

St Barnabas CE Primary School - Science LTP & Knowledge Progression - Rotation B 2021/2022

	Autumn 1 B	Autumn 2 B	Spring 1 B	Spring 2 B	Summer 1 B	Summer 2 B
EYFS	Use of Everyday Materials 2 Seasonal Changes Autumn/winter		Animals including humans 2	Living things and their habitats 2	Plants 2	
Year 1						
Year 2						
Possible cross-curricular links (English) Additional links to follow	EYFS: Polar Express - Seasonal changes Year two: The trouble with trolls (why are Treva's belongings made from certain materials) - Materials		EYFS: Three little pigs, The Gruffalo, Owl babies Year one: Three little wolves and the big bad pig, into the forest, where the wild things are Year two: A bear called Paddington (Peru)	EYFS: Goldilocks and the three bears (link to the woods) Year one: The red tree Little red riding hood (link to the woods) Year two: Red riding hood (link to the woods)		
Working scientifically Statutory requirements	Year one and two 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: <ul style="list-style-type: none"> • 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. 					
Knowledge progression	All objects are made of one or more materials. These are chosen because they have suitable properties. E.g children should be able to explain that we use plastic to make water bottles because it is see-through allowing you to see the drink inside and waterproof so that it holds the water. One kind of material can be suitable for many different purposes.	The year is divided into four parts according to the weather, each part is called a season. Our seasons are called summer, autumn, winter and spring. Children know that in the UK, the day length is longest in summer (about 16 hours) and gets shorter each day until winter (about 8 hours) before getting longer again.	Animals, including humans, reproduce and have offspring which grow into adults. Reproduction is when living things (animal or plant) make new living things of the same kind. Offspring is the child of an animal (including humans). In humans and mammals, these offspring will be young, such as babies or kittens,	Children know that all objects are either living, dead or have never been alive <i>Living things are plants (including seeds) and animals.</i> <i>Dead things include dead animals and plants as well as parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers.</i> <i>An object made from wood is dead.</i> <i>Objects made from rock, metal and plastic have</i>	Plants may grow from either seeds or bulbs. (A seed/bulb is the part of a flowering plant that can develop into a new plant.) Seeds or bulbs germinate (this is when a seed turns into a very small plant). When a seed germinates it grows into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds. Plants need water, space, suitable temperature and light to grow. But all plants need different amounts of these things.	

	<p>Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. e.g clay.</p>	<p>Children also know that the weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer.</p> <p>Children can also describe other changes in the seasons. For example: numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people.</p>	<p>that grow into adults.</p> <p>In other animals there are more stages e.g egg > chick > chicken.</p> <p>The young of some animals do not look like their parents e.g tadpoles.</p> <p>All animals including humans have three basic needs to survive: feeding, drinking and breathing.</p> <p>To grow into healthy adults, we need the right amounts and types of food. Exercise and hygiene are also important in keeping our bodies healthy and preventing infections.</p>	<p><i>never been alive.</i></p> <p>Animals and plants live in a habitat which provides the basic needs of the animals and plants - shelter, food and water.</p> <p>Within a habitat there are always 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 and this affects which plants and animals live there.</p> <p>The way that animals obtain their food from plants and other animals can be shown in a food chain.</p>	
<p>Key vocabulary</p>	<p>Names of materials - wood, metal, plastic, glass, brick, rock, paper, cardboard.</p> <p>Properties of materials - hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, reflective, non-reflective, flexible, rigid.</p> <p>Shape - push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching.</p>	<p>Weather - sunny, rainy, windy, snowy etc.</p> <p>Seasons - winter, summer, spring, autumn.</p> <p>Sun, sunrise, sunset, day, length.</p>	<p>Offspring, reproduction, growth, child, young/old stages (examples: chick/hen, baby/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples: meat, fish, vegetables, bread, rice, pasta).</p>	<p>Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed.</p> <p>Names of local habitats e.g. pond, woodland etc.</p> <p>Names of micro-habitats e.g. under logs, in bushes etc.</p>	<p>Light, sun, shade, warm, cool, water, grow, healthy, leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, germinate, seedling, mature plant.</p>

