

Science Progression at Patrington CE Primary Academy 2023 -24

<p>Intent</p>	<p>At Patrington Church of England Primary Academy our curriculum is designed to: inspire enthusiasm for learning, build on achievement and support pupil well-being and happiness to allow our learners a safe environment within which to flourish.</p> <p>We follow our Christian Values of Trust, Friendship and Perseverance to strive to ensure that: Everyone Belongs, Everyone Cares and Everyone Tries.</p> <p>We recognise that we are educating children for an unrecognisable future and in order to be prepared for this we identified the following golden threads which are woven throughout our broad and balanced Curriculum:</p> <p style="text-align: center;"><u>Our Golden Threads through our curriculum</u></p> <p style="text-align: center;">Foster curiosity.</p> <p style="text-align: center;">Learn to disagree respectfully.</p> <p style="text-align: center;">Be open to another way.</p> <p style="text-align: center;">Find your wonderful - ambition and self worth</p> <p>Within our inclusive environment our curriculum allows all children to ensure that Equity, Curiosity and Ambition are nurtured.</p> <p>"And Jesus said to him, If you can? All things are possible to those who believe." Mark 9:23</p> <p>At Patrington Primary Academy, we live out our curriculum intent in Science by providing our children with access to a broad, balanced and enriching science curriculum. We recognise the importance of science in everyday life. We strive to develop a curriculum to enable children to become inquiry based learners and develop a child's natural curiosity. We want to inspire them and develop their hopes, dreams and aspirations to possibly work towards a career influenced by science in the future, thus developing them as active citizens who contribute positively to society.</p> <p>Science explains the material world. By learning about the products of science, children are able to explain the world around them. Children establish their scientific knowledge using scientific enquiry. Curiosity begins to grow in the early years; children are introduced to a wide-range of vocabulary that categorises and describes the natural world. These words are not too technical but provide the 'seeds' for developing scientific concepts that will be built on in later years. The most relevant statements for science are taken from the following areas of learning:</p> <ul style="list-style-type: none"> · Communication and Language · Personal, Social and Emotional Development · Understanding the World <p>The end points of the curriculum are revisited through the year, and they build through the year groups. Scientific knowledge becomes established and gets revised based on the topic that the year group is studying. In our science curriculum, knowledge is carefully sequenced to reveal the interplay between substantive and disciplinary knowledge. This ensures that children not only know 'the science'; they also know the evidence for it and can use this knowledge to work scientifically.</p>
<p>Implementation</p>	<p>Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;</p> <ul style="list-style-type: none"> ● Science will be taught in planned, and arranged, topic blocks by the class teacher. Our strategy is to enable all children to be catered for through adapted planning suited to their abilities ● We plan for problem solving and real life opportunities that enable children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating practical, engaging lessons with opportunities for precise questioning in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning. ● Our curriculum is progressive. We build upon the learning and skill development of the previous years, which is tested through our 'pre-learning quizzes' where teachers can

	<ul style="list-style-type: none"> identify misconceptions that need addressing. Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career, and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in keeping with the topics. Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and workshops with experts.
Impact	The successful approach to the teaching of science at Patrington results in a fun, engaging, high quality science education that provides children with the foundations for understanding the world that they can take with them once they complete their primary education. So much of science lends itself to outdoor learning, and so we provide children with opportunities to experience this. Pupil voice is used to further develop the Science curriculum, through questioning of pupils' views and attitudes towards Science, to assess the children's enjoyment of science, and to motivate learners.
Substantive Knowledge in Science	Substantive knowledge is the product of science. This is referred to as scientific knowledge and conceptual understanding. Examples of substantive knowledge include knowledge of the concept of magnetism, the theory of evolution by natural selection, Newton's laws of motion and the geocentric model of the solar system.
Disciplinary Knowledge in Science	Disciplinary knowledge is knowledge of how scientific enquiry generates and grows substantive knowledge. The National Curriculum outlines what children need to know about disciplinary knowledge through 'working scientifically'. Examples of disciplinary knowledge include knowledge of methods, measurement, variables and practical procedures.

