

# BEING A SCIENTIST



## Whole School Progression Document Science

### Science

Development matters non-statutory guidance  <b>Three and Four Year Olds</b>	Communication and Language	Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"	<b>Marvellous me and my family tree</b> <ul style="list-style-type: none"> <li>Look at the past and present in relation to 'self'- from baby to now</li> <li>Investigate and use construction materials</li> <li>Ask why things happen and how they work</li> </ul> <b>Let's Celebrate</b> <ul style="list-style-type: none"> <li>Exploring light and dark in relation to seasons and celebrations e.g., Bonfire night, Christmas</li> <li>Baking- Christmas cookies/ biscuits/ cakes</li> </ul> <b>Toys/ Bears</b> <ul style="list-style-type: none"> <li>Exploring and describing materials</li> <li>Collecting and sorting toys into simple categories, big, small, hard, soft, shiny, dull, how they work.</li> <li>Tasting porridge with different toppings- Which was your favourite?</li> </ul> <b>Enchanted Garden</b> <ul style="list-style-type: none"> <li>What do plants need to grow? - learning about weather and suitable conditions for growth</li> <li>What do we need to be able grow? Learning about how to keep a healthy body</li> <li>Learning about the development of a seed- carry out growth experiments- Grow cress</li> <li>Children grow fruit, vegetables and seeds themselves. Watch for signs of growth</li> </ul> <b>Minibeasts</b> <ul style="list-style-type: none"> <li>Look for mini beasts in the local grounds and observe their behaviour <sup>[SEP]</sup></li> <li>Compare the different mini-beats and find ways to group them</li> <li>Talk about mini-beast habitats</li> </ul>
	Personal, Social and Emotional Development	Make healthy choices about food, drink, activity and toothbrushing.	
	Understanding the World	Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary. Begin to make sense of their own life-story and family's history. Explore how things work. Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice.	

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			<ul style="list-style-type: none"> <li>Look at lifecycles of a caterpillar.</li> </ul> <p><b>Around the World</b></p>
Development matters non-statutory guidance  <b>Reception</b>	Communication and Language		Learn new vocabulary. Ask questions to find out more and to check what has been said to them. Articulate their ideas and thoughts in well-formed sentences. Describe events in some detail. Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. Use new vocabulary in different contexts.
	Personal, Social and Emotional Development		Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine being a safe pedestrian
	Understanding the World		Explore the natural world around them. Describe what they see, hear and feel while they are outside. Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them.
Statutory Framework <b>Early Learning Goals</b>	Communication and Language	Listening, Attention and Understanding	Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Managing Self	Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
			<ul style="list-style-type: none"> <li>How to be a superhero</li> <li>Explore everyday clothes and name each garment. Discuss the types of materials that would be needed to ensure that the properties match the purpose. Begin to sort and describe different materials</li> <li>Superhero senses: know the 5 senses and relevant body parts.</li> <li>Know about ways to stay healthy</li> <li>Sort and label healthy / unhealthy food</li> <li>Key vocabulary: Senses: touch, taste, smell, sight, hearing. Eyes, nose, mouth, tongue, ears, skin</li> <li>Seasonal changes: Key vocabulary: season, autumn, spring, summer, winter. Months of the year, changes, weather, hot, cold, warm, frost, ice, sun, wind, rain, heat</li> </ul> <p><b>How many buns in the baker's shop?</b></p> <ul style="list-style-type: none"> <li>Seasonal changes / weather</li> <li>Bake Bread. How does dough change when heated? - observe dough rising</li> </ul> <p><b>Whatever Next!</b></p> <ul style="list-style-type: none"> <li>Seasonal changes / weather</li> <li>Day and night, light and dark. Compare the different activities done during the day &amp; at night</li> <li>Read the Letter from the Aliens to the class asking children to find the magnetic items they dropped from their spaceship - sort magnetic and non-magnetic materials</li> </ul> <p><b>What's inside the egg?</b></p> <ul style="list-style-type: none"> <li>Hatching chicks - life cycle of a hen</li> <li>Compare themselves to chicks, similarities/differences.</li> </ul>

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nt			<ul style="list-style-type: none"> <li>• Key vocabulary: egg, chick, hen, incubate, lay, hatch, wings, beak, feathers, yolk, brooder box, incubator, life cycle,</li> </ul>
Understanding the World	The Natural World	<p>Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<p><b>Dinosaurs</b></p> <ul style="list-style-type: none"> <li>• Sort objects and images of objects into 3 categories, living, dead or never alive</li> <li>• Can we humans eat the same food as the dinosaurs? What is a healthy diet for us? Help create a menu of dinosaur theme snacks and smoothies.</li> </ul> <p><b>What's that growing in the garden?</b></p> <ul style="list-style-type: none"> <li>• Ask children to bring in own baby photos - guess who? Compare now and then. When I was a baby I ..... now I.... How have I changed?             <ul style="list-style-type: none"> <li>• Baby, toddler child, adult, grow, change, develop, now, then</li> </ul> </li> <li>• Go on a plant and flower hunt in the local area. Use frames to compare areas of the garden - what did you find in your frame? Was it the same as someone else's? Use tablets for children to record what they have found.</li> <li>• Plant own sunflower seeds. Discuss what might happen to the seeds. - Encourage children to go into nature area and explore other plants. (Remind children of health and safety - not touching berries/ nettles etc.)</li> <li>• Plant different kinds of beans, look at the life cycle of a bean</li> <li>• Name parts of a flowering plant</li> <li>• Look at plants already growing in the garden and compare</li> <li>• Sort different seeds             <ul style="list-style-type: none"> <li>• Flower, leaf, stem, roots, water, soil, light, dark, beans seeds, bulbs, flowers, fruit, vegetables</li> </ul> </li> </ul>

