Science Skills Progression

Substantive knowledge
Disciplinary knowledge

Early Years Foundation Stage

The Natural World

Stage One	Stage Two	Stage Three
Is curious about things in nature.	Looks closely at things in nature, e.g. animals and plants, and talks about what they have seen.	Shows a basic understanding of how they might have an impact on the environment.
Is beginning to appreciate being in nature, e.g. the feeling of the wind and sun on their face	Can talk about how being outside makes them feel.	Knows that being outside can make them feel better if they are anxious or upset.
Enjoys being outside.	Knows that plants and animals need water and animals need food.	Takes responsibility for materials – using them properly, putting them away and performing basic repairs, e.g. sticking down a torn book cover.
Is beginning to understand that we need to take care of things.	Knows that plants and animals need to be looked after to survive.	Explores and talks about forces.
Is interested to explore familiar and new experiences in nature, e.g. looking at plants, animals, puddles, mud.	Shows concern for living things, e.g. is careful not to damage plants.	Investigates forces, light and vibrations.
Talks about what they see.	Knows we need to take care of materials, e.g. putting things away properly.	Looks closely at similarities and differences in nature.
Describes, in simple terms, life cycles of plants and animals.	Explores the natural world, using their five senses.	Participates in guided investigations and makes observations.
Can identify differences between some materials.	Describes the impact of weather and seasons on their daily life.	Asks and responds to questions about familiar objects. Talks about observable changes.
	Names and describes familiar plants and animals.	Understands that objects move in different ways depending on size and weight.

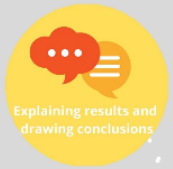
Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

	 Is beginning to talk about why things happen.  Predicts what might happen and explains why.  Records findings in a simple way. 	 Asks questions such as 'What would happen if …?'. Records ideas and observations. 	
- *Can name different weathers and identify them day by day* - *Understand humans change as they grow* - *Can identify common animals and plants in the local community* - *Can suggest where certain animals live (sea, field, pond, forest)* - *Suggest different properties of habitats* - *Know there are four seasons: spring, summer, autumn, winter* - *Know that birds fly and animals like cows spend time in fields* - *Know that dogs and cats are animals that may live with people*	- *Know that people wear different clothes in different seasons to stay comfortable (e.g., coats and hats in winter).* - *Know that seeds need soil, water, and light to grow into plants (e.g., cress grows quickly).* - *Can describe and order the lifecycle of a caterpillar* - *Know that flowers have different parts: petals (colourful), stem (holds it up), leaves (green), roots (in soil).* - *Know that seasons occur in a cycle: spring (growth and new life), summer (warmth and full growth), autumn (cooling, preparation for rest).* - *Name several species that live in different habitats e.g land and sea.*	- *Can recall the features of each season and the impact on the local environment.* - *Name specific ways people can look after the environment such as recycling and explain why this is important* - *Can recognise that lighter objects float and heavier objects sink* - *Can recognise that shadows are formed by blocking the light* - *Can recognise that some materials hold their shape* - *Can identify the process of melting and freezing in their immediate environment*	Key Vocabulary: *Weather, hot, cold, rain, snow, sun, temperature, windy, cloudy, snow, drizzle, Winter, Spring, Autumn, Summer, frost. Grow, seed, new life, caterpillar, Cocoon, butterfly, metamorphosis, transform, den, burrow, hill, hibernate, meadow, petal, stem, root, function, pond, frog spawn, minibeast, star, constellation, night, sky, pattern, Deciduous, adapt, migrate, insulate, frost, evergreen, Recycle, reuse, save, floating, sinking, heavier, lighter, shadows, sun, reflection.*

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically	**Questioning and predicting**  	Ask simple questions such as 'why are flowers different colours?' and 'Why do some animals eat meat and others do not?'	Ask simple questions such as 'why do some trees lose their leaves in Autumn and others do not?'' How long are roots of tall trees?' 'Why do some animals have underground habitats?' Use observations and ideas to suggest answers to questions	Ask relevant questions such as 'why does the moon appear as different shapes in the night sky?' 'Why do shadows change during the day?' 'Where does a fossil come from?' Start to make predictions	Make sensible predictions Ask questions such as 'why are steam and ice the same thing?' 'why is the liver important in the digestive system?' and 'what do we mean by pitch?' Use straightforward scientific evidence to answer questions and support their findings	Use test results to make appropriate, linked predictions and ask further questions Recognise when other sources of information (secondary sources) will help answer questions that cannot be answered through practical investigations and use this to make predictions	Know which type of investigation is needed to suit particular scientific enquiry e.g. looking at the relationship between pulse and exercise Set up a fair test Know how to set up an enquiry based investigation including a fair test with variables and can isolate each one when investigating Make predictions for new values

