

KS1 Skills End Points (Working scientifically):

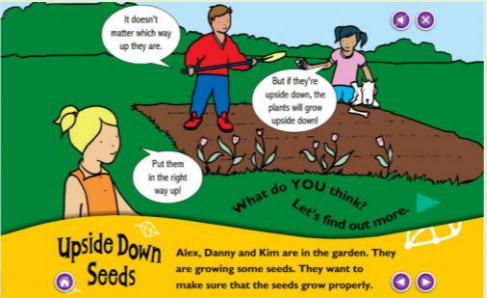
- Asks simple questions and recognises that they can be answered in different ways.
- Observes closely, using simple equipment.
- Performs simple tests.
- Can identify and classify.
- Uses their observations and ideas to suggest answers to questions.
- Gathers and records data to help in answering questions

Lower KS2 Skills (Working Scientifically) End Points:

- Asks relevant questions and use different types of scientific enquiries to answer them.
- Sets up simple practical enquiries, comparative and fair tests.
- Makes systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- Gathers, records, classifies and presents data in a variety of ways to help in answering questions.
- Records findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- Reports on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Uses results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Identifies differences, similarities or changes related to simple scientific ideas and processes.
- Use straightforward scientific evidence to answer questions or to support their findings.

Upper KS2 Skills End Points (Working Scientifically):

- Plans different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Takes measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Records data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Reports and presents 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.
- Uses test results to make predictions to set up further comparative and fair tests.
- Identifies scientific evidence that has been used to support or refute ideas or arguments

Yr 1	Everyday Materials	Seasonal Changes	Human Body & Senses	Plants and Trees	Animals
Knowledge	<p style="text-align: center;">Chester Greenwood (Inventor of Earmuffs)</p> <ul style="list-style-type: none"> - Distinguish between an object and the material from which it is made - Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. - Describe the simple physical properties of a variety of everyday materials. - Compare and group together a variety of everyday materials based on their simple physical properties. 	<p style="text-align: center;">Jim Cantore (American Meteorologist on TV)</p> <ul style="list-style-type: none"> - Understand changes across the four seasons - Know and describe weather associated with the seasons and how day length varies. 	<p style="text-align: center;">Miller Hutchinson (Invented first electrical hearing aid)</p> <ul style="list-style-type: none"> - Identify, name, draw and label basic parts of human body and associate with each sense 	<p style="text-align: center;">Maria Sibylla Merian (scientific illustrator/naturalist)</p> <ul style="list-style-type: none"> - To identify and name a variety of common plants including deciduous and evergreen trees. - To identify and describe the basic structure of common plants and trees. 	<p style="text-align: center;">Joan Beauchamp Procter (Known as the Dragon Doctor)/Reptiles – London Zoo</p> <ul style="list-style-type: none"> - 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)
Scientific Skills	<p>Working scientifically</p> <ul style="list-style-type: none"> • Compare and group together a variety of everyday materials based on their simple physical properties. • Classify objects made of one material in different ways e.g. a group of objects made of metal. • Classify one type of object made from a range of materials e.g. a collection of spoons made of different materials. 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Gather and record data using simple equipment i.e. jugs to collect rainfall about weather conditions in autumn, drawing on observation and using simple pictograms to represent this. • Use their evidence to describe some other features of the weather, surroundings, themselves, animals and plants found in autumn. • Demonstrate their knowledge in different ways e.g. creating seasonal artwork. 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Take measurements of parts of the body and present results in a table to interpret. 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Sort and group parts of plants using similarities and differences e.g. the shape of leaves, the colour of petals • Can use simple charts and Venn diagrams etc. to identify and classify plants. • Use photographs and their own observations to talk about how plants change over time (e.g. seed to sapling to tree) and over the year (deciduous and fruit bearing trees). • Make close observations of plants, including trees - leaves, seeds, flowers etc. • Recognising that plants are not always the same e.g. leaves and stems may not be green, the leaves are different shapes. 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Make first hand close observations of animals from each of the groups • Compare the structure of two animals from the same or different group e.g. wings, feathers, vertebrates/invertebrates. • Classify animals using a range of features e.g. lay eggs/give birth to live young. herbivore, omnivore (these terms do not have to be explicitly taught). • Identify animals by matching statements to named images.
Experiment	<p>Experiment: Is it waterproof or is it absorbent?</p> <ul style="list-style-type: none"> • Test the properties of objects e.g. absorbency of materials or waterproofness of shelters. • Chose an appropriate method for testing an object for a particular property. • Use their test evidence to answer the questions about properties e.g. Which material is the most absorbent? <p>Possible further thinking Enquiry Mending a torn umbrella</p>	<p>Experiment: What does the weather look like in Autumn? Seasons - Explorify</p> <ul style="list-style-type: none"> • On every school day for several weeks, pupils observe the weather. (sunny, rainy, cloudy, foggy, windy, snowy/icy) They can check for rainfall using simple equipment left outside intended to gather rainfall. • Gather and record data using simple equipment i.e. jugs to collect rainfall about weather conditions in autumn, drawing on observation and using simple pictograms to represent this. <p>Possible Further thinking Enquiry Adopt a tree near to school and make regular observations for the rest of the year. Draw or paint pictures of it, take photos and record wildlife around it over</p>	<p>Experiment: Which sense should I use?</p> <ul style="list-style-type: none"> • Conduct simple sense experiments. Which part of my body is good for feeling, which is not? Which part of my body is good for seeing? Which part of my body is good for hearing? Which food/flavours can I identify by taste? Which smells can I match? <p>Write or draw observations of each of the senses following senses experiments i.e., What's that flavour? What's that sound? What's that smell? What's in the bag? Optical illusions – what can you see? Record answers and the sense they used</p> <p>Possible Further thinking Enquiry Does popping candy get louder in different liquids? Predict and investigate.</p>	<p>Experiment: What do I need to grow?</p> <ul style="list-style-type: none"> • Plant seeds and observe how they grow and change by making simple observations and understanding they need light, nutrients and water to grow. <p>Possible Further thinking Enquiry Plants Concept cartoon</p> 	<p>Experiment: n/a</p> <p>Trip – Hertfordshire Zoo</p> <p>Possible Further thinking Enquiry How do animals hide? Camouflage</p>