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				<p><b>Pretty Pirates and Powerful Princesses</b></p> <ul style="list-style-type: none"> <li>Investigate floating and sinking objects. Ask children to make predictions as to whether object will float or sink. Does it matter which way round the object is? Can you make some plasticine float?</li> <li>Design and make a boat that floats</li> </ul>
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Year Group	National Curriculum	Sticky Knowledge	Vocabulary	Skills
Y1	<p><b>Seasonal Changes</b> (Taught throughout the year)</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Observe changes across the four seasons</li> <li>Observe and describe weather associated with the seasons and how day length varies.</li> </ul>	<ul style="list-style-type: none"> <li>In the UK we have four seasons. Summer is the hottest, winter is the coldest.</li> <li>The shortest day is in the winter and the longest day is in the summer</li> <li>Seasons change throughout the year because of the way the earth travels around the sun</li> <li>Deciduous trees change throughout the year, with trees shedding their leaves in autumn.</li> </ul>	<p>Season, sun, sky, autumn, winter, spring, summer, day, week, month, year, weather, hot, warm, cool, cold, sunny, cloudy, snowy, rainy, dry, windy, still, light, dark, senses, temperature, day-length, table of results, record, tally, pictogram, block-chart, axis, coordinate.</p>	<p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Remember some simple science facts within a topic</li> <li>Use &amp; remember science words during an activity</li> </ul> <p><b>Classification</b></p> <ul style="list-style-type: none"> <li>Use simple table recording in words and numbers</li> <li>Use a frame to add to pictograms and block charts</li> <li>Add to block charts by counting up</li> </ul>
	<p><b>Plants</b></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</li> <li>Identify and describe the basic structure of a variety of common flowering plants, including trees.</li> </ul>	<ul style="list-style-type: none"> <li>Know the parts of a plant including roots, stem, leaves, bud, flower, petals,</li> <li>Know leaves can be many different shapes and they take in sunlight and use water and food from the roots to make the plant grow.</li> <li>Know the parts of a tree and their function- the trunk is the main body of</li> </ul>	<p>Plant, leaf, stem (trunk, branch), root, flower (petals), bud, fruit, seed, bulb, grow, evergreen, deciduous, spring, summer, autumn, winter, (hibernate), (chlorophyll - green substance in leaves that 'makes' food), sort, group, classify, feature (criteria), spider key.</p>	<p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Remember some simple science facts within a topic</li> <li>Use &amp; remember science words during an activity</li> <li>Add science word labels to diagrams</li> </ul> <p><b>Classification</b></p> <ul style="list-style-type: none"> <li>Sort by using yes/no statements</li> </ul>

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	<p>the tree and the trunk is covered with bark which protects it from damage</p> <ul style="list-style-type: none"> <li>• Know the names of a variety of common wild and garden plants</li> <li>• Know the names of a variety of common trees in the school grounds- silver birch/ ash/ hawthorn/ laurel.</li> <li>• Know the difference between deciduous and evergreen trees</li> <li>• Know we can eat certain plants.</li> </ul>		<ul style="list-style-type: none"> <li>• Group by difference or similarity</li> </ul>
<p><b>Materials</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• Distinguish between an object and the material from which it is made</li> <li>• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</li> <li>• Describe the simple physical properties of a variety of everyday materials</li> <li>• Compare and group together a variety of everyday materials on the basis of their simple physical properties.</li> </ul>	<p><b>Sticky Knowledge</b> Know the uses of different materials-</p> <ul style="list-style-type: none"> <li>• Glass is used for windows (transparent),</li> <li>• Wood is used for furniture</li> <li>• Metal is used for planes, cars, trains- strength</li> <li>• Plastic is used to form any shape such as toys</li> <li>• Brick is used to build houses</li> </ul>	<p><b>Vocabulary</b> Solid, bending, squashing, twisting, stretching, similarity, difference, property, hard/soft, shiny/dull, bendy/not bendy, stretchy/stiff, transparent/opaque, rough/smooth, waterproof/not waterproof, absorbent/not absorbent, metal, plastic, glass, brick, paper, fabric, foil, elastic, wood</p>	<p><b>Skills</b> <b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>• Remember some simple science facts</li> <li>• Use &amp; remember science words during an activity</li> <li>• Add science word labels to diagrams with help</li> </ul> <p><b>Classification</b></p> <ul style="list-style-type: none"> <li>• Sort using yes/no statements</li> <li>• Group by difference or similarity</li> <li>• Link properties of materials to an application</li> </ul>
<p><b>Animals including humans</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</li> <li>• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know the parts of the body: head, neck, shoulder, arm, elbow, hand, wrist, finger, leg, knee, foot, ankle, toe, face, ear, nose, eye, hair, mouth, teeth</li> <li>• Know why we have 5 senses</li> <li>• A mammal has live babies, breathe air, warm blooded and have a backbone</li> <li>• A carnivore is an animal that eats meat:</li> </ul>	<p><b>Vocabulary</b> Animal, vertebrate (backbone), invertebrate (exoskeleton), fish, amphibian, , reptile, bird, mammal, scales, fins, gills, lung, scales, fur, carnivore, herbivore, omnivore, habitat, pet, head, hair, ears, eyes, nose, mouth, tongue, teeth, neck, arm, elbow, shoulder, hands, fingers, leg,</p>	<p><b>Skills</b> <b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>• Remember some simple science facts</li> <li>• Use &amp; remember science words during an activity</li> <li>• Add science word labels to diagrams</li> </ul> <p><b>Classification</b></p> <ul style="list-style-type: none"> <li>• Sort by using yes/no statements</li> <li>• Group by difference or similarity</li> </ul>

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	<ul style="list-style-type: none"> <li>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</li> <li>Describe and compare the structure of a variety of common animals including fish, amphibians, reptiles, birds and mammals, including pets.</li> </ul>	<p>lion, meerkat, polar bear</p> <ul style="list-style-type: none"> <li>A herbivore is an animal that eats plants; elephant, giraffe, zebra, Arctic hare</li> <li>An omnivore is an animal that eats both plants and animals: humans, baboon, Arctic fox</li> <li>Know the key differences between fish, birds, amphibians, reptiles, invertebrates and mammals.</li> </ul>	<p>knee, ankle, feet, toes, sight, hearing, touch, taste, feeling, sort, group, classify, feature (criteria), spider key.</p>	
Y2	<p><b>Living things and their habitats</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Explore and compare the differences between things that are living, dead, and things that have never been alive</li> <li>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</li> <li>Identify and name a variety of plants and animals in their habitats, including micro-habitats</li> <li>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.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>To know that living things grow reproduce, produce waste (excrete) and need nutrition.</li> <li>To know a habitat is a natural environment or home of a variety of plants and animals-it provides the animal with food, water and shelter.</li> <li>To be able to name some different habitats and some animals you would find there.</li> <li>A microhabitat is a very small habitat, for example for woodlice under stones, logs or leaf litter.</li> <li>To know what a food chain is.</li> <li>To be able to name different sources of food.</li> </ul>	<p><b>Vocabulary</b> Living, dead, non-living, movement, respiration, breathing, energy, sensitivity, sight, touch, hearing, smell, taste, growth, reproduction, offspring, excretion, waste, nutrition, habitat, microhabitat, conditions, adapted, adaptation, light, temperature, water, humidity, food chain, feeding, sort, group, classify, criteria, spider key.</p>	<p><b>Skills</b> <b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Use &amp; remember science words over a short time</li> <li>Add science labels &amp; information (with help) to diagrams                             <ul style="list-style-type: none"> <li>Use science to describe &amp; recall what I have seen</li> </ul> </li> </ul> <p><b>Classification</b></p> <ul style="list-style-type: none"> <li>Group by difference, similarity or change</li> <li>Use spider keys with obvious differences</li> </ul>
	<p><b>Uses of everyday materials</b></p> <ul style="list-style-type: none"> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass,</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> </ul>	<p><b>Vocabulary</b> Object, material, wood, metal, plastic, wool, cotton, paper, cork, rock, glass, fabric, ceramic, rope, concrete, brick,</p>	<p><b>Skills</b> <b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>Use a range of equipment correctly</li> <li>Follow short spoken &amp; written instructions</li> </ul>

