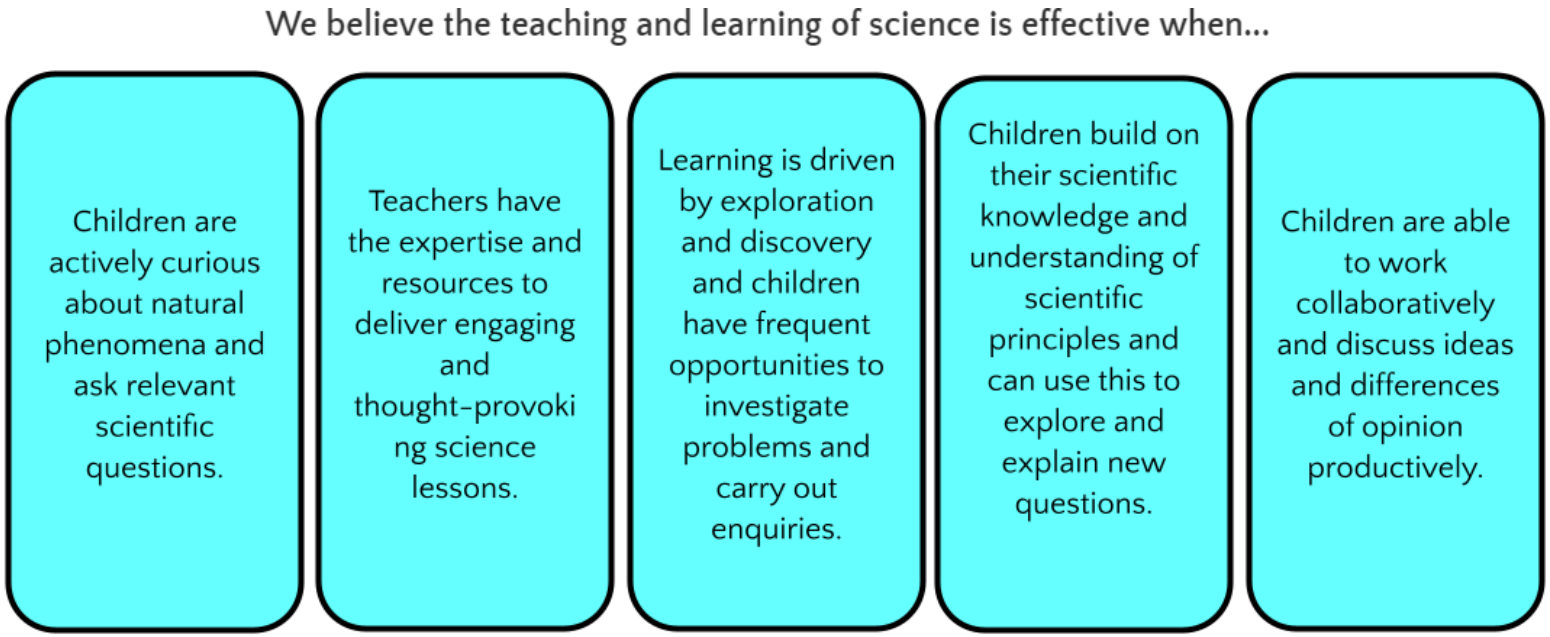
Science

"*The important thing is to not stop questioning*", Albert Einstein

Children are naturally curious. At Blewbury, we use science as a vehicle to nurture this curiosity, encourage children to ask questions and develop the skills they need to answer questions. Science gives children a process for exploring anything and everything in the physical and natural world. It is about asking good questions, suggesting possible explanations, and then testing them to see if they make sense. Studying science improves our ability to understand ideas, assess the credibility, reliability, and validity of what we see and hear and make informed decisions. At Blewbury, the science curriculum provides a valuable and rich opportunity for children to explore questions and ideas first-hand, carry out enquiries, look for proof of their ideas and formulate arguments and conclusions. It encourages critical thinking and deductive reasoning; analysis and problem solving. We aim for all children to leave the school with an appreciation of the application and use of science in the world and why it matters.



Year group	Knowledge	Skills	Vocabulary	Suggested activities/concepts	Resources	Local enrichment/Significant people
EYFS	• Children know about similarities and differences in relation to places, objects, materials and living things. • They talk about the features of their own immediate environment and how environments might vary from one another. • They make observations of animals and plants and explain why some things occur and talk about changes.	**Plan** • choose the resources they need for their chosen activities and say when they do or don't need help **Do** • know about similarities and differences in relation to places, objects, materials and living things • make observations of animals and plants • explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • select and use technology for particular purposes **Record** • represent their own ideas, thoughts and feelings through design and technology, art, music, dance, role play, drawing, writing, models, photographs and stories **Review** • talk about the features of their own immediate	Science Experiment Fair Find out Explain Reason Why Change	• Examine change over time, e.g. growing plants • Change that may be reversed, e.g. melting ice. • Help children to find out about the environment by talking to people, examining photographs and visiting local places. • Use correct terms, e.g. children will enjoy naming a chrysalis if the practitioner uses the correct name. • Pose carefully framed open-ended questions, such as "How can we…?" or "What would happen if…?". • Give opportunities to design practical, attractive environments, e.g. taking care of the flowerbeds or organising equipment outdoors.	Animal toys Seeds Leaves Ice with objects in Water tray Sand tray PSTT Resources Science Sparks	

		environment and how environments might vary from one another ● explain why some things occur and talk about changes				
1	**Animals including humans** ● identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals ● identify and name a variety of common animals that are carnivores, herbivores and omnivores ● describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) ● identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	**Plan** ● ask simple questions and recognise that they can be answered in different ways **Do** ● observe closely, using simple equipment ● perform simple tests ● identify and classify **Record** ● gather and record data to help in answering questions **Review** ● use their observations and ideas to suggest answers to questions	Fish, amphibians, reptiles, birds, mammals, pets, tongue, nose, eyes, ears, skin, taste, smell, sight, touch, hear, head, legs, eyes, neck, knees, hair, arms, face, mouth, elbows, ears, teeth, carnivore, omnivore, herbivore, meat, plants, names of animals	● Make first-hand, close observations of animals from each of the groups. ● Compare two animals from the same or different groups. ● Classify animals using a range of features. ● Identify animals by matching them to named images. ● Classify animals according to what they eat. ● Make first-hand close observations of parts of the body e.g. hands, eyes. ● Compare two people. ● Take measurements of parts of their body. ● Compare parts of their own body. ● Look for patterns between people e.g. Do people with big hands have big feet? ● Classify people according to their features. ● Investigate human senses e.g. Which part of my body is good for feeling, which is not? Which	Monterey Bay Aquarium Online San Diego Zoo Online Africam Zoos Victoria Online STEM resources Odd One Out Positive Minus Interesting BBC Bitesize - Animals BBC Bitesize – The Human Body Photos of animals Senses pots/feely bag Animal identification guides Big Questions Animal Pictures Explorify Senses activity ideas Inspect an Insect	● Cotswold Wildlife Park ● Linda Buck (smell/nose) ● George Mottershead (founded Chester Zoo) ● Chris Packham (Animal Conservationist) ● Steve Irwin (Crocodile Hunter, conservationist and TV presenter)

