



Key Concepts: scientific process, measurement, organisation, variation, change, diversity

Biology	Physics	Chemistry	Mix of strands
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Pre-School

Managing Self PSED Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.	The Natural World UW Explore the natural world around them, making observations and drawing pictures of animals and plants. UW Know some similarities and differences between the natural world around them and contrasting environments UW Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.
Children will:	
All About Me and Nursery Rhymes	*learn to be increasingly independent as they get dressed and undressed; eg putting coats on and doing up zips, putting their own shoes on *learn to be increasingly independent in meeting their own care needs eg using the toilet, washing and drying hands, brushing teeth *measure their height and comparing shoe sizes
Celebrations	*make observations about the changing seasons - eg leaves turning different colours (Autumn) *explore light and dark using torches in soft play room *observe the change in weather outside in the garden - frost/ice etc and be able to learn associated vocabulary - frozen, frost, melt etc
Traditional Tales	*compare the strength and forces of different materials - eg sticks, straw and bricks in the 3 little pigs story *grow a bean for Jack and the beanstalk and learning associated vocabulary - shoot, leaves etc and draw their plant *learn to be increasingly independent as they get dressed and undressed; eg putting coats on and doing up zips, putting own shoes on *learn to be increasingly independent in meeting their own care needs eg using the toilet, washing and drying hands, brushing teeth
Journeys	*discuss boats in the water and learn about floating and sinking through water play *explore colour mixing using pipettes
Minibeasts	*grow various plants and vegetables in the garden and discussions about what plants need to be able to grow *use magnifying glasses to look closely and name parts (Minibeast small world play) *observe the real life cycle of frogs and also through watching caterpillars turn into butterflies *learn about healthy and unhealthy foods (The Very Hungry Caterpillar)
People Who Help Us	*observe the changing seasons *observe the changing effects on our bodies in hot weather *learn to be increasingly independent as they get dressed and undressed; eg putting coats on and doing up zips, putting their own shoes on *learn to be increasingly independent in meeting their own care needs eg using the toilet, washing and drying hands, brushing teeth

Reception Year

ELGs PSED Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. UW The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants.	ELGs UW The Natural World Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.
Children will:	
Term 1 – Marvellous Me	*learn names of body parts *explore the 5 senses *learn about the growth of a human from baby to adult, observing differences *identify physical similarities and differences between themselves and their peers *learn about the importance of healthy eating and dental hygiene *identify how our body changes as we grow *learn about how and why some animals hibernate *share knowledge about how to look after pets
	*identify and name different materials *investigate the properties of different materials *investigate insulation through hibernation investigation
	*observe changes across the four seasons – all about autumn
Term 2 – Once Upon a Time	*use the senses to explore pumpkins *explore light and dark (Diwali) *observe changes across the four seasons – all about winter
Term 3 – Space Explorers	*ask and answer questions about planets and stars and research information using a range of sources *discuss similarities and differences between Earth and a chosen planet *recreate the process of how craters are made using rocks and flour
	*investigate natural processes such as melting ice, travelling of light, shadows, magnets and materials
Term 4 - Roots, Shoots and Muddy Boots	*explore the natural world by making observations and drawings of rocks and fossils
	*grow cress and identify what the plants needs to grow *make observations and simple drawings of plants and flowers, identifying and naming the stem, roots, leaves, flower. *learn why vegetables are good for us *learn about the lifecycle and habitat of butterflies and frogs *explore a variety of vegetables using all 5 senses
	*observe changes across the four seasons – all about spring

Term 5 - Mad About Animals	*identify and name common animals *match animals with their young *find out how to look after a range of animals *learn about some animal habitats *use the 5 senses to describe animals Animal visitors in school for children to meet and touch.
Term 6 - Pirates, Mermaids and Under the Sea	*learn how to keep themselves safe and healthy in the summer *sort creatures which live in the sea and learn how they are adapted to this *identify and name sea creatures
	*observe changes across the four seasons – all about summer *investigate floating and sinking *learn about use of light in lighthouse (revisit)

