

Progression of Scientific Knowledge

Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop 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



	Not taught in this year group.
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	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Animals including humans	NC Statements	<p>*To understand the need to respect and care for the natural environment and all living things. Understand the key features of the life cycle of animals (humans).</p>	<p>*Know the names of body parts and their function *Name some body parts of animals and minibeasts *Know what we can do to keep us healthy – exercise, healthy eating, cleaning teeth, limiting screen time</p> <p>*Understand the need to show respect for animals and the natural world. *Describe what they can see, hear and feel when outside.</p> <p>Talk /order some life cycles such as a butterfly, chick, frog etc</p>	<p>* Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals * Identify and name a variety of common animals that are carnivores, herbivores and omnivores * Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) * 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>* Notice that animals, including humans, have offspring which grow into adults * Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) * Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<p>*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. *Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>	<p>* Describe the simple functions of the basic parts of the digestive system in humans * Identify the different types of teeth in humans and their simple functions * Construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<p>*Describe the changes as humans develop to old age.</p>	<p>*Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. *Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. *Describe the ways in which nutrients and water are transported within animals, including humans.</p>

	Objectives		<p>*Animals, minibeasts and humans have some different body parts that are the same and some that are different.</p> <p>*Humans need to stay healthy and can do this in lots of different ways – exercise, hygiene, healthy eating</p>	<p>*Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them.</p> <p>*Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals</p>	<p>*Animals, including humans, have offspring which grow into adults. *In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults.</p> <p>*The young of some animals do not look like their parents e.g. tadpoles.</p> <p>*All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive.</p> <p>*To grow into healthy adults, they also need the right amounts and types of food and exercise. *Good hygiene is also important in preventing infections and illnesses.</p>	<p>*Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need.</p> <p>*Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy.</p> <p>*A piece of food will often provide a range of nutrients.</p> <p>*Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.</p>	<p>*To identify animals as carnivores, herbivores and omnivores.</p> <p>* Construct food chains and pyramids – consolidate food group names</p> <p>* Identify all teeth groups and functions</p> <p>* Explore how to keep teeth healthy</p> <p>* Identify all organs in digestive system – label a diagram</p> <p>* Describe the function of the organs within the digestive system</p>	<p>To recognise the stages of growth and development in humans from gestation to old age</p> <p>* To know how babies are made</p> <p>* To recognise the stages of development in childhood – newborn, toddler, child</p> <p>* To understand the initial changes inside outside the body during puberty</p> <p>* To know the changes during puberty for girls and boys</p> <p>* To understand how the body changes during adulthood and old age</p>	<p>* To find out how scientific ideas about food and diet were tested in the past and how this has contributed to our knowledge of a balanced diet.</p> <p>* To investigate some different food groups and find out why a variety of foods is important for a healthy diet – using all food group titles and knowing what their function within the body is.</p> <p>* The circulatory system transports water and nutrients around the body – the function of the lungs, heart, circulatory system, the make up of the heart and our pulse.</p> <p>*The need for exercise, the function of the heart during exercise</p> <p>* Smooth, cardiac and skeletal muscles – names of biceps / triceps, obliques, gluteal, quadriceps</p> <p>* Prescribed drugs and illegal drugs -the effect of alcohol and tobacco on the body including long term effects</p>
	Vocabulary	Human, minibeast, animal,	healthy, exercise, head, arms, legs, body, names of some minibeasts	Fish, Reptiles, Mammals, Birds, Amphibians Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak Herbivore, Omnivore, Carnivore,	water, air, food, adult, baby, kitten, calf, puppy, exercise, offspring, life cycles, grow, change, adults, basic needs, water, food, survival, food types (fruit and veg, bread, rice, pasta, milk, dairy, foods high in fat and sugar, meat, fish, eggs, beans), hygiene	Movement, Muscles, Bones, Skull, Nutrition, Skeletons,	Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar	Baby, Toddler, Teenager, Elderly, Growth, Development, Foetus, Embryo, Womb, Gestation, Puberty	Heart, Blood Vessels, Veins, Arteries, Valve, Exercise, Respiration Circulatory, Oxygenated, Deoxygenated,
	Scientists		Daniella Dos Santos - vet	Prem Singh Gill – polar scientist	Jemma Dias – animal behaviour in zoos	Chris Packham	Dawood Qureshi Marine Biologist	David Attenborough	Dr Ben Woodcock – ecological entomologist