				food/flavours can I identify by taste? Which smells can I match? ● Tin foil models of animals		
	Key Learning Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals. Humans have key parts in common, but these vary from person to person. Humans (and other animals) find out about the world using their senses. Humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body.			**Possible misconceptions** ● only four-legged mammals, such as pets, are animals ● humans are not animals ● insects are not animals ● all 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group ● amphibians and reptiles are the same.		
	Everyday Materials ● 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	**Plan** ● ask simple questions and recognise that they can be answered in different ways **Do** ● observe closely, using simple equipment ● perform simple tests ● identify and classify **Record**	Material, object, wood, plastic, glass, metal, water, rock, brick, paper, fabrics, elastic, foil, properties, hard, soft, stretchy, stiff, shiny, dull, rough, smooth,	● Classify objects made of one material in different ways e.g. a group of object made of metal. ● Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials. ● Classify materials based on their properties. ● Test the properties of objects e.g. absorbency of	Three Little Pigs/Three Little Wolves and the Big Bad Pig picture books STEM resources Odd One Out BBC Bitesize Various objects made of different materials Salt dough Positive Minus Interesting Big Questions	● Ole Kirk Christiansen (Invented Lego) ● Martin Brock (XelfleX inventor, nanotechnology engineer) ● Charles Macintosh (Inventor of waterproof fabric)

	materials on the basis of their simple physical properties	• gather and record data to help in answering questions **Review** • use their observations and ideas to suggest answers to questions	bendy, not bendy, waterproof, not waterproof, absorbent, non-absorbent	cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters. • Build sandcastles. • Paper Flowers	Explorify	
	Key Learning All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons. Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties.			**Possible misconceptions** • only fabrics are materials • only building materials are materials • only writing materials are materials • the word 'rock' describes an object rather than a material • 'solid' is another word for hard.		
	Plants • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees	**Plan** • ask simple questions and recognise that they can be answered in different ways **Do** • observe closely, using simple equipment • perform simple tests • identify and classify **Record**	Common, wild plants, garden plants, deciduous, evergreen, plant, leaf, root, leaves, bud, flowers, blossom, petals, root, stem, tree, trunk, branches, leaf, root,	• Make close observations of leaves, seeds, flowers etc. • Compare two leaves, seeds, flowers etc. • Classify leaves, seeds, flowers etc. using a range of characteristics. • Identify plants by matching them to named images. • Make observations of how plants change over a period of time.	Raised beds in playground Seeds Plant pots Soil Spotter Sheets Walk around local area STEM resources Odd One Out Big Questions BBC Bitesize Books Positive Minus Interesting	• Oxford Botanic Garden • Oxford Arboretum • Beatrix Potter (Author & Botanist) • Allotment • School garden

		● gather and record data to help in answering questions **Review** ● use their observations and ideas to suggest answers to questions	fruit, vegetables, bulb, seed	● When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them.	Big Questions Plant Discovery Pack Explorify	
	Key Learning Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.			**Possible Misconceptions** ● plants are flowering plants grown in pots with coloured petals and leaves and a stem ● trees are not plants ● all leaves are green ● all stems are green ● a trunk is not a stem ● blossom is not a flower		
	Seasonal Changes ● observe changes across the four seasons ● observe and describe weather associated with the seasons and how day length varies	**Plan** ● ask simple questions and recognise that they can be answered in different ways **Do** ● observe closely, using simple equipment ● perform simple tests ● identify and classify **Record** ● gather and record data to help in answering questions	Season, month, summer, autumn, winter, spring, day, daytime, sun, day length, weather, wind, rain, snow, hail, sleet, fog, sun, hot, burn, warm, cold, animals,	● Collect information about the weather regularly throughout the year. ● Present this information in tables and charts to compare the weather across the seasons. ● Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans. ● Present this information in different ways to compare the seasons.	One Year with Kipper picture book STEM resources BBC Bitesize Rain gauge Windsock Window Swap Books Positive Minus Interesting Big Questions Explorify Wind Experiment Ideas	● George James Symons (invented a rain gauge) ● Dr Steve Lyons (Extreme Weather)

		Review ● use their observations and ideas to suggest answers to questions	plants, trees, flowers, leaves, adapting, hibernating, migrating	● Gather data about day length regularly throughout the year and present this to compare the seasons. ● Make rain gauges and windsocks.	How do we know when it will rain video Evergreen Trees video Winter Live Lesson Why are there seasons video	
	Key Learning In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again. The weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer. The change in weather causes many other changes. Some examples are: numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people.			**Possible misconceptions** ● it always snows in winter ● it is always sunny in the summer ● there are only flowers in spring and summer ● it rains most in the winter.		
2	**Animals including humans** ● notice that animals including humans, have offspring which grow into adults ● find out about and describe the basic needs of animals, including humans, for survival (water, food and air) ● describe the importance for humans of exercise, eating the right amounts of	**Plan** ● ask simple questions and recognise that they can be answered in different ways **Do** ● observe closely, using simple equipment ● perform simple tests ● identify and classify	Offspring, grow, adults, survival, water, food, air, exercise, hygiene, nutrition, reproduce, egg, chick, chicken, egg, caterpillar,	● Ask people questions and use secondary sources to find out about the life cycles of some animals. ● Observe animals growing over a period of time e.g. chicks, caterpillars, a baby. ● Ask questions of a parent about how they look after their baby.	STEM resources Odd One Out BBC Bitesize Photos of animals Food pyramid Positive Minus Interesting Big Questions Butterfly Lifecycle Explorify	● Local Farms ● The Living Rainforest ● Adelle Davis (20th Century Nutritionist) ● Robert Winston (Human Scientist) ● Florence Nightingale (Pioneer of modern nursing in GB)