		school year. Take photos of class in front of adopted tree as it changes.			
	Vocabulary: Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, not bendy, waterproof, not waterproof, absorbent, not absorbent, opaque, transparent	Vocabulary: season, spring, summer, autumn, winter, month, year, day, night, sun, moon, light, dark	Vocabulary: head, nose, ear, neck, shoulder, arm, elbow, wrist, hand, back, chest, hip, leg, knee, ankle, foot, taste, touch, hear, sight, smell	Vocabulary: root, leaf, leaves, flower, petals, fruit, roots, bulbs, blossom, bud, seed, stem, trunk, branches, deciduous, evergreen, wild, garden	Vocabulary: amphibians, fish, reptiles, mammals, birds, herbivore, omnivore, carnivore wing, beak, tail, fin

Yr 2	Materials	Living/Non-Living	Plants	Animals	Habitats – food chains
	<p style="text-align: center;">Charles Macintosh (Chemist and inventor of waterproof clothing)</p>	<p style="text-align: center;">Prem Singh Gill (Polar Scientist – particularly Antarctic seals)</p>	<p style="text-align: center;">Daniel Solander (Botanist who made a classification system of plants)</p>	<p style="text-align: center;">Elizabeth Garrett Anderson First English woman to qualify as a doctor)</p>	<p style="text-align: center;">William Kirby (Entomologist – study of insects)</p>
Knowledge	<ul style="list-style-type: none"> - Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses - Find out how the shape of solid objects made from some materials can be changed through squashing, bending, twisting and stretching. 	<ul style="list-style-type: none"> -Explore and compare the differences between things that are living, dead and things that have never been alive. 	<ul style="list-style-type: none"> -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 	<ul style="list-style-type: none"> -Notice that animals, inc humans, have offspring which grow into adults -Find out about and describe the basic needs of animals, inc 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. 	<ul style="list-style-type: none"> -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 -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
Scientific Skills	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Investigate and observe what happens to different materials during testing and use this to inform explanation of their properties ● Explain from their observations how materials change when a force is exerted on them by squashing, bending, twisting and stretching. ● Classify and sort materials by their properties e.g. manmade, natural ● Ask and answer questions about everyday materials 	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Explore the outside environment regularly to find objects that are living, dead and have never lived ● Can sort into living, dead and never lived ● Classify objects found in the local environment 	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Make close observations of seeds and bulbs ● Can spot similarities and difference between bulbs and seed ● Classify seeds and bulbs ● Research and plan when and how to plant a range of seeds and bulbs 	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Investigate the effect of exercise on their bodies ● Classify food in a range of ways, including using the Eatwell guide ● Investigate washing hands, using glitter gel ● Collate what they know about looking after a baby/animal by creating a parenting/pet owners' guide ● Explain how development and health might be affected by differing conditions and needs being met/not met (draw on knowledge from plants last half term and apply to animals/ humans) 	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Create simple food chains for a familiar local habitat from first hand observation and research ● Can give key features that mean the animal or plant is suited to its micro-habitat ● Create simple food chains from information given e.g. in picture books (Gruffalo etc) ● Can explain in simple terms why an animal or plant is suited to a habitat ● Using a food chain can explain what animals eat ● Observe animals and plants carefully, drawing and labelling diagrams ● Create a diorama of a suitable habitat for a chosen animal/minibeast.
Experiment	<p>Experiment: Which material would be best for our 'Owl who is Afraid of The Dark'?</p> <ul style="list-style-type: none"> ● Investigate which materials are fit for a purpose ● Investigate the transparency of objects, recording class data in a table and drawing simple conclusions from the findings. <p>The basic purpose of a bird house is to keep the inside of a house warm and dry. Because of this it has to be strong – it will be heavy and would collapse if it was made from the wrong materials. Think about the story of The Owl Who is Afraid of the Dark– What would the owl need? i.e. want it to be transparent, waterproof, strong and warm. Why? Could you do an investigation?</p> <p>Possible Further thinking Enquiry</p>	<p>Experiment: Is it living, dead or has it never been alive?</p> <ul style="list-style-type: none"> ● Explore the outside environment to find objects that are living, dead and have never lived <p>Record results. Write conclusion. How do you know?</p> <p>Possible Further thinking Enquiry</p>	<p>Experiment: What happens to plants in different conditions? (air, light, water and neutral)</p> <p>Plant seeds and keep them in different environments and monitor their growth to draw some conclusions.</p> <ul style="list-style-type: none"> ● Make comparisons between plants as they grow ● Make close observations and measurements of their plants growing from seeds and bulbs 	<p>Experiment: What happens to the caterpillars/frogs over time?</p> <ul style="list-style-type: none"> ● Describe, using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child. ● Measure/observe how animals, including humans, grow. <p>Possible Further thinking Enquiry</p>	<p>Possible Further thinking Enquiry</p>