<p style="text-align: center;">Living things and their habitats</p>	<p style="text-align: center;">NC Statements</p>	<p>*Begin to understand the need to respect and care for the natural environment and all living things. *Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world</p>	<p>*Explore scientific experimentations *Talk about things they have observed. *Recognise some environments that are different to the one they live in. *Show care and concern for living things. *Make observations about the natural world</p>		<p>* Explore and compare the differences between things that are living, dead, and things that have never been alive * 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 * Identify and name a variety of plants and animals in their habitats, including microhabitats * 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>* Recognise that living things can be grouped in a variety of ways * Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment * Recognise that environments can change and that this can sometimes pose dangers to living things</p>	<p>*Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. *Describe the life process of reproduction in some plants and animals</p>	<p>*Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. *Give reasons for classifying plants and animals based on specific characteristics.</p>

	Objectives	<p>*Living things need to be looked after.</p> <p>*Living things can be found in our school environment</p>	<p>*Minibeasts help humans – bees make honey, worms help the soil</p> <p>*Minibeasts can be found in different places in our environment.</p>		<p>*All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.)</p> <p>*An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels).</p> <p>*Animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water.</p> <p>*Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain.</p>		<p>*Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things.</p> <p>*Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year</p>	<p>*As part of their life cycle, plants and animals reproduce.</p> <p>*Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg.</p> <p>*Animals, including humans, have offspring which grow into adults.</p> <p>* In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults.</p> <p>*In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults.</p> <p>*Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis.</p> <p>*Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent.</p> <p>*Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.</p>	<p>* Living things can be formally grouped according to characteristics.</p> <p>*Plants and animals are two main groups but there are other living things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms.</p> <p>*Plants can make their own food whereas animals cannot.</p> <p>*Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates).</p> <p>*Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics.</p> <p>*Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms.</p> <p>*Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.</p>
	Vocabulary	Minibeast, animals, home	Minibeasts, animals habitat, home		living, dead, never been alive, names of local habitats, woodland, meadow, name micro habitats, under log, stony path, under bushes depend, food, food chain, shelter, predator, prey,		Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats	Mammal, Reproduction, Insect, Amphibian, Bird, Offspring	Classification, Amphibians, Reptiles, Mammals, Insects, Vertebrates, Invertebrates, Micro-organisms,

	Scientists		Entomologists at zoos		Dawood Qureshi		Tanesha Aleen	Sylvia Earle Rachel Carson	Carl Linnaeus
Plants	NC Statements	*To understand the need to respect and care for the natural environment and all living things. *Plant seeds and care for growing plants.	*Name parts of a plant or tree	* Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees * Identify and describe the basic structure of a variety of common flowering plants, including trees	* Observe and describe how seeds and bulbs grow into mature plants * Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	*Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; leaves; and flowers. *Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. *Investigate the way in which water is transported within plants. *Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			

	Objectives	<p>*Plants can grow from seeds</p>	<p>*Plants and trees have different parts that do a different job. *Plants can grow from seeds *Plants need water and sunlight to grow</p>	<p>*Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. *Plants have common parts, but they vary between the different types of plants. *Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.</p>	<p>*Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. *Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy.</p>	<p>*Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. *The roots absorb water and nutrients from the soil and anchor the plant in place. *The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. *The leaves use sunlight and water to produce the plant's food. *Some plants produce flowers which enable the plant to reproduce. *Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. *Different plants require different conditions for germination and growth.</p>			
	Vocabulary	Seed, plant, flower	Stem, branch, leaf, flower, trunk, roots	Names of: wild plants, garden plants, flowering plants, trees, Trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem Deciduous, Evergreen	seeds, bulbs, water, light, growth, healthy, shoot, seedling, germinate	Air, Light, Water, Soil, Flower Nutrients, Dispersal, Pollination, Reproduction, Transportation,			
	Scientists		Gardeners	Careers in horticulture	Poppy Okotcha	Angie Burnett			

