



We ensure that the 'Working Scientifically' skills are built-on and developed throughout children's school career so that they can use equipment, conduct experiments, build arguments and explain concepts confidently and continue to ask questions and be curious about their surroundings. Children will develop a broad range of skills for investigation – pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. and will regularly be given the opportunity to create their own scientific questions and to explore these using a 'child led enquiry' approach. Working Scientifically should not be taught as a separate strand but should be embedded throughout all topics of learning.

Below you will see the topic areas, and how the working scientifically skills are woven through each area. At the end of the document, the working scientifically skills are separated into year group strands, in more detail.

Animals including humans					
	EYFS	YEAR 1	YEAR 2	Year 3	Year 4
Animals including humans~ Knowledge	<ul style="list-style-type: none"> - To know that everyone starts as a baby and grows up. - To know the names of facial features - self portraits. - To name the five senses. - To talk about how they have changed since they were a baby. - To know that humans and other animals can grow. <p>ELG - The Natural World Explore the natural world around them, making observations and drawing pictures of animals.</p>	<ul style="list-style-type: none"> • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • identify and name a variety of common animals that are carnivores, herbivores and omnivores • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • identify, name, draw and label the basic parts of the human body and say which part of the body links with each sense. 	<ul style="list-style-type: none"> • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	<ul style="list-style-type: none"> • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food • they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement. 	<ul style="list-style-type: none"> • describe the simple functions of the basic parts of the digestive system in humans • identify the different types of teeth in humans and their simple functions • construct and interpret a variety of food chains, identifying producers, predators and prey.
Animals including humans~ working scientifically	<ul style="list-style-type: none"> • Children make observations of animals and plants and explain why some things occur, and talk about changes 	<ul style="list-style-type: none"> • use observations to compare and contrast animals at first hand or through videos and photographs • describe how they identify and group animals • group animals according to what they eat • use their senses to compare different textures, sounds and smells. 	<ul style="list-style-type: none"> • observe, through video or first-hand observation and measurement, how different animals, including humans, grow • ask questions about what things animals need for survival and what humans need to stay healthy • suggest ways to find answers to their questions. 	<ul style="list-style-type: none"> • Identify and group animals with and without skeletons and observe and compare their movement • explore ideas about what would happen if humans did not have skeletons • compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat • research different food groups and how they keep us healthy and design meals based on what they find out. 	<ul style="list-style-type: none"> • compare the teeth of carnivores and herbivores, and suggest reasons for differences • find out what damages teeth and how to look after them • draw and discuss their ideas about the digestive system and compare them with models or images.

Plants

	EYFS	YEAR 1	YEAR 2	Year 3	Year 4
Plants~ Knowledge	<p><u>Plants</u></p> <ul style="list-style-type: none"> - To name the main parts of a plant. To know the names of common fruits and vegetables. - ELG - The Natural World Explore the natural world around them, making observations and drawing pictures of plants. 	<ul style="list-style-type: none"> • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees. 	<ul style="list-style-type: none"> • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 	<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • know 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 • observe and know the way in which water is transported within plants • know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	
Plants~ working scientifically	<ul style="list-style-type: none"> • Children know about similarities and differences in relation to living things. • Children make observations of plants and explain why some things occur, and talk about changes. 	<ul style="list-style-type: none"> • observe closely, perhaps using magnifying glasses, and compare and contrast familiar plants; • describe how they were able to identify and group them, and draw diagrams showing the parts of different plants including trees. • keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants. 	<ul style="list-style-type: none"> • observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth • set up a comparative test to show that plants need light and water to stay healthy. 	<ul style="list-style-type: none"> • compare the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser • discover how seeds are formed by observing the different stages of plant life cycles over a period of time • look for patterns in the structure of fruits that relate to how the seeds are dispersed. • observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers. 	