<p>Vocabulary: including wood, metal, plastic, glass, brick, rock, paper, cardboard, rough, smooth, hard, soft, shiny, dull, transparent, opaque, translucent, flexible, rigid, waterproof, absorbent, stretchy, durable</p>	<p>Vocabulary: living, dead, never been alive, air, food (nutrition), growth, habitat, microhabitat, woodland, meadow, hedgerow, pond, deciduous, evergreen</p>	<p>Possible Further thinking Enquiry</p> <p>Vocabulary: Recap vocabulary from year 1 Bulb, nutrients, soil, water, light, sun, temperature, warm, cold, seed, germination, seedling, mature plant (exact vocabulary may change depending on the plant lifecycle being taught)</p>	<p>Vocabulary: survival, water, air, food reproduce, adult, baby, offspring, kitten, calf, puppy, food chain, prey, predator, camouflage, protection exercise, hygiene, balanced diet, nutrition, life cycle</p>	<p>Vocabulary: food chain, herbivore, carnivore, habitat, seashore, woodland, rainforest, ocean</p>
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Yr 3	Forces and Magnets	Nutrition	Rocks and Soils	Muscles and Skeletons	Light and Shadow	Plants
	<p>William Gilbert (Doctor developed theory of Magnetism)</p>	<p>Adelle Davis (Biochemist and Nutritionist)</p>	<p>Mary Anning (Palaeontologist – Fossil Hunter)</p>	<p>Marie Curie (Physicist – invented first mobile x ray)</p>	<p>Percy Shaw (Invented the Cat’s Eye)</p>	<p>Jan Ingenhousz (Scientist who discovered Photosynthesis)</p>
Knowledge	<ul style="list-style-type: none"> -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 	<ul style="list-style-type: none"> -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 	<ul style="list-style-type: none"> -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 	<ul style="list-style-type: none"> -Identify that humans and some other animals have skeletons and muscles for support, protection and movement 	<ul style="list-style-type: none"> - Recognise that the need light in order to see things and that dark is the absences 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 	<ul style="list-style-type: none"> -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, room to grow) and how they vary from plant to plant -Investigate the way in which water is transported in plants -Explore the part that flowers play in the lifecycle of flowering plants, including, pollination, seed formation and seed dispersal
Scientific Skills	<p>Working scientifically</p> <ul style="list-style-type: none"> • Compare and group materials following magnetic testing, recording findings and use the outcome to answer questions about which materials are magnetic. • Investigate predictions on whether two magnets will attract or repel, depending on which poles are facing 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Classify food in a range of ways • Use food labels to explore the nutritional content of a range of food items • Use secondary sources to find out the types of food that contain different nutrients • Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? • Plan a daily diet contain a good balance of nutrients and record and present findings • Explore the nutrients contained in fast food 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • Can devise tests to explore the properties of rocks and use data to rank the rocks. • Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily. • Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation. • Can identify plant/animal matter and rocks in samples of soil. • Can devise a test to explore the water retention of soils. 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Use secondary sources to research the parts and functions of the skeleton • Investigate pattern seeking questions such as ; Can people with longer legs run faster?; Can people with bigger hands catch a ball better? <i>Do male humans have larger skulls than those of female humans?</i> • Compare, contrast and classify skeletons of different animals 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Observe and identify changes to the size and orientation of shadows, relative to their proximity to the light source. • Observe and identify the difference in shadows of opaque, translucent and transparent objects/materials. • Observe how shadows are formed and affected by different circumstances. <ul style="list-style-type: none"> • To notice that light can be reflected off surfaces. • Investigate the size of shadows according to times of day and year, by tracing shadows outside and comparing differences. • Classify materials according to opaque, transparent and translucent. • Use oral and written explanations to report on how to keep safe in the sun. • Investigates questions related to an object and the shadow it will cause • Classify sources of light/not sources of light i.e. the moon 	<p>Working scientifically</p> <ul style="list-style-type: none"> • Observe the effect of putting cut white carnations or celery in coloured water. • Investigate what happens to plants when they are put in offered varying conditions i.e. different levels of space, water and light (how often it receives light 1hr per day) • Spot flowers, seeds, berries and fruits outside throughout the year. • Observe flowers carefully to identify the pollen • Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. • Observe seeds being blown from the trees e.g. sycamore seeds. • Research different types of seed dispersal. • Can explain observations made during investigations. • Can look at the features of seeds to decide on their methods of dispersal. • Explore the function of different parts of flowering plants; roots/stems/ trunks/leaves/flowers through dissection.

