Science Knowledge Development and Scientific Enquiry

		Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
EYFS	Area of learning	**Who am I?** Me, Myself and I	**What do people celebrate?** Forest Schools	**What's where in the world?** All around the world	**How have things changed? (History focus)**	**How do things change and grow?** Growing plants and lifecycles	**Can we go on an adventure?** Adventure/Fantasy stories
	Prior knowledge	Explore and respond to different natural phenomena in their setting and on trips. Use all their senses in hands-on exploration of natural materials Talk about what they see, using a wide vocabulary.				Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things.	Explore how things work. Explore and talk about different forces they can feel. Talk about differences between materials and changes they notice.
	New knowledge	Talk about members of their immediate family and community. Name and describe people who are familiar to them.	Explore the natural world around them. Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them.	Know some similarities and differences between the natural world around them and contrasting environments drawing upon their experiences and what has been read in class.		Explore the natural world around them, making observations, drawing pictures of animals and plants. **Celebrate, care for and wonder at their immediate natural world.**	Understand some important process and changes in the natural world around them, including the seasons and changing states of matter.
	Core Knowledge	1. Name simple body parts,eg, eyes, ears lips, nose, skin, hair. 2. Describe people by looking at photos. Notice similarities and differences. 3. Describe family members by looking at photos. Notice similarities and differences.	CONTINUOUS Know the effect that winter has on the plants around them. Know the effect that winter has on the animals around them. Observe and describe the weather in winter.	1..Name and describe 5 animals that children would find locally and 5 that would be found in contrasting environment such as the desert, ocean, jungle or polar regions. 2.Describe the habitats for these animals. 3.Sort animals according to where they live.	CONTINUOUS Know the effect that spring has on the animals and plants around them. Observe and describe the weather in spring.	1.Describe what is meant by a 'mini-beast'. 2.Name 5 mini-beasts found in the school grounds. 3.Know that an insect has 6 legs. 4.Name 5 common plants found in the school grounds. 5.Explain that a plant needs light, water and soil to grow. 6.Explain the life cycle of a butterfly.	1.Describe simple forces, such as push and pull. 2. Explore the effects of forces using simple machines, such as levers , pulleys, wheels and ramps. 3. Explore the concept of floating and sinking. CONTINUOUS Know the effect that summer has on the animals and plants around them.

		4. Compare hand, foot and fingerprints with friends. CONTINUOUS Know that some animals hibernate in winter. Know the effect that autumn has on the plants around them. Observe and describe the weather in autumn.				7.Explain how worms are important to our environment.		Observe and describe the weather in summer.
	Key vocabulary	Substantive weather, sunny, raining, windy, snowy, dry, clear, cloudy, cold, warm, hot, autumn, season, colours, leaves	Disciplinary notice see change find out Talk about Question answer		Substantive city, country, continent, ocean, Arctic, Antarctic, ice, cold, Africa, savannah, desert, hot, dry habitat	Disciplinary Sort Group Compare Notice Find out Question Answer change		Substantive plant, flower, seed, leaves, green, roots eggs, warm, caterpillar, chrysalis, butterfly, metamorphosis	Disciplinary Notice See Change Find out Talk about Question answer sort	Substantive float, sink, melt, freeze spring, summer, autumn, winter seasons push pull twist forces materials	Disciplinary Notice See Change Find out Talk about Question answer sort
	Development Matters Objectives	**Understanding the World** • Talk about members of their immediate family and community. • Name and describe people who are familiar to them.		**Understanding the World** • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them.	**Understanding the World** • Recognise some environments that are different to the one in which they live.			**Understanding the World** • Draw information from a simple map. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live.		**Understanding the World** • Explore the natural world around them. • Describe what they see, hear and feel whilst outside.	
	Scientific enquiry focus *Researching using secondary sources*	*Classification* • Sort images of people according to their characteristics. *Researching using secondary sources* • *Find out information from visitors (dentist, nurse etc.).* *Pattern seeking* • Are taller children faster?		*Classification* • Which clothes are suitable for each season? *Observing over time* • How does a puddle change over time? • How does a snowman change as it melts? • How does the natural world change with the seasons?	*Classification* • Sort animals according to where they live. *Researching using secondary sources* • Learn how animals from a different habitat are cared for. • Learn about animals in a different habitat.	*Observing over time* • How does the natural world change with the seasons? *Comparative testing* • How many cubes/small plastic animals can fit in different 'boats'? •Compare how cars move down ramps/gutters.		*Classification* • Name and describe plants and animals they find in the school grounds. *Pattern seeking* • Look for minibeasts in different areas of the school grounds. • Look for plants in different areas of the school grounds.		*Comparative testing* • How many cubes/small plastic animals can fit in different 'boats'? •Compare how cars move down ramps/gutters. • Compare how wheels turn when sand or water is poured through. • Compare how objects fall with and without parachutes.	