	Planning and carrying out investigations 	Set up a test to see which materials keep things warmest, know if the test has been successful and say what has been learned.	Carry out pre-planned investigations – with support Carry out simple and fair tests such as finding out how seeds grow best.	Use different types of scientific enquiries to answer questions Set up a simple test with different variables Set up simple comparative tests such as which type of soil is most suitable when growing two similar plants and if their right hand is as efficient as their left hand Explain why a test is fair	Make predictions with reasons Identify differences, similarities or changes related to simple scientific ideas and processes Use research to find out how much time it takes to digest food and to find out which material make effective conductors and insulators of electricity Carry out tests for example 'which instrument makes the highest and lowest sound and to see if a glass of ice weighs the same as glass of water Set up fair test with more than one variable and can explain why it is fair	Plan different types of scientific enquiries to answer questions – including recognising and controlling variables where necessary Suggest sensible improvements to experiments Know what the valuables are in a given enquiry and can isolate each one when investigating (finding out how effective parachutes are when made with different materials). Create new investigations based of previous investigations	Set up further comparative and fair tests in response to results Make accurate predictions based on information from results of their investigations and create new investigations
	Taking and recording observations, measurements and results 	Identify and classify things. Perform a simple test	Gather and record data to help answer questions – with support Use simple equipment (thermometers, rain gauges and microscopes) to make observations within the local environment Identify and classify according to a given criteria (deciduous and coniferous trees)	Observe at what time of day a shadow is likely to be at its longest and shortest Observe which types of plants grows in different places (bluebells in woodland, roses in gardens) Use research to find out how reflection can help us see things around the corner and the main differences between sedimentary and igneous rock Start to make systematic and careful observations Take accurate measurements using standard units including a data logger and a thermometer understanding that there are two main scales to measure temperature	Make systematic and careful observations Take accurate measurements using standard units using a range of equipment including thermometers and data loggers Record findings using simple scientific language – demonstrate through drawings, labelled diagrams, keys, bar charts and tables Use a chart, a matrix or a tally chart to record findings	Take accurate, precise measurements using appropriate equipment (newton measure, thermometer, rain gauge and data logger). Know and explain when it is appropriate to take repeat measurements Gather, record, classify and present data in a variety of ways including scientific diagrams and labels, keys, tables, scatter graphs and bar and line graphs (in line with the Year Five Maths curriculum) Keep a record of new scientific words (glossary)	Choose the most appropriate method for recording data and results of increasing complexity Make a series of observations, comparisons and measurements with precision Gather, record, classify and present data in a variety of ways including scientific diagrams and labels, keys, tables, scatter graphs and bar and line graphs (in line with the Year Five Maths curriculum) Keep a record of new scientific words (glossary)

				Use a chart, a matrix or a tally chart to record findings Start to record findings using simple scientific language			
	Explaining results and drawing conclusions 	Explain to someone what has been learned from an investigation they have been involved with and draw conclusion from the questions asked	Start to use simple scientific language in context Explain to others what I have found out. Use simple data to answer question.	Report back on findings verbally Form conclusions from findings Suggest improvements to investigations Use straightforward scientific evidence to answer questions Use bar charts and other statistical tables (in line with the Year Three Maths curriculum) Use a key to help understand information presented on a chart Form new predictions according to findings Be able to change ideas based on gathered scientific evidence and suggest improvements to make a test more reliable	Present finding using written and oral explanations and diagrams when needed Use bar charts and statistical tables when suitable to record findings (in line with the Year Four Maths curriculum) Form sensible conclusions from findings which helps them understand more about the scientific information that has been learned Be able to change ideas based on gathered scientific evidence and suggest improvements to make a test more reliable Group information according to common factors such as insulators and conductors.	Able to present information related to scientific enquiries in a range of ways using diagrams when necessary and evaluate when explaining these findings Use scientific evidence to support findings Use results to draw conclusions Able to relate casual relationships e.g. explaining the relationship between gestation periods and life expectancy. Be able to relate the outcomes from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.	Present observations and data using appropriate methods Report and present results including conclusions, causal relationships and explanations Make conclusions consistent with evidence and related to scientific understanding Able to present information related to scientific enquiries in a range of ways using diagrams when necessary and evaluate when explaining these findings Be aware of the need to support conclusion with evidence Be able to explain casual relationships in an enquiry Be able to relate the outcomes from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.
Biology	**Seasonal changes** 	**<u>Big Question: How does the weather change across a year?</u>** Observe changes across the four seasons and name these. Observe and describe weather associated with the seasons and how day length varies					

