Barnfields Primary School

Linked Prime Areas of Learning – Communication and Language and Personal, Social and Emotional Development

These are all key skills and children develop at their own rate in these. We will use next steps to move each child on through these skills using our ongoing individual assessments.

ELG: Listening, attention and understanding

- Make comments about what they have heard and ask questions to clarify their understanding.

Development Matters Statements

- Learn new vocabulary.
- Ask questions to find out more and to check what has been said to them.
- Articulate their ideas and thoughts in well-formed sentences.
- Describe events in some detail.
- Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.
- Use new vocabulary in different contexts.

ELG: Managing Self

- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.

Development Matters Statements

- Know and talk about the different factors that support their overall health and wellbeing:

regular physical activity, healthy eating, toothbrushing sensible amounts of 'screen time', having a good sleep routine, being a safe pedestrian

**** Development Matters statements repeated in skills.**

Science Curriculum Knowledge and Skills Progression Map

KS1 National Curriculum Strands				
KS1 Working Scientifically	Year 1			
• Asking simple questions and recognising that they can be answered in different ways • Observing closely, using simple equipment • Performing simple tests • Identifying and classifying • Using their observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions.	**Animals, including Humans**	**Everyday Materials**	**Seasonal Change**	**Plants**
	Year 2			
	Uses of materials	**Animals including humans**	**Living things and habitats**	**Growing Plants**

Lower KS2 National Curriculum Strands	
LKS2 Working Scientifically	**Year 3**
• Asking relevant questions and using different types of scientific enquiries to answer them	

• Setting up simple practical enquiries, comparative and fair tests • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Identifying differences, similarities or changes related to simple scientific ideas and processes.	**Rocks and Soils**	**Parts of a plant**	**Forces and magnets**	**Light**	**Movement and feeding**
	Year 4				
	Changes of state	**Sound**	**Human nutrition**	**Classification and habitats**	**Electricity**

Upper KS2 National Curriculum Strands					
UKS2 Working Scientifically	**Year 5**				
• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Using test results to make predictions to set up further comparative and fair tests • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identifying scientific evidence that has been used to support or refute ideas or arguments.	**Living things and their habitats**	**Properties and Changes in Materials**	**Forces**	**Earth and space**	**Animals including humans**
	Year 6				
	Animals, including Humans: Circulatory System	**All living things and their habitats**	**Evolution and Inheritance**	**Electricity (circuits)**	**Light**

EYFS (Reception)					
EYFS ELG Understanding the World	**Development Matters (Reception)**		**Autumn**	**Spring**	**Summer**
		Unit	**Ourselves and Our World**	**Contrasting Locations**	**Summer and Growth**
<u>The Natural World</u> **- 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**	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. ** Understand the effect of changing seasons on the	**Substantive Knowledge**	• Name things that they see in the natural world eg plants, trees, leaves, spiders. • Know signs of autumn (including weather). • To name and identify a range of different materials and to know how they are used in familiar environments. • Know that ice feels cold. • Know that ice melts when it gets warmer. • Know the names of animals we find in our environment. • Know what the weather is like in our environment. • Know the season name for autumn. • Know that some animals hibernate in autumn..	• To know different creatures live in different places based on their characteristics e.g farm animals can live around people however wild animals. • Know the names of Antarctic animals such as penguins, seals, whales. • Know the names of jungle animals such as parrot, monkey. • Know that Antarctica is a cold country and the ground is made of ice. • Know that the jungle is a hot and wet place. • Know that it is always hot in the jungle and it rains a lot. • Name animals that live in Antarctica and animals that live in the jungle. • Know the season name for spring. • To know some signs of spring and winter (including weather). • Know that lots of baby animals are born such as chicks and lambs. • To name the daffodil flower and know it grows in spring.	• To know about family structures and be able to talk about who is part of their family. • To know that some animals are nocturnal and some are diurnal. • To know about the differences between farm animals and wild animals. • To be able to categorise animals by their characteristics. • Know that every living being has a life cycle and they change in shape and size as they grow. • To know that every living thing follow a similar growth pattern and make comparisons. • Know plants need water and sunlight to grow. • Know that plants grow from seeds. Know that some materials sink and some materials float. • Know the names of animals from a variety of habitats. • To know the names of different body parts. • Know that animals have different body parts suited to their environment. Eg fish have fins and gills. • Know that minibeasts like dark, damp places. • Know the season name for summer.

around them, including the seasons and changing states of matter.	natural world around them. **				• Know some signs of summer (including weather).
	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. ** Understand the effect of changing seasons on the natural world around them. **	**Disciplinary knowledge**	• Explore and observe the world around them. • Describe the weather in each season using correct vocabulary. • Use magnifying glasses to explore the world around them. • Use senses to explore the world around them. • Talk about things in the environment eg name simple animals and features. • Explore the changes in season.	• Notice changes in the world around them. • Draw pictures of animals and plants. • Make comparisons between habitats of farm animals and wild animals. • Describe the changes in season using correct vocabulary. • Exploring a range of habitats, looking at why the animal lives like that.	• To be able to talk about their body parts and what the function is of each part. • To be able to identify similarities and differences between themselves and peers. • Talking about the life cycle of plants and animals and what they need to survive. • Describe the world around them (what they hear, see, smell, taste and touch) using correct vocabulary. • Describe the weather in each season using correct vocabulary. • To listen to traditional stories such as Jack and the Beanstalk and talk about plants. Plant their own seeds and check how tall the plants grow. • Talk about the life cycle of a plant. • Make comparisons between habitats of farm animals and wild animals.