<p>Experiment – Which surface will help the car travel the furthest?</p> <ul style="list-style-type: none"> Record and report on findings from investigations, involving how things move on different surfaces <p>Possible Further thinking Enquiry – Noticing Patterns</p> <p>There's a hole in my bottle - Explorify – video</p> <p>There's a hole in my bottle (Explorify)</p>	<p>Possible Further thinking Enquiry -</p> <p>Which breakfast is best? - Explorify – video</p> <p>Which breakfast is best? (Explorify)</p>	<p>Experiment – Which is the most permeable soil to help us grow plants?</p> <p>Further thinking Enquiry - Comparative or Fair test</p> <p>Which rock would be best for a skate ramp? - Explorify - video</p> <p>Which rock would be best on a skate ramp? (Explorify)</p>	<p>Experiment - Do male humans have larger skulls than those of female humans? To find out the size of someone's skull, you can measure the circumference of their head with a tape measure. If your class was to split up into boys and girls and you simply looked without taking any measurements, which group of people do you think would have the larger skulls? Predict/Why?</p> <p>How are you going to record your results when you take your measurements?</p> <p>Further thinking Enquiry – Odd one out – observations and discussion</p> <p>Weird walkers - Explorify – video</p> <p>Weird Walkers (Explorify)</p>	<p>Experiment – How does our shadow change throughout the day?</p> <p>Further thinking Enquiry – Noticing Patterns</p> <p>Observing changes over time</p> <p>Exploding lights - Explorify video</p> <p>Exploding Lights – (Explorify)</p>	<p>Experiment - What factors affect the growth of plants?</p> <p>Group 1 explore light</p> <p>Group 2 explore space</p> <p>Group 3 explore water</p> <p>Further thinking Enquiry – Observing changes over time</p> <p>How is water transported with in plants?</p> <p>☑ Water is absorbed from the soil by the roots.</p> <p>☑ It is then transported from the roots to the stem and then to the rest of the plant.</p> <p>Place white carnations in dyed water to observe how plants transports water.</p>
<p>Vocabulary:</p> <p>force, contact, surface, magnetic, attract, repel, poles</p>	<p>Vocabulary:</p> <p>nutrition, food, water, growth, healthy, unhealthy, exercise, balanced diet, fruit, vegetables, protein, carbohydrates, fat, sugar</p>	<p>Vocabulary:</p> <p>soils, organic matter, fossil, crystal, sandstone, granite, marble, pumice absorbent, crumble sedimentary, layer, sediment igneous, magma, lava, gas bubbles (tiny holes/spaces) metamorphic, change, squeeze, pressure</p>	<p>Vocabulary:</p> <p>skeleton, skull, bones, muscles, contract. Lengthen, movement, support, protection, skull, jaw, humerus, radius, ulna, spine, pelvis, femur, tibia, fibula</p>	<p>Vocabulary:</p> <p>light source, mirror, reflect, reflective, reflection shadow, blocked transparent, translucent, opaque</p>	<p>Vocabulary:</p> <p>roots, stem, trunk, leaves, flowers, air, light, water, nutrients, soil, space, grow, absorb, store, secure, support, transport, produce food (don't need to understand how), attract insects</p>