	Key vocabulary	*Weather (sunny, rainy, windy, snowy etc.), Seasons (winter, summer, spring, autumn), Sun, sunrise, sunset, day length*					
	Working Scientifically Skills	Know that science is about asking questions. Ask and suggest answers to one key question: Make observations about living things in the local area in each season. Observe changes and link them to the seasons. Draw conclusions about the characteristics of each season. Plant seeds and observe growth over time, drawing the different stages of growth that they see					
	Animals including humans 	**<u>Big question: What is an animal?</u>** 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) Sort living and non-living things. Name parts of the human body that I can see. Link the correct part of the human body to each sense.	**<u>Big question: What do animals need to survive?</u>** 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, air) Notice that humans have offspring which grow into adults understanding the basic stages of a lifecycle for animals including humans Find out about and describe the basic needs for survival (food, water, air) Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	**<u>Big question: How can humans stay healthy?</u>** 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 Identify that humans need the right types and amount of nutrition considering a balanced diet and that they cannot make their own food – they get nutrition from what they eat Identify that humans have skeletons and muscles for support, protection and movement	**<u>Big question: Where does food go after an animal eats it?</u>** Construct and interpret a variety of food chains, identifying producers, predators and prey Identify and name parts of the human digestive system (mouth, tongue, teeth, oesophagus, stomach, small and large intestine) and explain their function Identify the different types of teeth in humans and their simple functions Use and produce food chains to identify producers, predators and prey.	**<u>Big Question: How do humans change over time?</u>** Describe the changes as humans develop from conception to old age	**<u>Big question: What is the purpose of the circulatory system?</u>** Describe the ways in which nutrients and water are transported within animals (including humans) 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 humans (and other animals)

	Key Vocabulary	head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth (outlined in NC), also include tongue, feet, hands, torso, skin senses, ears/hearing, hands/touch, nose/smell, eyes/sight, tongue/taste characteristics, birds, fish, feathers, cold-blooded, warm-blooded, scales, breathe, lay, young mammals, reptiles, amphibians diet, carnivore, omnivore, herbivore	*offspring, growth, lifecycle, stage, reproduce, human lifecycle, child, toddler, teenager, adult, limbs, essential, survive, shelter, energy, air (oxygen), temperature, exercise, brain, muscles, heart, lungs, mental health, hygiene, fruit, vegetables, cereal, meat, dairy, fat, sugar, energy, healthy, portion*	*nutrition, carbohydrates, fat, protein, calcium, dairy, energy, growth, domesticated, pet, environment, diet, behaviour, company, health and welfare, skeleton, skull, ribcage, spine, joints, organs, protection, support, movement, muscle, triceps, bicep, relax, contract, investigation, pattern, comparative, prediction, data, analysis, scatter graph*	*teeth, incisors, molars, premolars, canines revisit omnivore, herbivore and carnivore, adaptation digestive system, mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine (NC); acids, nutrients, bloodstream, waste, rectum, anus. food chain, producer, primary/secondary/tertiary consumer, prey, predator, energy*	*embryo, foetus, toddler, adolescent, stages, lifecycle, hormone, genes, DNA, puberty, pubic hair, breasts, oestrogen, testosterone, pituitary gland, reproduction, menstruation, hormones, periods, chemical, mass, gestation period, womb, viviparous, zygote*	*circulatory system, heart, organ, blood vessels, arteries, veins, capillaries, living cells, pump, oxygen, carbon dioxide, deoxygenated, oxygenated, platelets, plasma, red blood cells, white blood cells, antibodies, double circulatory system, single, circulatory system, open single circulatory system, closed single circulatory system, vertebrates, invertebrates, lifestyle, nicotine, drugs, medicine, illegal, caffeine, vitamins, proteins, stimulant, hallucinogen, depressant, nicotine, ethanol*
	Working Scientifically Skills	Carry out activities to identify which body part is used for each sense. Learn how scientists find answers by observing. Pupils use magnifying glasses to make closer observations using pictures of animals, looking for detail. Identify what is the same between animal groups and use this to sort mammals, reptiles, amphibians and birds, carnivores, herbivores and omnivores into the correct groups based on their common features. Identify similarities and differences between animals and groups. Draw up concluding statements based on investigations e.g. we use our ears to hear.	Pupils begin to suggest ways we could find out about how humans grow, using their observations. Pupils identify activities to carry out to help us find out which make us 'puff most' Use observation to identify change and growth and order life cycles in response. Use knowledge of what animals need to survive and explore the school grounds, using observation to identify where animals could access food, water and shelter Using knowledge learnt about food, pupils sort healthy and unhealthy food intake based on the impact on our bodies Accurately use rulers and tape measures to measure the lengths of arms and legs in cm Use stop watches to count the number of breaths in a minute. Pupils carry out exercise for one minute, use a stopwatch	Make predictions about whether doing more exercise makes our muscles stronger Carry out a pattern seeking investigation to find out if the amount of physical activity we do makes us stronger Ensure that a test is fair by ensuring the same activities are carried out by each person. Watch videos to observe similarities and differences in the movement of animals with skeletons and animals without Organise foods into their food groups and use this knowledge to model a balanced diet Present data in a scattergram to show the relationship between strength and the amount of physical activity pupils do	Set up an experiment over time to compare the impact of different liquids on teeth, making regular observations Ensure fair tests by putting eggshells in the same place Make predictions about how our activity level affects our muscle strength Over the course of a week, observe eggshell in different liquids to see the impact of drinks on our teeth Observe the teeth of animals to make judgements about the diet Explore the local area, looking for plants and wildlife that may form a food chain Group animals with or without skeletons Sort living things according to whether they are producers or consumers in a food chain	Pupils to devise a comparative enquiry question to find out how people change as they get older Pupils to plan their own experiment about how people change as they get older – write the method and design a table for recording Carry out a pattern seeking investigation to identify relationships between mass of animals and their gestation period Carry out an interview and record and summarise answers about how we change as we grow Take measurements to show how people grow as they age. Present this in a line graph, identify patterns and draw conclusions about how we change as we grow Use venn diagrams to show how some changes in puberty are the same and some are different for males and females Experiments can be used to create a general rule e.g. bigger animals have a longer gestation period	Plan a pattern-seeking experiment to explore the relationship between the types of exercise we can do and heart rate Identify the variables that need to be controlled Write a hypothesis Plan a method independently for how they will keep this a fair test, how they will measure and record Use a heart monitor/pulse meter to take measurements Monitor sleep over time in a diary. Use scientific diagrams and annotate them to explain a process – the circulatory system Create and annotate the process of the human circulatory system