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	<p>brick, rock, paper and cardboard for particular uses</p> <ul style="list-style-type: none"> <li>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</li> </ul>	<ul style="list-style-type: none"> <li>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</li> </ul>	<p>rubber, sponge, elastic, foil, ice, water, water vapour, property, rigid, bendy (flexible), hard, soft, waterproof, absorbent, warm, cold, rough, smooth, dull, shiny, opaque, transparent, application, solid, liquid, gas, squash, bend, twist, stretch, force, sort, group, classify, criteria, equipment, variable, variable label, cause, effect, investigation, range, method.</p>	<ul style="list-style-type: none"> <li>Identify the cause variable correctly</li> </ul> <p><b>Classification</b></p> <ul style="list-style-type: none"> <li>Use a spider key with obvious differences</li> <li>Group using differences, similarities or changes</li> </ul>
	<p><b>Animals including humans</b></p> <ul style="list-style-type: none"> <li>Notice that animals, including humans, have offspring which grow into adults</li> <li>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</li> <li>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>To know humans have offspring that looks like them. Compare to caterpillar and butterfly.</li> <li>To know that humans and animals need water food and air to survive.</li> <li>To know keeping healthy means caring for our body so we have enough energy to learn, play and grow.</li> <li>Food contains nutrients (link to living things) which we need for our body to stay active.</li> <li>What does 5 a day mean/look like?</li> <li>Sugary foods are bad for your health.</li> <li>We should have 30-60 minutes of exercise each day</li> </ul>	<p><b>Vocabulary</b></p> <p>Baby, offspring, toddler, child, adolescent, teenager, adult, reproduction, growth, water, hydrated, food, nutrition, diet, balanced, air, oxygen, breathing, respiration, exercise, fitness, heart rate, pulse, hygiene, microbes (bacteria, viruses, fungi), number track, number line, division, table of results, cause, effect, pictogram, block, block chart, bar, bar chart, axes, coordinate.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Use &amp; remember science words over a short time</li> <li>Add science labels &amp; information (with help) to diagrams             <ul style="list-style-type: none"> <li>Use science to describe &amp; recall what I have seen</li> </ul> </li> </ul> <p><b>Data, Tables &amp; Graphs</b></p> <ul style="list-style-type: none"> <li>Measure labelled divisions on a number line</li> <li>Use a simple table; record in words and numbers (inc. tally)</li> <li>Construct pictograms and block charts</li> </ul>
Y2	<p><b>Plants</b></p> <ul style="list-style-type: none"> <li>Observe and describe how seeds and bulbs grow into mature plants</li> <li>Find out and describe how plants need water, light and a</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Trees and shrubs take in water and carbon dioxide and give out oxygen- link to humans.</li> </ul>	<p><b>Vocabulary</b></p> <p>Leaf, leaf vein, mid-rib, stem, root, flower, bud, shoot, tap root, side root, seed, bulb, germinate, grow, cotyledon, seedling, adult, water, light,</p>	<p><b>Skills</b></p> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>Suggest what might happen (simple prediction)</li> <li>Follow short spoken &amp; written instructions in order</li> </ul>

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	<p>suitable temperature to grow and stay healthy.</p>	<ul style="list-style-type: none"> <li>• Trees can live for a very long time- the oldest known tree is over 5000 years old.</li> <li>• Trees get their food and water from their roots in the ground.</li> <li>• Leaves take in sunlight.</li> <li>• To know what plants need to grow.</li> </ul>	<p>temperature, survive, reproduction, experiment, variable, observe, measure, cause, effect, comparative test, fair test, method, data range, predict, pattern.</p>	<ul style="list-style-type: none"> <li>• Identify the cause variable correctly</li> </ul> <p><b>Making Conclusions</b></p> <ul style="list-style-type: none"> <li>• Describe features and patterns in data and charts</li> <li>• Describe the changes that have happened</li> <li>• Suggest a different way to do things with help</li> </ul>
<p><b>Y3</b></p>	<p><b>Rocks</b> Links with history topic Stone Age</p> <ul style="list-style-type: none"> <li>• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>• Describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>• Recognise that soils are made from rocks and organic matter.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know that rocks have different attributes</li> <li>• Know that rocks have been used by humans for millions of years, to make early tools and weapons</li> <li>• Know when magma cools and solidifies it forms igneous rock. Examples are granite and pumice.</li> <li>• Explain that sediment deposited over time, often as layers at the bottom of lakes and oceans, forms sedimentary rocks.</li> <li>• Know that extreme pressure and heat over time forms metamorphic rocks. Examples are marble and slate.</li> <li>• Recognise that fossils show creatures from millions of years ago</li> <li>• Know that soil develops from rocks and organic matter.</li> </ul>	<p><b>Vocabulary</b> Rocks (e.g. sandstone, limestone, chalk, shale, coal, conglomerate, granite, slate, marble, basalt, obsidian, pumice, etc), texture, crystals, minerals, sedimentary, layers / bands, metamorphic, heat, pressure, igneous, magma, larva, fossil (body, trace, cast, mould), petrification, soil, clay, silt, sand, organic matter, key, spider key, criteria, classify (classification), sort, group, material, property, application.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>• Remember science words used before</li> <li>• Begin to use science models to describe</li> <li>• Add science labels &amp; information to diagrams</li> </ul> <p><b>Classification</b></p> <ul style="list-style-type: none"> <li>• Use a large spider key with obvious differences</li> <li>• Create groups for sorting (create criteria)</li> <li>• Combine properties of materials required for an application.</li> </ul>