		• *Are taller children stronger?*	*Researching using secondary sources* • Find out about how animals behave in different seasons. • Find out about the weather and seasons.		• Compare how wheels turn when sand or water is poured through. • Compare how objects fall with and without parachutes. • Compare how different balls bounce. • Compare how things move when blown. • Compare how a marble moves through different liquids. • Compare how different paper aeroplanes fly.		• Compare how different balls bounce. • Compare how things move when blown. • Compare how a marble moves through different liquids. • Compare how different paper aeroplanes fly.
Year 1	Area of learning	**Animals including humans**	**Seasonal changes**		**Plants**	**Everyday materials**	
	Prior knowledge	Explore the natural world around them, making observations, drawing pictures of animals and plants. Understand some important process and changes in the natural world around them, including the seasons and changing states of matter	Explore the natural world around them, making observations, drawing pictures of animals and plants. Understand some important process and changes in the natural world around them, including the seasons and changing states of matter		Explore the natural world around them, making observations, drawing pictures of animals and plants. Understand some important process and changes in the natural world around them, including the seasons and changing states of matter	Explore the natural world around them.	
	New knowledge	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 **Key Scientists: Chris Packham (animal conservationist); Carl Hagenbeck (zoos); Lind Brown Buck (mammal studies)**	Observe changes across the 4 seasons (ongoing) Observe and describe weather associated with the seasons and how day length varies **Key Scientists: Holly Green (meteorologist); George James Symons (inventor of rain gauge)** Resources: Seymour Science BBC bitesize – features of seasons.		**I**dentify 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 **Key Scientists: Beatrix Potter (author and botanist)**	Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties **Key Scientists: Ole Kirk Christiansen (inventor of Lego); Charles Mackintosh (inventor of waterproof coat)**	

	Core Knowledge	1. Sort common animals into groups: fish, amphibians, reptiles, birds and mammals. Notice their features. 2. Know that rabbits and horses are herbivores, otters and tawny owls are carnivores. Badgers, foxes and hedgehos are all omnivores. 3. Label the basic parts of the human body head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teethand 4. Understand how senses link to body parts. 5. Take measurements of parts of their body. Investigate patterns – do children with big hands also have big feet? 6. Investigate sorting food through smell (Sweet, Savory etc).	1. Explain how day length varies depending on the seasons. 2. Measure the weather at points across the year, using simple equipment, rain gauge and thermometer. Record results in simple tables. Know the names of the different seasons and which months they occur. CONTINUOUS: Observe seasonal changes in playground (revisit throughout the year). AUTUMN	CONTINUOUS: Observe seasonal changes in playground (revisit throughout the year). WINTER	1. Explain the difference between deciduous and evergreen trees. 2. Identify and name 5 common plants found in the school grounds. 3. Describe what a plant needs to grow: soil, light, water. 4. Identify roots, flower, stem, leaves & petals on a daffodil. 5. Describe similarities and differences between two flowering plants (Primrose & daffodil): leaves, flowers, seeds/ bulbs, roots. 6. Observe growth of a broad bean and observe changes over time. 7. Accurately measure using a ruler and record results on a simple table. CONTINUOUS: Observe seasonal changes in playground (revisit throughout the year). SPRING	1. Name objects made of wood, plastic, glass, metal, water, and rock. 2. Sort/ classify objects by their material. 3. Describe the properties of materials: stretchy, bendy, hard/ soft, shiny/ dull, waterproof/ absorbent, rough/ smooth. 4. Sort/ classify objects by their properties. 5. Test an object based on its properties e.g. which material is the most absorbent?	CONTINUOUS: Observe seasonal changes in playground (revisit throughout the year). SUMMER
	Key vocabulary	Substantive amphibians, birds, fish, mammals, reptiles, carnivore, herbivore, omnivore, sight, hearing, touch, taste, smell, head, neck, ear, mouth, shoulder, hand, fingers, leg, foot, thumb, eye, nose, knee, toes, teeth, elbow, torso, head, skull Disciplinary Question Answer Observe Compare Describe observe	Substantive seasons, spring, summer, autumn, winter, weather, daylight, windy, sunny, overcast, snow, rain, temperature botanist, Disciplinary inventor, scientist, meteorologist, observe, explore, notice, record results observe changes describe		Substantive leaves, trunk, branch, root, seed, bulb, flower, petals, stem, wild, garden, weed, deciduous evergreen Disciplinary Question Answer Observe Compare Describe Observe notice	Substantive object, material, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent, opaque, transparent, paper, fabric, stone, brick, plastic, wood, metal, glass Disciplinary Question Answer Observe Compare Describe observe	
	Scientific enquiry focus	Classifying Pattern seeking Comparative/Fair testing • Make first-hand, close observations of animals from each of the groups.	Observing over time Pattern seeking • Collect information about the weather regularly throughout the year. • Present this information in tables and charts to		Classifying Observing over time Pattern seeking • Make close observations of leaves, seeds, flowers etc. •Compare two leaves, seeds, flowers etc.	Classifying Comparative/Fair testing • Classify objects made of one material in different ways e.g. a group of objects made of metal.	