			and calculate puffs on a piece of paper for one minute to identify which makes us breathe harder. Record the length of arms and legs in a table using correct units of measure Pupils use time to record in a table the number of breaths taken in the minute after different physical activities. Identify whether arms and legs get longer as we get older by comparing measurements. Looking at the number of breaths taken, pupils to identify which exercise made them work hardest.	Look for patterns in a scattergram to draw a conclusion about whether activity levels impact muscle strength	Enq 5: Use process diagrams to show the transfer of energy in a food chain	Pupils to think about how the evidence that has been collected might be useful to scientists – what can they find out from this data? Pupils will come up with rules based on questions about their data e.g. can you estimate the gestation period of these animals, is there a relationship between the size of the animal and the number of offspring it has?	Present findings in a graph that pupils consider appropriate to show the relationship between exercise and heart rate Draw conclusions and suggest further investigations Investigate nutritional values on packaging and draw conclusions about the health benefits of different foods Draw conclusions about the impact of sleep on our lives
	Plants  	**<u>Big question: What are the features of a plant?</u>** 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 (petal, stem, leaves and roots), including trees (roots, trunk, branches and leaves).	**<u>Big question: Where do plants grow best?</u>** 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	**<u>Big question: How do more plants grow?</u>** 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 pollination, seed formation and seed dispersal			
	Key Vocabulary	*plants, wild plants, garden plants, weeds, trees, local plant names, seeds, root, shoot, soil, flower, petal, root, stem, leaf/leaves, common flower names*	*seed, seed coat, bulb, food store, protect, mature, bulb, seed, roots, seed leaves, shoot, germinate/germination, absorb, nutrients, energy,*	*seed, parent plant, dispersal, germination, roots, root hair, stem, leaves, flowers, function, nutrients, transport, absorb, root, root hairs, stem, tubes, trunk/branches,*			

		already identified and in the local environment, tree, trunk, bark, branch, flower, blossom, acorn, common tree names identified, deciduous, evergreen, leaf/leaves, bark, branches, trunk	*seeds, germinate, food supply, temperature, seed, germinate, plant, temperature, mature, lifecycle, germinate, reproduce*	*leaves, nutrient, drought, climate, flower, pollen, nectar, pollination, reproduce*			
	Working Scientifically Skills	Plant seeds and observe growth over time, drawing the different stages of growth that they see Know that by observing living things over time, we can monitor changes. Identify and describe the roots of a plant and the detail of leaves by observing closely using simple equipment – magnifying glasses/hand lenses. Identify similarities and differences. Use an identification chart to name plants we see in the local area. Classify plants as garden plants, wild plants, trees or weeds. Identify and classify common trees according to their physical features: leaves, bark, branches, trunk. Choose ways to sort leaves. Use magnifying glasses/hand lenses to observe and describe features of plants. Use string to measure trunks and then order them according to size.	Begin to develop the idea that we should keep some things the same when planning an experiment. Begin to make predictions. Observe seed germination closely; set up a simple test/ investigation following a model. Discuss the method together and have it scaffolded to enable them to plan. Use observations and ideas (about seeds and bulbs) to suggest answers to questions. Take weekly photos to monitor change over time. See teachers modelling using observations to ask questions about what we see. Based on observations over time, predict what might happen to the plants in the future. Perform a simple comparative test to see whether seeds need water to grow. Carry out a simple comparative test to show that plants need water and light to stay healthy.	Practical enquiries, comparative and fair tests to find out how quickly the roots of a seed grow. Set up a simple practical enquiry to explore the different requirements of plants to live and grow. Set up simple practical inquiries to show water transport through a stem, marking the changes on a jar. Set up a comparative test to see how plants in different situations grow. Make systematic and careful observations of seeds to look for properties that will help us to understand how they are dispersed. Make systematic and careful observations and, where appropriate, use a range of equipment (e.g. microscope). Make systematic and careful observations of the plants each week for changes in condition.			