Yr 4	States of matter Water cycle	Sound	Electricity	Living things and their habitats	Animals, including Humans
	Daniel Fahrenheit (Fahrenheit temperature scale) Anders Celsius (Celsius temperature scale)	Aristotle (Philosopher – developed concept that sound travels through air – movement of air particles)	Lewis Howard Latimer (Electronic Engineer who improved the design of Edison’s light bulb to bring street lighting to the world)	Jacques Cousteau (Oceanographer – invented the Aqualung)	Washington and Lucius Sheffield (Dentists – invented toothpaste in a tube)
	-Compare and group materials together, according to whether they are solids, liquids or gases -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) -Identify the part played by evaporating and condensation in the water cycle and associate the rate of evaporation with temperature	-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 -Recognise that sounds get fainter as the distance from the sound source increases - Find patterns between the volume of a sound and the strength of the vibrations that produced it.	-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	-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	-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>Working scientifically</p> <ul style="list-style-type: none"> ● Observe closely and classify a range of solids and liquids. ● Explore making gases visible ● Observe a range of materials melting and investigate melting point of different materials. ● Observe the changes that are non-reversible relating (common ingredients). ● Explore freezing and melting different liquids. ● Observe and measure temperature of icy water, tap water, hot water. ● Observe water evaporating and forming condensation. ● Set up investigations to explore changing the rate of evaporation. ● Use secondary sources to find out about the water cycle.* <ul style="list-style-type: none"> ● Using their data, can explain what affects how quickly a solid melts. ● From their data, can explain how to speed up or slow down melting process. ● Present learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet. ● Use of equipment from school kitchen area 	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Experiment with at least three different instruments to observe and explore volume and pitch. ● Make predictions and draw conclusions about the pitch and volume of sounds. ● Note how vibrations make sounds of different volumes and travel to our ears. ● Identify and show how sound travels through particles and into the ear. ● Make own instruments that produce a range of pitches. ● Understand how to measure sound using decibel. 	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Construct and investigate a range of circuits. ● Investigate which materials can be used instead of wires to make a circuit. ● Classify materials that conduct electricity and those that don't following investigation and record findings. 	<p>Working scientifically</p> <p>Observe plants and animals in different habitats throughout the year and use recordings to compare and contrast the living things observed.</p> <ul style="list-style-type: none"> ● Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. ● Classify living things found in different habitats based on their features. ● Create a simple identification key based on observable features. ● Use research to explore human impact on the local environment e.g. litter, tree planting. (could do a community project? Link to Global Goals) ● Use secondary sources to find out about how environments may naturally change. <ul style="list-style-type: none"> ● Use secondary sources to find out about human impact, both positive and negative, on environments and write a report on this. 	<p>Working scientifically</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p> <ul style="list-style-type: none"> ● Can create food chains based on research. ● Identifies differences, and similarities of different types of teeth according to herbivore, omnivore and carnivore. ● Can record the teeth in their mouth (make a dental record). ● recreate the human stomach and observe representation of how food breaks down. ● Label the different parts of the digestive system.
<p>Experiment – Different Melting Points of Different Materials – Chocolate-milk, dark and white etc – predict which will melt fastest and what temp. (C) Draw table for results. Researching Melting Points – saved in Science Investigations</p> <p>Further thinking Enquiry – Using Secondary Sources The sea was gloopy? (Like ketchup!) - Explorify – video What if water didn't freeze? (Explorify)</p>	<p>Experiment – Can sound move through solids, liquids and gases? <i>Predict/explanation, diagrams</i> Traveling Sound - Activity - TeachEngineering</p> <p>Further thinking Enquiry – Using Secondary Sources Lyre liar - Explorify – video Lyre Liar (Explorify)</p>	<p>Experiment – What will light up? Make working circuit – use different materials in circuit – predict which will conduct electricity. (variety of materials of conductors and insulators as variables) Using an electric circuit to make a lighthouse – saved in Science Investigations</p> <p>Further thinking Enquiry – Notice Patterns and Relationships Battery bonanza! - Explorify Battery Bonanza – (Explorify)</p>	<p>Experiment – Use local areas research to explore human impact on the local environment e.g. litter, tree planting. (could do a community project? Link to Global Goals) and use scientific skills to draw conclusion about impact.</p> <p>Further thinking Enquiry – Comparative or fair test Make a challenge-proof creature - Explorify – video Make a class proof creature (YOU NEED PLAY DOUGH)</p>	<p>Experiment How does an egg shell/ tooth/chicken bone change when it is left in cola or water? What happens observe and record findings. Predict. Make it a fair test. Explain what they have found out and how this links to our diet. Give reasons.</p> <p>Further thinking Enquiry – Notice patterns and relationships Fuel up - Explorify - video Odd one out</p>
<p>Vocabulary: solid, liquid, gas, evaporation, condensation, particle, temperature, freezing, heating</p>	<p>Vocabulary: vibration wave, volume, pitch, tone, insulation</p>	<p>Vocabulary: appliance, battery power, main power, circuit, series, cell, battery, wire, bulb, switch, break in circuit, conductor, insulator</p>	<p>Vocabulary: food chain, producer, consumer, predator, herbivore, carnivore, habitat, prey, vertebrates, invertebrates, mammal, reptile, amphibian, bird, insect.</p>	<p>Vocabulary: mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine, nutrients, absorb, canine, incisor, molar producer, consumer, apex predator</p>

