



Science Progression of Skills

<i>Substantive Knowledge – (Know what)</i>				
	EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Plants	<ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. 	<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. • 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. • 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. 	<ul style="list-style-type: none"> • 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 micro-organisms, plants and animals. • Give reasons for classifying plants and animals based on specific characteristics.
<i>Disciplinary Knowledge (Think like)</i>				
Plants	<p>Explore what plants need to survive.</p> <p>Use all their senses in hands-on exploration of natural materials.</p> <p>Plant seeds and care for growing plants.</p> <p>Understand the key features of the life cycle of a plant and an animal.</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>Children will make observations</p>	<ul style="list-style-type: none"> ■ Observing closely, perhaps using magnifying glasses. (Y1) ■ Comparing and contrasting familiar plants. (Y1) ■ Describing how they were able to identify and group them (Y1) ■ Drawing diagrams showing the parts of different plants including trees. (Y1) ■ Keeping records of how plants have changed over time, for example the leaves falling off trees and buds opening. (Y1) ■ Comparing and contrasting what they have found out about different plants. (Y1) 	<ul style="list-style-type: none"> ■ Comparing the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser; ■ Discovering how seeds are formed by ■ Observing the different stages of plant cycles over a period of time; ■ Looking for patterns in the structure of fruits that relate to how the seeds are dispersed. ■ Observing how water is transported in plants, for example, by putting cut, white carnations into coloured water. <p>Observing how water travels up the stem to the flowers.</p>	<ul style="list-style-type: none"> ■ Using classification systems and keys. ■ Identifying some animals and plants in the immediate environment. ■ Researching unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.



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	<p>about plants discussing similarities and differences.</p>	<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, (Y2) ■ Observing similar plants at different stages of growth; (Y2) <p>Setting up a comparative test to show that plants need light and water to stay healthy. (Y2)</p>		
<p><i>Substantive Knowledge – (Know what)</i></p>				
<p>Animals</p>	<ul style="list-style-type: none"> • Talk about members of their immediate family and community. • Name and describe people who are familiar to them. • Recognise some environments that are different to the one in which they live. <p>Identify basic body parts.</p> <p>Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating.</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 is associated with each sense. • 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. • 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. 	<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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Disciplinary Knowledge (Think like)

Animals	<p>Compare and contrast animals living in other countries to animals in the uk.</p>	<ul style="list-style-type: none"> ■ Compare and contrast animals (humans) at first hand or through videos and photographs. (Y1) ■ Using their senses to compare different textures, sounds and smells. (Y1) ■ Describing how they identify and group them. (Y1) ■ Grouping animals according to what they eat. (Y1) ■ Observing, through video or first-hand observation and measurement, how different animals grow; (Y2) ■ Asking questions about what things animals need for survival suggesting ways to find answers to their questions. (Y2) 	<ul style="list-style-type: none"> ■ Comparing and contrasting the diets of different animals (including their pets). ■ Decide ways of grouping them according to what they eat. ■ Researching different food groups and how they keep us healthy. ■ Designing meals based on what they find out. ■ Identifying and grouping animals with and without skeletons. ■ Observing and comparing their movement. ■ Exploring ideas about what would happen if humans did not have skeletons ■ Comparing the teeth of carnivores and herbivores. (Y4) ■ Suggesting reasons for differences. (Y4) ■ Finding out what damages teeth and how to look after them. (Y4) ■ Drawing and discussing their ideas about the digestive system. (Y4) ■ Comparing them with models or images. 	<ul style="list-style-type: none"> ■ Observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times). ■ Asking pertinent questions. ■ Suggesting reasons for similarities & differences. ■ They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. ■ Observe changes in an animal over a period of time (for example, by hatching and rearing chicks). ■ Comparing how different animals reproduce and grow. ■ Researching the gestation periods other animals and comparing them with humans. ■ By finding out and recording the length and mass of a baby as it grows. ■ Exploring the work of scientists. (Y6) ■ Scientific research about the relationship between diet, exercise, drugs, lifestyle and health. (Y6)
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<i>Substantive Knowledge – (Know what)</i>				
Habitats	<ul style="list-style-type: none"> • 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 	<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 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 	<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 	<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
<i>Disciplinary Knowledge (Think like)</i>				
Habitats	Sort and classify minibeasts.	<ul style="list-style-type: none"> ■ Sorting and classifying things as to whether they are living, dead or were never alive. ■ Recording their findings using charts ■ Describing how they decided where to place things, ■ Exploring questions such as: ‘Is a flame alive? Is a deciduous tree dead in winter?’ ■ Talking about ways of answering their questions. ■ Constructing a simple food chain that includes humans (e.g. grass, cow, human); 	<ul style="list-style-type: none"> ■ Using and making simple guides or keys [sorting, grouping, comparing, classifying] to explore and identify local plants and animals. ■ Making a guide [sorting, grouping, comparing, classifying] to local living things. ■ Raising and answering questions based on their observations of animals. What they have found out about other animals that they have researched. 	<ul style="list-style-type: none"> ■ Using classification systems and keys. ■ Identifying some animals and plants in the immediate environment. Researching unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.