	different types of food, and hygiene	**Record** ● gather and record data to help in answering questions **Review** ● use their observations and ideas to suggest answers to questions	pupa, butterfly, spawn, tadpole, frog, lamb, sheet, baby, toddler, child, teenager, adult	● Ask pet owners questions about how they look after their pet. ● Explore 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.	How a caterpillar becomes a butterfly video	
	Key Learning Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles. All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To grow into healthy adults, they also need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses.			**Possible misconceptions** ● an animal's habitat is like its 'home' ● all animals that live in the sea are fish ● respiration is breathing ● breathing is respiration.		
	Use of everyday materials ● identify and compare the suitability of a variety of	**Plan**	Material, object, wood, metal,	● Classify materials. ● Make suggestions about alternative materials for a	STEM resources Odd One Out BBC Bitesize	● Julie Brusaw (Solar Roadways inventor, material engineer)

	everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses ● find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	● ask simple questions and recognise that they can be answered in different ways **Do** ● observe closely, using simple equipment ● perform simple tests ● identify and classify **Record** ● gather and record data to help in answering questions **Review** ● use their observations and ideas to suggest answers to questions	plastic, glass, brick, rock, paper, cardboard, rubber, squash, bend, twist, stretch, waterproof fabric, macadamisation	purpose that are both suitable and unsuitable ● Test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for Elastigirl's costume, test materials for waterproofness to select the most appropriate for a rain hat	Range of different materials Positive Minus Interesting Big Questions Explorify	● John Loudon McAdam (Inventor of macadam road surfacing) ● Joe Zekoski (Developer of the BH03 tyre) ● John Boyd Dunlop (Developed inflatable rubber tyres)
	Key Learning All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the			**Possible misconceptions** ● only fabrics are materials ● only building materials are materials ● only writing materials are materials ● the word rock describes an object rather than a material ● solid is another word for hard.		

	material or depend on how the material has been processed e.g. thickness.					
	Living things and their habitats ● explore and compare the differences between things that are living, dead, and things that have never been alive ● identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other ● identify and name a variety of plants and animals in their habitats, including microhabitats ● describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food	**Plan** ● ask simple questions and recognise that they can be answered in different ways **Do** ● observe closely, using simple equipment ● perform simple tests ● identify and classify **Record** ● gather and record data to help in answering questions **Review** ● use their observations and ideas to suggest answers to questions	Living, dead, never alive, habitats, micro-habitats, food, food chain, sun, grass, cow, human, alive, healthy, logs, leaf litter, stony path, under bushes, shelter, seashore, woodland, ocean, rainforest, conditions, hot, warm, cold, dry, damp, wet, bright, shade, dark	● Explore the outside environment regularly to find objects that are living, dead and have never lived. ● Classify objects found in the local environment. ● Observe animals and plants carefully, drawing and labelling diagrams. ● Create simple food chains for a familiar local habitat from first-hand observation and research. ● Make a bug hotel. ● Explore the effect of plastic pollution on animals in the ocean/marine habitats - link to Somebody Swallowed Stanley picture book. ● Explore the effect of plastic/rubbish on habitats - link to	STEM resources BBC Bitesize What is happening to bees Odd One Out Pooters Bug nets Magnifying glasses Somebody Crunched Colin - picture book Somebody Swallowed Stanley - picture book Positive Minus Interesting Big Questions Explorify Woodlice Habitats Investigation	● Local river/pond ● School grounds ● Terry Nutkins (TV Presenter) ● Liz Bonnin (Conservationist) ● Gerald Durrell (naturalist, zookeeper, conservationist)

				Somebody Crunched Colin picture book. ● Create simple food chains from information given e.g. in picture books (Gruffalo etc.). ● Explore how animals camouflage themselves.		
	Key Learning All objects are either living, dead or have never been alive. Living things are plants (incl. seeds) and animals. Dead things include dead animals, plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers. An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive. Animals and plants live in a habitat to which they are suited. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The			**Possible misconceptions** ● an animal's habitat is like its 'home' ● plants and seeds are not alive as they cannot be seen to move ● fire is living ● arrows in a food chain mean 'eats'.		

	plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain.					
	Plants ● 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	**Plan** ● ask simple questions and recognise that they can be answered in different ways **Do** ● observe closely, using simple equipment ● perform simple tests ● identify and classify **Record** ● gather and record data to help in answering questions	common, wild plants, garden plants, deciduous, evergreen, leaf, root, leaves, bud, flowers, blossom, petals, root, stem, tree, trunk, branches, leaf, root, fruit, vegetables,	● Make close observations of seeds and bulbs. ● Classify seeds and bulbs. ● Research and plan when and how to plant a range of seeds and bulbs. ● Look after the plants as they grow – weeding, thinning, watering etc. ● Make close observations and measurements of their plants growing from seeds and bulbs. ● Make comparisons between plants as they grow.	Gardening area in school grounds Jack and the Beanstalk book Seeds Soil Pots Bulbs STEM resources Odd One Out Big Questions BBC Bitesize Books Positive Minus Interesting Big Questions Explorify	● Joseph Banks (Botanist) ● Alan Titchmarsh (Botanist & Gardener) ● Oxford Botanic Garden ● Oxford Arboretum

