



Science		
Year group	Working scientifically <i>(processes and methods of science)</i>	Scientific content <i>(knowledge and conceptual understanding)</i>
N	<ul style="list-style-type: none"> • Talk about some of the things they have observed such as plants, animals, natural and found objects • Make observations of animals and plants • Make observations about changes of state e.g. when cooking – combining different ingredients, and then cooling or heating (cooking) them. Also melting (UTW DM) • Explore and talk about different forces they can feel (UTW DM) • Use equipment to support investigations e.g. magnifying glasses or a tablet with a magnifying app (UTW DM) • Talk about what they see (UTW DM) • Use new vocabulary to discuss their findings and ideas (UTW EP) 	<p>By the end of Nursery, the children will be able to:</p> <ul style="list-style-type: none"> • Plant seeds and care for growing plants (UTW DM) • Understand the key features of the life cycle of a plant and an animal (UTW DM) e.g. children to care for animals and take part in first-hand scientific explorations of animal life cycles, such as caterpillars or chick eggs. • Begin to understand the need to respect and care for the natural environment and all living things (UTW DM) • Talk about the differences between materials and changes they notice (UTW DM) • Explore how different materials sink and float (UTW DM) • Explore how you can shine light through some materials, but not others. Investigate shadows (UTW DM) • Draw children's attention to forces. For example, how the water pushes up when they try to push a plastic boat under it, how they can stretch elastic, snap a twig, but cannot bend a metal rod and magnetic attraction and repulsion (UTW DM) • Plant seeds and bulbs and observe growth and decay over time (UTW DM) • Observe an apple core going brown and mouldy over time- looking at growth and decay (UTW DM)
R	<p>DM= Development matters EP=Educational programmes ELG=Early Learning Goal CG=Curriculum Goal</p> <ul style="list-style-type: none"> • Asking questions based on observations • Observe and interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object and a boat floating on water (UTW DM) • Use and understand new vocabulary linked to the topic (UTW EP) • Describe what they see, hear and feel whilst outside through focused observations of the natural world (UTW DM) • Explore the natural world around them, making observations and drawing pictures of animals and plants (UTW ELG) 	<p>By the end of Reception, the children will be able to:</p> <ul style="list-style-type: none"> • Growing plants and watching them decay • 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 (UTW ELG and CG). • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter (UTW ELG) • Understand the effect of changing seasons on the natural world around them (UTW DM) • Look at how animals behave differently during different seasons (UTW DM) • Describe and comment on things they have seen whilst outside, including plants and animals (UTW DM) • Naming the plants and animals in the local environment and compare them (UTW DM) • Start to look at the weather and different seasons (UTW DM)
1	<p>Questioning</p> <ul style="list-style-type: none"> • Ask simple questions and recognise that they can be answered in different ways <p>Comparative & Fair Testing</p> <ul style="list-style-type: none"> • Perform simple tests • Experience different types of scientific enquiry including practical activities <p>Identifying classifying and grouping</p> <ul style="list-style-type: none"> • With help, sort and group objects • With help, notice patterns and relationships <p>Observing over time</p> <ul style="list-style-type: none"> • Observe changes over time <p>Research using secondary sources</p> <ul style="list-style-type: none"> • Ask people and use simple secondary sources to find answers <p>Pattern Seeking</p> <ul style="list-style-type: none"> • Use simple measurements and equipment to gather data, carry out simple tests, record data and discuss what has been found <p>Conclusion Record and communicate findings in a range of ways using simple language</p>	<p>By the end of Year 1, the children will be able to:</p> <p>Materials</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. <p>Seasonal changes</p> <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 <p>Plants and animals</p> <ul style="list-style-type: none"> • Name, identify, describe and compare a variety of common animals (and their structures) including fish, amphibians, reptiles, birds and mammals and make reference to: carnivores, herbivores and omnivores • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees, and describe their basic structure.



2	<p>Questioning</p> <ul style="list-style-type: none">• Ask simple questions and recognise that they can be answered in different ways <p>Comparative & Fair Testing</p> <ul style="list-style-type: none">• Perform simple tests• Experience different types of scientific enquiry including practical activities <p>Identifying classifying and grouping</p> <ul style="list-style-type: none">• Identify and classify• Use simple features to compare objects, materials and living things <p>Observing over time</p> <ul style="list-style-type: none">• Observe closely, using simple equipment <p>Research using secondary sources</p> <ul style="list-style-type: none">• Ask people and use simple secondary sources to find answers <p>Pattern Seeking</p> <ul style="list-style-type: none">• Gather and record data to help in answering questions <p>Conclusion</p> <ul style="list-style-type: none">• Use their observations and ideas to suggest answers to questions	<p>By the end of Year 2, the children will be able to:</p> <p>Everyday materials</p> <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. <p>Animals, including humans such as: <i>Mo Farah, Jessica Ennis Hill and Usain Bolt</i></p> <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) as well as describing the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. <p>Plants, living things and their habitats</p> <ul style="list-style-type: none">• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. Observe and describe how seeds and bulbs grow.• Explore and compare the differences between things that are living, dead, and things that have never been alive• Identify and name a variety of plants and animals in their habitats, including microhabitats• 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• 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.