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	<p><b>Animals including humans</b></p> <ul style="list-style-type: none"> <li>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</li> </ul>	<ul style="list-style-type: none"> <li>Know how nutrients, water and oxygen are transported within animals and humans</li> <li>Recognise that different species have different nutritional requirements, e.g., human, cat, dog,</li> <li>Know the importance of a balanced diet.</li> <li>Be able to say some of the foods that will fit into each food group, e.g., pasta, rice, bread, vegetables and fruit, milk, cheese, meats, fish, crisps, chocolate etc.</li> <li>Become familiar with the 'eat well' plate and nutrition pyramid.</li> </ul>	<p>Nutrition, photosynthesis, energy, transfer, diet, carbohydrate (sugar), protein, fat, vitamins, minerals, fibre, balanced, unbalanced, obesity, starvation, skeleton, bones (various, humerus, ulna, radius), joint (hinge), vertebrate, invertebrate, muscles (triceps, biceps), tendon, antagonistic, pull force, push force, number line, division, table of results, cause, effect, pictogram, block, block chart, bar, bar chart, axes, coordinate.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Remember science words used before</li> <li>Begin to use science models to describe</li> <li>Add labels &amp; information to diagrams</li> </ul> <p><b>Data, Tables &amp; Graphs</b></p> <ul style="list-style-type: none"> <li>Measure unlabelled divisions on a number line</li> <li>Use a frame to construct a simple table of results</li> <li>Use a frame to construct a bar chart</li> </ul>
	<p><b>Animals including humans</b></p> <ul style="list-style-type: none"> <li>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Know the purpose of the skeletal system in the body</li> <li>Know how the skeleton is connected through joints, types of joint and begin to understand their movement.</li> <li>Know the purpose of muscles and be able to identify some more familiar muscle by name.</li> <li>Know how muscles are connected to our bones for movement</li> <li>Know that muscles work in pairs and begin to describe how they help the body to move.</li> <li>Know that there are different types of skeletons, e.g., endo, exo and hydrostatic</li> </ul>	<p><b>Vocabulary</b></p> <p>Circulation, blood, heart, vertebrate, invertebrate, skeleton (simple examples of bones: pelvis, rib cage, spine), support, protection, movement, muscle, joint, cartilage, tendon, ball and socket joint, hinge joint, bicep, triceps, contract, endo, exo and hydrostatic skeleton.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Remember science words used before</li> <li>Begin to use science models to describe</li> <li>Add labels &amp; information to diagrams</li> </ul> <p><b>Data, Tables &amp; Graphs</b></p> <ul style="list-style-type: none"> <li>Measure unlabelled divisions on a number line</li> <li>Use a frame to construct a simple table of results</li> <li>Use a frame to construct a bar chart</li> </ul>



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	<p><b>Plants</b></p> <ul style="list-style-type: none"><li>• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</li><li>• Explore the requirements of plants for life and growth (air, water, nutrients from the soil, and room to grow) and how they vary from plant to plant.</li><li>• Investigate the way in which water is transported within plants</li><li>• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li></ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"><li>• Know the different parts of a flowering plant and their function in relation to keeping the plant alive.</li><li>• Know the conditions required for successful plant growth and begin to explain the effects when needs are not met, e.g., water, light, air.</li><li>• Know how water is transferred around a plant.</li><li>• Identify different methods of seed dispersal</li><li>• Use diagrams and explanations to describe the life cycle of a flowering plant</li></ul>	<p><b>Vocabulary</b></p> <p>Life cycle, leaf, photosynthesis, mid-rib, leaf-veins, petiole, stem, xylem vessels, flower, bud, petal, sepal, anther, filament, stigma, pollen, style, ovary, ovule, shoot, root, tap root, lateral root, root hairs, seed, seed coat (testa), bulb, grow, radicle, plumule, cotyledon, seedling, adult, water, light, temperature, survive, reproduction, absorb (absorbed), transported, healthy, nutrients, carbon dioxide, oxygen, germinate (germination), pollen, pollination, fertilise (fertilisation), dispersal, variable, cause, effect, prediction, pattern, comparative test, fair test, method, relationship, trend, data range, data interval.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"><li>• Remember science words used before</li><li>• Begin to use science models to describe</li><li>• Add science labels &amp; information to diagrams</li></ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"><li>• Predict cause &amp; effect (science prediction)</li><li>• Identify cause &amp; effect in an investigation</li><li>• Suggest a suitable data range for the cause variable</li></ul>
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# BEING A SCIENTIST



	<p><b>Light</b></p> <ul style="list-style-type: none"> <li>• Recognise that they need light in order to see things and that dark is the absence of light</li> <li>• Notice that light is reflected from surfaces</li> <li>• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>• Recognise that shadows are formed when the light from a light source is blocked by an opaque object</li> <li>• Find patterns in the way that the size of shadows change.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know darkness is the absence of light.</li> <li>• Know that light is needed to be able to see and reflects off surfaces.</li> <li>• Know the difference between natural and man-made light sources and be able to give examples, e.g., torch, sun, stars, lights, fires</li> <li>• Know that shadows are formed when the path of light is blocked by an opaque object and can change size and shape according to distance from the light source.</li> <li>• Recognise opaque, transparent and translucent objects and the effect of light on them.</li> <li>• Know that some animals are nocturnal and how their eyes differ from that of humans.</li> <li>• Know how to protect oneself from direct sunlight and the dangers of looking directly at the sun</li> </ul>	<p><b>Vocabulary</b></p> <p>Life cycle, leaf, photosynthesis, mid-rib, leaf-veins, petiole, stem, xylem vessels, flower, bud, petal, sepal, anther, filament, stigma, pollen, style, ovary, ovule, shoot, root, tap root, lateral root, root hairs, seed, seed coat (testa), bulb, grow, radicle, plumule, cotyledon, seedling, adult, water, light, temperature, survive, reproduction, absorb (absorbed), transported, healthy, nutrients, carbon dioxide, oxygen, germinate (germination), pollen, pollination, fertilise (fertilisation), dispersal, variable, cause, effect, prediction, pattern, comparative test, fair test, method, relationship, trend, data range, data interval.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>• Remember science words used before</li> <li>• Begin to use science models to describe</li> <li>• Add labels &amp; information to diagrams</li> </ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>• Predict cause &amp; effect (science prediction)</li> <li>• Identify cause &amp; effect in an investigation</li> <li>• Suggest a suitable data range for the cause variable</li> </ul>
	<p><b>Forces and magnets</b></p> <ul style="list-style-type: none"> <li>• Compare how things move on different surfaces</li> <li>• Notice that some forces need contact between two objects, but magnetic forces can act at a distance</li> <li>• Observe how magnets attract or repel each other and attract some materials and not others</li> <li>• Compare and group together a variety of everyday materials on</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>• Recognise forces as a push or a pull.</li> <li>• Know that forces can be balanced and unbalanced</li> <li>• Know that gravity is a force within the earth and has a north and south pole.</li> <li>• Know that magnets have a north and south pole and opposites attract while same repel</li> <li>• Know that some metal materials are magnetic, while other materials are not.</li> </ul>	<p><b>Vocabulary</b></p> <p>Force, force arrow, contact force, push force, pull force, twist force, friction force, non-contact force, gravity force, movement, magnet (types), attract, repel, poles (north and south), magnetic, non-magnetic, magnetism, variable, cause, effect, prediction, comparative test, fair test, pattern, method,</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>• Remember science words used before</li> <li>• Begin to use science models to describe</li> <li>• Add labels &amp; information to diagrams</li> </ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>• Predict cause &amp; effect (science prediction)</li> </ul>