		Gather data about the thickness of tree trunks and compare and contrast to understand variation.	Keep a seed diary to track changes. Use observations and ideas (about seeds and bulbs) to suggest answers to questions. Take weekly photos to monitor change over time. See teachers modelling using observations to ask questions about what we see. Based on observations over time, predict what might happen to the plants in the future. Suggest answers to questions (What does a seed need to grow?).	Make systematic and careful observations of flowers, recording colours in a table. Sort seeds into groups according to dispersal method. Use a ruler and measure in mm how much the root of a seed grows over time. Use measurements on a jar to calculate the growth rate. Measure different changes e.g. height and number of leaves over time. Report on their findings and draw simple conclusions. Gather, record and presenting data in a graph that shows the frequency of different colours in the plants. Use results to draw simple conclusions and make predictions e.g. which colours are most common and why might that be?			
	Living things and their habitats  **Evolution and inheritance**		**Big question: What is a habitat?** 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		**Big question: How can we group living things?** 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 Create classification keys to group, identify and name living things for others to use	**Big Question: How do animals reproduce?** Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe the life processes of reproduction in some plants and animals	**Big question: How have living things changed over time?** 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, but normally offspring vary and are not identical to their parents.

			Identify and name a variety of plants and animals in their habitats – including microhabitats and match living things to their habitat. Describe how animals obtain their food from plants and other animals using the idea of a simple food chain – identify and name different sources of food		Recognise that environments can change and that this can sometimes pose dangers to living things		Identify how animals and plants are adapted to suit their environment and that adaptations lead to evolution **<u>Big question: How are animals classified?</u>** 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 Vocabulary		*living, features, move, feed, grow, reproduce, senses (light, sound, temperature) habitat, environment, microhabitat, shelter, survive, suitability, desert, ocean, tundra/Artic, grassland, rainforest, forest/wood, wetlands, source, nutrients, energy, transfer, food chain, producer, prey, predator, depend/survive*		*classification, group, category, key, vertebrate, invertebrate (insect, arachnid, annelid, mollusc), flowering, nonflowering, spores, seed conesclassification, dichotomous key, categorise, environment, surroundings, conditions, natural, human-made, urbanisation, deforestation, pollution, climate change, population, fossil fuels, natural disaster, human impact, endangered, extinct, Venn diagram, positive, negative, indifferent, impact, conservation, protect, manage*	*lifecycle, stages of development, sexual, asexual, reproduction, , larvae, embryo, metamorphosis, naturalist, natural world, expertise, observe, document, stud, sexual/asexual reproduction, pistal/carpel, stigma, style, ovary, stamen, anther, nectar, pollen, pollination, fertilisation, dispersal, tuber, bulb, runner, clone, asexual reproduction, vegetative propagation, fertilisation, external fertilisation, internal fertilisation, sperm, egg, embryo*	*vertebrate/non-vertebrate, taxonomy, arachnids, crustaceans, insects, millipedes, annelids, echinoderms, molluscs, coelenterates. dichotomous key, algae, moss, fern, conifer, ginkgoes, angiosperms, microorganism, microbes, fungi, bacteria, protists* *evolution, generation, natural selection, mould fossils, body fossils, trace fossil, cast fossil, fossil record, species, fossil record, diversity, species, variation, siblings, inheritance, inherited variation, environmental variation, selective-breeding, crossbreed, characteristics, traits, natural selection, variation, habitats, adaptation, traits, characteristics organism, climate, extinction, adaptation, pollinators*

	Working Scientifically Skills		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. Create simple food chains from information given e.g. in picture books (Gruffalo etc.)		Observe plants and animals in different habitats throughout the year. Compare and contrast the living things observed. 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.	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. 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.	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.