Year 1					
KS1 Knowledge End Points (NC)	**Unit**	**Animals, including Humans**	**Everyday Materials**	**Seasonal Change**	**Plants**
• **Has experienced and observed phenomena, having looked more closely at the natural and humanly constructed world around them.** • **Shows curiosity, asking questions about what they have noticed.** • **Has developed understanding of scientific ideas through the use of different types of scientific enquiry (5 types) to answer own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information.** • **Is beginning to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.**	**Substantive Knowledge**	• Knows and can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals e.g., cat, robin, adder, frog, salmon. • Knows and can identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense . • There are many different animals with different characteristics. • Animals have senses to help individuals survive; when animals sense things they are able to respond. • Animals need food to survive but different animals have different diets. • Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy.	• Distinguish between an object and the material from which it is made. Can 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. • Knows why and how the properties of materials make them particularly useful for specific purposes (for example, stone is a hard, heavy and durable material so is useful for construction of buildings). • Know how the properties of a material can make it useful for a range of different purposes (for example, plastic is waterproof so it can be used to coat fabric for clothing but can also be used for outdoor play equipment) • Knows that different materials can share the same properties (for example glass and plastic can both be transparent). • There are many different materials that have different describable and measurable properties. • Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic, ceramics and glass.	• Knows when each of the four seasons occurs. • Knows what the features of autumn are and what happens to trees in this season. • Knows that days are longer in summer (sunshine hours) than in winter • Observe changes across the four seasons. • Knows about and can describe weather in different seasons over a year. • Knows and can describe the features of different seasons and how they change through the year. • Weather can change. • The weather includes the temperature outside, wind direction and strength, as well as rain, cloud, snow and sun. • Daylight is when it is light outside. • The amount of daylight changes with the seasons.	• Knows and can identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Knows and can identify and describe the basic structure of a variety of common flowering plants, including trees. • A wild plant grows where the seed lands. It doesn't need to be planted or cared for. • Plants grow from seeds/bulbs. • Plants need light and water to grow and survive. • We can eat lots of plants. • Garden plants are plants people choose to grow in their gardens. • Weeds are wild plants that grow in places people don't want them.

			• The properties of a material determine whether they are suitable for a purpose.	• There are four seasons: spring, summer, autumn, winter	
KS1 Skills End Points (Working scientifically): • **Asks simple questions and recognises that they can be answered in different ways.** • **Observes closely, using simple equipment.** • **Performs simple tests.** • **Can identify and classify.** • **Uses their observations and ideas to suggest answers to questions.** • **Gathers and records data to help in answering questions.**	**Disciplinary Knowledge**	• Make first hand close observations of animals from each of the groups • Compare the structure of two animals from the same or different group e.g., wings, feathers, vertebrates/ invertebrates. • Classify animals using a range of features e.g., lay eggs/give birth to live young. herbivore, omnivore (these terms do not have to be explicitly taught). • Identify animals by matching statements to named images. • Take measurements of parts of the body and present results in a table to interpret. • Conduct simple sense experiments. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste?	• Compare and group together a variety of everyday materials based on their simple physical properties. • Classify objects made of one material in different ways e.g., a group of objects made of metal. • Classify one type of object made from a range of materials e.g., a collection of spoons made of different materials. • Chosen an appropriate method for testing an object for a particular property. • Use their test evidence to answer the questions about properties e.g. Which cloth is the most absorbent? • 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.	• Gather and record data about weather conditions in autumn, drawing on observation and using simple equipment (such as a container to measure rainfall) • Use data to create a pictogram and use this to describe changes in day length over the seasons. • Use their evidence to describe some other features of the weather, surroundings, themselves, animals, and plants found in autumn. • Demonstrate their knowledge in different ways e.g., creating seasonal artwork, creating a pictogram (and use this to ask and answer related questions).	• Make close observations of seedsand bulbs • Classify seeds and bulbs • Research and plan when and howto plant a range of seeds and bulbs • Look after the plants as theygrow – weeding, thinning, watering etc. • Make close observations and measurements of their plantsgrowing from seeds and bulbs • Make comparisons betweenplants as they grow • Can spot similarities and difference between bulbs andseeds
Year 2					
KS1 Knowledge End Points (NC)	**Unit**	**Uses of materials**	**Animals including humans**	**Living things and habitats**	**Growing plants**