# BEING A SCIENTIST



	<p>the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <ul style="list-style-type: none"> <li>Describe magnets as having two poles</li> <li>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul>		<p>relationship, trend, data range, data interval.</p>	<ul style="list-style-type: none"> <li>Identify cause &amp; effect in an investigation</li> <li>Suggest a suitable data range for the cause variable</li> </ul>
Y4	<p><b>Animals, including humans</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Describe the simple functions of the basic parts of the digestive system in humans</li> <li>Identify the different types of teeth in humans and their simple functions</li> <li>Construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Know the names and functions of the following parts of the digestive system: mouth, tongue, teeth, oesophagus, stomach, and small and large intestines.</li> <li>Know the three types of teeth in carnivores and herbivores and the specific jobs that they do.</li> <li>Know that teeth are covered in enamel which protects them.</li> <li>Know how to keep teeth healthy, recognising which foods can be harmful to teeth.</li> <li>Know the difference between carnivores, omnivores and herbivores.</li> <li>Be able to give an example of a food chain that includes a producer, predator and prey.</li> <li>Recognise and give examples of food chains within the local area.</li> </ul>	<p><b>Vocabulary</b> Nutrition, nutrients, digestion (physical / chemical), enzymes, acid, mouth, teeth, incisor, canine, pre-molar, molar, enamel, bacteria, plaque, decay, hygiene, gullet (oesophagus), stomach, small intestine, large intestine, anus, liver, gall bladder, pancreas, absorb (absorption), faeces, diet, carbohydrate, protein, fat, energy, calories, food chain, producer, consumer, predator, prey, transfer, carnivore, herbivore, omnivore, pattern, trend, relationship, conclusion, valid (validity).</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Remember &amp; use science words correctly.</li> <li>Use science models to describe</li> <li>Annotate diagrams to help describe &amp; explain</li> </ul> <p><b>Making conclusions</b></p> <ul style="list-style-type: none"> <li>Describe simple patterns, trends &amp; relationships</li> <li>Describe trends &amp; use science models to explain</li> <li>Suggest sensible improvements to a method</li> </ul>



# BEING A SCIENTIST

	<p><b>States of Matter</b> Pupils should be taught to:</p> <ul style="list-style-type: none"><li>• Compare and group materials together, according to whether they are solids, liquids or gases</li><li>• 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)</li><li>• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li></ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"><li>• Know that the sun heats rivers, lakes and seas.</li><li>• Know that water then evaporates into the air and is called water vapour.</li><li>• Know that the water vapour rises, cools and condenses to form clouds.</li><li>• Know that the droplets in the clouds become too heavy and fall as rain, snow or hail, which runs into the rivers, lakes, seas and the whole process starts again.</li><li>• Name the three states of matter and give examples of each.</li><li>• Know solids hold a shape, liquids form a pool and gasses escape.</li><li>• Explain how water changes when it is heated and cooled.</li><li>• Explain the effects of temperature of substances such as chocolate, butter and cream (to make cakes)</li></ul>	<p><b>Vocabulary</b> Material, substance, solid, liquid, gas, flow, compressed, volume, density, state, particle, energy, movement, collision, attraction, heat, temperature (°Celsius), ice, water, water vapour, melting, boiling, freezing, condensation, evaporation, speed (rate), melting point, boiling point, water cycle, run-off, rainfall (precipitation), variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"><li>• Remember &amp; use science words correctly</li><li>• Use science models to describe</li><li>• Annotate diagrams to help describe &amp; explain</li></ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"><li>• Predict a trend (relationship prediction)</li><li>• Plan investigations by selecting variables to change</li><li>• Suggest a data range &amp; interval for the cause variable</li></ul>
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# BEING A SCIENTIST



## **Living Things and their Habitats**

Pupils should be taught to

- 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

## **Sticky Knowledge**

- Give examples of habitats and the living things which grow/live there, particularly in the local area.
- Know the difference between different vertebrate animals such as fish, birds, reptiles and give examples of each.
- Know how a habitat might change throughout the year and effect that might have on living things within it.
- Explain ways that humans can have impact on the environment (positive and negative) e.g., deforestation, natures reserves.

## **Vocabulary**

Habitat, environment, micro-habitat, abiotic, plants (habitat specific examples), animals (habitat specific examples), vertebrates, invertebrates, predator, prey, adapted (adaptation), competition, pollution, toxic, conservation, species, diversity, richness, abundance, biodiversity, sample (sampling), pit-fall trap, sweep net, pooter, key, spider key, number key, classify (classification), feature, table of results, cause, effect, repeats (repetition), bar chart, bar, graph, axes, data point, coordinate.