Substantive and Disciplinary Knowledge - Strand progression							
Science							
F1	F2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals Including Humans							
Substantive Knowledge							
<p>The body has basic body parts.</p> <p>Body parts of animals including fur, scales.</p> <p>Life-cycle of a butterfly</p>	<p>Different body parts are used for different things, such as the eyes are used to see.</p> <p>Animals grow and change over time.</p> <p>There are different types of animals.</p> <p>Life-cycles of various animals including frogs and chicks.</p>	<p>NC: Ears are used for hearing, eyes are used to see, the nose is used to smell, the tongue is used to taste and skin gives the sense of touch.</p> <p>NC: There are a variety of common animals that are carnivores, herbivores and omnivores. Common animals include fish, amphibians, reptiles, birds and mammals.</p>	<p>Human offspring go through different stages as they grow to become adults.</p> <p>NC: Animals have offspring that grow into adults. Different animals have different stages of growth or life cycles.</p> <p>NC: Animals have basic needs, including humans, for survival (water, food and air).</p> <p>NC: Animals obtain their food from plants and other animals, using the idea of a simple food chain.</p> <p>NC: It is important that humans exercise, eat the right amounts of different types of food, and have good hygiene.</p>	<p>NC: Some animals have skeletons for support, movement and Protection.</p> <p>NC: Humans have a skeleton and muscles for movement, support and protecting organs.</p> <p>NC: Animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food.</p>	<p>NC: There are a variety of food chains.</p> <p>NC: The digestive system is responsible for digesting food and absorbing nutrients and water.</p> <p>NC: There are different types of teeth in humans and their simple functions.</p> <p>Animals can be divided into six main groups.</p>	<p>NC: There are different life processes of reproduction in some plants and animals.</p> <p>Humans reproduce sexually, which involves two parents (one female and one male) and produces offspring that are different from the parents.</p> <p>Humans go through characteristic stages as they develop towards old age. Puberty is the transition between childhood and adulthood.</p>	<p>NC: Classification keys help us identify living things (animals) based on their physical characteristics.</p> <p>NC: The circulatory system includes the heart, blood vessels and blood.</p> <p>The blood carries gases (oxygen and carbon dioxide), water and nutrients to where they are needed.</p> <p>NC: Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Characteristics are passed from parents to their offspring,</p>

Disciplinary Knowledge							
<p>Identify some of the different body parts from pictures.</p>	<p>Draw pictures of the human body and name some of the different body parts.</p> <p>Match animals to their young.</p>	<p>NC: Draw and label the main parts of the human body and say which body part is associated with which sense.</p> <p>NC: Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p> <p>NC: Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</p> <p>NC: using their observations to compare and contrast animals.</p> <p>NC: Identify, compare, group and sort a variety of common animals, including fish, amphibians, reptiles, birds, invertebrates and mammals, based on observable features and structures.</p> <p>NC: Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p>	<p>Describe the stages of human development (baby, toddler, child, teenager, adult and elderly).</p> <p>Describe the basic life cycles of some familiar animals (egg, caterpillar, pupa, butterfly; egg, chick, chicken; spawn, tadpole, froglet, frog).</p>	<p>NC: Describe how humans need the skeleton and muscles for support, protection and movement.</p> <p>NC: Identify and group animals that have no skeleton, an internal skeleton (endoskeleton) and an external skeleton (exoskeleton).</p> <p>NC: Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.</p> <p>NC: Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>	<p>NC: Describe the purpose of the digestive system, its main parts and each of their functions.</p> <p>NC: Research, construct and interpret a variety of food chains, identifying producers, predators and prey.</p> <p>NC: Comparing the teeth of carnivores and herbivores.</p>	<p>NC: Compare the life cycles of animals, including a mammal, an amphibian, an insect and a bird.</p> <p>Describe the process of human reproduction.</p> <p>NC: Describe the changes as humans develop from birth to old age.</p> <p>NC: Describe the life process of reproduction in some plants and animals.</p> <p>NC: Observe changes in an animal over a period of time.</p>	<p>NC: Identify, name and describe the purpose of the circulatory system and the functions of the heart, blood vessels and blood.</p> <p>NC: Describe the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>NC: Describe the ways in which nutrients and water are transported within animals, including humans.</p> <p>NC: Exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.</p>
Key Vocabulary							
head, arms, legs	nose, eyes, ears, mouth, hands, feet, life cycle, butterfly, chrysalis, egg, tadpoles, frog spawn cow, calf, sheep, lamb, cat, kitten, duck, duckling, chicken, chick,	hearing, sight, smell, taste, touch fish, amphibian, reptile, bird and mammal	offspring, baby, toddler, child, teenager, adult, elderly fish, amphibians, reptiles, birds, invertebrates, mammals, arachnid, backbone, crustacean, egg, embryo,	Major bones: skull, ribs, spine, humerus, ulna, radius, pelvis, femur, tibia and fibula Major muscle groups: biceps, triceps, abdominals, hamstrings, quadriceps, pectorals nutrition, carbohydrates,	mouth, oesophagus, saliva, stomach, small intestines, large intestines, rectum, excretion, molars, canines, incisors high pitch, low pitch, vibration, volume, food chain, energy, producer, predator, prey,	life-cycle, sexual reproduction, puberty, gestation, juvenile, adolescent	blood vessels, arteries, veins, capillaries, lumen, red blood cells, white blood cells, infection natural selection, identical, genes, Charles Darwin microorganism, germ, microbe, ancestry, genetic comparison

