plants 
Year 4	Grouping living things 	Changes of State 	Sound 	Electricity 	Dangers to Living Things 	Human Nutrition 
Year 5	Life Cycles 	Earth and Space 	Materials 	Separating Mixtures 	Types of Changes 	Forces 
Year 6	Living Things & Habitats 	Evolution and inheritance 	Changing Circuits 	Light and Sight 	Our Bodies 	

Subject Intent:

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.

Implementation:

Children's discovery of the world around them begins in the Early Years where children are provided with opportunities to talk about the features of their own immediate environment and how environments might vary from one another. Children are encouraged to make observations of animals and plants, explain why some things occur and talk about changes.

Our Science curriculum then goes on to ensure that the foundational building blocks in biology, chemistry and physics are further developed in Key Stages 1 and 2. Our Curriculum Map outlines a sequence of concepts and knowledge, and an order of how they are taught which is fully compliant with the National Curriculum 2014.

Some of the units follow directly on from others, building on pupils' prior knowledge and understanding (such as the Chemistry strand, which starts with common materials in KSI and builds up to changing states of matter in UKS2). Other units are not directly linked to previous learning, such as many of the units within the physics strand. These have been sequenced so that children's breadth of knowledge is built upon year after year.

It is vitally important that all pupils develop a secure understanding of each block of knowledge in order to progress to the next stage. For example, if a child does not understand some of the basic properties of materials, they will be at a significant disadvantage when learning about changes in state to those materials. Likewise, the topic of Sound is taught only once, so if a child completes this unit without a secure understanding of the concepts, this will not be revisiting and expanding on these ideas until Secondary School.

At the end of scientific units, pupils will be able to describe associated processes and key characteristics in common language, but they will also become familiar with, and use, technical terminology accurately and precisely, building up an extended specialist vocabulary. Being immersed in scientific vocabulary aids children's knowledge and understanding, not only of the topic they are studying, but of the world around them.

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 staff at Ark Blacklands ensure that all children are exposed to high quality teaching and learning experiences, allowing children to explore their outdoor environment and their locality, thus maturing their scientific enquiry and investigative skills. These skills are embedded in each topic and the topics are revisited and expanded as the children journey through school.

Year 1

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Changing Seasons 	Types of Animals 	Parts of Animals 	Identifying Materials 	Plants 	Comparing Materials 
Suggested Content	<p>Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p> <p>*unit runs throughout the year</p>	<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p>	<p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p>Distinguish between an object and the material from which it is made.</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</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>Describe the simple physical properties of a variety of everyday materials.</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p>
Key Vocabulary	<i>humidity</i> <i>cloudy</i> <i>pouring</i> <i>droplet</i> <i>crystal</i> <i>blizzard</i> <i>shiver</i> <i>clear</i>	<i>carnivore</i> <i>omnivore</i> <i>herbivore</i> <i>identify</i> <i>predator</i> <i>construct</i> <i>responsibility</i> <i>grouping</i>	<i>sight</i> <i>taste</i> <i>cleanliness</i> <i>aroma</i> <i>healthy</i> <i>exercise</i> <i>hearing</i> <i>require</i>	<i>object</i> <i>material</i> <i>hard</i> <i>soft</i> <i>stretchy</i> <i>stiff</i> <i>bendy</i> <i>rough</i>	<i>warmth</i> <i>evergreen</i> <i>deciduous</i> <i>bud</i> <i>leaf</i> <i>branch</i> <i>root</i> <i>stem</i>	<i>smooth</i> <i>waterproof</i> <i>absorbent</i> <i>everyday</i> <i>dull</i> <i>see through</i> <i>plastic</i> <i>recycle</i>
Observing over time	What do we observe as the seasons change?		What do we observe as the seasons change?		What do we observe as the seasons?	
Pattern Seeking		Is there a pattern in the types of animals observed in the school grounds and local park?				
Research		How can we identify the animals we observe in the school grounds and local park?		How manipulating materials changes their properties?		Which materials can be recycled?
Identifying & classifying		How can we organise all the zoo animals?		Which material will be good for their homes?		Which materials can float and sink?
Comparative tests	Which materials are waterproof?		Is our sense of taste influenced by what we can see?		Which material makes the fastest ramp? (Linked to our topic)	