Year 3	States of matter: SLG and water cycle 4	Electricity: circuits, conductors and insulators 4	Plants: parts and functions, water transport and life cycles 3	Animals including humans: teeth and digestion 4	Sound 4	Animals including humans: skeleton and muscles 3
Year 4						
Possible cross-curricular links (English) Additional links to follow	Nim's island - tropical water cycle				Firework Maker's daughter	
Working scientifically Statutory requirements	<p>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:</p> <ul style="list-style-type: none"> • 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. 					
Knowledge progression	<p>Children understand the differences between solids, liquids and gases: <i>A solid keeps its shape and has a fixed volume</i> <i>A liquid will always change its shape to fit a container. A liquid can be poured and keeps a level surface.</i> <i>A gas fills all available space; it has no fixed shape.</i></p> <p>Children know that granular and powdery solids (like sand) are not liquids. Although they</p>	<p>Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. Children should be able to give examples of both types.</p> <p>An electrical circuit consists of a cell (or battery) connected to a component using wires.</p> <p>Children can identify cells, wires, bulbs, switches and buzzers in a circuit.</p>	<p>Many plants have roots, stems (trunk), leaves and flowers.</p> <p><i>The root absorbs water and nutrients from the soil and anchors the plant in place.</i></p> <p><i>The stem/trunk transports water and nutrients/minerals around the plant. It also holds the leaves and flowers up in the air.</i></p> <p><i>The leaves use sunlight and water to produce the plant's food.</i></p> <p><i>Some plants produce flowers (or blossom)</i></p>	<p>Children can identify the basic process of the digestive system in humans:</p> <ul style="list-style-type: none"> - Food enters the body - Digestion starts when the teeth break food down - Saliva is added - Food is swallowed and passes down the oesophagus to the stomach - In the stomach food is broken down further - Food passes to the small intestine. Here nutrients are removed 	<p>A sound produces vibrations which travel from the source to our ears through a medium.</p> <p>Solids, liquids and gases (mediums) can carry sound, but sound cannot travel through a vacuum (an area empty of matter)</p> <p>The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound.</p>	<p>Plants can make their own food but animals cannot and need to eat in order to get the nutrients they need.</p> <p>A piece of food will often provide a range of nutrients. Children should be able to understand the basic roles of the different nutrient types:</p> <ul style="list-style-type: none"> - Carbohydrates/ fats = provide energy - Vitamins and minerals = keep us healthy

	<p>can be poured, they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid.</p> <p>Children can identify the key changes of state of materials (melting, freezing, boiling, evaporation and condensation)</p> <p>Children can describe the water cycle (precipitation):</p> <ol style="list-style-type: none"> 1, Surface water evaporates 2, rises and cools condensing into clouds 3, water droplets fall down as rain/snow/sleet etc. and drain back into rivers/ponds/lakes/sea. 	<p>If there's a break in the circuit, a loose connection or no cell included in the circuit, the component (bulb/buzzer/motor) will not work.</p> <p>A switch can open or close a circuit. When we add a switch to a circuit we can use them to turn a component on or off.</p> <p>Metals are good conductors so they can be used as wires</p> <p>Non-metallic solids are insulators (except for graphite)</p> <p>Water (if not pure) also conducts electricity.</p>	<p><i>which enables them to create seeds. This allows them to reproduce.</i></p> <p>Plants require room to grow, air, light, water and nutrients from soil in order to grow and survive.</p> <p>Water is transported through the roots and into the stem/trunk before reaching the leaves.</p> <p>Children understand the basic processes involved in a plant's life cycle (pollination, fertilisation and seed dispersal)</p>	<p>- The rest of the food passes to the large intestine. Here water is removed</p> <p>- What is left is stored in the rectum and leaves the body when you go to the toilet.</p> <p>Humans have four types of teeth: incisors, canines and molars.</p> <p>Living things can be classified as producers, predators and prey according to their place in the food chain.</p> <p>Producer: Plants get their energy from the Sun. They are called producers because they make their own food.</p> <p>Consumer: Animals are called consumers because they do not make their own food. They have to eat plants and other animals.</p> <p>Predator: Animals that eat other animals are called predators.</p> <p>Prey: The animals predators eat are called prey.</p>	<p>The loudness (volume) of the sound depends on the strength (size) of vibrations.</p> <p>Sounds decrease in volume as you move away from the source.</p> <p>A sound insulator is a material which blocks sound effectively.</p> <p>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>- Protein = helps us grow and repair our muscles</p> <p>- Fibre = helps us digest the food we have eaten</p> <p>Children can identify some basic foods which can correspond with these nutrient types. E.g. bread= carbohydrate / cheese = fat + protein/ chicken = protein</p> <p>Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.</p> <p>Children can identify the key bones in the human skeleton: skull/ spine / ribcage/ tibia/ fibula/ femur/ radius/ ulna/ humerus</p> <p>Children be able to explain that skeletons do three important jobs: - protect organs inside the body -allow movement; - support the body and stop it from falling on the floor.</p>
<p>Key vocabulary</p>	<p>Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle</p>	<p>Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, broken circuit, component, cell, battery, positive, negative, connect/connections,</p>	<p>Pollen, insect/wind pollination, seed formation, seed dispersal, roots, stems, trunks, leaves, flowers, absorb, nutrients, transport</p>	<p>Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, teeth, incisor, canine, molar, premolars, herbivore, carnivore,</p>	<p>Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation</p>	<p>Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints,</p>