			hatching, insect, metamorphosis, microhabitat, mollusc, myriapod, offspring, pupa, reproduction, worm	protein, fats, sugar, dairy, fruit and vegetables, balanced diet, energy skeleton, endoskeleton, exoskeleton, movement, protection	decomposer vertebrate and invertebrate animals		
Living Things							
Substantive Knowledge							
Plants and trees are living things. Living things change and grow.	Plants and animals can be identified according to their features. Living things change over time.	NC: Plants are living things. Common plants include the daisy, daffodil and grass. NC: Trees are large, woody plants and are either evergreen or deciduous. All living things (plants and animals) change over time as they grow and mature.	NC: Plants grow from seeds and bulbs. NC: Plants need water, light and a suitable temperature to grow and stay healthy. NC: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.	NC: Plants need air, light, water, nutrients from soil, and room to grow. NC: Flowers are important in the life cycle of flowering plants including pollination, seed formation and seed dispersal. NC: Seeds can be transported in a variety of ways. NC: Water is transported within the plant.	NC: Scientists classify living things according to shared characteristics. NC: Environments can change and that this can sometimes pose dangers to living things.	Flowering plants reproduce sexually. The flower is essential for sexual reproduction. Other plants reproduce asexually. Bulbs, corms and rhizomes reproduce asexually.	NC: Living things are classified into groups, according to common observable characteristics and based on similarities and differences (including micro-organisms, plants and animals). Classification keys help us identify living things (plants) based on their physical characteristics. NC: Living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
Disciplinary Knowledge							
Say how living things have changed over time .	Begin to name and group plants and trees according to their observable features.	NC: Describe , following observation , how plants and animals change over time . NC: Describe the basic structure of a variety of common flowering plants, including trees. NC: Compare and contrast familiar plants. NC: Identify, name, compare, group and sort a variety of common wild and garden flowering plants, including deciduous and evergreen trees, based on observable features .	NC: Observe and describe how seeds and bulbs change over time as they grow into mature plants. NC: Compare and group things that are living, dead or have never been alive.	NC: Draw and label the life cycle of a flowering plant. NC: Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. NC: Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. NC: Explore the effect of different factors on plant growth. NC: Investigate the way in	NC: Compare, sort and group living things (including animals, flowering and non-flowering plants) from a range of environments, in a variety of ways, based on observable features and behaviour. NC: Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. NC: Using and making simple guides or keys to explore and identify local plants and animals.	Group and sort plants by how they reproduce.	NC: Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. NC: Classifying plants and animals based on specific characteristics. NC: Explain that living things have changed over time , using specific examples and evidence. NC: Research unfamiliar animals and plants from a broad range of other