		• Compare two animals from the same or different groups. • Identify animals by matching them to named images. • Classify animals according to what they eat (carnivour etc). • Make first-hand close observations of parts of the body e.g. hands, eyes. • Take measurements of parts of their body. • Look for patterns between people e.g. Do people with big hands have big feet? • Investigate human senses e.g. Which smells can I match?	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. • Gather data about day length regularly throughout the year and present this to compare the seasons.		•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. • When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them.	• 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 cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.	
Year 2	Area of learning	**Living things and their habitats**		**Animals including humans**		**Plants**	**Uses of everyday materials**
	Prior knowledge	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 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 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	Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties
	New knowledge	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		Notice that animals, including humans, have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene **Key Scientists: Louis Pasteur (germs)**		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 **Key Scientists: Jane Colden (botanist); Tim Smit (Eden Project)**	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular use Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **Key Scientists: John MacAdam (road-builder); Isambard Kingdom Brunel (engineer)**

		Key Scientists: Liz Boning (conservationist); Rachel Carson (marine biologist)			
	Core Knowledge	1. Classify photographs and objects by whether they are alive, dead, never been alive. 2. Describe a local habitat found on the school field e.g. fox den, hedge row. Identify the features within this habitat which supports plants and animals. 3. Describe a micro-habitat e.g. under a log and how this supports plant and insect life e.g. ants, snails, worms etc. 4. Describe savannah habitat (linked to Kenya topic). Identify features within this habitat which supports plants and animals. 5. Explain that all food chains start with a plant. 6. Describe simple food chains in, micro, local and Kenyan habitat. 7. Describe the structure of a variety of common animals e.g. a. Bird – wings, light skeleton, feathers for warmth, warm blooded and flight. b. Fish – gills, fins, scales, cold-blooded c. Insects – shell, multiple legs, antenna, cold-blooded. d. Mammals – Fur/ skin, arms/ legs, internal skeleton. e. Amphibians – live in water and on land, webbed feet, smooth skin, cold-blooded. f. Reptiles – scales, cold-blooded, spine.	1. Describe how birds, amphibians, mammals, reptiles and fish are born and grow into adults (e.g. egg → chick → adult bird, baby → Child → Adult, Frog spawn → tadpole → froglet → Frog). 2. Describe what animals need to survive e.g. water, food, air. Explain that this is the same for fish, but that they extract oxygen from the water. 3. Describe why exercise is important for health in humans e.g. building muscle and heart health. 4. Describe how food types support health (carbohydrate, protein, fats, sugars, dairy, fruit/ veg). 5. Describe what germs are and how we can stay healthy with good hygiene.	1. Describe how plants grow from seeds or bulbs. 2. Describe that plants need water, soil, **heat** and light to grow. 3. Identify a range of common seeds & bulbs e.g. tomato, cress, sunflower seeds, broad beans, apple seeds, daffodil bulb. 4. Describe maturity of a plant: seed → seedling → mature plant. 5. Measure and record to the nearest ½ cm how the height of a cress plant changes over time. 6. Plan a fair test: does the temperature of the environment affect the growth of a plant?	1. Name and describe the properties of wood, metal, plastic, glass, brick, rock, paper, fabric and cardboard. 2. Classify and sort objects by their maluability: Paper, clay, play-dough, tin foil vs brick, wood, glass, steel, plastic. 3. Explain why materials are used for specific purposes e.g. Windows = Glass (strong, transparent), Clothes = fabric (flexible, light, warm etc) & other examples. 4. Suggest alternative materials for clothing, building, spoons etc and suggest which is the most appropriate material based on their knowledge of its properties. 7. Complete a fair test to determine which material would be best for a waterproof hat
	Key vocabulary	Substantive living, dead, never alive, depend, survive, habitat, micro-habitat, food, food chain, food sources, woodland, urban, coastal, rainforest, arctic, desert, ocean, river, mountain Disciplinary Question Answer Observe Compare Describe Observe Sort Group measurements	Substantive germinate, germination, seed, sprout, dispersal, warmth, sunlight, water, temperature Disciplinary Question Answer Observe Compare Describe Observe Record Diagram Equipment Contrast Classify Sort Group Results measurements	Substantive germinate, germination, seed, sprout, dispersal, warmth, sunlight, water, temperature Disciplinary Question Answer Observe Compare Describe Observe Record Diagram Equipment Contrast Classify Sort Group results	Substantive materials, suitability, properties, waterproof, fabric, rubber, cars, rock, paper, cardboard, wood, metal, plastic, glass, brick, twisting, squashing, bending Disciplinary Question Answer Observe Compare Describe Observe Record Diagram Equipment Contrast Classify Sort Group Results measurements
	Scientific enquiry focus	Classifying Observing over time Pattern seeking 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.	Classifying Observing over time • 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. • Observe physical effect of exercise on the body e.g. heart rate, breathing.	Classifying Observing over time Pattern seeking • 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.	Classifying Comparative/Fair testing • Classify materials. • Make suggestions about alternative materials for a purpose that are both suitable and unsuitable • Test the properties of materials for particular uses e.g. compare the