Seasonal changes Weather and Climate Light and Dark	NC Statements	<ul style="list-style-type: none"> *Begin to talk about what they see (light and dark) 	<ul style="list-style-type: none"> *Explore the natural world around them. *Understand the effect of changing seasons on the natural world *Understand changes in the natural world such as day and night. *Identify and name different types of weather. *Talk about the different seasons. *Can link different types of weather to different seasons. 	<ul style="list-style-type: none"> * Observe changes across the 4 seasons * Observe and describe weather associated with the seasons and how day length varies 	<ul style="list-style-type: none"> *Observe and describe weather *Investigate climate change 				
	Objectives	<ul style="list-style-type: none"> *It gets dark at night and is light during the day *We can do different activities depending on if it is day or night. 	<ul style="list-style-type: none"> *There are 4 seasons in the year. *The weather changes depending on the season. Winter – colder, snowy, darker earlier Spring – getting warmer, sunny and rainy, getting light Summer – hotter, lighter later Autumn – windy, colder, getting darker 	<ul style="list-style-type: none"> *A natural light source is one which you find naturally in the world, humans don't make or create it. *A man-made light source is one which humans have created. Often it is powered by electricity or batteries. *A nocturnal animal is one which sleeps during the daytime and is awake and looking for food at night. *A diurnal animal is one which is awake during the day and asleep at night, like humans. *Shadows are created when a source of light shines on an object, but the light is blocked and does not pass through it. The size of the shadow can change depending on how close the object is to the light source. *Know that darkness is the absences of light *Recognise the dangers of the Sun – sunburn, eyesight *The weather, light/dark animals change through the seasons. 	<ul style="list-style-type: none"> *Meteorologists use rain gauges effectively to predict rainfall. *Items can be sorted based on their materials for recycling *Reduce, reuse and recycle can be used to encourage recycling. *Sources of renewable energy include solar, wind, geothermal, biomass and hydropower. 				
	Vocabulary	Light, dark	Summer, Spring, Autumn, Winter, Weather – rain, snow, sun, cloud, frost	Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark Weather - rain, snow, sun, cloud, frost, foggy, misty, drizzle, hail stones					

	Scientists		Lucy Martin – weather presenter	Liam Dutton - Meteorologist	Prem Singh Gill – Polar Scientist				
Materials	NC Statements	<p>*Use all their senses in hands on- exploration of natural materials</p> <p>*Talk about the differences between materials and changes they notice</p>	<p>*Talk about why some things happen e.g. melting, freezing, floating, sinking</p> <p>*Talk about changes of states such as freezing and melting.</p>	<p>Everyday materials</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>* 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>	<p>Uses of everyday materials</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>* Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>		<p>States of Matter</p> <p>* Compare and 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, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>* Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>Properties and changes in materials</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>*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>*Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</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>	

Core Knowledge		<p>*Some objects float and some sink. *Water can freeze and melt *Some food items can change form liquids to solids and solids to liquids and back again. Water, jelly, chocolate *Some materials are waterproof and some are not.</p>	<p>*All objects are made of one or more materials. *Some objects can be made from different materials e.g. plastic, metal or wooden spoons. *Materials can be described by their properties e.g. shiny, stretchy, rough etc. * Some materials e.g. plastic can be in different forms with very different properties.</p>	<p>*All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. *When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. *A material can be suitable for different purposes and an object can be made of different materials. *Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness.</p>		<p>*A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. *Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. *Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. *Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as</p>	<p>*Materials have different uses depending on their properties and state (liquid, solid, gas). *Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. *Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. * Mixtures can be separated by filtering, sieving and evaporation. *Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible</p>	

Rocks							precipitation. This is the water cycle.		
	Vocabulary		Freeze, melt, float, sink, change	Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth	Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil, Waterproof, Absorbent, Opaque, Transparent		Solid, Liquid, Gas, Temperature, Freezing, Heating, Series, Conductors, Insulators	Hardness, Magnetic, Filter, Mixing, mixture, reversible, irreversible Solubility, Transparency, Conductivity, Evaporation, Dissolving, solute, solution,	
	Scientists			Raquel Prado	Dunlop, Macintosh McAdam		Delphine Lebrun	Dr Pearl Agyakwa	
Rocks	NC Statements					Rocks and Soils *Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. *Describe in simple terms how fossils are formed when things that have lived are trapped within rock. *Recognise that soils are made from rocks and organic matter.			