Living things and habitats

	- EYFS	YEAR 1	YEAR 2	Year 3	Year 4
Living things and habitats~ Knowledge	<ul style="list-style-type: none"> - <u>Habitats</u> - To know that there are different environments to their own and describe them. - ELG - The Natural World 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. 		<ul style="list-style-type: none"> • Explore and compare the differences between things that are living, dead, and things that have never been alive. • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Identify and name a variety of plants and animals in their habitats, including micro-habitats. • Describe how animals obtain their food from plants and other animals, using the idea of simple food chain, and identify and name different sources of food. 		<ul style="list-style-type: none"> •recognise that living things can be grouped in a variety of ways • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • recognise that environments can change and that this can sometimes pose dangers to living things
Living things and habitats~ working scientifically	<ul style="list-style-type: none"> • Children know about similarities and differences in relation to places, and living things • Children talk about the features of their own immediate environment and how environments might vary from one another • Children make observations of animals and plants and explain why some things occur, and talk about changes 		<ul style="list-style-type: none"> Sort and classify things according to whether they are living, dead or were never alive, and recording their findings using charts. • Describe how they decided where to place things, exploring questions such as: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. • Construct a simple food chain that includes humans (e.g. grass, cow, human). • Describe the conditions in different habitats and microhabitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there. 		<ul style="list-style-type: none"> •use and make simple guides or keys to explore and identify local plants and animals • make a guide to local living things • raise and answer questions based on their observations of animals and what they have found out about other animals that they have researched.

Everyday materials

	EYFS	YEAR 1	YEAR 2	Year 3	Year 4
Everyday materials~ Knowledge	<p><u>Materials - Goldilocks - Spring 1 Hard and Soft.</u></p> <ul style="list-style-type: none"> To select appropriate materials according to their properties. To name and identify a range of different materials and to know how they are used in familiar environments. <p><u>Humpty Dumpty - Spring 2.</u> To select appropriate materials according to their properties.</p> <p><u>Three Little Pigs - Summer 1.</u> Name a variety of materials - wood, plastic, glass, metal, rock, brick. To select appropriate materials according to their properties.</p> <p>ELG - The Natural World Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<ul style="list-style-type: none"> distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties. 	<ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 	<ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter 	<ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
Everyday materials~ working scientifically	<ul style="list-style-type: none"> Children use what they have learnt about media and materials in original ways, thinking about uses and purposes. Children know about similarities and differences in relation to places, objects, materials and living things 	<ul style="list-style-type: none"> performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?' 	<ul style="list-style-type: none"> comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs) observe closely, identifying and classifying the uses of different materials, and recording their observations. 	<ul style="list-style-type: none"> observe rocks, including those used in buildings and gravestones, and explore how and why they might have changed over time; use a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. explore different soils, identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. raise and answer questions about the way soils are formed. 	<ul style="list-style-type: none"> grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.

Forces and Magnets

	EYFS	YEAR 1	YEAR 2	Year 3	Year 4
Forces and Magnets~ knowledge	<p><u>Forces and magnets:</u></p> <ul style="list-style-type: none"> - ELG - The Natural World Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 			<ul style="list-style-type: none"> • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing. 	
Forces and Magnets~ working scientifically	<ul style="list-style-type: none"> • Children know about similarities and differences in relation to objects and materials • Children make observations and explain why some things occur, and talk about changes 			<ul style="list-style-type: none"> • compare how different things move and group them • raise questions and carry out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; • explore the strengths of different magnets and find a fair way to compare them • sort materials into those that are magnetic and those that are not; • look for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another • identify how these properties make magnets useful in everyday items and suggesting creative uses for different magnets 	

Seasons and light

<p>Seasons and light ~ knowledge</p>	<p>Make observations across the four seasons.</p> <ul style="list-style-type: none"> - ELG - The Natural World Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 	<ul style="list-style-type: none"> •observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies. 		<ul style="list-style-type: none"> •recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change. 	
<p>Seasons and light</p>	<ul style="list-style-type: none"> • Children make observations and explain why some things occur, and talk about changes • Children know about similarities and differences in relation to places, objects, materials and living things • Children talk about the features of their own immediate environment and how environments might vary from one another 	<ul style="list-style-type: none"> •make tables and charts about the weather; and make displays of what happens in the world around them, including day length, as the seasons change. 		<ul style="list-style-type: none"> •looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes. 	