		• Create simple food chains from information given e.g. in picture books (The Gruffalo, etc)		• Classify food in a range of ways, including using the Eatwell Guide. • Investigate washing hands, using glitter gel.	• 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.	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.
Year 3	Area of learning	**Growing plants**	**Forces and magnets**	**Animals, including humans**	**Rocks**	**Light**
	Prior knowledge	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	Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Notice that animals, including humans, have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. • Describe the simple physical properties of a variety of everyday materials. • Compare and group together a variety of everyday materials on the basis of their simple physical properties. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Describe the simple physical properties of a variety of everyday materials.
	New knowledge	Identify and describe the functions of different parts of flowering plants: roots, stem, 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 in plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal **Key Scientists: Jan Ingenhousz (photosynthesis); George**	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	**I**dentify 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 **Key Scientists: Adele Davis (20th Century nutritionist); Marie Curie (x-ray)**	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 oils are make from rocks and organic matter **Key Scientists: Mary Anning (fossils); Inge Lehmann (Earth's mantle); William Smith (geologist)**	Recognise that they need light in order to see things and that dark is the absence of light. 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 Notice that light is reflected from surfaces Find patterns in the way that the sizes of shadows change

		Washington Carver (agricultural scientist)		Predict whether two magnets will attract or repel each other, depending on which poles are facing **Key Scientists: William Gilbert (magnetism); Andre Marie Ampere (founder of electro-magnetism)**						**Key Scientists: James Clerk Maxwell (visible and invisible waves of light)**	
	Core Knowledge	1. Describe the functions of different parts of a flowering plant: roots (absorb water from the soil), stem (transport water around the plant), leaves (produce food energy from sunlight) and flower (reproduce). 2. Explain what a plant needs to grow: water, light, air, warmth, **nutrients from the soil & room to grow.** 3. Understand that water is transported up the stem, providing a practical explanation from observations e.g. white carnation in food colouring. 4. Describe and explain life-cycle of a flowering plant: seed →seedling→ flowering plants → pollination → seed dispersal. 5. **Through observation,** explain pollination, including male and female parts of a flower. 6. **Through observation,** explain different types of seed dispersal: wind, water, bursting, shaking & animals. 7. Complete a fair test: Does the type of soil affect the growth of a plant e.g. no soil (water), soil, sand.		1 Explain how different surfaces create different amounts of friction and compare how things move. 2.Explain how most forces need contact between two objects, but magnetic forces can act at a distance. 3. Know that magnets are metals that attract some other metals (iron, nickel, steel (which contains iron) and colbalt. 4. Classify everyday materials according to whether they are attracted to a magnet. 5. Know that magnets have 2 poles and that magnets will attract or repel depending which poles are facing. 6. Explore how objects move on different surfaces e.g soles of shoes etc. 7. Plan a fair test to investigate the strength of different magnets.		1. Describe how humans gain nutrition from different types of food e.g. bread/ pasta = Carbohydrate for energy, meat/ fish/ eggs/ nuts = protein = muscle health & growth, Sweets etc = Fats/ Sugars for energy, Fruit & Veg = vitamins for growth and sustaining health, Dairy for Calcium = healthy teeth and bones. 2. Describe the functions of the skeleton (protection, support & movement) and name key bones which serve different purposes e.g. ribs, pelvis, femer, skull etc.		3. Describe how igneous, sedimentary & metamorphic rocks are formed. 4. Describe how fossils are formed. 5. Describe what soil is made of (rock & organic matter). 6. Classify rocks based on: appearance, hardness & permeability. 7. Know that you can separate soil into its component parts through sieving using different sized sieves.		1. Explain that light is needed in order to see things and that darkness is the absence of light. 2. Explain how light reflects off surfaces . 3. Explain that light travels in a straight line and is reflected of reflective surfaces. 4. Explain how shadows are formed. 5. Explain the relationship between the size of a shadow formed and its proximity to a light source. 6. Explain how shadows on the playground change during the school day by observing.	
	Key vocabulary	Substantive support, anchor, reproduction, fertilisation, pollination, dispersal, germination transportation root, stem, leaves, flower, nutrient,	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Predict Compare Observe	Substantive force, push, pull, friction, surface, magnet, magnetic, magnetic field, pole, north, south, attract, repel, compass	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare	Substantive healthy, nutrients, nutrition, energy, carbohydrates, protein, fats, vitamins, minerals, water, fibre, vertebrates, invertebrates, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic skeleton, skull, clavicle, ribcage, scapula, humerus, ulna, radius, pelvis, femur, tibia, fibula, muscles, tendons, contract, relax	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare	Substantive rocks, igneous, metamorphic, sedimentary, magma, lava, sediment, permeable, impermeable, density, durable, fossilisation, palaeontology,	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare	Substantive light source, dark, reflect, reflection, reflective, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow,	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare

		evaporation energy, growth, seedling, carbon dioxide, oxygen, petal, stamen, carpel, sepal, ovule, stigma, style, anther, filament, photosynthesis	investigation		Observe Investigation		Observe investigation	erosion, permeate, soil, base rock, sub-soil, top-soil, mineral, organic matter	Observe investigation	block, transparent, translucent. pupil, retina,	Observe investigation
	Scientific enquiry focus	Classifying Observing over time Pattern seeking • 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. • 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.		Classifying Comparative/fair testing • 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. • 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.		Classifying Pattern seeking • 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 classify skeletons of different animals.		Classifying Observing over time Comparative/fair testing • 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. • 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.		Classifying Comparative/fair testing • 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.	
	Area of learning	**Animals including humans**		**Electricity**		**States of matter**		**Sound**		**Living things and their habitats**	

Year 4	Prior knowledge	**Y2 prior knowledge** Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. Identify and name a variety of common animals that are carnivores, herbivores and omnivores	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. (Early Learning Goal)	Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	**Y2 prior knowledge** 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)
	New knowledge	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, including producers, predators and prey **Key Scientists: Ivan Pavlov (digestive system mechanisms); William Colgate (toothpaste**	Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors **Key Scientists: Thomas Edison (inventor of the lightbulb)**	Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature **Key Scientists: Anders Celsius (temperature scale); Daniel Fahrenheit (temperature scale); Lord Kelvin (temperature scale)**	Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sounds travel through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it Find patterns between the volume of a sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases **Key Scientists: Aristotle (sound waves); Gailileo Galilei (frequency and pitch of sound waves); Alexander Graham Bell (inventor of the telephone)**	Recognise that living things can be grouped in a variety of ways Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Recognise that environments can change and that this can sometimes pose dangers to living things. **Key Scientists: Cindy Looy (environmental change); Jaques Cousteau (marine biologist); Gerard Durrell (conservationist)**
	Core Knowledge:	1. Describe how food is digested using key vocabulary: mouth, tongue, teeth, oesophagus, stomach, and small and large intestine. 2. Identify different types of teeth e.g. molar, canines, pre-molars, incisors and describe their different purposes. 3. Explain what damages teeth and how to look after them.	1.Understand what electricity is and how it is made and identify common appliances that run on electricity. 2. Understand how to be safe with electricity and its dangers. 3. Identify and name the parts of a simple series electrical circuit. Name cells, wires, bulbs, switches and buzzers. 3. Construct a simple series circuit using components.	1.All materials can exist as a solid, liquid or gas. 2.Solids have molecules which are tightly packed together, liquids have molecules which are connected but further apart (allowing them to take the shape of their container); in gases molecules are far apart and can move freely. 3. Heating or cooling causes materials to change state. 4. Water freezes at 0C and evaporates at 100C. 5. When water changes from a liquid to a gas this is called evaporation. 6. Explain that evaporation can be speeded up through wind/ blowing or stirring.	1. Understand that sound is a form of energy and sounds are made when objects vibrate. 2. Understand how vibrations from sounds travel through air to the ear. 3. Understand pitch and volume by exploring instruments and the different sounds they make.	1. Understand what is meant by a vertebrate and invertebrate and group animals according. 2. Group animals according to species: reptile, amphibians, fish, birds, mammals, insects.