## **Skills**

### **Classification**

- Use a spider key with fine differences
- Create appropriate groups for sorting (create criteria)

### **Data, Tables & Graphs**

- Construct a simple table to compare cause & effect
- Construct a bar chart correctly
- Plot coordinates (data points) on a graph

# BEING A SCIENTIST



	<p><b>Sound</b></p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"><li>• identify how sounds are made, associating some of them with something vibrating</li><li>• recognise that vibrations from sounds travel through a medium to the ear</li><li>• find patterns between the pitch of a sound and features of the object that produced</li><li>• find patterns between the volume of a sound and the strength of the vibrations that produced it</li><li>• recognise that sounds get fainter as the distance from the sound source increases.</li></ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"><li>• Explain that sound is made when something vibrates.</li><li>• Explain that those vibrations travel through the air to the ears so it can be heard.</li><li>• Know the correlation between pitch and the object producing a sound.</li><li>• Know the correlation between volume of a sound and the strength of the vibrations that produced it.</li><li>• Know that a sound gets fainter as it travels away from a sound source.</li></ul>	<p><b>Vocabulary</b></p> <p>Sound, energy, transfer, source, ear, particles, solid, liquid, gas, vibration, volume, decibels, frequency, pitch, Hertz, reflected, transmitted, absorbed, fainter / louder, lower / higher, variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"><li>• Remember &amp; use science words correctly</li><li>• Use science models to describe</li><li>• Annotate diagrams to help describe &amp; explain</li></ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"><li>• Predict a trend (relationship prediction)</li><li>• Plan investigations by selecting variables to change</li><li>• Suggest a data range &amp; interval for the cause variable</li></ul>
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# BEING A SCIENTIST



	<p><b>Electricity</b> Pupils should be taught to:</p> <ul style="list-style-type: none"><li>• identify common appliances that run on electricity</li><li>• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</li><li>• 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</li><li>• recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</li><li>• recognise some common conductors and insulators, and associate metals with being good conductors.</li></ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"><li>• Know the energy transfer model</li><li>• Name common appliances that run on electricity.</li><li>• Know how to construct a simple series electrical circuit.</li><li>• identify and name parts of a circuit including cells, wires, bulbs, switches, buzzers.</li><li>• Know that a switch opens and closes and circuit.</li><li>• Name a common conductor and a common insulator.</li><li>• Know that metals are good conductors.</li><li>• Draw a picture of a circuit.</li><li>• Explain how to work safely with electricity.</li><li>• Talk about patterns they notice such as bulbs getting brighter when more cells are added and that some materials can and some cannot be used to close the gap in a circuit.</li></ul>	<p><b>Vocabulary</b> Electric (electricity), source, energy, transfer, flow, closed / open circuits, series, cell, battery, positive, negative, wire, bulb, buzzer, motor, switch, clip, light, sound, conductor, insulator, metal, copper, iron, steel, non-metals, plastic, wood, glass, rubber, pattern, trend, relationship, conclusion, valid (validity).</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"><li>• Remember &amp; use science words correctly</li><li>• Use science models to describe</li><li>• Annotate diagrams to help describe &amp; explain</li></ul> <p><b>Making Conclusions</b></p> <ul style="list-style-type: none"><li>• Describe simple patterns, trends &amp; relationships</li><li>• Describe trends &amp; use science models to explain</li></ul>
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# BEING A SCIENTIST



Y5	<p><b>Earth and Space</b> (Space is Autumn Term Topic - the Science NC is taught first and then the NC is taught through this theme - art, D&amp;T, History etc) Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Describe the movement of the earth, and other planets, relative to the sun in the solar system</li> <li>Describe the movement of the moon relative to the earth</li> <li>Describe the sun, earth and moon as approximately spherical bodies</li> <li>Use the idea of the earth's rotation to explain day and night and the apparent movement of the sun across the sky</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>The sun is considered to be an average size star.</li> <li>Earth is the third planet from the sun and is the only world known one to support an atmosphere with free oxygen, oceans of liquid water on the surface and life.</li> <li>The Earth and other planets orbit the Sun.</li> <li>The Earth's position and where about on the earth in relation to the Sun gives us day and night.</li> <li>The 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).</li> <li>A moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).</li> <li>Day and night are a result of the Earth's rotation/position.</li> </ul>	<p><b>Vocabulary</b></p> <p>Solar system, sun, star, planet, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, Asteroids, moon, orbit, ellipses, gravity force, temperature, solid, liquid, gas, axis, tilted axis, day, night, month, year, satellite, atmosphere, surface, new moon, full moon, quarter moon, waxing, waning, crescent, gibbous, energy, transfer, Universe, telescope, astronomy, heliocentric, pattern, data, primary data, secondary data, trend, relationship, conclusion, valid (validity).</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Begin to use complex words correctly</li> <li>Use science models to describe &amp; begin to explain</li> <li>Begin to create &amp; annotate my own 2D/3D diagrams</li> </ul> <p><b>Making Conclusions</b></p> <ul style="list-style-type: none"> <li>Describe patterns, trends &amp; relationships</li> <li>Use data in conclusions &amp; science models to explain</li> </ul>
	<p><b>Forces</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Explain that unsupported objects fall towards the earth because of the force of gravity acting between earth and the falling object</li> <li>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>Recognize that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>All forces are either a push or a pull.</li> <li>Gravity is a pulling force acting between Earth and a falling object.</li> <li>Frictional force is any force that is caused due to friction.</li> <li>Surface resistance is the force on objects moving across a surface such as an ice skater, skating on ice.</li> <li>Air resistance is the force on an object moving through air.</li> <li>Water resistance is the force on objects floating on or moving in water.</li> </ul>	<p><b>Vocabulary</b></p> <p>Force, force arrow, contact force, non-contact force, push force, pull force, twist force, friction force, upthrust force, reaction force, gravity force, air resistance force, water resistance force, particle, solid, liquid, gas, balanced, unbalanced, resultant force, force meter, Newton (N), mass, weight, machine, lever (type 1,2 &amp; 3), pivot, fulcrum, effort, load, pulley, mechanical advantage, force multiplier, gear, cog,</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Begin to use complex science words correctly</li> <li>Use science models to describe and begin to explain</li> <li>Create &amp; annotate diagrams 2D/3D diagrams</li> </ul> <p><b>Data, Tables &amp; Graphs</b></p> <ul style="list-style-type: none"> <li>Use a frame to construct a complex table of results</li> <li>Use a frame to construct a graph &amp; scale axes with help</li> </ul>