• **Has experienced and observed phenomena, having looked more closely at the natural and humanly constructed world around them.** • **Shows curiosity, asking questions about what they have noticed.** • **Has developed understanding of scientific ideas through the use of different types of scientific enquiry (5 types) to answer own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information.** • **Is beginning to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.**	**Substantive Knowledge**	• Knows and can explain why somematerials, including wood, metal, plastic, glass, brick, rock, paper and cardboard are particularly suited to specific purposes. • Knows how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting andstretching. • Knows the difference between materials that are transparent, translucent and opaque. • Materials can be changed by physical force (twisting, bending, squashing and stretching). • Materials can be used for more than one thing e.g. metal: coins, cans, cars, table legs. • Different materials can be used for the same thing e.g. a spoon made from wood, metal, plastic. • Suitability means having the right properties for a particular purpose.	• Can describe how animals including humans have offspring which grow into adults,using the appropriate names for the stages • Knows that to survive animals need sunlight, water, air, food and a suitable habitat (including shelter for protection from predators and the environment. • Knows that exercise is important to humans and can explain why. • Knows the different food groups and the benefits of each as part of a healthy, balanced diet • Knows which food groups common foods belong to. • Knows about general hygiene and its importance and can state examples of hygienic practice. • Some things are living, some were once living but now dead and some things never lived. • All living things move, breathe, sense, grow, make babies, get rid of waste and get their energy from food. • Different animals move in different ways to help them survive.	• Knows and can explain the differences between things that are living, dead, andthings that have never been alive. • Knows that most living things live inhabitats to which they are suited. • Knows and can describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Knows and can name a variety of plantsand animals in their habitats, including micro-habitats. • Knows and can describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and make the differentsources of food. • Different animals and plants live in different places. Living things are adapted to survive in different habitats. • Environmental change can affect plants and animals that live there. • Arrows in a food chain show the flow of energy.	• Knows that plants may grow from either seeds or bulbs. • Knows that seeds and bulbs can germinate and then grow into seedlings and then continue to grow into mature plants. • Knows that mature plants may have flowers which then develop into seeds, berries and fruits etc. • Knows that seeds and bulbs need to be planted at particular times of the year and will germinate and grow at differentrates. • Knows that some plants are better suited to growing in fullsun and some grow better in partial and full shade. • Knows that plants need water, light and a suitable temperatureto grow and stay healthy. • We need plants to survive (to clean air, to eat). • We can eat different parts of the plants (leaves, stems, roots, seeds, and fruit).

			• Exercise and a good diet keeps animals' bodies in good condition and increases survival chances. • Animals reproduce new animals when they reach maturity. Some animals give birth to live young and some animals lay eggs. • Animals grow until maturity and then don't grow any larger. All animals eventually die. • To stop illness and infection we need to maintain a healthy lifestyle and keep ourselves clean.		
KS1 Skills End Points (Working Scientifically) • **Asks simple questions and recognises that they can be answered in different ways.** • **Observes closely, using simple equipment.** • **Performs simple tests.** • **Can identify and classify.** • **Uses their observations and ideas to suggest answers to questions.** • **Gathers and records data to help in answering questions.**	**Disciplinary Knowledge**	• Classify and sort materials by their properties e.g. manmade, natural • Investigate and observe what happens to different materials during testing and use this to inform explanation of their properties • Investigate which materials are fit for a purpose e.g. What is the best material for an umbrella? • Explain from their observations how materials change when a force is exerted on them by squashing, bending, twisting and stretching. • Investigate the transparency of objects, recording class data in a table and drawing simple conclusions from the findings.	• Ask 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 • Ask pet owners questions about how they look after their pet • Investigate the effect of exercise on their bodies • Classify food in a range of ways, including using the Eatwell guide	• 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.) • Can sort into living, dead and never lived. • Can give key features that	• Make close observations of seedsand bulbs • Classify seeds and bulbs • Research and plan when and howto plant a range of seeds and bulbs • Look after the plants as theygrow – weeding, thinning, watering etc. • Make close observations and measurements of their plantsgrowing from seeds and bulbs • Make comparisons betweenplants as they grow. • Can spot similarities and difference between bulbs andseeds

		• Ask and answer questions about everyday materials	• Investigate washing hands, using glitter gel • Describe, using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child • Measure/observe how animals, including humans, grow. • Collate what they know about looking after a baby/animal by creating a parenting/pet owners' guide • Explain how development and health might be affected by differing conditions and needs being met/not met	mean the animal or plant is suited to its micro- habitat • Using a food chain can explain what animals eat. • Can explain in simple terms why an animal or plant is suited to a habitat	