		4. Plan a fair test to investigate what happens to egg shells (representing tooth enamel) when placed in different sugary liquids. 5. Explain and construct food chains which include producers (plants) , prey (worm) and predators (bird) for a variety of habitats.		4. Explain whether 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. 5.Explain how a switch works and its purpose in a circuit. 6. Understand what conductors and insulators are. 7.Make controlled circuits as part of a DT project.		7. When water changes from a gas to a liquid this is called condensation. 8. Describe the water cycle in terms of evaporation and condensation. 9. Accurately read temperatures on a thermometer. 10. Plan a fair test: Does the temperature of the air affect the time it takes for water to evaporate off a paper towel.		4. Understand that sounds get fainter as the distance from the sound source increases. 5. Plan a fair test to measure sounds through different insulation materials.		3. Create classification keys which divide types of animals using Yes/ No questions. 4. Classify animals according to features e.g. cold/ warm blooded, exo and endo skeletons, etc. 5. Describe how habitats can change and be damaged over time (Locally & African Savannah). 6. Explain the impact of environmental change on animals.	
	Key vocabulary	Substantive herbivore, carnivore, omnivore, digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, rectum, liver, tooth, canine, incisor, molar, decay, premolar, producer, predator, prey, consumer	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Investigation Classify evidence	Substantive electricitygenerate, renewable, non-renewable, electric current, appliances, mains, circuit, electronscrocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, insulator, component	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Investigation Evidence Comparative and fair test diagram	Substantive solid, liquid, gas, particles, state, materials, properties, matter, melting, freezing, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Investigation Thermometer Comparative and fair test	Substantive amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave, vibration, distance, soundproof, vacuum, eardrum,	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Investigation	Substantive environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation inventor, scientist, conservationist, environmentalist biologist, observe, explore, notice, record, compare, predict, group, classify, evidence, conclusion, results, investigation, measurements	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observation Investigate Measurements Predict Compare Observe Investigation classify
	Scientific enquiry focus	Classifying/ fair testing • Research the function of the parts of the digestive system. • Create a model of the digestive system using household objects. • Investigate the effect of different sugary liquids on egg		Classifying Comparative/fair testing • Construct a range of circuits. • Explore which materials can be used instead of wires to make a circuit.		Classifying Observing over time Comparative/fair testing • 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 straws to blow objects, trees moving in the wind.		Classifying Comparative/fair testing • Classify sound sources. • Explore making sounds with a range of objects, such as musical instruments and other household objects.		Classifying Observing over time Pattern seeking • Observe plants and animals in different habitats throughout the year. • Compare and contrast the living things observed.	

		shells to replicate tooth enamel. • 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.	• 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. • Apply their knowledge of conductors and insulators to design and make different types of switch. • Make circuits that can be controlled as part of a DT project.	• 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. washing, puddles, handprints on paper towels, liquids in containers. • Use secondary sources to find out about the water cycle.		• Explore how string telephones or ear gongs work. • 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. • Measure sounds over different distances. • Measure sounds through different insulation materials.	• 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.
Year 5	Area of learning	**Properties and changes of materials**		**Earth and space**	**Forces**	**Living things and their habitats**	**Animals including humans**
	Prior knowledge	Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature		Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.	Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.	Identify and describe the functions of different parts of flowering plants: roots, stem, 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 in plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Notice that animals, including humans, have offspring which grow into adults.
	New knowledge	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		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	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	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	Describe the changes as humans develop to old age **Key Scientists: David Attenborough (naturalist)**

		Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and changes of state are reversible changes Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda **Key Scientists: Ruth Benerito (wrinkle-free cotton); Stephanie Kwolek (inventor of Kevlar)**		Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky **Key Scientists: Claudius Ptolemy and Nicolaus Copernicus (heliocentric vs geocentric); Neil Armstrong , Helen Sharman and Tim Peake (space travel)**		Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect **Key Scientists: Galileo Galilei (gravity); Isaac Newton (gravity); Archimedes (levers)**		**Key Scientists: David Attenborough (naturalist); Eva Crane (life cycle of bees)**		
	Core knowledge	1. Describe properties of everyday materials by transparency (transparent, translucent & opaque). 2. Describe properties of everyday materials by electrical conductivity (complete simple circuit metal, wood, plastic). 3. Explain which materials are magnetic. 4. Describe properties of everyday materials by thermal conductivity (metal/ plastic/ wooden spoon in water). 5. Describe how some materials will dissolve into a salute to create a solution e.g. sugar + water. 6. Describe how solutions can be separated by evaporation. 7. Understand that some changes are irreversible e.g. baking, burning, acid (vinegar) on bicarbonate of soda. 8. Understand how sieving, magnetism and filtering can be used to separate materials e.g. rocks, sand, paper clips and water. 9. Plan a fair test: Does the temperature of water affect how quickly sugar dissolves?		1. Understand that the Sun is a star at the centre of our solar system. 2. Understand that the Earth orbits the sun and that one full orbit takes one year. 3. Describe the movement of the Earth and the other planets, relative to the Sun in the solar system. 4. Understand that the moon orbits the earth and this orbit takes 28 days. 5. Understand that the Sun, Earth and moon are approximately spherical. 6. Understand that 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. 7. Explain how shadows, which are caused by the Sun, change through the day. Take measurements and record results.		1.Explain how forces cause objects to start moving, stop movin, speed up, slow down or change direction. 2. Explain that gravity is a force which acts at a distance and causes unsupported objects to fall towards the Earth. Everything is pulled to the Earth by gravity. 3. Explain that forces such as friction, air resistance and water resistance are contact forces that act between moving surfaces. 4. Investigate the effects of air resistance in a range of contexts,eg, spinners, parachutes. 5.Understand how simple mechanisms work, allowing a smaller force to have a greater effect. 6. Explore how pulleys, levers and gears work. 7. Make a product that involves a lever, pulley or gear.		1. Explain that Fish, Insects, Reptiles, Birds & Amphibians give birth to eggs which are gestated outside the body and hatch. 2. Explain that mammals give birth to live young. 3. Explain that animals reproduce with a sperm and egg from male and female (sexual reproduction). 4. Identify the parts of a flowering plant including male/ female reproductive parts. 5. Explain pollination and fertilisation of a flowering plant. 6. Describe the life-cycle of a flowering plant e.g. seed → germination→ seedling → adult plant → flower → fruiting plant → seed dispersal.		1. Describe the life-cycle of a human e.g. birth → baby → Infant → child → adolescent → adult → OAP → death. 2. Understand the changes which occur during puberty (link to RSE).	
	Key vocabulary	Substantive solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, hardness, solubility, transparency,	Disciplinary Equipment Data Record Enquiry Results Questions	Substantive sun, star, moon, planet, dwarf planet, axis, rotation, orbit, day, night, phases of the	Disciplinary Equipment Data Record Enquiry Results Questions	Substantive force, air resistance, water resistance, friction, buoyancy,	Disciplinary Equipment Data Record Enquiry Results Questions	Substantive reproduction , asexual reproduction , sexual reproduction	Disciplinary Equipment Data Record Enquiry Results Questions	Substantive Substantive adult, develop, life cycle, offspring, reproduce,	Disciplinary Equipment Data Record Enquiry Results Questions