In Year One the children will be taught to:

Knowledge		
Ongoing: *observe changes across the four seasons *observe and describe weather associated with the seasons and how day length varies * identify and name a variety of common wild and garden plants, including deciduous and evergreen trees growing in and around the school grounds		
Living Things *identify and describe the basic structure of a variety of common flowering plants, including trees *identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals *describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) * identify and name a variety of common animals that are carnivores, herbivores and omnivores <i>The children will investigate plants and animals in the school and local environment to consolidate and extend their understanding.</i>	Come Outside *identify and name a variety of common wild and garden plants, including deciduous and evergreen trees growing in and around the school grounds <i>By investigating materials in and around school, children will be taught to:</i> *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 * <i>Their exploration and understanding of materials will be extended through art and DT activities.</i>	Let's Play <i>Through exploration of toys, children will be taught to:</i> *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 <i>Their exploration and understanding of materials will be extended through DT activities</i>
Skills		
*Ask, with prompting, simple questions that can be tested, e.g. about plants growing in their habitat. *Offer ways of gathering the evidence to answer the question, e.g. by suggesting how to group everyday materials *Conduct, with support, simple tests, e.g. comparing the properties of different materials. *Examine objects to note key features, e.g. observe properties of materials. *Identify, with support, what needs to be recorded, e.g. recording changing day length. *Collect data, e.g. comparing and contrasting familiar plants. *Identify key findings from an enquiry, e.g. noting weather common to the different seasons. *Suggest answers to enquiry questions using data, e.g. describe how to group plants.		

In Year Two the children will be taught to:

Knowledge			
Animal, including Humans *notice that animals, including humans, have offspring which grow into adults *find out about and describe the basic needs of animals, including humans, for survival (water, food and air) *describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. *identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. <i>Children will conduct investigations into the effect of exercise on the body and the effect of micro-organisms (germs) on bread.</i>	Uses of everyday materials *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	Living Things and their Habitats *explore and compare the differences between things that are living, dead, and things that have never been alive *identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other *identify and name a variety of plants and animals in their habitats, including microhabitats *describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. <i>Children will use the school environment to investigate habitats.</i>	Plants *observe and describe how seeds and bulbs grow into mature plants *find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. <i>Children will grow beans.</i>
Skills			
*Ask simple questions that can be tested, e.g. about the local environment and how organisms depend on each other. *Suggest different ways of answering a question, e.g. testing changes to the human body when exercising. *Conduct a simple test, e.g. setting up comparative tests to show that plants need water and light. *Examine carefully, e.g. using a hand lens. *Draw and label diagrams, e.g. recording plants changing over time, starting from seed or bulb. *Collect data relevant to the answering of questions, e.g. seeing how plants in different conditions grow. *Identify and group key outcomes from an enquiry, e.g. describing conditions in different habitats and how these affect the numbers and types of organisms. *Answer enquiry questions using data and ideas, e.g. to help decide why certain animals and plants live in specific habitats.			

In Year Three the children will be taught to:

Knowledge				
Forces, focusing on Magnets *compare how things move on different surfaces *notice that some forces need contact between two objects, but magnetic forces can act at a distance *observe how magnets attract or repel each other and attract some materials and not others *compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials *describe magnets as having two poles *predict whether two magnets will attract or repel each other, depending on which poles are facing.	Animals, including Humans *identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat *identify that humans and some other animals have skeletons and muscles for support, protection and movement <i>This links closely to the PSHE unit on healthy eating and choices.</i>	Light *recognise that they need light in order to see things and that dark is the absence of light *notice that light is reflected from surfaces *recognise that light from the sun can be dangerous and that there are ways to protect their eyes *recognise that shadows are formed when the light from a light source is blocked by an opaque object *find patterns in the way that the size of shadows change. <i>This topic is carried out in Term 5 to maximise opportunities to explore shadows created by blocked sunlight.</i>	States of Matter *compare and group materials together, according to whether they are solids, liquids or gases *observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)	Plants *identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers *explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant *investigate the way in which water is transported within plants *explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
Skills				
*With support, develop relevant, testable questions, e.g. what happens to shadows when the light source moves. *Plan an enquiry, such as comparative or fair test, e.g. comparing how reflective different materials are. *Set up a comparative test, e.g. how far things move on different surfaces *Use various equipment, as instructed, e.g. data loggers *Use standard measurements when taking measurements, e.g. measuring distances between a light source and an object. *With prompting, gather and display evidence in various ways, e.g. comparing properties of solids, liquids and gases. *With prompting, draw and label diagrams, e.g. to show how muscles work in pairs. *With prompting, use tables to record evidence, e.g. recording how far a car travels on different surfaces. *Indicate findings from an enquiry that could be reported, e.g. relating to investigating which materials are magnetic. *With prompting, write a conclusion based on evidence, e.g. the size of shadows through the day. *Suggest how an investigation could be extended, e.g. suggesting creative uses for different magnets. *Recognise patterns that relate to scientific ideas, e.g. investigating the behaviour of magnets. *With support, use evidence to produce a simple conclusion, e.g. the effect of temperature on various substances.				

In Year Four the children will be taught to:

Knowledge				
Electricity *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.	Sound *identify how sounds are made, associating some of them with something vibrating *recognise that vibrations from sounds travel through a medium to the ear *find patterns between the pitch of a sound and features of the object that produced it *find patterns between the volume of a sound and the strength of the vibrations that produced it *recognise that sounds get fainter as the distance from the sound source increases. <i>During music lessons, children will consolidate their understanding of pitch and volume.</i>	Rocks and Soils *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. <i>Children will explore natural forms and clay through their art topic drawing inspiration from the sculptures of Henry Moore.</i>	Habitats *recognise that living things can be grouped in a variety of ways *explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment *recognise that environments can change and that this can sometimes pose dangers to living things. *construct and interpret a variety of food chains, identifying producers, predators and prey <i>Children will explore habitats in the school grounds and local area (coastal habitat).</i>	Animals, including Humans *describe the simple functions of the basic parts of the digestive system in humans *identify the different types of teeth in humans and their simple functions
Skills				
*Develop relevant, testable questions, e.g. based on observations of animals. *Plan investigations using different types of scientific enquiry, e.g. exploring various rocks by observing change over time, running comparative tests and conducting surveys. *Set up comparative and fair tests, e.g.. finding patterns in the sounds made by elastic bands of different thicknesses. *Use various equipment, as instructed, repeatedly and with care, e.g. rulers *Recognise the importance of using standard units and measures accurately. *Use various ways to record, group and display evidence, e.g. grouping and classifying various rocks. *Use words and diagrams to record findings, e.g. how habitats change during the year. *Use various ways to record evidence, e.g.. recording what happens to teeth when left in different liquids *Present findings either in writing or orally, e.g. answering questions about how humans digest food. *Write a conclusion based on evidence, e.g. materials electrical conductors are made of. *Use evidence to suggest further relevant investigations, e.g. making own instruments, using ideas about pitch and volume *Recognise patterns that relate to scientific ideas, e.g. finding out which materials make better earmuffs *Use evidence to produce a simple conclusion, e.g. the changes that occur when rocks are in water.				