	Key Learning Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy.	**Review** ● use their observations and ideas to suggest answers to questions	bulb, seed, water, light, suitable, temperature, germination, reproduction, grow, healthy	**Possible misconceptions** ● plants are not alive as they cannot be seen to move ● seeds are not alive ● all plants start out as seeds ● seeds and bulbs need sunlight to germinate	Jack and the Beanstalk Experiment Ideas Evergreen trees video	
3	**Plants** ● Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; leaves; and flowers. ● Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. ● Investigate the way in which water is transported within plants. ● Explore the part that flowers play in the life cycle of flowering plants, including	**Plan** ● ask relevant questions and using different types of scientific enquiries to answer them ● set up simple practical enquiries, comparative and fair tests **Do** ● make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including	common, wild plants, garden plants, deciduous, evergreen, leaf, root, leaves, bud, flowers, blossom, petals, root, stem, trunk, branches, leaf, root, fruit, vegetables, bulb, seed, water, light, suitable,	● Observe what happens to plants over time when the leaves or roots are removed. ● Observe the effect of putting cut white carnations or celery in coloured water. ● Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.	Seeds Bulbs Soil Pots Plant spotter guides Odd One Out Books BBC Bitesize Positive Minus Interesting Big Questions Plant Discovery Pack Explorify STEM resources Tallest Trees Video Biggest Flower Video	● Ahmed Mumin Warfa (Botanist) ● George Washington Carver (botanist and inventor who researched alternative crops to cotton) ● Oxford Botanic Garden ● Oxford Arboretum

	pollination, seed formation and seed dispersal. **Key Learning** Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the	thermometers and data loggers **Record** ● gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables **Review** ● report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes ● use straightforward scientific evidence to answer questions or to support their findings	temperature, germination, reproduction, grow, healthy, structure, flowering plants, nutrition, support, air, light, water, soil, grow, varying needs, fertiliser, flowers, pollination, seed formation, seed dispersal, life cycle	● 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. ● Classify seeds in a range of ways, including by how they are dispersed. ● Create a new species of flowering plant. **Possible misconceptions** ● plants eat food ● food comes from the soil via the roots ● flowers are merely decorative rather than a vital part of the life cycle in reproduction ● plants only need sunlight to keep them warm ● roots suck in water which is then sucked up the stem.	Plants with weapons video The Eden Project Look inside a flower video Guess the tree video The Regenerators - The Green Planet Live Lesson 1 (Plants) The Regenerators - The Green Planet Live Lesson 2 (Plants)	

	flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways.					
	Animals including humans ● Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food – they get nutrition from what they eat. ● Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	**Plan** ● ask relevant questions and using different types of scientific enquiries to answer them ● set up simple practical enquiries, comparative and fair tests **Do** ● make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers **Record** ● gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Nutrition, nutrients, carbohydrates, protein, fats, fibre, water, vitamins, minerals, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic, skeleton, vertebrate, invertebrate, contract, relax, muscles, ball joint, socket joint, hinge joint, gliding joint	● 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 the 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 to contain a good balance of nutrients. ● Explore the nutrients contained in fast food. ● Use secondary sources to research the parts and functions of the skeleton. ● Investigate patterns asking questions such as: Can people with longer legs run faster? Can people with bigger hands catch a ball better? Compare, contrast and	Animal x-rays Animal skulls and bones Food pyramid Odd One Out BBC Bitesize BBC Bitesize BBC Bitesize Positive Minus Interesting Big Questions Explorify STEM resources The food groups video How do our bodies move video	● Leoanrdo da Vinci (first anatomically correct drawings of bones) ● Andreas Vesalius (founder of modern observational anatomy)

		Review ● report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes ● use straightforward scientific evidence to answer questions or to support their findings		classify skeletons of different animals.		
	Key Learning Animals need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.			**Possible misconceptions** ● certain whole food groups like fats are 'bad' for you ● certain specific foods, like cheese are also 'bad' for you ● diet and fruit drinks are 'good' for you ● snakes are similar to worms, so they must also be invertebrates ● invertebrates have no form of skeleton.		
	Rocks ● 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.	**Plan** ● ask relevant questions and using different types of scientific enquiries to answer them ● set up simple practical enquiries, comparative and fair tests **Do** ● make systematic and careful observations and, where appropriate, take accurate measurements using standard	Rock, appearance, physical, properties, hard, soft, shiny, dull, rough, smooth, absorbent, non-absorbent, fossils, sedimentary, soils, organic matter, buildings,	● Observe rocks closely. ● Classify rocks in a range of ways, based on their appearance. ● Devise a test to investigate the hardness of a range of rocks. ● Devise a test to investigate how much water different rocks absorb. ● Observe how rocks change over time e.g. gravestones or old building.	Range of rocks and soils Sandpaper Sieves of various sizes Magnifying glasses Odd One Out Books BBC Bitesize Positive Minus Interesting Big Questions Explorify STEM resources Rocks video	● Mary Anning (Palaeontologist and fossil collector) ● Inge Lehmann (Earth's Mantle) ● William Smith (Fossils strata) ● Katia Krafft - Geologist and Volcanologist) ● Kay Behrensmeyer (paleontologist)

		units, use a range of equipment, including thermometers and data loggers **Record** ● gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	gravestones, grains, crystals	● Research using secondary sources how fossils are formed. ● Observe soils closely. ● Classify soils in a range of ways based on their appearance. ● Devise a test to investigate the water retention of soils. ● Observe how soil can be separated through sedimentation. ● Research the work of Mary Anning.	Rock detective video Soil Video Where does soil come from video	
	Key Learning Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the	**Review** ● report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes ● use straightforward scientific evidence to answer questions or to support their findings		**Possible misconceptions** ● rocks are all hard in nature ● rock-like, man-made substances such as concrete or brick are rocks ● materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer ‘natural’ ● certain found artefacts, like old bits of pottery or coins, are fossils ● a fossil is an actual piece of the extinct animal or plant		

	dissolving animal and plant matter is replaced by minerals from the water.			• soil and compost are the same thing.		
	Light • Recognise that they need light in order to see things, and that dark is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. • Find patterns in the way that the size of shadows change.	**Plan** • ask relevant questions and using different types of scientific enquiries to answer them • set up simple practical enquiries, comparative and fair tests **Do** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers **Record** • gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables **Review** • report on findings from enquiries, including oral and	Light, see, dark, reflect, surface, natural, star, moon, sun, shadow, blocked, solid, artificial, torch, candle, lamp, sunlight, dangerous, protect eyes	• Explore how different objects are more or less visible in different levels of lighting. • Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. • Explore how shadows vary as the distance between a light source and an object or surface is changed. • Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground. • Choose suitable materials to make shadow puppets. • Create artwork using shadows. • Shadow Puppets	Mirrors and light Prisms Torches Colour filters/paddles Dark tent/blackout material Black paper Candles Odd One Out BBC Bitesize Positive Minus Interesting Big Questions Explorify STEM resources How do we see colours video	• Ibn al-Haytham (Conducted important experiments on light and how eyes work)
	Key Learning We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light.			**Possible misconceptions** • we can still see even where there is an absence of any light • our eyes 'get used to' the dark • the moon and reflective surfaces are light sources		

	Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.	written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes ● use straightforward scientific evidence to answer questions or to support their findings		● a transparent object is a light source ● shadows contain details of the object, such as facial features on their own shadow ● shadows result from objects giving off darkness.		
	Forces and Magnets ● Compare how things move on different surfaces. ● Notice that some forces need contact between two objects, but magnetic forces can act at a distance. ● Observe how magnets attract or repel each other and attract some materials and not others. ● Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. ● Describe magnets as having two poles. ● Predict whether two magnets will attract or repel	**Plan** ● ask relevant questions and using different types of scientific enquiries to answer them ● set up simple practical enquiries, comparative and fair tests **Do** ● make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers **Record**	Force, push, pull, open, surface, magnet, magnetic, attract, repel, magnetic poles, North, South	● Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. ● Explore what materials are attracted to a magnet. ● Classify materials according to whether they are magnetic. ● Explore the way that magnets behave in relation to each other. ● Use a marked magnet to find the unmarked poles on other types of magnets.	Range of different magnets Force metres Ramps Toy cars Marbles Range of materials – magnetic and non-magnetic Odd One Out BBC Bitesize Positive Minus Interesting Big Questions Explorify STEM resources Fun with magnets video	● Michael Faraday (invented the electric motor and worked on magnetism and creation of electromagnets)

	each other, depending on which poles are facing. **Key Learning** A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement. A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles are brought together they will push away from each other – repel. If two unlike poles are brought together they will pull together – attract.	● gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables **Review** ● report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes ● use straightforward scientific evidence to answer questions or to support their findings		● Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table. ● Devise an investigation to test the strength of magnets. **Possible misconceptions** ● the bigger the magnet the stronger it is ● all metals are magnetic.		
4	**Living things and their habitats** ● 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	**Plan** ● ask relevant questions and using different types of scientific enquiries to answer them	Environment, flowering, non-flowering, plants, animals, vertebrate,	● Observe plants and animals in different habitats throughout the year. ● Compare and contrast the living things observed.	Classification keys Books BBC Bitesize Odd One Out Positive Minus Interesting Big Questions	● Seirian Sumner (Evolutionary biologist and behavioural ecologist) ● Jane Goodall (Primatologist)

	things in their local and wider environment. ● Recognise that environments can change and that this can sometimes pose dangers to living things.	● set up simple practical enquiries, comparative and fair tests **Do** ● make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers **Record** ● gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables **Review** ● report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	danger, fish, amphibians, reptiles, birds, mammals, invertebrate, snails, slugs, worms, spiders, insects, grasses, mosses, ferns, human impact, positive, negative, nature reserve, ecologically planned parks, garden ponds, population, development, litter, deforestation	● Use classification keys to name unknown living things. ● Classify living things found in different habitats based on their features. ● Create a simple identification key based on observable features. ● Use fieldwork to explore human impact on the local environment e.g. litter, tree planting. ● Use secondary sources to find out about how environments may naturally change. ● Use secondary sources to find out about human impact, both positive and negative, on environments.	Explorify STEM resources	● Rachel Carson (marine biologist- researched polluting effect of pesticides) ● Cindy Looy (Environmental Change and Extinction)
	Key Learning Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited. These environments may change naturally e.g. through flooding, fire, earthquakes. Humans also cause the environment to change. This can be in a good			**Possible misconceptions** ● the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain ● there is always plenty of food for wild animals ● animals are only land-living creatures ● animals and plants can adapt to their habitats, however they change		

	way (e.g. setting up nature reserves) or in a bad way (e.g. littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.	• identify differences, similarities or changes related to simple scientific ideas and processes • use straightforward scientific evidence to answer questions or to support their findings		• all changes to habitats are negative.		
	Animals including humans • 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. **Key Learning**	**Plan** • ask relevant questions and using different types of scientific enquiries to answer them • set up simple practical enquiries, comparative and fair tests **Do** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers **Record** • gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled	Human digestive system, digestion, mouth, tongue, mixes, moistens, saliva, oesophagus, transports, stomach, acid, enzymes, small intestines, colon, absorbs, compacts, teeth, incisors, cutting, slicing, canines, ripping, tearing, molars, chewing, grinding, floss, brush, food chain,	• Research the function of the parts of the digestive system. • Create a model of the digestive system using household objects. • Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing). • Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls. • Use food chains to identify producers, predators and prey within a habitat. • Use secondary sources to identify animals in a habitat and find out what they eat. • Digestive system experiment using tights **Possible misconceptions**	Model of the digestive system Photos of the digestive system BBC Bitesize BBC Bitesize Odd One Out Positive Minus Interesting Big Questions Explorify STEM resources Why do we have baby teeth video The tongue video Why do we brush our teeth video Teeth – not just for smiles video Weird animal teeth video Digestion Live Lesson	• Ivan Pavlov (Digestive System - Mechanisms)

	Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).	diagrams, keys, bar charts, and tables **Review** ● report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes ● use straightforward scientific evidence to answer questions or to support their findings	sun, producers, prey, predators, carnivore, herbivore, omnivore	● arrows in a food chains mean 'eats' ● the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain ● there is always plenty of food for wild animals ● your stomach is where your belly button is ● food is digested only in the stomach ● when you have a meal, your food goes down one tube and your drink down another ● the food you eat becomes "poo" and the drink becomes "wee".		
	States of matter ● 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	**Plan** ● ask relevant questions and using different types of scientific enquiries to answer them ● set up simple practical enquiries, comparative and fair tests	Solid, solidify, iron, ice, melt, freeze, liquid, evaporate, condense, gas, container, changing	● Observe closely and classify a range of solids. ● Observe closely and classify a range of liquids. ● Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using	Candles/tealights Sand boxes Tealight stands/holders Water cycle model The Rhythm of the Rain - book A Drop In My Drink - book BBC Bitesize	● Daniel Fahrenheit (Invented temperature scale and mercury thermometer) ● Anders Celsius

	happens in degrees Celsius (°C). ● Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Do** ● make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers **Record** ● gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables **Review** ● report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes	state, heated, heat, cooled, cool, degrees Celsius, thermometer, water cycle, evaporation, condensation, temperature, melting, warm, cool, water, water vapour	straws to blow objects, trees moving in the wind. ● Classify materials according to whether they are solids, liquids and gases. ● Observe a range of materials melting e.g. ice, chocolate, butter. ● Investigate how to melt ice more quickly. ● Observe the changes when making rocky road cakes or ice-cream. ● Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate. ● Explore freezing different liquids e.g. tomato ketchup, oil, shampoo. ● Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration). ● Observe water evaporating and condensing e.g. on cups of icy water and hot water. ● Set up investigations to explore changing the rate of evaporation e.g.	Odd One Out Positive Minus Interesting Big Questions Explorify STEM resources Solar Ovens Video	