		conductivity, magnetism, insulator, transparent, flexible, permeable, soluble, property, magnetic, hard, conductor, melting, freezing, evaporating, dissolving, dissolve, soluble, insoluble, suspension, solution, chemical, physical, irreversible, reversible, separate, mixture, sieving, filtering, reactant	Interpret Observations Investigate Measurements Predict Compare Observe Variables Conclusion Comparative and fair test diagram	moon, constellation, waxing, waning, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, solar system, spherical, geocentric, heliocentric, crescent, gibbous, satellite	Interpret Observations Investigate Measurements Predict Compare Observe Variables Conclusion diagram	streamlined, gravity, gravitational pull, weight, mass, Newtons, gears, pulleys, opposing, brake, mechanism, levers, cogs	Interpret Observations Investigate Measurements Predict Compare Observe Variables Conclusion Fair test diagram	, offspring, fertilise, gestation, life cycle, monotreme, metamorphosis, pollination, pollen, petal, stamen, carpel, sepal, ovule, stigma, style, anther, filament	Interpret Observations Investigate Measurements Predict Compare Observe Diagram Conclusion variables	young, live young, diet, disease, energy, exercise, germs, hygiene, nutrition, pulse, heart rate	Interpret Observations Investigate Measurements Predict Compare Observe Diagram Conclusion variables
	Scientific enquiry focus	Classifying Observing over time Comparative/fair testing • Investigate e 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 e.g. What affects the rate of rusting? What affects the amount of gas produced? • Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton).		Observing over time • 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. • 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 planets before space travel.		Comparative/fair testing • Investigate e the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter. • Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through 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.		Classifying Observing over time Pattern seeking • Disect a flowering plant and identify key features. 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. • Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes. • Take cuttings from a range of plants e.g. African violet, mint. • Use secondary sources to find out about pollination.		Researching using secondary sources This unit is likely to be taught through direct instruction due to its sensitive nature, although children can 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.	
Year 6	Area of learning	**Electricity**	**Light**	**Living things and their habitats**	**Evolution and inheritance**	**Animals including humans**					
	Prior knowledge	**Y4 prior knowledge** Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its	**Y3 prior knowledge** Recognise that they need light in order to see things and that dark is the absence of light.	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	**Y4 Prior knowledge** Recognise that environments can change and that this can sometimes pose dangers to living things. **Y5 Prior knowledge**	**Y3 Prior knowledge** Nutrition and skeletons 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					

		basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors	Recognise that 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 Notice that light is reflected from surfaces Find patterns in the way that the sizes of shadows change		Describe the changes as humans develop to old age	Identify that humans and some other animals have skeletons and muscles for support, protection and movement **Y4 Prior knowledge** Digestive system 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
	New knowledge	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Use symbols when representing a simple circuit in a diagram **Key Scientists: Alessandro Volta (electrical battery); Nicola Tesla (alternating currents); Steve Jobs (electronics in computing)**	Recognise that light appears to travel in straight lines Use the idea that light travels in straight lines to explain objects are seen because they give out or reflect light into the eye Explain that we see things because light travels from light sources from our eyes or from light sources to objects and then to our eyes Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them **Key Scientists: Thomas Young (wave theory of light); Ibn Al-Haytham (light and our eyes); Stephen Hawking (black holes)**	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 **Key Scientists: Carl Linnaeus (classifying plants and organisms); Libbie Hyman (classifying invertebrates)**	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 and that adaptation may lead to evolution **Key Scientists: Charles Darwin and Alfred Russel Wallace (theory of evolution); Jane Goodall (chimpanzees); Mary Leakey (fossils)**	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans **Key Scientists: Justus von Liebig (nutrition and metabolism); Sir Richard Doll (research on smoking); Leonardo Da Vinci (anatomy)**
	Core knowledge	1. Explain how adding more cells to a complete circuit will make the bulb shine brighter, a motor spin faster or a buzzer louder. 2. Explain how using a battery with a higher voltage will cause the same thing to happen. 3. Explain how adding more bulbs to a circuit will make the bulbs less bright.	1. Understand that light appears to travel in straight lines and we see objects when light from them goes into our eyes. 2. Explain how light may come directly from light sources or frm light sources to objects and then to our eyes. 3. Explain how objects that block light cause shadows. 4. Explain how shadows have the same shape as the objects	7. Explain what the characteristics of a micro-organism. 8. Categorise living things by whether they are micro-organisms, plants or animals. 9. Create classification keys which divide types of animals using Yes/ No questions using vertebrate/ invertebrate, skeleton type, warm/cold blooded to identify species. 10. Create classification key to identify insects found in the	1. Understand that all living things produce offspring of the same kind, as features in the offspring are inherited from the parents. 2. Understand that, due to sexual reproduction, the offspring are not identical to their parents and vary from each other. 3. Explain how animals and plants have adapted to suit	1. Identify and name the main parts of the human circulatory system. 2. Describe the functions of the heart, blood vessels and blood. 3. Describe the ways in which nutrients and water are transported within the blood from the organs to muscles etc. 4. Explain the positive impact of diet and exercise on the body and how our circulation is improved through exercise. 5. Explain the negative impact of poor diet and limited exercise on the body.

		4. Explain how adding more motors or buzzers will make the motors spin slower or the buzzers quieter. 5. Know circuit symbols and draw circuits using these. 6. Plan a fair test exploring changes in circuits.		that cast them because light travels in straight lines.		local environment by their features.		their environment in different ways. 4. Explain how if an environment changes quickly, not all species can adapt which means they may die. 5. Explain that adaption leads to evolution. 6. Explain how fossils provide information about how living things have changed over time.		6. Explain the impact of drugs on the body for medicine (link to PSHE). 7. Explain the negative impact of common drugs (tabacco, alcohol etc) on the body.	
	Key vocabulary	Substantive electricity, circuit, cell, battery, symbol, current, amps, voltage, resistance, electrons, indicator, lamp, bulb, wire, motor, buzzer, switch, series circuit, parallel circuit, broken circuit,	Disciplinary Accuracy Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Conclusion Variables Comparative and fair test evidence patterns accuracy	Substantive light source, reflection, incident ray, reflected ray, mirror, bounce, visible, beam, sun, glare, travel, incidence, straight, opaque, shadow, block, transparent, translucent, absorb, emitted, scattered, refraction, spectrum, prism,	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Conclusion Variables Comparative and fair test evidence patterns	Substantive classify, sort, group, similarities, differences, compare, characteristics, observable, Linnean, classification, standard, domain, kingdom, phylum, class, order, family, genus, species, vertebrates, invertebrates, mammals, bird, insects, reptiles, amphibians, fish, arachnids, annelids, crustaceans, echinoderms, molluscs, micro-organisms, fungus, bacteria, virus, microscopic, mould, cell, nucleus, DNA, plants, flowering, non-flowering,	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Conclusion Variables Comparative and fair test evidence	Substantive classify, sort, group, similarities, differences, compare, characteristics, observable, Linnean, classification, standard, domain, kingdom, phylum, class, order, family, genus, species, vertebrates, invertebrates, mammals, bird, insects, reptiles, amphibians, fish, arachnids, annelids, crustaceans, echinoderms, molluscs, micro-organisms, fungus, bacteria, virus, microscopic, mould, cell, nucleus, DNA, plants, flowering, non-flowering, moss, fern, fruit	offspring, inheritance, variations, characteristics, adaptation, acquired, environment, habitat, adaptive traits, inherited traits, evolution, natural selection, fossil Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Conclusion Variables Comparative and fair test evidence	Substantive circulatory system, heart, pulmonary, alveoli, gas exchange, blood vessels, artery, vein, capillary, oxygenated, deoxygenated, nutrients, oxygen, carbon dioxide, exchange, villi, muscle, kidneys, liver, lungs, exercise, drugs, alcohol, tobacco	Disciplinary Equipment Data Record Enquiry Results Questions Interpret Observations Investigate Measurements Predict Compare Observe Conclusion Variables Comparative and fair test Evidence Patterns accuracy

						moss, fern, fruit						
	Scientific enquiry focus	Comparative/fair testing • 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 burglar alarm. • Carry out fair tests exploring changes in circuits. • Make circuits that can be controlled as part of a DT project.		Comparative/fair testing • 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.		Classifying • 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. • Create an imaginary animal which has features from one or more groups.		Classifying Pattern seeking • 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. • Identify features in animals and plants that are passed on to 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.		Observing over time Pattern seeking Comparative/fair testing Disect a lamb heart and name main features. • Carry out a range of pulse rate investigations: fair test – effect of different 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.	