Year 3						
LKS2 Knowledge End Points (NC)	**Unit**	**Rocks and Soils**	**Parts of a plant**	**Forces and magnets**	**Light**	**Movement and feeding**
• **Has broadened their scientific view ofthe world around them through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments and by beginning to develop ideas about functions, relationships and interactions.** • **Asks their own questions about what they observe and is able to make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, includingobserving changes over time,**	**Substantive Knowledge**	• There are different types of rock e.g. sandstone, limestone,slate etc. which have different properties. • Rocks can be hard or soft. They have different sizes of grainor crystal.	• Knows and can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • Knows the requirements of plants for life andgrowth (air, light, water, nutrients	• Knows that friction affects the way that things move on different surfaces • Knows that some forces need contact between two objects, but magnetic forces can act at a distance • Knows that magnets attract or repel each	• Knows that light is needed to see things and thatdark is the absence of light • Knows that light is reflected from surfaces • Knows that light from the sun can be dangerousand that there are ways to protect the eyes	• Animals, unlike plants which can make their own food, need • to eat in order to get the nutrients they need. • Food contains a range of different nutrients that are needed by the body

noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. • **Draws simple conclusions and uses some scientific language, to both and write about what they have found out.** • **Reads and spells scientific vocabulary correctly and with confidence, using their growing word and spelling knowledge.**		• Rocks can be different shapes and sizes (stones, pebbles, boulders) and some absorb water. • Knows, in simple terms, how fossils are formed when things that have lived are trapped within rock. • Knows that soils are made from rocks and organic matter. • Some rocks are natural and some are human-made. There are 3 types of naturally occurring rock. • Soil is the uppermost layer of the earth and is made up of different things. • Different plants grow in different soils. • Fossils tell us what has happened before (they give us evidence) and show that living things have changed over time. • Fossils are most commonly found in sedimentary rock.	from soil, and room to grow) and how they vary from plant to plant. • Knows through investigation, the ways in which water is transported within plants • Knows the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. • Plants are producers, they make their own food. • Their leaves absorb sunlight and carbon dioxide. • Plants have roots, which provide support and draw water from the soil. • Flowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed production. • Seed dispersal improves a plant's chances of	other and attract some materials and not others • Knows and can describe magnets as having two poles • Knows whether two magnets will attract or repel each other, depending on which poles are facing. • Forces can be pushes or pulls. • Friction is a force that acts between two surfaces or objects that are moving (or trying to move) across each other. • Magnets exert attractive and repulsive forces on each other. • Magnets exert non-contact forces, which work through some materials. • Magnets exert attractive forces on some materials which are affected by magnet strength, object mass, distance from object and object material.	• Knows that shadow are formed when the light from a light source is blocked by an opaque object. • Knows and can explain some of the reasons why the size of shadows changes. • Knows how the shadows of transparent, opaque and translucent materials vary. • There must be light for us to see; without light it is dark. • We need light to see things, even shiny things. • Transparent materials let light through them and opaque materials don't let light through. • Beams of light bounce off some materials (reflection). • Smooth, shiny materials reflect light beams better than bumpy, non-shiny materials. • Light comes from a source.	to stay healthy – carbohydrates including sugars, protein, vitamins, minerals, fibre, fat, sugars, water. • A piece of food will often provide a range of nutrients. • Humans and some other animals have skeletons and muscles which help them move and provide protection and support • Different animals are adapted to eat different foods. • To stay healthy, humans need to exercise, eat a healthy diet and be hygienic. • Many animals have skeletons to protect vital organs inside the body, allow movement and support the body and stop it from falling on the floor. • Muscles are connected to bones and move them when they contract.

		• Palaeontologists use Fossils to find out about the past.	successful reproduction. • Seeds/bulbs require the right conditions to germinate and grow. • Seeds contain enough food for the plant's initial growth.		• Reflective materials can be very useful e.g. cat's eyes, hi-vis jacket.	• Movable joints connect bones.
LKS2 Skills End Points (Working Scientifically) • **Asks relevant questions and use different types of scientific enquiries toanswer them.** • **Sets up simple practical enquiries, comparative and fair tests.** • **Makes systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers anddata loggers.** • **Gathers, records, classifies and presents data in a variety of ways tohelp in answering questions.** • **Records findings using simple scientific language, drawings, labelled diagrams,keys, bar charts, and tables.** • **Reports on findings from enquiries, including oral and written explanations,displays or presentations of results andconclusions.** • **Uses results to draw simple conclusions, make predictions for newvalues, suggest improvements and raise further questions.** • **Identifies differences, similarities orchanges related to simple scientificideas and processes.** • **Use straightforward scientific evidence to answer questions or to support their findings.**	**Disciplinary Knowledge**	• Can compare and group together different • kinds of rocks on the basis of their appearance and simplephysical properties. • Can devise tests to explore the propertiesof rocks and use datato rank the rocks.* • Can link rocks changing over time withtheir properties e.g. softrocks get worn away more easily. • Can present in differentways their understanding of how fossils are formed e.g. in role play, comic strip,chronological report, stop-go animation etc. • Can identify plant/animal matter androcks in samples	• Observe what happens to plants over time whenthe 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, inthe cold, deprived of air, different types of soil, different fertilisers, varying amount of space. • Spot flowers, seeds, berries and fruits outsidethroughout the year. • Observe flowers carefully to identify the pollen	• Record and report on findings from investigations, involving how things move on different surfaces* • Compare and group materials following magnetic testing, recording findings and use the outcometo answer questions about which materials are magnetic.* • Make and investigate predictions on whether two magnets will attract or repel, dependingon which poles are facing.	• Observe and identify changes to the size and orientation of shadows, relative to their proximityto the light source. • Observe and identify the difference in shadows ofopaque, translucent and transparent objects/materials. • Observe how shadows are formed and affected bydifferent circumstances. • To notice that light can be reflected off surfaces and Replace with 'investigate the visibility of different materials (eg shiny; foil, mirrors and matt; sugar paper) in a darker environment according towhich reflect most light.' • Investigate the size of shadows according to	• 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 findout the types of food that contain different nutrients * * * • Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? • Plan a daily diet contain a goodbalance of nutrients and recordand present findings * * * * * • Explore the nutrients containedin fast food • Use secondary sources to research the parts