		● use straightforward scientific evidence to answer questions or to support their findings		washing, puddles, handprints on paper towels, liquids in containers. ● Use secondary sources to find out about the water cycle.		
	Key Learning A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0°C. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the			**Possible misconceptions** ● 'solid' is another word for hard or opaque ● solids are hard and cannot break or change shape easily and are often in one piece ● substances made of very small particles like sugar or sand cannot be solids ● particles in liquids are further apart than in solids and they take up more space ● when air is pumped into balloons, they become lighter ● water in different forms – steam, water, ice – are all different substances ● all liquids boil at the same temperature as water (100 degrees) ● melting, as a change of state, is the same as dissolving ● steam is visible water vapour (only the		

	surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.			condensing water droplets can be seen) ● clouds are made of water vapour or steam ● the substance on windows etc. is condensation rather than water ● the changing states of water (illustrated by the water cycle) are irreversible ● evaporating or boiling water makes it vanish ● evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material		
	Sound ● Identify how sounds are made, associating some of them with something vibrating. ● Recognise that vibrations from sounds travel through a medium to the ear. ● Find patterns between the pitch of a sound and features of the object that produced it. ● Find patterns between the volume of a sound and the strength of the vibrations that produced it.	**Plan** ● ask relevant questions and using different types of scientific enquiries to answer them ● set up simple practical enquiries, comparative and fair tests **Do** ● make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including	Vibrate, vibration, vibrating, air, medium, ear, hear, sound, volume, pitch, faint, fainter, loud, louder, string, percussion, woodwind, brass, insulate	● Classify sound sources. ● Explore making sounds with a range of objects, such as musical instruments and other household objects. ● Explore how string telephones or ear gongs work. ● Slinky sound waves ● Slinky investigation ● Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks.	Coat hangers String Tin cans Slinky Tuning forks Musical instruments Rice on a drum Science of sound BBC Bitesize Odd One Out Positive Minus Interesting Big Questions Explorify STEM resources How do we sing video	● Alexander Graham Bell (inventor of the telephone) ● Aristotle (Sound Waves) ● Gailileo Galilei (Frequency and Pitch of Sound Waves)

	● Recognise that sounds get fainter as the distance from the sound source increases. **Key Learning** A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.	thermometers and data loggers **Record** ● gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables **Review** ● report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ● use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes ● use straightforward scientific evidence to answer questions or to support their findings		● Measure sounds over different distances. ● Measure sounds through different insulation materials. ● Making Music ● Sounds of Science Ideas ● Musical Science Ideas **Possible misconceptions** ● Pitch and volume are frequently confused, as both can be described as high or low. ● sound is only heard by the listener ● sound only travels in one direction from the source ● sound can't travel through solids and liquids ● high sounds are load and low sounds are quiet.	The Science of string phones video	
	Electricity ● Identify common appliances that run on electricity.	**Plan** ● ask relevant questions and using different types of	Appliances, electricity, electrical	● Construct a range of circuits.	Odd One Out BBC Bitesize	● Benjamin Franklin (Made discoveries

	• 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. **Key Learning**	scientific enquiries to answer them • set up simple practical enquiries, comparative and fair tests **Do** • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers **Record** • gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables **Review** • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • use results to draw simple conclusions, make predictions for new values, suggest	circuits, cell, wire, bulb, buzzer, danger, electrical safety, sign, insulators, conductors, switch, open, closed	• Energy stick/circuit ball to create a human circuit. • Explore which materials can be used instead of wires to make a circuit. • Classify the materials that were suitable/not suitable for wires. • Explore how to connect a range of different switches and investigate how they function in different ways. • Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm. • Identify power sources for different appliances found in the classroom/at home. • Apply their knowledge of conductors and insulators to design and make different types of switch. • Create a lemon/potato battery. • Make circuits that can be controlled as part of a DT project. N.B. Children should be given one component at a time to add to circuits. **Possible misconceptions**	Bulbs of various watts Batteries of various types Wire Crocodile clips Buzzers Motors Switches Human circuit stick Positive Minus Interesting Big Questions Explorify STEM resources	about the relationship between lightning and electricity and invented the lightning rod)

	Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.	improvements and raise further questions ● identify differences, similarities or changes related to simple scientific ideas and processes ● use straightforward scientific evidence to answer questions or to support their findings		● electricity flows to bulbs, not through them ● electricity flows out of both ends of a battery ● electricity works by simply coming out of one end of a battery into the component.		
5	**Living things and their habitats** ● 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.	**Plan** ● plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** ● take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate **Record** ● record data and results of increasing complexity using	Life cycles, mammal, amphibian, insect, bird, life processes, plants, animals, vegetable garden, flower border, animal naturalists, animal behaviourists, reproduction, sexual, asexual,	● Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals. ● 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. ● Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes.	Plants BBC Bitesize Odd One Out Root vegetables Positive Minus Interesting Big Questions Explorify STEM resources	● James Brodie (Reproduction of Plants by Spores)

		scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present 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 ● identify scientific evidence that has been used to support or refute ideas or arguments	rainforest, oceans, deserts, prehistoric, similarities, differences	● Take cuttings from a range of plants e.g. African violet, mint. ● Plant bulbs and then harvest to see how they multiply. ● Use secondary sources to find out about pollination.		
	Key Learning As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction			**Possible misconceptions** ● all plants start out as seeds ● all plants have flowers ● plants that grow from bulbs do not have seeds ● only birds lay eggs		

	occurs through pollination, usually involving wind or insects.					
	Animals including humans ● Describe the changes as humans develop to old age.	● plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** ● take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate **Record** ● record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as	Puberty, life cycle, gestation, growth, reproduce, foetus, baby, fertilisation, toddler, child, teenager, adult, old age, life expectancy, adolescence, adulthood, early adulthood, middle adulthood, late adulthood, childhood	● Carry out a research enquiry by asking an expert e.g. school nurse to provide answers to questions that have been filtered by the teacher	Odd One Out Photos of humans Positive Minus Interesting Big Questions Explorify STEM resources	
	Key Learning When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. This needs to be taught alongside PSHE.		**Possible misconceptions** ● a baby grows in a mother's tummy ● a baby is "made".		