				which water is transported within plants. Observing how water travels up the stem to the flowers.			habitats and decide where they belong in the classification system.
Vocabulary							
trees, grow	leaves, seeds, flowers, decay, growth, time	evergreen, deciduous, oak, beech, holly pine, mature leaves, flowers, blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem	water, warmth, germinate, leaves, flowers, branch, bulb, dormant, flower bud, flowering plant, leaf, stem	flower production, pollination, seed formation, seed dispersal, pollen, roots, stem/trunk, leaves and flowers	classification, natural influences, human influences, habitat destruction, risk	life-cycle, reproduce, rhizomes, asexual reproduction, fruit, stigma, anther, ovary, ovule, pollen, nectar	origin, theory, monera kingdom, evolution, fossilised remains
Habitats							
Substantive knowledge							
A habitat is a place where living things live.	Local habitats include woodlands, gardens and ponds. Other habitats include hot places and cold places.	The local environment is a habitat for living things and can change during the seasons.	NC: All living things live in a habitat to which they are suited and it must provide everything they need to survive. NC: There are differences between things that are living, dead, and things that have never been alive.	Living things must adapt to changes in order to survive.	NC: Humans can affect habitats in negative ways and positive ways. NC: Habitats change over time, either due to natural or human influences.	Farming in the UK can be divided into three main types. Intensive farming in the past has resulted in the loss of habitats.	NC: Classification systems and keys are used to identify some animals and plants in the immediate environment and a broad range of habitats.
Disciplinary knowledge							
Care for growing seeds and plants and describe observable features of different types of plants and trees. Begin to observe and talk about living things in the local environment.	Observe and describe living things and their habitats within the local environment. Explore the natural world around them and give simple descriptions, following observation of changes .	NC: Observe the local environment throughout the year and ask and answer questions about living things and seasonal change .	NC: Identify and name a variety of plants and animals in a range of habitats and Microhabitats.	Describe how environments can change due to natural influences and how living things need to be able to adapt to these changes .	Explain how unfamiliar habitats, such as a mountain or ocean, can change over time and what influences these changes . NC: Recognise that environments can change and that this can sometimes pose dangers to living things.	Research and describe different farming practices in the UK and how these can have positive and negative effects on natural habitats.	Use and construct classification systems to identify animals and plants from a range of habitats. Classify living things, including microorganisms, animals and plants, into groups according to common observable characteristics and based on similarities and differences. NC: Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

							<p>Research unfamiliar animals and plants from a range of habitats, deciding upon and explaining where they belong in the classification system.</p> <p>Compare the living things in two contrasting areas of a habitat.</p>
--	--	--	--	--	--	--	--

Vocabulary

habitat, plants, animals, local	hot, cold, deserts, Arctic	living things, seasons, change	beaches, rainforests, deserts, oceans, microhabitat living, alive, dead, near-alive	natural influences, seasons, extreme weather	human impact, littering, pollution, deforestation, extinction, garden ponds, bird boxes	arable, pastoral, intensive farming	Linnaean system
---------------------------------	----------------------------	--------------------------------	--	--	---	-------------------------------------	-----------------

Evolution and inheritance

Substantive knowledge

							<p>Recognise that living things have changed over time and 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 and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>
--	--	--	--	--	--	--	---

Vocabulary

							<p>offspring, characteristic, adaptation, natural, selection, identical, genes, Charles Darwin</p>
--	--	--	--	--	--	--	--

Earth and Space

Substantive knowledge							
<p>I can talk about some natural features that I see and feel during different seasons, including different weather.</p> <p>Weather is warmer in the summer and colder in the winter.</p>	<p>Daylight hours vary throughout the year, according to the season.</p> <p>Weather is warmer in the summer with more sunshine and colder in the winter with more snow, hail and rain.</p>	<p>NC: Day length (the number of daylight hours) is longer in the summer months and shorter in the winter months.</p> <p>NC: The weather can change daily and some weather types are more common in certain seasons, such as snow in winter.</p>	<p>The UK has typical weather in each of the seasons. For example, winter is cold and sometimes frosty, whereas summer is warm and sometimes sunny.</p> <p>The Earth is spherical and is covered in water and land. When it is daytime in one location, it is night time on the other side of the world.</p>	<p>NC: Soils are made from tiny pieces of eroded rock, air and organic matter.</p> <p>NC: Fossils form over millions of years and are the remains of a once-living organism, preserved as rock.</p> <p>NC: Light from the Sun is damaging for vision and the skin. Shadows change shape and size when the light source moves.</p> <p>NC: Notice that light is reflected from surfaces</p> <p>NC: We need light in order to see things and that dark is the absence of light.</p> <p>NC: Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change.</p>	<p>The water cycle has four stages. Evaporation and condensation is caused by temperature changes.</p>	<p>The Solar System is made up of the Sun and everything that orbits around it.</p> <p>The Moon orbits Earth, completing a full orbit every month (27.3 days).</p> <p>NC: Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).</p> <p>NC: As Earth rotates, different parts of it face the Sun, which brings what we call daytime. The part facing away is in shadow, which is night time. There is an apparent movement of the sun across the sky.</p> <p>(see further knowledge of space in 'Forces')</p>	<p>NC: Light travels in straight lines. Light from a source or reflected from an object enters the eye.</p> <p>Light can be split into different colours using a prism.</p>
Disciplinary knowledge							
<p>Talk about the weather as being warm or cold.</p> <p>Talk about things they can do on winter evenings and things they can do on summer evenings and begin to notice the difference in day length.</p>	<p>Notice and begin to describe patterns of weather in summer and winter.</p> <p>Notice and talk about the differences in day length between the seasons.</p>	<p>NC: Observe changes across the four seasons.</p> <p>NC: Observe and describe how day length changes across the year.</p>	<p>Describe typical UK seasonal weather patterns.</p>	<p>NC: Find patterns in the way shadows change during the day.</p> <p>NC: Describe simply how fossils are formed, using words, pictures or a Model.</p> <p>Investigate soils from the local environment, making comparisons and identifying features.</p>	<p>Describe the water cycle using words or diagrams and explain the part played by evaporation and condensation.</p>	<p>NC: Use the idea of Earth's Rotation patterns to explain day and night, and the Sun's apparent movement across the sky.</p> <p>NC: Describe the movement of the planets in our Solar System, including Earth, relative to the Sun.</p> <p>NC: Describe the movement of the Moon relative to Earth.</p>	<p>NC: Explain why shadows have the same shape as the objects that cast them and how shadows can be changed.</p> <p>NC: Describe some significant changes that have happened on Earth and the evidence, such as fossils, that support this. Fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>NC: Identify that light travels in straight lines. Explain that, due to how light travels, we can see things because they give out or reflect light into the eye. (see materials for</p>