		of soil. • Can devise a test to explore the water • retention of soils.	• Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. • Observe seeds being blown from the trees e.g. sycamore seeds. • Research different types of seed dispersal. • Classify seeds in a range of ways including by how they are dispersed. • Create a new species of flowering plant • Can explain observations made during investigations. • Can look at the features of seeds to decide on their method of dispersal. • Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal.		timesof day and year, by tracing shadows outside and comparing differences. • Classify materials according to opaque, transparent and translucent. • Use oral and written explanations to report on whyshadows are formed and how the length and size of a shadow can be changed. • Investigates questions related to an object and theshadow it will cause.*	and functions of the skeleton* • Investigate pattern seeking questions such as ; Can peoplewith longer legs run faster?; Can people with bigger hands catch a ball better? • Compare, contrast and classifyskeletons of different animals

Year 4						
Lower KS2 End Points (NC):	**Unit**	**Changes of state**	**Sound**	**Human nutrition**	**Classification and habitats**	**Electricity**
• **Has broadened their scientific view of the world around them through exploring, talking about, testing anddeveloping ideas about everyday phenomena and the relationships between living and non-living thingsand familiar environments and by beginning to develop ideas about functions, relationships and interactions.** • **Asks their own questions about what they observe and is able to make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative andfair tests and finding things out using secondary sources of information.** • **Draws simple conclusions and usessome scientific language, to both and write about what they have found out.** • **Reads and spells scientific vocabulary correctly and with confidence, using their growingword and spelling knowledge.**	**Substantive Knowledge**	• Knows how to distinguish between a solid, liquid and gas. • Knows that some materials change statewhen they are heated or cooled. • Knows the temperatures at which ice, water and water vapour change state. • Knows the part played by evaporation and condensation in the water cycle. • Materials can be divided into solids, liquids and gases. • Some materials can change from one state to another and back again. • Heating causes solids to melt into liquids and liquids evaporate	• Knows how soundsare made, associating some ofthem with vibrating. • Knows how sound travels from a source to our ears. • Knows the correlation between pitch and the object. • Knows the correlation between the volume of a sound and the strength of the vibrations that produced it. • Know that sounds get fainter as the distance from the sound source increases. • Sound is a type of energy	• Knows the basic parts of the digestivesystem in humans. • Knows and can identify the differenttypes of teeth in humans and their simple functions. • Knows which organisms are producers, predators and prey and apply tothe construction and interpretation of food chains. • The teeth of animals (including humans) are designed to eat different foods depending on the diet of the animal. • Food is broken down by the teeth and further in the stomach and	• Knows that living things can begrouped in a variety of ways. • Knows and can name living thingsin a range of habitats. • Knows and can relate the key adaptational features of an organism to the known features ofits habitat. • Knows and can give examples ofhow an environment may change both naturally and due to human impact. • Living things can be divided into groups based upon their characteristics. • Environmental change can positively or negatively affect a habitat; changes can be	• Can identify and name appliancesthat require electricity to function • Knows the basic parts of a circuit,including cells, wires, bulbs, switches and buzzers • Knows that for an appliance to work within a circuit, it has to bepart of a complete loop with a battery. • Knows that a switch in a circuit is a temporary break in an otherwise‘complete circuit’. • All metals conduct electricity butsome, such as aluminum and titanium, are relatively poor conductors. • Knows the recognised symbols used to represent components ofa circuit and uses these to represent a circuit pictorially. • A source of electricity (mains of battery) is needed for electrical devices to work. • Electricity sources push electricity round a circuit. • More batteries will push the electricity round the circuit faster.

		into gases. • Cooling causes gases to condense into liquids and liquids to freeze into solids. • The temperature at which given substances change state are always the same. • Condensation and evaporation occur within the water cycle.	created by vibrations; the louder the sound, the bigger the vibration. • Sound travels from its source in all directions and we hear it when it travels to our ears. • Sound travel can be blocked. • Changing the shape, size and material of an object will change the sound it produces. • Sound moves through all materials by making them vibrate; changing the way an object vibrates changes its	intestines where nutrients go into the blood; the blood takes nutrients around the body. • Nutrients produced by plants move to primary consumers then to secondary consumers through food chains; this flow of energy is shown on a food chain.	natural or caused by humans. • Organisms are affected in different ways by environmental change. • Conservationists work to help promote the protection of the environment.	• A complete circuit is needed for electricity to flow and devices to work. • Some materials allow electricity to flow easily and these are called conductors. • Materials that don't allow electricity to flow easily are called insulators.