Chemistry	**Materials Including: Everyday uses of materials, rocks, properties and changes and states of matter**  	**Big question: Which materials could make a waterproof shelter?** 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 and explain the difference between these. 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	**Big question: Which materials would be best for a bridge?** Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Explain why a material might or might not be used for a job Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	**Big question: How are fossils formed?** Compare and group together different kinds of rocks (sedimentary, metamorphic and igneous) 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	**Big question: Where does water come from?** 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: measure or research the temperature at which this happens in degrees (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	**Big Question: What new states can materials become?** Compare and group everyday materials based on their properties, including hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism Know some materials dissolve in liquid to form a solution and describe how to recover a substance from solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials and that these changes are usually irreversible eg: changes from burning or the action of acid on bicarbonate of soda. Give evidenced reasons why materials should be used for specific purposes	
	Key Vocabulary	*property, material, object, suitability, purpose, wood, metal, plastic, glass, brick, rock, paper, cardboard, strong, waterproof, bounce, grip (sole), solid, squash, bend, twist, stretch, stretchy/not stretchy, fabric, fair test*	*property, material, object, suitability, purpose, wood, metal, plastic, glass, brick, rock, paper, cardboard, strong, waterproof, bounce, grip (sole), solid, squash, bend, twist, stretch, stretchy/not stretchy, fabric, fair test*	*Rock, cliff, mountain, coarse grain, fine grain, crystal, layer, names of different rocks, metamorphic, sedimentary, igneous, grains, molten, magma, lava, crystals, pressure, permeable, impermeable, durable, sedimentary rock, fossil, palaeontologist, decay, sediment, fossilisation, sedimentary rock,*	*states of matter, solid, liquid, gas, matter, mass, volume, particles, properties changing state, melt, temperature, freeze, water vapour, melting point freezing, freezing point, melt, melting point condensation, evaporation, water cycle, precipitation, water vapour condensation, evaporation*	*thermal conductor, thermal insulator, thermal, insulator, material, transference, independent/dependent/controlled variable, dissolve, solid, liquid, gas, states of matter, solution, mixture, solution, filtration, sieving, evaporation, permeable, vapour, particles, irreversible burning, chemical changes, rust, acid*	

				earthworm, leaves, soil, organic matter			
	Working Scientifically Skills	Know that science is about asking questions. Ask and suggest answers to one key question: What properties does the material have? Ask a simple question: What material is best at absorbing water? Perform a simple test to find out which material is the most waterproof by comparing. Make observations about living things in the local area in each season. Using observation of the different materials, suggest answers for their uses. Use observations to suggest what material is best at absorbing water? Know how to sort objects according to the material they are made from. Use simple equipment for measurement – a teaspoon to measure water. Measure the water gathered from each material and present this in a pictogram. Draw conclusions about the characteristics of each season. Collectively draw a conclusion about which material is best for keeping us dry.	Gather and record data in a simple test to help answer questions – finding out which material makes a ball bounce higher. Independently identify why it needs to be a fair test and how to ensure this. Use their observations and experimentation to suggest answers to questions – can solid objects change shape? Pupils make a prediction about which fabric they think will be stretchiest and collectively plan how to test this. Identify and classify the variety of uses of different materials based on their properties. Identifying and classifying, using observations and ideas to suggest answers to questions – use knowledge of materials to select the correct one for a given purpose. Use tape or wool on the wall to measure the height of bounces. Use a metre stick to measure the stretchiness of fabric. Use weights to test them.	With support, carry out a comparative test to find out which rocks are permeable (absorb water) and which rocks are impermeable (do not absorb water). Make careful observations about permeability Use observation and touch to identify types of soil. Classify rocks according to whether they have grains, crystals or layers Make careful observations of rocks using a hand lens or magnifying glass. Use a stopwatch or second hand on a clock to time the length the rocks are in the water Record findings based on a model and using the scientific language.	Explore the effect of temperature on some substances by investigating the temperature at which a range of solids change state and become liquids. Set up a simple practical enquiry, ensuring it is a fair test, to find out the answer to whether all liquids can change state to become a solid. Increasingly give pupils opportunities to answer, 'How can we find this. Set up comparative and fair tests to determine the effect of temperature on rates of evaporation. out?' Group and classify a variety of different materials according to whether they are a solid, liquid or gas. Make systematic and careful observations and take accurate measurements using standard units, using a range of equipment: thermometers or data loggers to measure the temperature of melting points. Make systematic and careful observations and take accurate measurements using standard units by	Decide how to measure which cup is the best thermal insulator – how will it be measured? What will be used? What method will be followed? Use previous test results (from enquiry 1) to make a prediction to set up further fair tests. Plan an enquiry (fair test) answer a question to find thermal conductors and insulators, including recognising and controlling variables. Take measurements using a thermometer with increasing accuracy. Report and present findings from enquiries, including conclusions, in oral and written forms. Report using firsthand observations and findings from demonstrations in written forms. Read an existing graph that shows cooling speeds and interpret.	