Y r 5	Living things and their habitats	Earth and Space	Properties and changes in Materials	Forces	Animals including humans
	Jane Goodall (Wildlife researcher/Conservationist – chimpanzees)	Galileo Galilei (Astronomer – made first telescope, discovered Neptune, rings of Saturn)	Spencer Silver (Chemical engineer) Arthur Fry (Chemist) (Invented post-it notes)	Archimedes (Mathematician – theories how levers and pulleys can lift heavy objects)	Virginia Apgar (Apgar Score – to quickly assess health of new born babies)
	<ul style="list-style-type: none"> -Observe life-cycle changes in a variety of living things, e.g. plants in a vegetable garden or flower border -Sexual and asexual reproduction in plants -bulbs, tubers, runners and plantlets are examples of plant reproduction involving only one parent -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 	<ul style="list-style-type: none"> - Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. - Describe the movement of the Moon relative to the Earth. (The Sun is a star. It is at the centre of our solar system. There are 8 planets. These travel around the Sun in fixed orbits.) - Describe the Sun, Earth and Moon as approximate spherical bodies. - Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky. (Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (here it is day) and half is facing away from the Sun (night). As the Earth rotates the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit.) - Explore the phases of the moon. 	<ul style="list-style-type: none"> -Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and respond to magnets -Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution -Use knowledge of solids, liquids and gases to decide how mixtures might be separated including through filtering, sieving and evaporating -Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials including metals, wood and plastic -Demonstrate that dissolving, mixing and changes of state are reversible changes -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. 	<ul style="list-style-type: none"> -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 	<ul style="list-style-type: none"> -Describe the changes as humans develop to old age