			sound. • Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds. • Faster vibrations (higher frequencies) produce higher pitched sounds.			
LKS2 Skills End Points (Working Scientifically) • **Asks relevant questions and use different types of scientific enquiries toanswer them.** • **Sets up simple practical enquiries, comparative and fair tests.** • **Makes systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers anddata loggers.** • **Gathers, records, classifies and presents data in a variety of ways tohelp in answering questions.** • **Records findings using simple scientific language, drawings, labelled diagrams,keys, bar charts, and tables.** • **Reports on findings from enquiries, including oral and written explanations,displays or presentations of results andconclusions.** • **Uses results to draw simple conclusions, make predictions for newvalues, suggest**	**Disciplinary Knowledge**	• Observe closely and classify a range of solids and liquids. • Explore making gases visible • Classify materials according to whether theyare solids, liquids and gases. • Observe a range of materials melting. • Investigate how to melt ice more quickly. • Observe the changes that are non-reversible	• Experiment with at least three different instruments to observe and explore volume and pitch. • Make predictions anddraw conclusions about the pitch and volume of sounds.* • Note how vibrations	• Construct and interpret a variety of food chains, identifying producers, predators and prey. • Can create food chains based on research.* • Identifies differences,and similarities of different types of teeth according to herbivore, omnivore and	• Observe plants and animals in different habitats throughout the year and use recordings to compare and contrast the livingthings observed. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.	• Construct and investigate a rangeof circuits. • Investigate which materials can be used instead of wires to makea circuit • Classify materials that conduct electricity and those that don't following investigation and record findings..* • Investigate the effect of a switch and combinations of switches in simple circuits. • Investigate switches and considervariations for specific uses, such as a pressure switch for a burglaralarm.

improvements and raise further questions. • **Identifies differences, similarities or changes related to simple scientificideas and processes.** • **Use straightforward scientific evidence to answer questions or to support their findings.**		relating (common ingredients). • Investigate melting point of different materials. • Explore freezing different liquids. • Observe and measure temperature of icywater, tap water, hot water. • Observe water evaporating and condensing. • Set up investigations to explore changing therate of evaporation.* • Use secondary sources to find out about the water cycle.* • Using their data, can explain what affects how quickly a solid melts. • From their data, can explain how to speed upor slow down evaporation. • Present learning about the water cycle in a range	make sounds of different volumes and travel to our ears. • Identify and show how sound travels through particles and into the ear. • Make own instruments that produce a range of pitches.	carnivore. • Can record the teeth in their mouth (make a dental record). • Recreate the human stomach and observe representation of howfood breaks down. • Label the different parts of the digestive system.	• Classify living things found in different habitats based on their features. • Create a simple identification keybased on observable features. • Use research to explore human impact on the local environment • e.g. litter, tree planting.* • Use secondary sources to find outabout how environments may naturally change.* • Use secondary sources to find out about human impact, both positive and negative, on environments and write a report on this.*	• Apply their knowledge of conductors and insulators to design and make different types of switch.

		of ways e.g. diagrams, explanation text, story of a water droplet.				

Year 5						
KS2 End Points (NC):	**Unit**	**Living things and their habitats**	**Properties and Changes in Materials**	**Forces**	**Earth and space**	**Animals including humans**
• **Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking their own questions about scientific phenomena and analysing functions, relationships and interactions more systematically.** • **Has encountered more abstract ideas and is beginning to recognize how these help them to understand and predict how the world operates.** • **Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fairtests and finding things out using a wide range of secondary sources of information.** • **Is able to draw conclusions based on their data and observations, using evidence to justify their ideasand their scientific knowledge and understanding to explain their findings.**	**Substantive Knowledge**	• Knows and can describe the differences in the life cycles of a mammal, an amphibian, an insectand a bird • Knows and can describe the life processes of reproduction in some plants (including the pollination process) and animals • Knows that bulbs, tubers, runners and plantlets are examples of plant reproduction involving only one parent • Different animals mature at different rates and live to different ages. • Some organisms reproduce sexually where offspring inherit information from both parents. • Some organisms reproduce asexually by making a copy of a single parent.	• Materials have different uses depending on their properties and state (liquid, solid, gas).Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. • Some materials will dissolve in a liquid andform a solution while others are insoluble and form sediment. • Mixtures can be separated by filtering, sieving and evaporation. • Some changes to materials such as dissolving, mixing and changes of state are	• Knows that unsupported objects fall to Earth becauseof the force of gravity acting between the earth and the falling object • Knows and can identify the effects of air resistance, water resistance and friction,that act between moving surfaces • Knows that some mechanisms, including levers, pulleys and gears, allow a smaller force to havea greater effect. • Air resistance and water resistance are forces against motion caused by objects having to	• The Sun is a star. It is at the centre ofour solar system. There are 8 planets(can choose to name them, but not essential). These travel around the Sun in fixed orbits. • Earth takes 365¼ days to complete itsorbit around the Sun. • The Earth rotates (spins) on its axisevery 24 hours. • As Earth rotates half faces the Sun (here it is day) and half is facing awayfrom the Sun (night). As the Earth rotates the Sun appears to move across the sky.	• Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction. • Hormones control these changes; which can be physical and/or emotional. • Humans reproduce sexually where offspring inherit information from both parents. • The average length of gestation in humans is 280 days, or 40 weeks.