<p>3</p>	<p>Questioning</p> <ul style="list-style-type: none"> Asking relevant questions and using different types of scientific enquiries to answer them <p>Comparative & Fair Testing</p> <ul style="list-style-type: none"> Recognise when a simple fair test is necessary and help decide how to set it up <p>Identifying classifying and grouping</p> <ul style="list-style-type: none"> Talk about criteria for grouping, sorting and classifying whilst using simple keys <p>Observing over time</p> <ul style="list-style-type: none"> Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Learn about new equipment such as data loggers <p>Research using secondary sources</p> <ul style="list-style-type: none"> Use straightforward scientific evidence to answer questions or to support their findings <p>Pattern Seeking</p> <ul style="list-style-type: none"> Identify differences, similarities or changes related to simple scientific ideas and processes With help, look for changes, patterns, similarities and differences to draw simple conclusions and answer questions <p>Conclusion</p> <ul style="list-style-type: none"> Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Find ways of improving what has been done 	<p>By the end of Key Stage 2, the children will be able to:</p> <p>Plants</p> <p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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</p> <p>Investigate the way in which water is transported within plants</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p> <p>Rocks</p> <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 <p>Forces (including magnets)</p> <ul style="list-style-type: none"> Compare how things move on different surfaces and 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 <p>Light</p> <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 whilst recognising that light from the sun can be dangerous Recognise that shadows are formed when the light from a light source is blocked by an opaque object and find patterns in the way that the size of shadows change <p>Animals, including humans</p> <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 <p>Sound</p> <ul style="list-style-type: none"> Identify how sounds are made, associating some of them with something vibrating through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it as well as volume and strength of vibrations. Recognise that sounds get fainter as the distance from the sound source increases. <p>Electricity including reference to: Thomas Edison</p> <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 <p>States of matter</p> <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. <p>Animals, living things and their habitats</p> <ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans
<p>4</p>	<p>Questioning</p> <ul style="list-style-type: none"> Use and answer questions With help, identify new questions that arise from data, making predictions within and beyond the data collected <p>Comparative & Fair Testing</p> <ul style="list-style-type: none"> Set up simple practical enquiries, comparative and fair tests Start to make decisions about the most appropriate type of scientific enquiry <p>Identifying classifying and grouping</p> <ul style="list-style-type: none"> Gather, record, classify and present data in a variety of ways to help in answering questions Using own data, make notes, draw simple tables, record and analyse data <p>Observing over time</p> <ul style="list-style-type: none"> Make systematic and careful observations and, where appropriate Make observations, deciding how long they should be for and what simple equipment might be used <p>Research using secondary sources</p>	<p>Electricity including reference to: Thomas Edison</p> <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 <p>States of matter</p> <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. <p>Animals, living things and their habitats</p> <ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans



	<ul style="list-style-type: none"> • Recognise when and how secondary sources can support answering questions <p>Pattern Seeking</p> <ul style="list-style-type: none"> • Identify patterns and relationships that occur and decide what data to use to collect them <p>Conclusion</p> <ul style="list-style-type: none"> • 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 new values, suggest improvements and raise further questions • Use relevant scientific language whilst discussing and communicating finding to different audiences 	<ul style="list-style-type: none"> • 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 • 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 <p>Earth and space, light</p> <ul style="list-style-type: none"> • Describe the Sun, Earth, and other planets, and Moon as approximately spherical bodies and the movement of each in relation to the solar system • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky • Recognise that light appears to travel in straight lines and explain that objects are seen because they give out or reflect light into the eye
5	<p>Questioning</p> <ul style="list-style-type: none"> • Explore ideas and raise different kinds of questions <p>Comparative & Fair Testing</p> <ul style="list-style-type: none"> • Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions • Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. <p>Identifying classifying and grouping</p> <ul style="list-style-type: none"> • Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. <p>Observing over time</p> <ul style="list-style-type: none"> • Choose the most appropriate equipment to make measurements and explain how to use it accurately • Decide how to record data from a choice of familiar approaches <p>Research using secondary sources</p> <ul style="list-style-type: none"> • Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact <p>Pattern Seeking</p> <ul style="list-style-type: none"> • Use results to identify when further tests and observations might be needed <p>Conclusion</p> <ul style="list-style-type: none"> • Report and present 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 	<ul style="list-style-type: none"> • 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 <p>Forces</p> <ul style="list-style-type: none"> • Explain the concept 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 <p>Properties and changes of materials</p> <ul style="list-style-type: none"> • Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • Demonstrate that dissolving, mixing and changes of state are reversible changes • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda <p>Electricity</p> <ul style="list-style-type: none"> • 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 <p>Evolution and inheritance</p>



6	<p>Questioning</p> <ul style="list-style-type: none">• Explore ideas and raise different kinds of questions <p>Comparative & Fair Testing</p> <p>Planning different types of scientific enquiries to answer questions, including recognising and</p> <ul style="list-style-type: none">• controlling variables where necessary• Use test results to make predictions to set up further comparative and fair tests• Make decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them <p>Identifying classifying and grouping</p> <ul style="list-style-type: none">• Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs <p>Observing over time</p> <ul style="list-style-type: none">• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate <p>Research using secondary sources</p> <ul style="list-style-type: none">• Identify scientific evidence that has been used to support or refute ideas or arguments <p>Pattern Seeking</p> <ul style="list-style-type: none">• Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time <p>Conclusion</p> <p>Report and present 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</p>	<ul style="list-style-type: none">• 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 <p>Living things and their habitats</p> <ul style="list-style-type: none">• Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird• Describe the life process of reproduction in some plants and animals• Describe 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 <p>Animals including humans</p> <ul style="list-style-type: none">• Describe the changes as humans develop to old age• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood• Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function• Describe the ways in which nutrients and water are transported within animals, including humans
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