		displays and other presentations ● identify scientific evidence that has been used to support or refute ideas or arguments				
	Properties and changes of materials ● Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. ● 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.	● plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** ● take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate **Record** ● record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present findings from enquiries, including	Properties, hardness, solubility, transparency, electrical conductor, thermal conductor, magnetic, dissolve, solution, separate, separating, solids, liquids, gases, evaporating, reversible changes, dissolving, mixing, evaporation, filtering, sieving, melting, irreversible, new material, burning, rusting, magnetism, electricity,	● 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 coat. ● Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. ● Investigate rates of dissolving by carrying out comparative and fair test. ● Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. ● Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. ● Carry out comparative and fair tests involving non-reversible changes	Salt Sugar Sieves Filter paper Tealights Tealight holders Sand boxes BBC Bitesize Odd One Out Positive Minus Interesting Big Questions Explorify STEM resources Videos demonstrating changing material investigations (need to register for free first to access) Videos demonstrating liquid investigations (need to register for free first) Videos demonstrating gases investigations	● Joe Keddie (Professor of Soft Matter Physics) ● Spencer Silver (Inventor of Post-it® notes)

	• 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.	conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • identify scientific evidence that has been used to support or refute ideas or arguments	chemists, quantitate, measurements, conductivity, insulation, chemical	e.g. What affects the rate of rusting? What affects the amount of gas produced? • Explore the time taken for live mealworms to eat plastic - eg. plastic bag and polystyrene cup. • Lava lamps. • Walking on custard/cornflour. • Making sherbet. • Most suitable material for goalie gloves. • Making butter. • Bath bombs. • Best biscuit for dunking in a drink. • Making fire extinguishers. • Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton).	(need to register for free first) Videos demonstrating solids investigations (need to register for free first) Videos demonstrating separating mixtures investigations (need to register for free first)	
	Key Learning Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.			**Possible misconceptions** • thermal insulators keep cold in or out • thermal insulators warm things up • solids dissolved in liquids have vanished and so you cannot get them back		

	Mixtures can be separated by filtering, sieving and evaporation. Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.			• lit candles only melt, which is a reversible change.		
	Earth and Space • 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. • Describe the Sun, Earth and Moon as approximately 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.	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate **Record** • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Earth, sun, moon, space, planets, dwarf planet, stars, solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, rotate, day, night, Aristotle, Ptolemy, Galileo, Copernicus, Brahe, Alhazen, orbit, axis, spherical, heliocentric, geocentric,	• 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. • Fruit solar system • Use secondary sources to help make 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. • Research time zones. • Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and	Books BBC Bitesize Odd One Out Solar System Model Interactive Solar System NASA Kids Inflatable Planetarium Solar system bibs Photos of planets Telescopes World Space Week Ideas Positive Minus Interesting Big Questions Explorify STEM resources What would we eat on Mars Video Was there water on Mars Video	• Maggie Aderin-Pocock (Astronomer and science communicator) • Nicolaus Copernicus (Proposed that the Sun was the centre of our universe) • Emma England (Aerospace engineer) • Mae Carol Jemison

	Key Learning The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. 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 (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. The Sun, Earth and Moon are approximately spherical.	**Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present 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 ● identify scientific evidence that has been used to support or refute ideas or arguments	hemisphere, season, tilt	planets before space travel. **Possible misconceptions** ● the Earth is flat ● the Sun is a planet ● the Sun rotates around the Earth ● the Sun moves across the sky during the day ● the Sun rises in the morning and sets in the evening ● the Moon appears only at night ● night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.	What is the sun video Satellites Video What is the furthest we've ever gone into space video Where did the moon come from video Explore Saturn's Rings Video Why can I see the moon during the day video What are stars video Meet the five dwarf planets video Explore the solar system – Gas giants Explore the solar system – Rocky planets Space Live Lesson	
	Forces ● Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. ● Identify the effects of air resistance, water resistance and friction that act between moving surfaces.	● plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** ● take measurements, using a range of scientific equipment, with increasing	gravity, air resistance, water, resistance, friction, surface, force, effect, move, accelerate, decelerate, stop, change	● Investigate the effect of friction in a range of contexts e.g. trainers, bathmats, gloves for hanging from monkey bars, mats for a helter-skelter. ● Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through	Odd One Out Various sized balls Parachute Pulleys Levers BBC Bitesize BBC Bitesize Playing with parachutes Positive Minus Interesting	● Isaac Newton (gravity) ● Galileo Galilei

	• Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. **Key Learning** A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and	accuracy and precision, taking repeat readings when appropriate **Record** • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **Review** • use test results to make predictions to set up further comparative and fair tests • report and present 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 • identify scientific evidence that has been used to support or refute ideas or arguments	direction, brake, mechanism, pulley, gear, spring, theory of gravitation, Galileo Galelei, Isaac Newton	water and pulling shapes, such as 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. • Make a product that involves a lever, pulley or gear. • Create a timer that uses gravity to move a ball. • Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. • Straw planes • Falling Paper • Catapults and Levers • Paper Friction • Pendulum Timers • Spinning Paper **Possible misconceptions** • the heavier the object the faster it falls because it has more gravity acting on it • forces always act in pairs which are equal and opposite	Big Questions Explorify STEM resources How do rockets fly video Pulleys Video Levers Video Parachutes Video Terrific Science - Forces Live Lesson	

	friction are contact forces that act between moving surfaces. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.			• smooth surfaces have no friction • objects always travel better on smooth surfaces • a moving object has a force which is pushing it forwards and it stops when the pushing force wears out • a non-moving object has no forces acting on it • heavy objects sink and light objects float.		
6	**Living things and their habitats** • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. • Give reasons for classifying plants and animals based on specific characteristics	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate **Record** • record data and results of increasing complexity using scientific diagrams and labels, classification keys,	Classify, compare, Linnaean, Carl Linneus, classification, domain, kingdom, phylum, class, order, family, genus, species, characteristics, vertebrates, invertebrates, microorganisms, organism, flowering, nonflowering	• Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. • Use first-hand observation to identify characteristics shared by the animals in a group. • Use secondary sources to research the characteristics of animals that belong to a group. • Use information about the characteristics of an unknown animal or plant to assign it to a group. • Classify plants and animals, presenting this in a range of ways e.g. Venn diagrams, Carroll diagrams and keys.	Odd One Out Classification keys BBC Bitesize BBC Bitesize STEM Investigations Positive Minus Interesting Big Questions Explorify STEM resources	• Chris Nelson (Horticulturalist) • Carl Linnaeus (Developed the modern system of classifying and naming organisms)