		• Environmental change can affect how well an organism is suited to its environment. • Different types of organisms have different life cycles.	reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are notreversible. • All matter (including gas) has mass. • Sometimes mixed substances react to make a new substance. These changes are usually irreversible. • Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible. • Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature). • Reversible changes can be reversed by: sieving, filtering, and evaporating.	move air and water out of their way. • Friction is a force against motion caused by two surfaces rubbing against each other. • Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move. • Some objects/animals are streamlined to minimise the effects of air/water resistance.	• The Moon orbits the Earth. It takes about 28 days to complete its orbit. • The Sun, Earth and Moon are approximately spherical. • Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance. • Objects with larger masses exert bigger gravitational forces. • Objects like planets, moons and stars spin. • Smaller mass objects like planets orbit large mass objects like stars. • Stars produce vast amounts of heat and light. • All other objects are lumps of rock, metal or ice and can be seen because they	

					reflect the light of stars.	
UKS2 Skills End Points (Working Scientifically • **Plans different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.** • **Takes measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.** • **Records data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.** • **Reports and presents findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.** • **Uses test results to make predictions to set up further comparative and fair tests.** • **Identifies scientific evidence that has been used to support or refute ideas or arguments.**	**Disciplinary Knowledge**	• Organise mammals into different groups - sea and landand marsupials and use scientific evidence to refute/support correct/incorrect statements (such as 'dolphins are fish'). • Draw and label appropriate scientific diagrams following use of secondary sources and first hand observations relating to the life cycle of a range ofanimals. • Compare and contrast the life cycles of different livingthings and present findings • Identify the key differences between some amphibians – for example, toads and frogs, and present findings in different forms. • Use data to compare and find patterns, for example to compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth/Look for patterns between the size of an animal and its expected life span)	• Investigate the properties of different materials in order to recommend materials • for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabricfor a coat • Explore adding a range of solids to waterand other liquids e.g. cooking oil, as appropriate • Investigate rates of dissolving by carrying out comparative and fair test and records findings * • Separate mixtures by sieving, filtering andevaporation, choosing the most suitable method and equipment for each mixture • Explore a range of non-reversible	• Investigate the pull on different • objects using a newton meter and record forces in Newtons(N). • Report on conclusions relatingto an object's mass and its weight in Newtons. • Investigate the effect of friction in a range of contexts . • Investigate the effects of water resistance in a range of contexts e.g. dropping shapesthrough water, pulling shapes • e.g. boats along the surface of water. • Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. • Explore how	• 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 aroundthe Earth. • Use secondary sources to create amodel to show why day and night occur • Make first-hand observations of howshadows caused by the Sun change through the day • Make a sundial and report on findings following observation of the changing place of the shadow, making conclusions as to what this demonstrates and how the sundial wasused to indicate the time. • Research time zones	• Identify key developments in early human life from birth to 12 months. • Recognise changes that children experience overtime before reaching puberty. Explore patterns of change from adulthood to old age. • Research a key scientist in relation to growing up and puberty.

			changes • e.g. rusting, adding fizzy tablets to water, burning • Carry out comparative and fair tests involving non-reversible changes e.g. What affects therate of rusting? What affects the amount of gas produced? • Research new materials produced by chemists e.g. Spencer Silver (glue of stickynotes) and Ruth Benerito (wrinkle free cotton)	levers, pulleys and gears work. • Research how the work of scientists such as Galileo Galileiand Isaac Newton helped to develop the theory of gravitation.	• Consider the views of scientists in the past and how evidence was used to deduce the shapes and movements ofthe Earth, Moon and planets before space travel.	

Year 6						
Upper KS2 End Points (NC):	**Unit**	**Animals, including Humans: Circulatory System**	**All living things and their habitats**	**Evolution and Inheritance**	**Electricity (circuits)**	**Light**
• **Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; askingtheir own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.** • **Has encountered more abstract ideas and is beginning to recognisehow these help them to understand and predict how the world operates.** • **Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying**	**Substantive Knowledge**	• Can identify and name the main parts of the human circulatory system, and describe the functionsof the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and	• Plants can be divided broadly into two main groups • flowering plants and non-flowering plants. • Living things can be formally grouped according to characteristics.	• All living things have offspring of thesame kind. The offspring are not identical to their parents and vary. • Plants and animals have characteristics that make them suited(adapted) to their environment.	• that the brightness of a bulb,or the volume of a buzzer, correlates with the voltage ofcells used in the circuit. • Knows and can give reasonsfor variations in how components function, including	• Light appears to travelin straight lines • Knows and can explainthat objects are seen because they give out or reflect light into the eye • Knows and can explain that we see things because light travels from light sources to oureyes or from light sources to objects and then to our eyes.