Year 2

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Keeping Healthy 	Habitats 	Changing Materials 	Growing Plants 	Everyday Materials 	Animals 
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 type of food, and hygiene.</p>	<p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</p> <p>Identify and name a variety of plants and animals in their habitats.</p>	<p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</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>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</p>	<p>Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats.</p>
Key Vocabulary	<p>exercise vitamins portion balanced carbohydrate proteins fats sugars</p>	<p>suited suitable habitat shelter feature leaf Litter Adaptations Continents diet</p>	<p>Solid Liquid Forces Reaction Melting point Freezing point Material Changing state push/pull/twist</p>	<p>germinate require dormant shade condition moist Produce Photosynthesis</p>	<p>absorbent waterproof stretch man-made material metal suitable properties</p>	<p>micro-habitat food chain Classifying Classification Once-living Never living Offspring</p>
Observing over time		Which glove is warmer?	Which chocolate lasts longest?	Which condition is best for growing plants? How does a sunflower change over time?		
Pattern Seeking	Can the person with the longest legs jump furthest?			What makes a plant, a plant?		Where do mini beast prefer to live?
Research		Am I adapted to my habitat?				What makes an insect an insect?
Identifying & classifying	Which food should I put in my healthy lunchbox? Different food types	What adaptations do animals need to survive in different habitats?	Which material can be changed by a force?	Which off-springs belong to which animals?		How would you group things to show which are living, dead or have never been alive?
Comparative tests	What stuff is stickier?	How does the habitat of the arctic compare to the habitat of the rainforest?	Is it best to push or pull the playdough?		Which material is best for a castle's wall?	

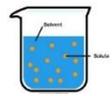
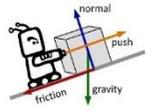
Year 3

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Rocks and Soils 	Magnets and Forces 	Light and Shadow 		Skeletons 	Parts of Plants 
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>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>Predict whether two magnets will attract or repel each other.</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>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>Identify that humans & some other animals have skeletons & muscles for support, protection & movement.</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>Investigate the way in which water is transported in plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation & seed dispersal.</p>
Key Vocabulary	<i>fossil sedimentary rock metamorphic rock igneous rock permeable decay durable absorb</i>	<i>iron attract repel magnetic needle pendulum magnetize force Poles Gravity</i>	<i>proximity ultraviolet concave convex reflect transparent translucent opaque</i>		<i>bone x-ray tendon cartilage ligament reflex joint hollow</i>	<i>vascular phloem spore sucrose starch fertilisation transpiration respiration</i>
Observing over time			Tbc		Tbc	Tbc
Pattern Seeking		Does the size and shape of a magnet affect how strong it is?				
Research	Who was Mary Anning?	How are magnets used in real-life situations?				
Identifying & classifying	What are rocks and how can they be identified?	How do magnets react to each other? What types of objects are magnetic?				
Comparative tests	How do rocks change? - Which type of rock is most durable? Permeable?	How do objects move on different surfaces?				
Fair Tests	Which type of soil absorbs the most water?					

Year 4

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Grouping living things 	Changes of State 	Sound 	Electricity 	Dangers to Living Things 	Human Nutrition 
Suggested Content	<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>	<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>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 environments can change & that this can sometimes pose dangers to living things.</p> <p>Construct & interpret a variety of food chains, identifying producers, predators & prey.</p>	<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>
Key Vocabulary	habitat ecology bacteria reintroduce emission pesticide woodland	solid liquid gas melting freezing evaporation / condensation transpiration / precipitation	eardrum sound waves decibel frequency muffle vibration vocal chords pitch	electricity electron battery motor bulb circuit switch insulator / conductor	food chain consumer producer prey predator environment ecosystem interdependent	decay digestion enamel plaque stomach intestine omnivore oesophagus
Observing over time			When is our classroom the quietest and the loudest?			How does an egg shell or tooth change over time when left in liquid?
Pattern Seeking		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?			Is there a pattern between human diet and health?
Research	Can we find other organisms to add complexity to our classification key?			What effect does changing the construction of a circuit have on the light produced in a bulb?	How is our local environment polluted?	
Identifying & classifying	Can we use the classification keys to identify all the animals that we caught in our traps?			How can we identify if a material is a conductor or an insulator of electricity?	Can we identify food chains in our local environment?	What are the names for all of the organs in the digestive system?
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?	Which material is the best conductor of electricity?	What would happen to the food chains if there was less water in a reservoir?	
Fair Tests			How does the volume of something change as you move further away from it?			How does an eggshell or tooth change over time when left in different liquids?