	Core Knowledge					<p>*Rock is a naturally occurring material.</p> <p>*There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders).</p> <p>*Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil.</p> <p>*Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.</p>			
	Vocabulary					<p>Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent</p>			
	Enrichment					<p>Teesmouth Field Centre fieldwork and scientific experiments</p> <p>STEM scientist to visit and discuss topic and careers in geology.</p>			
	Scientists					<p>Mary Anning</p>			



Light and Sound	NC Statements					<p>Light Recognise that they need light in order to see things, and that dark is the absence of light. *Notice that light is reflected from surfaces. *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</p>	<p>Sound * Identify how sounds are made, associating some of them with something vibrating * Recognise that vibrations from sounds travel through a medium to the ear * 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</p>		<p>Light *Recognise that light appears to travel in straight lines. *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. *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.</p>
	Core Knowledge					<p>*We see objects because our eyes can sense light. *Dark is the absence of light. We cannot see anything in complete darkness. *Some objects, for example, the sun, light bulbs and candles are sources of light. * Objects are easier to see if there is more light. Some surfaces reflect light. *Objects are easier to see when there is less light if they are reflective. * The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. *Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. *The size of the shadow depends on the position of the source, object and surface.</p>	<p>*A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). *The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. *The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. *Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.</p>		<p>*Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen. *Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.</p>
	Vocabulary					Light, Shadows, Mirror, Dark, Reflective, Reflection	Volume, Vibration, Speaker, Wave, Pitch, Tone,		Light, Spectrum, Rainbow, Colour, Refraction, Reflection

	Scientists					Isaac Newton	Evelyn Glennie		Professor Colin Webb
Forces and magnets	NC Statements	*Explore collections of materials with similar and/or different properties.	*Talk about why some things happen – pushing and pulling			Forces and magnets *Compare how things move on different surfaces. *Notice that some forces need contact between two objects, but magnetic forces can act at a distance. *Observe how magnets attract or repel each other and attract some materials and not others. *Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. *Describe magnets as having two poles. *Predict whether two magnets will attract or repel each other, depending on which poles are facing		Forces *Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. *Identify the effects of air resistance, water resistance and friction that act between moving surfaces. *Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	

	Core Knowledge	<p>*Magnets can stick to some objects and not to others. *Toy cars can move down a ramp by themselves.</p>	<p>*Objects/water can move downhill independently if nothing is in the way. *Objects need help to go uphill.</p>			<p>*A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. *A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract. *For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts</p>		<p>*A force causes an object to start moving, stop moving, speed up, slow down or change direction. *Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. *Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. *A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. *Pulleys, levers and gears are all mechanisms, also known as simple machines.</p>	
	Vocabulary					Contact, Poles, Push, Pull Magnetic, Force, Attract, Repel, Friction,		Air resistance, Water resistance, Friction, Gravity, Gears, Pulleys, Newton,	
	Scientists					William Gilbert		Isaac Newton	

Electricity	NC Statements						<ul style="list-style-type: none"> * Identify common appliances that run on electricity * Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers * 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 * Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit * Recognise some common conductors and insulators, and associate metals with being good conductors 		<ul style="list-style-type: none"> *Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. *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. *Use recognised symbols when representing a simple circuit in a diagram.
	Core Knowledge						<ul style="list-style-type: none"> *Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. *An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. *A switch can be added to the circuit to turn the component on and off. *Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). *Water, if not completely pure, also conducts electricity. 		<ul style="list-style-type: none"> *Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. *If you use a battery with a higher voltage, the same thing happens. *Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. *Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. *You can use recognised circuit symbols to draw simple circuit diagrams.
	Vocabulary						<p>Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators</p>		<p>Wires, Bulbs, Switches, Buzzers, Battery, Cells, Circuit, Series, Conductors, Insulators, Amps, Volts,</p>

Evolution and inheritance	Scientists		Astronauts – Tim Peake and Jessica Meir					Mae Jemison Dr Maggie Aderin- Pocock Dr Karen Aplin	
	NC Statements								<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>

	Core Knowledge																		<p>*All living things have offspring of the same kind, as features in the offspring are inherited from the parents.</p> <p>*Due to sexual reproduction, the offspring are not identical to their parents and vary from each other.</p> <p>*Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die.</p> <p>*If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution.</p> <p>*Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.</p>
	Vocabulary																		

	Scientists									Charles Darwin Rosalind Franklin Telma G. Laurentin – evolutionary biologist
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