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		<ul style="list-style-type: none"> ▪ Describing the conditions in different habitats and micro-habitats (under log, on stony path, under bushes); Finding out how the conditions affect the number and type(s) of plants and animals that live there. 		
<i>Substantive Knowledge – (Know what)</i>				
Light	<ul style="list-style-type: none"> • Describe what they see, hear and feel whilst outside 		<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. 	<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. (Y5 - Properties and changes of materials) • 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.
<i>Disciplinary Knowledge (Think like)</i>				
Light			<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. 	<ul style="list-style-type: none"> ▪ Comparing the time of day at different places on the Earth through internet links and direct communication. ▪ Creating simple models of the solar system.



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			<ul style="list-style-type: none"> ■ Constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day. ■ Finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.
<i>Substantive Knowledge – (Know what)</i>			
<i>Electricity</i>			<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.
<i>Disciplinary Knowledge (Think like)</i>			
<i>Electricity</i>	Explore how things work		<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 ■ Systematically identifying the effect of changing one [thing] component at a time in a circuit. ■ Designing and making a set of traffic lights, a burglar alarm or some other useful circuit.



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			cannot be used to connect across a gap in a circuit.	
<i>Substantive Knowledge – (Know what)</i>				
<i>Space</i>	Know that we live on planet Earth.			<ul style="list-style-type: none"> • 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>Disciplinary Knowledge (Think like)</i>				
<i>Space</i>				<ul style="list-style-type: none"> ■ Comparing the time of day at different places on the Earth through internet links and direct communication. ■ Creating simple models of the solar system. ■ Constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day. ■ Finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.



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<i>Substantive Knowledge – (Know what)</i>				
<i>Sound</i>	Use all their senses in hands-on exploration.		<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 	
<i>Disciplinary Knowledge (Think like)</i>				
<i>Sound</i>			<ul style="list-style-type: none"> ■ Finding patterns in the sounds that are made by different objects such as saucerpan lids of different sizes or elastic bands of different thicknesses. ■ They might make ear muffs from a variety of different materials to investigate which provides the best insulation against sound. ■ They could make and play their own instruments by using what they have found out about pitch and volume. 	



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<i>Substantive Knowledge – (Know what)</i>			
Forces			<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
			<ul style="list-style-type: none"> • 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>Disciplinary Knowledge (Think like)</i>			
Forces			<ul style="list-style-type: none"> ■ Comparing how different things move and grouping them. ■ Raising questions and carrying out tests to find out how far things move on different surfaces. ■ Gathering and recording data to find answers to their questions. ■ Exploring the strengths of different magnets and finding a fair way to compare them. ■ Sorting materials into those that are magnetic and those that are not.
			<ul style="list-style-type: none"> ■ Exploring falling paper cones or cup-cake cases. ■ Designing and making [exploring] a variety of parachutes. ■ Carrying out fair tests to determine which designs are the most effective. ■ Exploring resistance in water by making and testing boats of different shapes. ■ Design and make artefacts that use simple levers, pulleys, gears and/or springs and explore their effects.



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			<ul style="list-style-type: none"> ▪ Looking 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. <p>Identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.</p>	
<p><i>Substantive Knowledge – (Know what)</i></p>				
<p>Material Properties and Changes</p>	<ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. • Talk about the differences between materials and changes they notice. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. <p>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. • 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 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. • Recognise some common conductors and insulators, and associate metals with being good conductors 	<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,



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Disciplinary Knowledge (Think like)				
Material Properties and Changes	<ul style="list-style-type: none"> • Explore collections of materials with similar and/or different properties. Investigate which materials would be more suitable to use when creating and constructing for a purpose. 	<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?’ – 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); – Observing closely, – Identifying and classifying the uses of different materials, and – Recording their observations. <p>Thinking about unusual and creative uses for everyday materials.</p>	<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). ■ Researching the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. ■ Observing and recording evaporation over a period of time, such as a puddle in the playground or washing on a line. ■ Investigating the effect of temperature on washing drying or snowmen melting. ■ Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT. This unit provides an ideal opportunity for using data logging equipment to detect/measure and compare temperatures. 	<ul style="list-style-type: none"> ■ Carry out tests to answer questions such as ‘Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?’ ■ Compare materials in order to make a switch in a circuit. ■ Observing and comparing the changes that take place, for example, when burning different materials or baking bread or cakes. ■ Researching and discussing how chemical changes have an impact on our lives, for example cooking. ■ Discuss [research] the creative use of new materials such as polymers, super-sticky and super-thin materials.
Substantive Knowledge – (Know what)				
Rocks			<ul style="list-style-type: none"> • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. 	



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			<ul style="list-style-type: none"> • 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><i>Disciplinary Knowledge (Think like)</i></p>				
<p>Rocks</p>			<ul style="list-style-type: none"> ■ Observing rocks, including those used in buildings and gravestones. ■ Exploring how and why they might have changed over time. ■ Using a hand lens or microscope to help them. ■ 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. ■ Explore how fossils are formed. ■ Explore different soils. ■ Identify similarities and differences between them. ■ 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. 	