Year 5

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Life Cycles 	Earth Space 	Materials 	Separating Mixtures 	Types of Changes 	Forces 
Suggested Content	<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>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>Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the uses of everyday materials, including metals, wood and plastic.</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.</p> <p>*best taught before y5 types of Change.</p>	<p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</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>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>
Key Vocabulary	gestation puberty reproduce adolescence hormone dormant fertilisation chromosome	universe orbit solar system axis spherical revolve / rotate gravitational pull solar / lunar eclipse	solubility transparency conductivity	sieve filter evaporate polymers reversible irreversible	chemical change physical change particle solution substance	air resistance water resistance up thrust friction newton mass lever / pulley fulcrum
Observing over time	How does a planted seed change over time? What are the stages in a butterfly's life cycle?	How do shadows change during a day?			How does a copper sulphate solution change over time?	
Pattern Seeking	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	What are the differences between the life cycle of a bird and a mammal?	Can you observe and identify the phases in the cycle of the moon?	How can we classify materials?	How to separate alien soup? (water, salt, rice, paperclips, sand)	Which state of matter?	Can you label and name all the forces acting on the objects in each of these situations? Are the forces balanced/unbalanced?
Comparative tests			Which material is harder? More flexible? Magnetic? Transparent, translucent, opaque?	Which separation method is the most appropriate? (sieving, filtering, magnetism, evaporation) Why?		
Fair Tests			Which material makes a bulb shine the brightest? Which material makes the best raincoat?		Which type of sugar is the most soluble?	Which shoe has the strongest grip? Do all objects fall through water in the same way?

Year 6

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overview	Living Things & Habitats 	Evolution and inheritance 	Changing Circuits 	Light and Sight 	Our Bodies 	
Suggested Content	<p>Describe how living things are classified into broad groups according to common observable characteristics & based on similarities & differences, including micro-organisms, plants & animals.</p> <p>Give reasons for classifying plants & animals based on specific characteristics.</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>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>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>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</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	<i>classify</i> <i>identify</i> <i>conditions</i> <i>micro-organism</i> <i>oxygen</i> <i>moisture</i> <i>warmth</i>	<i>variation</i> <i>offspring</i> <i>ancestor</i> <i>natural selection</i> <i>fossilisation</i> <i>decompose</i> <i>sediment</i> <i>inherit</i>	<i>static electricity</i> <i>charge</i> <i>electron</i> <i>insulator</i> <i>conductor</i> <i>short circuit</i> <i>fuse</i> <i>electromagnet</i>	<i>light rays</i> <i>haze</i> <i>distort</i> <i>primary colour</i> <i>secondary colour</i> <i>variance</i> <i>obstruct</i> <i>refraction</i>	<i>respiration</i> <i>displace</i> <i>trachea</i> <i>cilia</i> <i>circulation</i> <i>blood vessels</i> <i>pulse</i> <i>BPM</i>	
Observing over time	Observing mould grow over time under different conditions.			What time of days it is brightest in our classroom and why?	How does my heart rate change over the day?	
Pattern Seeking	Investigating mould growing under different conditions and looking for the best conditions for mould to grow.	Is there a pattern between the size of a finches beak and the food that it eats?			What activities throughout the day make your heart rate rise?	
Research	What do different micro-organisms do? Are they always harmful?	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 are some examples of source of light?	What are the main systems of the body and what is the main function of the heart? What can humans do to improve their heart health?	
Identifying & classifying	Animals, plants and micro-organisms.	Identifying different variations of one species.	Scientific circuit symbols.		What are the different food categories and what is there function for the human body?	
Comparative tests	How do locations and condition affect the rate of which mould grows?	Does lung capacity impact speed?	How does the number of batteries in a circuit affect the brightness of a bulb?		How do different forms of exercise affect my heart rate?	
Fair Tests	How can we ensure our investigation is a fair test?	Using stop watches, tape measures to ensure the only changing variable is the participant.	How does the voltage of the batteries affect the brightness of the bulb? Does the length of a wire affect the brightness of a bulb?	How does light travel? How are light rays best reflected?	How does exercise affect my heart rate?	

Science – Working Scientifically Skills Progression

	End of Year 2	End of Year 4	End of Year 6
Observing over time	<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"> 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"> 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.