<p>Working scientifically Grow and observe plants that reproduce asexually e.g. carrot</p> <ul style="list-style-type: none"> ● Organise mammals into different groups - sea and land and marsupials and use scientific evidence to refute/support correct/incorrect statements (such as 'dolphins are fish'). ● Draw and label appropriate scientific diagrams following use of secondary sources and first hand observations relating to the life cycle of a range of animals. compare and contrast the life cycles of different living things and present findings identify which insects complete which type of metamorphosis and present findings identify the key differences between some amphibians – for example, toads and frogs, and present findings in different forms ● Use data to compare and find patterns, for example to compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth/Look for patterns between the size of an animal and its expected life span 	<p>Working scientifically Use secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth.</p> <ul style="list-style-type: none"> ● Use secondary sources to create a model to show why day and night occur ● Make first-hand observations of how shadows caused by the Sun change through the day ● Make a sundial and report on findings following observation of the changing place of the shadow, making conclusions as to what this demonstrates and how the sundial was used to indicate the time. ● Research time zones on opposing sides of the globe. ● Consider the views of scientists in the past and how evidence was used to deduce the shapes and movements of the Earth, Moon and planets before space travel. 	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a sleeping bag. ● Predict whether items are dissolvable by carrying out comparative and fair test and records findings then exploring their reversibility. ● Explore and predict a range of reversible and irreversible changes e.g. rusting, adding fizzy tablets to water, burning ● Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture ● Carry out comparative and fair tests involving irreversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? ● Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) 	<p>Working scientifically</p> <ul style="list-style-type: none"> ● Investigate the effect of friction in a range of contexts . ● Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water. ● Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. ● Explore how levers, pulleys and gears work. ● Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. <p>Investigate the pull-on different objects using a newton meter and record forces in Newtons (N).</p> <ul style="list-style-type: none"> ● Report on conclusions relating to an object's weight in Newtons. 	<p>Working scientifically Draw a timeline to indicate stages in the growth and development of humans. Sharing the life-cycle of humans. Compare this to another animal. Changes experienced in puberty.</p>
<p>Experiment – Where do carrots come from? Propagate a carrot head to watch it root, monitor, observe and record</p> <p>Further thinking Enquiry – Using Secondary Sources Cared for a baby animal? - Explorify – video Have you ever?</p>	<p>Observation – What happens to the moon over a month? Keep a moon diary (homework)</p> <p>Further thinking Enquiry – Using Secondary Sources There was no gravity? - Explorify – video What if there is no gravity?</p>	<p>Experiment – Link to English Shackleton - waterproofness and electrical and thermal conductivity to identify a suitable fabric for a sleeping bag</p> <p>Further thinking Enquiry - Notice Patterns and Relationships 3..2..1 lift off! - Explorify – video 3 -2-1 lift off - Can you spot a pattern in the results after blowing up balloons using the gas produced by vinegar and different amounts of bicarbonate of soda?</p>	<p>Experiment – Parachute Drop – gravity/air resistance/ Predict, fair test, conclusion/Different size parachutes – which falls the slowest?</p> <p>Further thinking Enquiry – Observe changes over time Tried to keep a balloon in the air? - Explorify - video YE tried to keep a balloon in the air? - observe how things fall to the ground. Do heavier or larger objects fall more quickly? Investigate by dropping plastic bottles filled with different amounts of water.</p>	<p>Experiment – Life expectancy and gestation – research – Make prediction (Create a line graph/barchart to share findings)</p> <p>Further thinking Enquiry – Notice Patterns and Relationships Pink and spongey - Explorify – picture What is it? How can we keep our lungs healthy into old age? Why has life expectancy increased?</p>