things, carrying out comparative fairtests and finding things out using a wide range of secondary sources of information. • **Is able to draw conclusions based on their data and observations, using evidence to justify their ideasand their scientific knowledge and understanding to explain their findings.**		lifestyle on theway the body functions • Knows and can describe the way in which nutrients and water are transported within animals, including humans • The heart pumps blood around the body. • Oxygen is breathed into the lungs where it is absorbed by the blood. • Muscles need oxygen to release energy from food to do work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood.) • Drugs, alcohol and smoking have negative effects on the body.	• Animals can be divided intotwo main groups — vertebrates and invertebrates. • Each group has common characteristics. • Variation exists within a population (and between offspring of some plants) – ***NB****: this Key Idea is duplicated in Year 6 Evolution and Inheritance.* • Organisms best suited to their environment are more likely to survive long enough to reproduce. • Organisms reproduce and offspring have similar characteristic patterns. • Competition exists for resources and mates. • Scientists, called Taxonomists, sort and group living	• If the environment changes rapidly some variations may not suit the new environment and will die. If it changesslowly, animals and plants with variations that are best suited survive and reproduce. • Over a very long period of time thesecharacteristics may be so different that a new species is created. This is evolution. • Fossils give us evidence of what lived on the Earth millions of years ago scientists such as Darwin and Wallace observed how living things adapt to different environments • Life cycles have evolved to help organisms survive to adulthood.	the brightness of bulbs, the loudness of buzzers and the on/off position of switches • Knows the effect of adding more components to a circuitwith one cell and the effect of adding multiple cells • Knows and can use the recognised symbols to represent a simple circuit in a diagram. • Batteries are a store of energy. This energy pushes electricity around the circuit. • When the battery's energy is gone it stops pushing. Voltage measures the 'push.' • Symbols for: lamp, wire, buzzer, cell, battery, motor, switch (open), switch (closed). • A series circuit will not work if a lamp is	• Knows and can explain,with reference to how light travels, why shadows have the sameshape as the objects that cast them • Animals see light sources when light travels from the source into their eyes. • Animals see objects when light is reflected off that object and enters their eyes. • Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light so we don't see the beam. • Light travels in straight lines, called rays or beams of light.

			things according to their similarities and differences.	• Over time the characteristics that are most suited to the environment become increasingly common. ***NB**: The following could be duplicated in Year 6 Living things and their habitats*. • Organisms best suited to their environment are more likely to survive long enough to reproduce. Organisms best adapted to reproduce are more likely to do so. • Organisms reproduce and offspring have similar characteristic patterns. • Variation exists within a population (and between offspring of some plants). • Competition exists for resources and mates	broken or a wire is disconnected.	
UKS2 Skills End Points (Working Scientifically • **Plans different types of scientific enquiries to answer questions, including recognising and controllingvariables where necessary.**	**Disciplinary Knowledge**	• Plan and conduct a scientific enquiryto identify different food groups.	• Classify plants and animals and record conclusions from the use of classification keys.	• Follow lines of enquiry to support Explanation of the process of	• Draw circuit diagrams of a range of simple series circuits,using recognised symbols.	• Plan and conduct a testto investigate how light travels and explain/present the findings. • Investigate the use of mirrors to reflect light and record using

• **Takes measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.** • **Records data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.** • **Reports and presents findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.** • **Uses test results to make predictions toset up further comparative and fair tests.** • **Identifies scientific evidence that has been used to support or refute ideas orarguments.**		• Use labelled diagrams to support understanding of how nutrients and oxygen are delivered around the body. • Use information to identify the main components of the heart. • Predict what will happen to the heart during exercise. • Construct and analyse the variablesthat make a fair test. • Conduct a fair investigation on the effects of exercise on the heart. • Use scientific equipment to track results and record data using tablesand graphs. ** • Analyse whole class data after investigation to compare and reflect on findings and draw conclusions.	• Use information about the characteristics of an unknown animal or plant toassign it to a group. • Use secondary sources to learn about the formal classification system devisedby Carl Linnaeus and why it is important. • Research an unfamiliar animal or plant using its characteristics to establishwhere it belongs in the classification system.	evolution. • Demonstrate an understanding, withspecific examples, of how an animalor plant has evolved over time e.g. penguin, peppered moth. • Identify characteristics that will make aplant or animal suited or not suited to a particular habitat. • Compare the ideas of Charles Darwin and Alfred Wallace on evolution. • Research the work of Mary Anningand understand how this provided evidence of evolution. • Referring to and using examples of fossil evidence that support the theoryof evolution.	• Communicate structures of circuits using circuit diagramswith recognised symbols • Make electric circuits and demonstrate, following investigation, how variation inthe working of particular components can be changed. • Plan and select resources fora fair scientific enquiry, deciding which variables to control. • Record results from an experiment using tables andgraphs • Evaluate and explain theirinvestigation, results and conclusions.	straight line diagrams toindicate the direction of light. • Use mirrors, torches and protractors to demonstrate and recordhow light is reflected in a mirror and how we see ourselves in a mirror. • Measure and record theangle of incidence and angle of reflection usinga protractor and detailed diagram.

		• Use information acquired to write a scientific report on how the human circulatory system works.				