# BEING A SCIENTIST



	<ul style="list-style-type: none"> <li>Magnetic force is an invisible force created by electrons. Magnetic force controls magnetism and electricity.</li> <li>Some forces can be measured using a newton metre</li> <li>List the different uses of a pulley, lever and springs</li> </ul>	turning force, speed, acceleration, table of results, cause, effect, repeats, bar chart, bar, coordinate, graph, data point, extrapolate, scale, plot, mean, trend line.	<ul style="list-style-type: none"> <li>Join plotted coordinates with straight lines</li> </ul>
<p><b>Living things and their habitats</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</li> <li>Describe the life process of reproduction in some plants and animals (sexual/asexual)</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Many insects have four stages in their life cycle: egg or the unborn stage; larva - young stage; pupa - inactive (no feeding) stage; and adult stage.</li> <li>In general, the life cycles of plants and animals have three basic stages including a fertilised egg or seed, immature juvenile, and adult. However, some organisms may have more than three life cycle stages, and the exact names of each stage can slightly differ depending on the species. (Mammal, amphibian and Insects)</li> <li>The difference between sexual and asexual reproduction in plants.</li> </ul>	<p><b>Vocabulary</b></p> Sexual, asexual, growth, metamorphosis, puberty, reproduction, fertilisation (internal / external), gamete, egg, sperm, embryo, foetus, larva, pupa (chrysalis), testes, uterus, gestation, birth, petals, sepals, carpel, stigma, ovary, anther, stamen, pollen, pollination, dispersal, vegetative, bulb, runner, tuber, rhizome, corm, stem, root, variation, clone, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship prediction, hypothesis, method, scale.	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Begin to use complex science words correctly</li> <li>Use science models to describe and begin to explain</li> <li>Create &amp; annotate diagrams 2D/3D diagrams</li> </ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>Use K&amp;U to explain prediction (relationship)</li> <li>Plan investigations &amp; ensure controlled variables kept the same</li> <li>Design &amp; write an ordered method (control variables)</li> </ul>
<p><b>Properties and changes of materials</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Compare and group together everyday materials on the basis of properties (e.g., their hardness, solubility, transparency, conductivity (electrical/thermal) and response to magnets</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Irreversible changes, like burning cannot be undone. Reversible changes, like melting and dissolving can be changed back again</li> <li>Mixtures can be separated out by methods like filtering and evaporating. A change is called irreversible if it cannot be changed back again.</li> </ul>	<p><b>Vocabulary</b></p> Material, particle, substance, mixture, compound, state, solid, liquid, gas, melting, boiling, evaporation, condensation, freezing, energy, attraction, dissolve (dissolving), solute, solvent, soluble (solubility),	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Begin to use complex science words correctly</li> <li>Use science models to describe and begin to explain</li> <li>Create &amp; annotate diagrams 2D/3D diagrams</li> </ul>

# BEING A SCIENTIST



	<ul style="list-style-type: none"> <li>• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> <li>• Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> <li>• Demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>• 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</li> </ul>	<ul style="list-style-type: none"> <li>• Examples of reversible changes: Melting is when a solid converts into a liquid after heating. An example of melting is turning ice into water. Freezing is when a liquid converts into a solid.</li> <li>• A cooked egg cannot be changed back to a raw egg again.</li> <li>• Mixing substances can cause an irreversible change. For example, when vinegar and bicarbonate of soda are mixed, the mixture changes and lots of bubbles of carbon dioxide are made.</li> <li>• Burning is an example of an irreversible change.</li> </ul>	<p>insoluble, opaque, translucent, transparent (transparency), conductive (conductivity), insulating (insulation), heat, temperature, thermal, flexible (flexibility), rigid (rigidity), elastic (elasticity), absorbent (absorbency), magnetic, filtration, sieving, permeable (permeability), chromatography, chemical, physical, reaction, bond (bonded), combined, reversible, irreversible, variable, cause, effect, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship</p>	<p><b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>• Use K&amp;U to explain prediction (relationship)</li> <li>• Plan investigations &amp; ensure controlled variables kept the same</li> <li>• Design &amp; write an ordered method (control variables)</li> </ul>
	<p><b>Animals including humans</b> (Part of topic is covered by School nurse - date dependent on availability)</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• Describe the changes as humans develop to old age (link to school policy on sex education)</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>• Draw a timeline to indicate stages in the growth and development of humans.</li> <li>• Be able to describe some of the changes experienced in puberty.</li> <li>• Children can compare the gestation periods of other animals and comparing them with humans</li> <li>• Describe what happens when people get old and the changes to their bodies.</li> </ul>	<p><b>Vocabulary</b></p> <p>Offspring, baby, toddler, child, adolescent, adult, geriatric, growth, puberty, fertilisation, gestation, birth, egg, sperm, gamete, embryo, foetus, periods, pubic hair, testicle, penis, vagina, uterus, womb, ovary, breasts, erection, intercourse, ejaculation, metamorphosis, table of results, cause, effect, repeats, bar</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>• Begin to use complex science words correctly</li> <li>• Use science models to describe and begin to explain</li> <li>• Create &amp; annotate diagrams 2D/3D diagrams</li> </ul> <p><b>Data, Tables &amp; Graphs</b></p> <ul style="list-style-type: none"> <li>• Use a frame to construct a complex table of results</li> </ul>

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			chart, coordinate, graph, data point, scale, plot, mean, trend line.	<ul style="list-style-type: none"> <li>Use a frame to construct a graph &amp; scale axes with help</li> <li>Join plotted coordinates with straight lines</li> </ul>
Y6	<p><b>Light</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Recognise that light appears to travel in straight lines.</li> <li>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.</li> <li>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.</li> <li>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Know that light travels in straight lines.</li> <li>Understand that because light travels in straight lines, objects are seen because they give out or reflect light into the eye.</li> <li>Know that we see things because light travels from light sources to objects then to our eyes.</li> <li>Know that light travels in straight lines and therefore shadows have the same shape as the objects that cast them.</li> <li>Know that light will travel in a completely straight line until it hits an object that will reflect it.</li> <li>Know that light doesn't travel as fast when it has to pass through mediums that are different, such as: air, water or glass.</li> <li>Know the light that we see from the sun actually leaves the sun ten minutes before we see it.</li> <li>Know that light can be controlled and produced in so many ways.</li> <li>Know that light is a type of energy named electromagnetic radiation.</li> </ul>	<p><b>Vocabulary</b> Light, source, energy, transfer, reflection (reflected), transmits (transmitted), absorbs (absorbed), shiny, dull, mirror, transparent, translucent, opaque, ray, eye, receptor, shadow, angle, incidence, perpendicular, pattern, data, primary data, secondary data, trend, relationship, conclusion, valid (validity), limitation.</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Use complex science words correctly (growing fluency)</li> <li>Use science models to describe &amp; explain</li> <li>Create &amp; annotate my own 2D/3D diagrams</li> </ul> <p><b>Making conclusions</b></p> <ul style="list-style-type: none"> <li>Describe changing patterns, trends &amp; relationships</li> <li>Use primary &amp; secondary data in my conclusions</li> <li>Suggest limitations (data) &amp; practical improvements</li> </ul>