							more 'Light' skills)
Vocabulary							
warmer, colder	autumn, winter, spring, summer, sunny, rainy, windy, cloudy	sunshine, hail, wind, snow, fog, lightning, storm	spherical, daytime, night	<p>protection, sunlight, eroded rock, particles, squashed, air, organic matter, clay, sand, silt, heated, cooled, crystals, fossil</p> <p>dark, dull, light, non-reflective, reflective, rough, shiny, smooth, translucent, transparent, opaque, skin cancer</p> <p>SPF, Sun, sunburn, sun cream, sunglasses, sun hat, sun protection factor, ultraviolet light, UV</p>	evaporation, condensation, precipitation, water vapour	solar system, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, orbit, rotate, Stonehenge	natural, artificial, absorbed, scattered, reflected, optic nerve, retina, transmitted, prism
Forces, Mechanisms and Electricity.							
Substantive knowledge							
<p>Some objects float and others sink.</p> <p>Toys and models that are powered by a battery can be switched on and off.</p>	<p>When an object sinks it falls through water to the bottom of the vessel. An object that floats stays at the water's surface.</p> <p>Some light sources need electricity or batteries to work.</p>	<p>NC: Simple equipment can be used for measuring weather and rainfall.</p>	<p>Objects that float are typically light or hollow. Objects that sink are typically heavy or Dense.</p> <p>Models can have moving parts that use levers, sliders, wheels and axles.</p>	<p>NC: An object will not move unless a pushing or pulling force is applied.</p> <p>NC: Magnets attract or repel each other and attract some materials and not others.</p> <p>NC: Magnetic forces do not require contact.</p> <p>NC: Switches open and close a circuit and provide control and whether a lamp lights in a simple series circuit.</p>	<p>A series circuit is a simple loop with only one path for the electricity to flow.</p> <p>A series circuit must be a complete loop to work and have a source of power from a battery or cell.</p>	<p>NC: The Sun, Earth and Moon are all planets are spherical because their mass is so large that they have their own force of gravity.</p> <p>NC: The Earth's large mass exerts a gravitational pull on all objects on Earth, making dropped objects fall to the ground.</p> <p>NC: Friction, air resistance and water resistance are forces that oppose motion, slow down moving objects and acting between moving surfaces.</p> <p>NC: The bigger the mechanical advantage, the less force we need to apply (levers, pulleys and gears).</p>	<p>NC: There are recognised symbols for different components of circuits.</p> <p>Voltage is measured in volts (V) and is a measure of the difference in electrical energy between two parts of a circuit. The bigger the voltage, the more electrons are pushed through the circuit.</p>
Disciplinary knowledge							
Talk about different materials and what they are used for e.g	Describe, predict and sort things	NC: Investigate weather using toys, models or	Sort and group objects that float and sink.	NC: Explain that an object will not move unless a push	Predict and describe whether a circuit will	NC: Explain that objects fall to Earth due to the force of	NC: Explain how the brightness of a lamp or