		tables, scatter graphs, bar and line graphs **Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present 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 ● identify scientific evidence that has been used to support or refute ideas or arguments		● Create an imaginary animal which has features from one or more groups **Possible misconceptions** ● all micro-organisms are harmful ● mushrooms are plants.		
	Key Learning Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms. Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants					
	Animals including humans ● Identify and name the main parts of the human circulatory system, and describe the functions of the	● plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	Internal organs, heart, lungs, liver, kidney, brain, skeletal,	● Create a role play model for the circulatory system. ● Carry out a range of pulse rate investigations: fair test – effect of different	Odd One Out BBC Bitesize Model of the heart Stethoscopes Timers Exploring the heart	● Sir Richard Doll (Linking Smoking and Health Problems) ● Santorio Santorio (Anatomist)

	heart, blood vessels and blood. ● Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. ● Describe the ways in which nutrients and water are transported within animals, including humans. **Key Learning** The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the	**Do** ● take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate **Record** ● record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present 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 ● identify scientific evidence that has been used to support or refute ideas or arguments	skeleton, muscle, muscular, digest, digestion, digestive, circulatory system, heart, blood vessels, blood, impact, diet, exercise, drugs, lifestyle, nutrients, water, damage, drugs, alcohol, substances	activities on my pulse rate; pattern seeking – exploring which groups of people may have higher or lower resting pulse rates; observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate); pattern seeking – exploring recovery rate for different groups of people. ● Research the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources. ● Pig heart dissection ● Make a pumping model heart **Possible misconceptions** ● your heart is on the left side of your chest ● the heart makes blood ● the blood travels in one loop from the heart to the lungs and around the body ● when we exercise, our heart beats faster to work the muscles more	Positive Minus Interesting Big Questions Explorify STEM resources Exercise Live Lesson	● Dr. Katherine Dibb (Expert in Cardiovascular Sciences)

	body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well out heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. This content is also included in PSHE.			• some blood in our bodies is blue and some blood is red • we just eat food for energy • all fat is bad for you • all dairy is good for you • protein is good for you, so you can eat as much as you want • foods only contain fat if you can see it • all drugs are bad for you.		
	Evolution and inheritance ●Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. ●Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. ●Identify how animals and plants are adapted to suit their environment in different ways	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate **Record**	Evolution, inheritance, inherited traits, adapted traits, natural selection, inheritance, Charles Darwin, DNA, genes, variation, parent, offspring, fossil, environment	• Design a new plant or animal to live in a particular habitat. • Use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity. • Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution. • Make observations of fossils to identify living things that lived on Earth millions of years ago.	Odd One Out BBC Bitesize Positive Minus Interesting Big Questions Explorify STEM resources Darwin and Natural Selection Activity Ideas Charles Darwin Video Fossil examples Mr Men and Little Miss inheritance activity BBC Live Lesson	• Professor Nazneen Rahman (Human geneticist) • Alfred Russel Wallace • Charles Darwin

	and that adaptation may lead to evolution. **Key Learning** All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass	● record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present 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 ● identify scientific evidence that has been used to support or refute ideas or arguments	, habitat, fossilisation, plants, animals, living things	● Identify features in animals and plants that are passed onto offspring and explore this process by considering the artificial breeding of animals or plants e.g. dogs. ● Compare the ideas of Charles Darwin and Alfred Wallace on evolution. ● Research the work of Mary Anning and how this provided evidence of evolution. ● Little Miss and Mr Men inheritance activity **Possible misconceptions** ● adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life ● offspring most resemble their parents of the same sex, so that sons look like fathers ● all characteristics, including those that are due to actions during the parent's life such as dyed		

	their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.			hair or footballing skills, can be inherited ● cavemen and dinosaurs were alive at the same time.		
	Light ● Recognise that light appears to travel in straight lines. ● Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. ● Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. ● Use the idea that light travels in straight lines to explain why shadows have the same	● plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** ● take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate **Record**	light, travel, straight, reflect, reflection, light source, object, shadows, mirrors, periscope, rainbow, filters	● Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card. ● Explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets. ● Light Up Science Ideas	Odd One Out BBC Bitesize Torches Dark Tent Prisms Model of the eye Positive Minus Interesting Big Questions Explorify STEM resources	● Thomas Edison (invented the light bulb)

	shape as the objects that cast them. **Key Learning** Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.	● record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs **Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present 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 ● identify scientific evidence that has been used to support or refute ideas or arguments		**Possible misconceptions** ● we see objects because light travels from our eyes to the object.		
	Electricity ● Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. ● Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of	● plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Do** ● take measurements, using a range of scientific equipment, with increasing	voltage, brightness, volume, switches, danger, series circuit, safety, sign, circuit diagram, switch, bulb, buzzer,	● Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower. ● Make circuits to solve particular problems, such as a quiet and a loud	Odd One Out BBC Bitesize Bulbs of various watts Batteries of various types Wire Crocodile clips Buzzers Motors Switches	● Peter Rawlinson (Working on the development of electric vehicles) ● Nicolas Tesla ● Thomas Edison

	buzzers and the on/off position of switches. ● Use recognised symbols when representing a simple circuit in a diagram	accuracy and precision, taking repeat readings when appropriate **Record** ● record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	motor, recognised, symbols	burglar alarm, a device to protect the crown jewels from being stolen, an alarm for a hamster cage to alert if the cage door is left open or an alarm to alert a farmer when the animals eat all the food in their trough. ● Carry out fair tests exploring changes in circuits.	Positive Minus Interesting Big Questions Explorify STEM resources	
	Key Learning Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.	**Review** ● use test results to make predictions to set up further comparative and fair tests ● report and present 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 ● identify scientific evidence that has been used to support or refute ideas or arguments		**Possible misconceptions** ● larger-sized batteries make bulbs brighter ● a complete circuit uses up electricity ● components in a circuit that are closer to the battery get more electricity		