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	<p><b>Evolution and Inheritance</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the earth millions of years ago.</li> <li>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</li> <li>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Know that evolution is a scientific theory used by biologists. It explains how living things changed over a long time, and how they have come to be the way they are.</li> <li>Know that living things have changed over time because we see their remains in rocks.</li> <li>Know that animals and plants of today are different from those of long ago.</li> <li>Know that evolution is ongoing and is still being actively researched by biologists today.</li> <li>Know about Charles Darwin and the Galapagos Islands case study concerning finches.</li> </ul>	<p><b>Vocabulary</b> Inherit (inheritance), variation, asexual, sexual, reproduction, sperm, egg, cell, nucleus, gene, characteristic, feature, trait, environment, parent, offspring, selection (selected), adapt (adaptation), species, evolution, fossil, extinct (extinction), survival, <b>table of results, cause, effect, repeats, bar chart, bar, coordinate, graph, data point, extrapolate, scale, plot, mean, trend line, linear, non-linear.</b></p>	<p><b>Skills</b> <b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Use complex science words correctly (growing fluency)</li> <li>Use science models to describe &amp; explain</li> <li>Create &amp; annotate my own 2D/3D diagrams</li> </ul> <p><b>Data, Tables and Graphs</b></p> <ul style="list-style-type: none"> <li>Construct a complex table to show repeated data</li> <li>Construct a graph &amp; scale at least one axis independently</li> <li>Plot mean value coordinates &amp; draw a trend line</li> </ul>
	<p><b>Living things and their habitats</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>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</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Know how to classify living things into broad groups according to observable characteristics and based on similarities and differences.</li> <li>Know how living things have been classified.</li> <li>Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>	<p><b>Vocabulary</b> Classification, taxonomy, characteristic, diversity, variation, Kingdom, phylum, class, order, family, genus, species, binomial, animal, plant, fungi, Protista (single-celled), Monera (bacteria), virus, vertebrate, invertebrate, agar,</p>	<p><b>Skills</b> <b>Classification</b></p> <ul style="list-style-type: none"> <li>Construct both spider &amp; number keys</li> <li>Group &amp; sub-group by fine observations</li> </ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>Reason K&amp;U to make a hypothesis (relationship)</li> </ul>

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	<ul style="list-style-type: none"> <li>Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>	<ul style="list-style-type: none"> <li>Know that an invertebrate is an animal that does not have a backbone; 97% of all animal species are invertebrates.</li> <li>Vertebrates tend to be much more intelligent than invertebrates.</li> <li>Vertebrate animals can be either warm or cold-blooded (a cold-blooded animal cannot maintain a constant body temperature as this is determined by its outside surroundings).</li> <li>Know that a wide range of ocean animals are invertebrates: sponges, corals, jellyfish and starfish are some examples.</li> <li>Know about the Linnaean system of classification.</li> <li>Know that the genus and species of humans is homo sapiens</li> </ul>	<p>sort, group, re-group, classify, criteria, spider key, number key, variable, cause, effect, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliable, risk, relationship prediction, hypothesis, method, precision, error.</p>	<ul style="list-style-type: none"> <li>Plan reliable investigations (variable terminology)</li> <li>Plan to minimise risk &amp; describe safe equipment use</li> </ul>
	<p><b>Animals including Humans</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>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.</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>Know the main parts of the circulatory system and their functions (heart, blood vessels, blood and lungs).</li> <li>Know that the heart will beat around 115,000 times each day, pumping around 2,000 gallons of blood.</li> <li>Know that the entire trip around the body only takes blood about 20 seconds in total.</li> <li>Know the ways in which nutrients and water are transported in animals, including humans.</li> <li>Know who William Harvey was.</li> <li>Know that the circulatory system is vital for fighting diseases and maintaining temperature.</li> <li>Know that the heart affects every part of the body and the impact that diet, exercise,</li> </ul>	<p><b>Vocabulary</b> Circulation (circulatory), heart, atrium (atria), ventricle (ventricles), valve, vessel, artery, vein, capillary, blood, red blood cell, white blood cell, platelets, plasma, lungs, oxygen, oxygenated, deoxygenated, carbon dioxide, nutrients, obesity, exchange, exercise, pulse, recovery time, drugs (various), variable, cause, effect, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship prediction,</p>	<p><b>Skills</b></p> <p><b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>Use complex science words correctly (growing fluency)</li> <li>Use science models to describe &amp; explain</li> <li>Create &amp; annotate my own 2D/3D diagrams</li> </ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>Reason K&amp;U to make a hypothesis (relationship)</li> <li>Plan a reliable investigation (use variable terminology)</li> <li>Collect repeated readings (&gt;3) &amp; calculate mean</li> </ul>

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		<p>drugs, alcohol, overall lifestyle and emotional well-being can have on it.</p> <ul style="list-style-type: none"> <li>• Know that because the heart is crucial to human survival, it is essential that it is kept healthy with a well-balanced diet, regular exercise and the avoidance of things that can damage it, such as smoking.</li> </ul>	<p>hypothesis, method, precision, error.</p>	
	<p><b>Electricity</b> Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>• 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.</li> <li>• Use recognised symbols when representing a simple circuit in a diagram</li> </ul>	<p><b>Sticky Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know that the brightness of a bulb is associated with the voltage.</li> <li>• Compare and give reasons for variations in how components function.</li> <li>• Use recognised symbols when representing a simple circuit in a diagram.</li> <li>• Construct simple series circuits.</li> <li>• Answer questions about what happens when different components are used: switches, bulbs, buzzers and motors.</li> <li>• Know that electricity travels at the speed of light.</li> <li>• Know that electricity can come from power stations, the wind, the sun, water and even an animal's waste.</li> <li>• Know that coal is the biggest source of energy for producing electricity.</li> <li>• Know that electric fields can either attract or repulse.</li> </ul>	<p><b>Vocabulary</b> Electric (electricity), source, energy, transfer, Voltage, flow, Current, resistance, insulator, conductor, closed / open circuits, series, cell, battery, positive, negative, wire, bulb, buzzer, motor, switch, clip, metal, light energy, sound energy, heat energy, kinetic energy, Voltmeter, variable, cause, effect, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship prediction, hypothesis, method, precision, error.</p>	<p><b>Skills</b> <b>Explaining Science</b></p> <ul style="list-style-type: none"> <li>• Reason K&amp;U to make a hypothesis (relationship)</li> <li>• Plan reliable investigations (variable terminology)</li> <li>• Plan to minimise risk &amp; describe safe equipment use</li> </ul> <p><b>Designing Experiments</b></p> <ul style="list-style-type: none"> <li>• Reason K&amp;U to make a hypothesis (relationship)</li> <li>• Plan reliable investigations (variable terminology)</li> <li>• Plan to minimise risk &amp; describe safe equipment use</li> </ul>