<p>Vocabulary: Mammal, amphibian, insect, bird, pollination, reproduction, off spring, organism, pollen, living, fertilisation, gametes, living, petal, pollen, stamen (anther, filament), sepal, stem, ovule, carpel (or pistil), stigma, style, ovary, nectaries, nectar, sexual, asexual, warm blooded, live, cold blooded, fur, hair, milk, develop, hatch, egg, gills, fins, lungs, legs, metamorphosis, complete, incomplete, larva, pupa, adult, nymph</p>	<p>Vocabulary: Earth, sun, moon, solar system, axis of rotation, day, night, phases of the moon, star, constellation</p>	<p>Vocabulary: hardness, transparency, conductivity (electrical, thermal) solubility, solution dissolve, filter, evaporate, sieve, reversible, irreversible</p>	<p>Vocabulary: force, gravity, fall, air resistance, water resistance, friction, levers, pulleys, gears, effect</p>	<p>Vocabulary: womb, foetus, embryo, gestation, baby, toddler, teenager, elderly growth, development, puberty</p>
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Yr 6	Light	Electricity	Living things and their habitats	Animals including humans	Evolution, Inheritance/variation
	Ibn Sahl (Law of Refraction – how curved mirrors and lenses bend and focus light)	Alessandro Volta (Physicist who developed the electric battery)	Carl Linnaeus (Botanist and Zoologist – taxonomy for classifying organisms)	William Harvey (Discovered nature of blood circulation and function of heart as pump)	Charles Darwin (Biological Evolution)
	<p>-Recognise that light appears to travel in straight lines</p> <p>-Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</p> <p>-Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</p> <p>-Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>	<p>-Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>-Compare and give reasons for variations in how components function including the brightness of bulbs, the loudness of buzzers and the on/off position on switches</p> <p>-Use recognised symbols when representing a simple circuit in a diagram</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</p> <p>-Give reasons for classifying plants and animals based on specific characteristics</p>	<p>-Identify and name the main parts of the human circulatory system and describe the functions of the heart, blood vessels and blood</p> <p>-Recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function</p> <p>-Describe the ways in which nutrients and water are transported within animals including humans</p>	<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>
	<p>Working scientifically</p> <p>Plan and conduct a test to investigate how light travels and explain/present the findings. i.e through shadows and mirrors.</p> <ul style="list-style-type: none"> Investigate the use of mirrors to reflect light (making a periscope) and record using straight line diagrams to indicate the direction of light. Use mirrors, torches and protractors to demonstrate and record how light is reflected in a mirror and how we see ourselves in a mirror. Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram. 	<p>Working scientifically</p> <p>Draw circuit diagrams of a range of simple series circuits, using recognised symbols.</p> <ul style="list-style-type: none"> Communicate structures of circuits using circuit diagrams with recognised symbols Make electric circuits and demonstrate, following investigation, how variation in the working of components can be changed. Plan and select resources for a fair scientific enquiry, deciding which variables to control. Record results from an experiment using tables and graphs Evaluate and explain their investigation, results and conclusions 	<p>Working scientifically</p> <p>Classify plants and animals and record conclusions from the use of classification keys. Introduce the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). Discuss reasons why living things are placed in one group and not another.</p> <ul style="list-style-type: none"> Use information about the characteristics of an unknown animal or plant to assign it to a group. Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. Research an unfamiliar animal or plant using its characteristics to establish where it belongs in the classification system. 	<p>Working scientifically</p> <p>Plan and conduct a scientific enquiry to identify different food groups.</p> <ul style="list-style-type: none"> Use labelled diagrams to support understanding of how nutrients and oxygen are delivered around the body. Use information to identify the main components of the heart. Predict what will happen to the heart during exercise. Construct and analyse the variables that make a fair test. Conduct a fair investigation on the effects of exercise on the heart. Use scientific equipment to track results and record data using tables and graphs. Analyse whole class data after investigation to compare and reflect on findings and draw conclusions. Use information acquired to write a scientific report on how the human circulatory system works. 	<p>Working scientifically</p> <p>Follow lines of enquiry to support Explanation of the process of evolution.</p> <ul style="list-style-type: none"> Demonstrate an understanding, with specific examples, of how an animal or plant has evolved over time e.g. penguin, peppered moth. Identify characteristics that will make a plant or animal suited or not suited to a particular habitat. Identify how Charles Darwin and Alfred Wallace used observation to support their theory of natural selection and evolution. Referring to and using examples of fossil evidence that support the theory of evolution, including learning about the work of Mary Morland and William Buckland

	<p>Experiment – What is refraction? Exploring when light waves change direction and what can be noticed and how this impacts light dispersal in prisms.</p> <p>Further thinking Enquiry - Cause and Effect. How does the angle that a light ray hits a plain mirror affects the angle at which it reflects off the surface?</p>	<p>Experiment – Can you make a circuit using LED and play dough? How does electricity flow through play dough?</p> <p>Further thinking Enquiry – Problem Solving Red, amber, green - Explorify Mission Survive Design a traffic light to manage flow of ch through the school Three light bulbs, coloured light filters, crocodile clips, batteries, split pins and cardboard to make 3 way switch</p>	<p>Experiment – Classification activities using Linnaeus system- saved in Yr 6 investigations</p> <p>Further thinking Enquiry - Classification Classification - Explorify – video Using art for this activity – see notes on using Can you see any similarities and differences between the living things shown in each of the drawings?</p>	<p>Experiment – https://www.stem.org.uk/elibrary/resource/34279 Heart recovery after exercise</p> <p>Further thinking Enquiry – Describing observations and discussing/applying ideas Skip a beat - Explorify – sound video Discussion – heartbeat activity</p>	<p>Experiment – How beaks have adapted over time-? saved in Yr 6 Investigations</p> <p>Further thinking Enquiry Been told you look like your parents or other relatives? - Explorify – photo Have you ever? Genes/Family traits/What if everyone looked the same?</p>
	<p>Vocabulary: refraction, reflection, spectrum, rainbow</p>	<p>Vocabulary: circuit - series, parallel voltage, volts, amps</p>	<p>Vocabulary: Invertebrates, vertebrates, animals, plants, fungi, protists, prokaryotes, Carl Linnaeus, characteristics</p>	<p>Vocabulary: function, circulatory system, heart, valve, blood vessel, vein, artery transport, oxygenated, deoxygenated lifestyle, drug</p>	<p>Vocabulary: adaptation, evolution, characteristic, reproduction, genetics, survival</p>