tables are made out of wood, cuddly toys are made out of fur.	that float and sink and talk about the forces that they can feel.	simple equipment.		<p>or pull force is applied, describing forces in action and whether the force requires direct contact or whether the force can act at a distance (magnetic force).</p> <p>NC: describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> <p>NC: construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>NC: identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.</p>	<p>work based on whether or not the circuit is a complete loop and has a battery or cell.</p> <p>Investigate and compare a range of magnets (bar, horseshoe and floating) and explain that magnets have two poles (north and south) and that opposite poles attract each other, while like poles repel each other.</p>	gravity.	<p>volume of a buzzer is affected by the number and voltage of cells used in a circuit.</p> <p>NC: Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.</p> <p>NC: use recognised symbols when representing a simple circuit in a diagram.</p>
Vocabulary							
float, sink, on, off	water's surface, vessel	temperature, thermometer, wind direction, force, rainfall	light, hollow, heavy, dense, moving parts that use levers, sliders, wheels, axles	<p>pushing force, poles, pulling force, magnetic force, cells, wires, lamps, motors, switches, buzzers, attract</p> <p>magnetic metal, magnetic field</p>	<p>electricity, power, battery, buzzer, cell, circuit, complete circuit, component, crocodile clip, electric current, lamp, LED, light-emitting diode, motor, series circuit, switch, wire</p>	<p>spherical, geocentric, heliocentric model</p> <p>gravity, gravitational pull, machine, levers, pulley, gears, daytime, nighttime, air resistance, water resistance, friction</p>	voltage, volts, electrons, lamp, buzzer, motor
Light and Sound							
Substantive knowledge							
Understanding that wearing hats and sunscreen will keep us safer in the sun.	Ways to stay safe include staying safe in strong sunlight (sun cream, sun hat and sunglasses).		<p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <p>Recognise light is reflected from surfaces.</p>	<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</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>	Understanding that wearing hats and sunscreen will keep us safer in the sun.

			Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object Find patterns in the way that the size of shadows change.	Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.		Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	
Vocabulary							
	Eyes, sight, light, sun Ear, sound, hearing			source of light, darkness, reflect, mirror, translucent, transparent, opaque, shadow	Vibration, volume, pitch		Prism, periscope
Materials and Properties							
Substantive							
Different materials can be used for different things.	Some materials are magnetic. Some materials are non-magnetic	Materials have different properties.	NC: A material's physical properties make it suitable for particular purposes. NC: Many materials are used for more than one purpose.	NC: Some materials have magnetic properties. NC: Magnetic materials are attracted to magnets. All magnetic materials are metals but not all metals are magnetic. Iron is a magnetic metal.	NC: Electrical conductors allow electricity to flow through them, whereas insulators do not. NC: Common electrical conductors are metals. NC: Common insulators include wood, glass, plastic and rubber. NC: Sound waves travel through a medium to the ear, such as air or water. When an instrument is played, the air around or inside it vibrates. Sounds are louder closer to the sound source and fainter as the distance from the sound source increases.	NC: Some materials will dissolve in liquid to form a solution. NC: Some mixtures can be separated by filtering, sieving and evaporating. A material's properties dictate what it can be used for.	Mirrors and lenses are used in a range of everyday objects, cars and on roads.
Disciplinary knowledge							
Make simple comparisons between objects and materials, such as bigger and smaller, and softer and harder.	Compare and group objects and materials according to simple given criteria.	NC: distinguish between an object and the material from which it is made. NC: Identify , name and	Describe how some objects and materials can be changed and how these changes can be desirable or undesirable.	NC: Identify, compare and group rocks based on their appearance, properties or uses.	NC: Identify common appliances that run on electricity. NC: Observe and explain	NC: Compare and group together everyday materials on the basis of their properties, including their hardness,	Describe , using diagrams, how light behaves when reflected off a mirror (plane, convex or concave) and when