		loose connection, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol.		omnivore, consumer, producer, predator, prey, food chain		skull, ribcage, tibia, fibula, femur, radius, ulna, humerus
Year 5	Properties and changes of materials 5	Electricity: symbols and circuits 6	Living things and their habitats: life cycles and reproduction 5	Evolution and inheritance 6		
Year 6						
Possible cross-curricular links (English) Additional links to follow		Cosmic (link to electrical systems in spacecraft)				
Working scientifically Statutory requirements	<p>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:</p> <ul style="list-style-type: none"> 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. 					
Knowledge progression	<p>• Children can identify the key properties of materials and can compare and group them based on these properties:</p> <ul style="list-style-type: none"> - <i>Hard: a material that is resistant to scratching.</i> - <i>Soluble: a material which will dissolve in a liquid.</i> - <i>Insoluble: a material which will not dissolve in a liquid.</i> 	<p>Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound.</p> <p>If you use a battery with a higher voltage, the same thing happens.</p> <p>Adding more bulbs to a circuit will make each bulb less bright.</p>	<p>As part of their life cycle, plants and animals reproduce.</p> <p>All animals, including humans, have offspring which grow into adults.</p> <p>Mammal offspring will be born live, such as babies or kittens, and then grow into adults.</p> <p>Amphibians, insects and birds will lay eggs that hatch to young which then grow to adults.</p>	<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.</p> <p>If the environment changes rapidly, some variations of a species may not suit the new environment and will die.</p>		

	<p>- <i>Transparent: a material which light can travel through.</i></p> <p>- <i>Electrical conductor: a material which allows electricity to pass through it easily.</i></p> <p>- <i>Thermal conductor: a material which allows heat to pass through it easily.</i></p> <p>- <i>Electrical insulator: a material which will not allow electricity to pass through it.</i></p> <p>- <i>Thermal insulator: a material which will not allow heat to pass through it easily.</i></p> <p>- <i>Magnetic: a material which will respond to a magnet.</i></p> <p>Materials have different uses depending on their properties and state (liquid, solid, gas).</p> <p>Materials that are soluble will dissolve in a liquid and form a solution.</p> <p>To recover a material from a solution you must use evaporation.</p> <p>Materials that are insoluble will not dissolve in a liquid and will create a mixture.</p> <p>To recover a material from a mixture you can use evaporation, filtering or sieving.</p> <p>We can change materials. Some changes</p>	<p>Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter.</p> <p>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.</p> <p>Children can use recognised circuit symbols to draw simple circuit diagrams.</p>	<p>Some amphibians and insects undergo a further change in between being an egg and before becoming adults e.g. caterpillars to butterflies / tadpole to frog. This is called a metamorphosis.</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>Scientists such as Darwin observed how living things adapt to different environments to become distinct varieties with their own characteristics.</p> <p>Children can give examples of evolved species e.g. Darwin's finches.</p> <p>Fossils give us evidence of what lived on the Earth millions of year ago.</p> <p>They provide evidence to support the theory of evolution.</p>
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	<p>are reversible, others are irreversible.</p> <ul style="list-style-type: none"> - In a reversible change we can always recover the original materials. - In an irreversible change we cannot recover the original materials and a new material is formed (usually gas). <p>Reversible changes include: dissolving, mixing and changes of state (e.g. melting/ freezing/ evaporating)</p> <p>Irreversible changes include: burning wood, rusting and mixing vinegar with bicarbonate of soda.</p>			
<p>Key vocabulary</p>	<p>Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material</p>	<p>Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage</p>	<p>mammal/ amphibian/ insect/ bird/ offspring / fertilises/ metamorphosis</p>	<p>Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils</p>