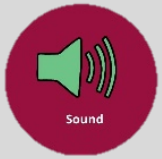
			Compare the suitability of a range of everyday materials. Record results in a table and present them in a bar chart. Record data from observations in a table to help answer questions. Draw conclusions against the initial question – which material is best for a bouncy ball? In pairs draw a conclusion about whether a solid can change shape.		measuring the amount of water in ml or the space taken up by the water in cm. Gather and record data in a table, using the correct unit of measure. Begin to choose an appropriate way to gather and record data to help in answering questions and draw simple conclusions Add diagrams to written explanations to explain processes e.g. whether all liquids can become solids. Gather and record data in a table and line graph to show changes in evaporation rates over time. Present results to the class. Present simple Scientific definitions for a solid, liquid and gas. Report on findings from enquiries in the form of a written conclusion. Use results to draw simple conclusions and raise further question e.g. What further experiments could be done to explore the changing state of these items?		
Physics	**Light**			**Big question: Where do shadows come from?** Recognise that light is needed in order to see things and that dark is the absence of light			**Big question: How does light travel?** Recognise that light appears to travel in straight lines

				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			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 shape as the objects that cast them Know how simple optical instruments work e.g periscope, binoculars, mirror and magnifying glass
	Key Vocabulary			*light, reflect, light source, visible, visibility, dark, shiny, bright, dull, matt, mirror, reflection, reflect, angle, opaque, translucent, transparent, shadows, angle, position, direction, filters, UV rays, protection, retina, pupil, damage, sunrise, sunset, rotation, compass direction*			*energy, beam, ray, reflect, light source, shadow, cast, object, distortion, factor, incident ray, reflected ray, angle of incidence, angle of reflection, normal line, phenomena/phenomenon, refraction, change direction, phenomena/phenomenon, refraction, spectrum, prism*
	Working Scientifically Skills			Set up a simple comparative test to see which materials can be seen in low light. Collectively set up a simple comparative and fair test to see how shadows change over the course of the day. Make systematic and careful observations to identify which objects can be seen in different lighting conditions. Make careful observations when using mirrors, to learn how light behaves			Plan a scientific enquiry to answer the question: Is a shadow always the same shape as the object that casts it? Prove hypotheses with evidence. Take measurements of angles of incidence and reflection, using a protractor, with increasing accuracy and precision, taking repeat readings when appropriate Record results of light model using scientific diagrams and labels.

				when it is reflected . Use observation (how does the height of light change shadows), tables of data (how does distance affect shadow size) and comparison (which objects create darker shadows) to answer questions. Take systematic and accurate measurements of length in cm, to measure how shadows change in size. Make careful observations of how position and size of shadows changes and take accurate measurements using standard units of the length. Record findings in a table. Write a written explanation of the learning about light and reflection. Use a simple diagram to show how shadows are formed. Use an appropriate graph/chart to show how shadows change across a day. Identify and explain differences, similarities or changes related to simple scientific ideas and processes (how and why shadows change) Report on findings			Report findings and share conclusions. Report and present findings about the refraction of light (as per pencil and glass demonstration) being an example of scientific phenomenon. Report and present findings from enquiries, including conclusions about the angles of incidence and reflection

				and draw a conclusion about which materials are more visible in low light. Use results to draw simple conclusions about why distance and height changes the size of shadows.			
	Forces and Magnets  			**Big question: What do magnets do?** 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 and how they work Predict whether two magnets will attract or repel each other depending on which poles are facing		**Big Question: What is the point in gravity?** Know what gravity is and its impact on our lives Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	
	Key Vocabulary			*force, contact force, push, pull, friction, resistance, surface, movement, gravity, magnet, magnetism, magnetic field, attract, repel, magnetic objects, north pole, south pole, metal, iron, steel, nickel, horseshoe magnet, bar magnet,ring magnet, strength of magnetic field*		*friction, resistance, force-meter, contact force, gravity, gravitational pull, mass, matter, air resistance, gravity, water resistance, drag, upthrust, float, sink, streamlined, displace, simple machine, lever, pulley, gear (driver/follower), transmission, mesh, axle, effort, load, fulcrum, pivot, mechanisms, redirecting force*	

	Working Scientifically Skills			Understand why tests should be fair and control all but one variable (the surface the car travels on). Predict whether two magnets will attract or repel each other, depending on which poles are facing. Independently set up an investigation when the method has been discussed collectively. Carry out a simple investigation and record results (bringing a range of materials near a magnet to test magnetism) Use observation to identify forces being used and to identify the effect these forces have on objects. Make systematic observations, testing the strength of magnetism from different distances. Sort into groups objects that are attracted to magnets and those that are not. Use measuring tape to measure the distance the cars travel. Measure the strength of a magnet by working out how many sheets of paper need to be in the way before a paperclip is no longer attracted. Record results in a table and use this data to		Plan a scientific enquiry to answer a question about friction. Decide the variables to be controlled. Plan a scientific enquiry, making choices about the variables to be changed to test the impact of air resistance. Make independent decisions about repeat readings. Use knowledge of water resistance to make predictions. Plan a scientific enquiry to test the effects of shape and surface area on water resistance. Take accurate measurements using a forcemeter. Calculate speed of a fall using a stopwatch. Pupils take readings from newton-meters. Use scientific diagrams to show the direction of forces. Measure speed and identify relationships between water resistance and shape. Explain causal relationships in the components of levers, gears and pulleys.	