Electricity					
	EVFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4 (Lower Key Stage 2)
Electricity~ knowledge					<ul style="list-style-type: none"> • 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.
Electricity~ working scientifically					<ul style="list-style-type: none"> • observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.
Sound					
Sound~ knowledge					<ul style="list-style-type: none"> • 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.
Sound~ working scientifically					<ul style="list-style-type: none"> • finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses • make earmuffs from a variety of different materials to investigate which provides the best insulation against sound • make and play their own instruments by using what they have found out about pitch and volume.

EYFS

- Children know about similarities and differences in relation to places, objects, materials and living things
 - Children talk about the features of their own immediate environment and how environments might vary from one another
 - Children make observations of animals and plants and explain why some things occur, and talk about changes
 - Children describe shapes, spaces, and measures
- Children use what they have learnt about media and materials in original ways, thinking about uses and purposes

Year 1

- ask simple scientific questions.
- observe closely, using simple equipment
- perform simple tests
- identify, group and classify
- use their observations and ideas to suggest answers to questions
- observe over time, look for simple patterns.
- use scientific vocabulary taught in the lesson.
- gather and record data, in simple tables, to help in answering questions
- answer some simple scientific questions about the world around them

Year 2

- ask scientific questions and recognise ways in which they might them.
- observe closely, using simple equipment
- use simple measurements (e.g. using comparisons or non-standard units),
- make careful observations in enquiries,
- carry out enquiries that involve observing over time
- use simple secondary sources for researching answers to questions
- carry out simple comparative tests
- carry out simple pattern seeking enquiries
- identify, group and classify
- gather and record observations to help answer questions in a variety of ways, e.g. labelled diagrams or simple tables
- gather and record measurements to help answer questions in a variety of ways, e.g. simple tables, pictograms, tally charts or block diagrams
- gather and record findings from their research (such as from secondary sources) in a variety of ways, e.g. fact files, answers to questions or giving explanations

Year 3

- ask relevant questions and use different types of scientific enquiries
- set up simple practical enquiries, comparative and fair tests
- make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gather, record, classify and present data in a variety of ways to help in answering questions
- record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- report on findings from enquiries, including oral and written explanations, displays or

Year 4

- start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions, e.g. recognising when a fair test is necessary
- help decide what observations or measurements they might make, how long they will make them for and the equipment they might use
- help decide how to record and analyse data
- ask relevant questions and use different types of scientific enquiries to answer them
- set up simple practical enquiries, comparative and fair tests
- make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gather, record, classify and present data in a variety of ways to help in answering questions
- record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- use results to draw simple conclusions, make predictions for

		<ul style="list-style-type: none"> • record classification tasks using tables and venn diagrams • use and apply mathematical skills at a level consistent with their increasing maths knowledge at key stage 1 • with support, begin to notice patterns and relationships • Draw simple conclusions • use a range of scientific vocabulary accurately. • communicate their findings to a variety of audiences in a variety of ways 	<p>presentations of results and conclusions</p> <ul style="list-style-type: none"> • use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identify differences, similarities or changes related to simple scientific ideas and processes use straightforward scientific evidence to answer questions or to support their findings. <p>use their scientific experiences to raise questions about the world around them</p>	<p>new values, suggest improvements and raise further questions</p> <ul style="list-style-type: none"> • identify differences, similarities or changes related to simple scientific ideas and processes use straightforward scientific evidence to answer questions or to support their findings. • raise further questions which could be investigated • suggest improvements to investigations
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