In Year Five the children will be taught to:

Knowledge				
Materials – Properties and Changes *compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets *give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic *identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. *use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating *know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution *demonstrate that dissolving, mixing and changes of state are reversible changes *explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. <i>Irreversible changes in cooking are explored when making pizzas at Hartsdown in the DT topic.</i>	Light *recognise that light appears to travel in straight lines * use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye *explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes *use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	Electricity *associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit *compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches *use recognised symbols when representing a simple circuit in a diagram.	Living Things *describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird *describe the life process of reproduction in some plants and animals	Animals, including Humans *describe the changes as humans develop to old age <i>The PHSE unit of puberty, including human reproduction, is taught as part of this topic. Wherever possible, a visitor with a baby/young child is invited in for a Q & A session about changes since birth.</i>
Skills				
*With support, answer questions with evidence from different types of scientific enquiry, e.g. comparing life cycles of plants using change over time, surveys and secondary sources. *With prompting, identify and manage variables, e.g. when exploring the brightness of bulbs. *Following discussion of alternatives, select appropriate equipment, e.g. a thermometer. *Take measurements that are precise as well as accurate, e.g. the amount of sugar which can be dissolved in different temperatures of water. *Know how to process repeat readings, e.g. when investigating the behaviour of components in a circuit. *Start to use labelled diagrams to show more complex outcomes, e.g. demonstrating how we see objects. *With prompting, use various ways to record complex evidence, e.g. the behaviour of particles in different states of matter and when changing between states. *Use a line graph to record basic data, e.g. length and mass of a baby as it grows. *With support, display and present key findings from enquiries orally and in writing, e.g. suggesting reasons for similarities and differences between various animals. *With support, indicate why some results may not be entirely trustworthy, e.g. in relating brightness of bulb to voltage supplied. *With prompting, write a conclusion using evidence and identifying causal links, e.g. what makes a bulb shine more brightly. *Suggest further relevant comparative or fair tests, e.g. when testing materials for various properties to determine their suitability for an application. *Show how evidence supports a conclusion, e.g. researching gestation periods of various mammals and relating them to adult mass.				

In Year Six the children will be taught to:

Knowledge					
Earth and Space *describe the movement of the Earth, and other planets, relative to the Sun in the solar system *describe the movement of the Moon relative to the Earth *describe the Sun, Earth and Moon as approximately spherical bodies *use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky <i>This topic is taught in Term 1 in order to maximise opportunities to observe the sun's apparent movement across the sky.</i> <i>Geographical understanding about the Greenwich Meridian and time zones is taught within this topic.</i>	Animals, including Humans *recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function *describe the ways in which nutrients and water are transported within animals, including humans.	Forces *explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object *identify the effects of air resistance, water resistance and friction, that act between moving surfaces *recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect <i>Understanding of mechanisms will be taught through the DT Unit.</i>	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	Living Things *describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals *give reasons for classifying plants and animals based on specific characteristics.	Adaptation, Evolution and Inheritance *recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago *recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents *identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. <i>Children will take part in an Evolution workshop during a visit to Wildwood.</i>
Skills					
*Answer questions using evidence gathered from different types of scientific enquiry, e.g. describing the effects of gravity as a result of experiment, survey and secondary research. *Identify and manage variables, e.g. speed and sizes in falling parachutes. *Use appropriate equipment, such as meter rule, to take measurements, e.g. measuring the length and position of a shadow from an object throughout the day. *Consider how, by modifying instrument or technique, measurements can be improved, e.g. when recording the apparent movement of the sun. *Identify situations in which taking repeat readings will improve the quality of evidence, e.g. investigating the effect of gravity on a falling object. *Use labelled diagrams to show complex outcomes, e.g. relating specific adaptations of organisms to environmental factors. *Use various ways, as appropriate, to record complex evidence, e.g. in the construction of a key to aid plant identification. *Use line graphs to display complex data, e.g. time of day in relation to the position of a shadow. *Display and present key findings from enquiries orally and in writing, e.g. deciding how well classifications fit unfamiliar animals and plants. *In conclusions, indicate how trustworthy they are, e.g. when timing falling objects. *Write a conclusion using evidence and identifying causal links, e.g. investigating what makes a parachute fall quicker *Use evidence to suggest further comparative or fair tests that would develop the investigation, e.g. in the design of paper aeroplanes. *Identify how an idea is supported or refuted by evidence, e.g. selective breeding to produce animals or plants with desirable characteristics.					