				draw conclusions about which surface slowed down the moving object the most. Carry out a simple investigation, record results in a table and use these to present data in a bar chart. Record results in a table and use this data to draw conclusions about which surface slowed down the moving object the most. Discuss the factors that might influence magnet strength, such as the size, shape, and material of the magnet.			
	Sound  				**<u>Big question: How is sound made?</u>** 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 Vocabulary				*sound, sound wave, vibrate/vibrations, medium, energy, strength of vibration, volume, distance, decrease, sound source, properties (of materials), sound, insulator,*		

					insulation, pitch, high pitch, low pitch		
	Working Scientifically Skills				Set up a comparative test to identify how the strength of vibrations affect the volume of a sound. Independently choose control variables. Carry out an experiment three times to increase reliability. Make careful observations about how we see, hear and feel sound (vibrations). Use data loggers with teacher support to measure the sound. Use a ranking system to compare and measure e.g. rank the volume from quietest to loudest. Independently respond to lesson question with lengthier responses. Investigate how the strength of vibrations affect the volume of a sound. Use these results to draw simple conclusions, make links between vibrations and sounds and identify patterns, Use scientific language about pitch and sound waves to explain how to change the pitch of a sound. Draw conclusions about what affects the pitch of a sound. Find patterns between the pitch of a sound and		

					features of the object that produced it. Create models of headphones to identify materials which act as the best insulators for sound. Scientists may create prototypes like these before creating a final product.		
	Electricity  				**Big question: How does electricity travel?** 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		**Big question: How can we alter a circuit?** 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 recognised symbols when representing a simple circuit in a diagram
	Key Vocabulary				*appliance, mains electricity, battery, generated, power station, plug, plug socket, electrical energy, series circuit, component, bulb (lamp), bulb (lamp) holder, buzzer, cell, battery, wire, crocodile clip, series circuit, component, bulb (lamp), bulb (lamp) holder, buzzer, cell, battery, wire, switch,*		*series circuit, cell, battery, symbol, component (wire, bulb, switch, buzzer, motor), battery, cell, voltage, circuit, cell, battery, voltage, component, circuit, device, series circuit, component (bulb/lamp), bulb/lamp holder, buzzer, cell, battery, wire, crocodile clip*

					electrical conductor, electrical insulator, series circuit, component, bulb (lamp), bulb (lamp) holder, buzzer, cell, battery, wire, switch		
	Working Scientifically Skills				Pupils record the method and table they are going to use. Know how to be safe around electricity. Set up a simple, practical investigation – using all the components to light a bulb. Investigate questions e.g. does the order of components matter? Set up a comparative test to identify which materials make good electrical conductors and which make good electrical insulators. Make systematic and careful observations about how appliances convert electrical energy. Sort devices according to whether they use mains or battery electricity Use scientific language and knowledge of circuits to design diagrams and create functional objects. Enq 3: Use scientific evidence to answer questions e.g. how do switches work? Enq 4: Use results from comparative tests to draw simple conclusions, make		Recognise which variable to control in a fair test and carry out a fair test to see how the number of cells in a circuit affects the brightness. Devise a question based on their own experience e.g. what else impacts the brightness of a bulb? Plan their own fair test to answer the question. Come up with their own questions. Make predictions about what will happen in a range of circuit set-ups and test the accuracy of these. Plan a specific scientific enquiry, which recognises and controls variables, to make a working device.

					links and identify patterns		
	Earth and Space 					**Big Question: Is there life in outer 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	
	Key Vocabulary					*orbit, solar system, Earth, sun, moon, planet, atmosphere, star, scale, heliocentric, geocentric, planetary movement, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, rotate, orbit, axis, 24 hours, daytime, night-time, seasons, shadows, position (of the sun),rotate, pattern-seeking, investigation*	
	Working Scientifically Skills					Plan a pattern-seeking investigation to identify how shadows change throughout the day. Take accurate measurements and record results in a table of their own design. Present data in a line graph and identify the pattern. Draw conclusions from this pattern and link this to historic views of the movement of the Earth and sun. Create a model to	

						understand the movement of Earth in relation to the sun and moon. Create a to-scale model of the Solar System to understand distances and sizes. Use a model to understand the movement of the Earth Use secondary sources to find out information about planets in the solar system. Identify scientific evidence that has been used to support or refute ideas or arguments e.g. heliocentric universe.	