		<p>describe a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p> <p>NC: Compare and group materials in a variety of ways, such as based on their physical properties; being natural or man-made and being recyclable or non-recyclable.</p>	<p>NC: Comparing the uses of everyday materials in and around the school with materials found in other places.</p> <p>NC: observing closely, identifying and classifying the uses of different materials, and recording their observations.</p>	<p>NC: Compare and group materials based on their magnetic properties.</p> <p>NC: Compare how things move on different surfaces.</p>	<p>that some materials change state when they are heated or cooled and measure or research the temperature in degrees Celsius (°C) at which materials change state.</p> <p>NC: Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>NC: Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> <p>NC: Identify how sounds are made, associating some of them with something vibrating.</p> <p>NC: Recognise that sounds get fainter as the distance from the sound source increases.</p> <p>NC: Compare and find patterns in the pitch/volume of a sound, using a range of equipment, such as musical instruments (links to the ear).</p>	<p>solubility, transparency, conductivity (electrical and thermal), and response to magnets.</p> <p>Compare common household equipment and appliances that are and are not powered by electricity.</p> <p>NC: Explain that some materials will feel hotter than others when a heat source is placed against them.</p> <p>NC: Describe how to recover a substance from a solution.</p> <p>NC: Identify how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>NC: Identify, demonstrate and compare reversible and irreversible changes.</p> <p>NC: 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>passing through a lens (concave or convex).</p>
--	--	---	--	--	---	--	--

Vocabulary

hard, soft	bendy, waterproof, metal, glass, wood, magnetic, non-magnetic	stretchy or stiff, rough or smooth, opaque or transparent; bendy or rigid, waterproof or not waterproof brick, paper, fabrics, elastic, foil.	window, brick, cutlery, cars, purpose, absorbent twist, squash, rigid, push, pull, flexible, stretch, twist, squash, bend, stretch	alloy, cobalt, ferrofluid, ferrous, iron, metal, nickel, steel	conductor, insulator, boiling point, condensation, condense, cool, freeze, heat, melt, reversible, water vapour	separate, evaporate, filtering, sieving and evaporating, solute, solution, solvent, burning, rusting	telescopes, periscopes
------------	---	--	--	--	---	--	------------------------

Additional evidence of progression

Questioning

Ask or answer	Ask a relevant	NC: Ask simple scientific	NC: Ask and answer scientific	NC: Ask questions about the	Ask relevant scientific	Make predictions and ask a	Ask and answer deeper
----------------------	-----------------------	----------------------------------	--------------------------------------	------------------------------------	--------------------------------	-----------------------------------	------------------------------

a simple scientific question.	scientific question to find out more, explain how things work and why they might happen.	questions.	questions about the world around them.	world around them and explain that they can be answered in different ways.	questions , independently, about the world around them and begin to identify how they can answer them.	wide range of relevant scientific questions that broaden their understanding of the world around them and identify how they can answer them.	and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge.
Measurement							
Place two to three items in order based on length, height or capacity.	With support, use simple equipment, such as timers, rulers and containers, to measure length, height, capacity and time.	NC: With support, use simple equipment to measure and make observations .	NC: Use simple equipment to measure and make observations .	NC: Take measurements in standard units, using a range of simple equipment .	Take accurate measurements in standard units, using a range of equipment .	Take increasingly accurate measurements in standard units, using a range of chosen equipment, controlling variables where necessary.	Take accurate, precise and repeated measurements in standard units, using a range of chosen equipment .
Data							
Begin to offer simple explanations for why things happen.	Represent scientific observations by mark making, drawing or creating simple charts and tables. Offer explanations for why things happen, making use of vocabulary, such as, because, then and next. Record data in simple tables and pictograms.	NC: With support, gather and record simple data in a range of ways (data tables, diagrams, Venn diagrams). NC: perform simple tests to find the best materials for certain items.	NC: Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.	NC: Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy.	Gather, record, classify and present observations and measurements in a variety of ways (pictorial representations, timelines, diagrams, keys, tables, charts and graphs).	Gather and record data and results of increasing complexity, selecting from a range of methods (scientific diagrams, labels, classification keys, tables, graphs and models). NC: Give reasons, based on evidence from comparative and fair tests , for the particular uses of everyday materials, including metals, wood and plastic.	Choose an appropriate approach to recording accurate results , including scientific diagrams, labels, timelines, classification keys, tables, models and graphs (bar, line and scatter), linking to mathematical knowledge. NC: Identifying scientific evidence that has been used to support or refute ideas or arguments.