

## Science Progression Map



### WORKING SCIENTIFICALLY

Foundation Stage	Key Stage One	Lower Key Stage Two	Upper Key Stage Two
<p><b>Nursery</b> Understand 'why' questions Talk about what they see, using a wide vocabulary Explore how things work</p> <p><b>Reception</b> Learn new vocabulary Ask questions to find out more and to check what has been said to them Articulate their ideas and thoughts in well-formed sentences Describe events in some detail Use talk to work out problems and organise thinking and activities Explain how things work and why they might happen Use new vocabulary in different contexts</p> <p><b>ELG</b> Make comments about what they have heard and ask questions to clarify their understanding.</p>	<p>Ask simple questions and recognise that they can be answered in different ways including use of scientific language from the national curriculum Use simple equipment to observe closely including changes over time Perform simple comparative tasks Identify, group and classify Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns Gather and record data to help in answering questions including from secondary sources of information</p>	<p>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 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 his/her findings</p>	<p>Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables where necessary Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Use test results to make predictions to set up further comparative and fair tests 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 Describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time) using evidence from a range of sources Group and classify things and recognise patterns</p>

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### BIOLOGY

	Foundation Stage	Key Stage One	Lower Key Stage Two	Upper Key Stage Two
<b>Animals including humans</b>	<p><b>Nursery</b> Make healthy choices about food, drink, activity and tooth brushing</p> <p><b>Reception</b> Know and talk about the different factors that support their overall health and wellbeing: regular physical activity, healthy eating, toothbrushing, sensible amounts of 'screen time', having a good sleep routine and being a safe pedestrian <i>Aut 1 - Using Our Senses 'smell station' &amp; Dentist Tuff Tray</i> <i>Sum 1 - Who's poo is this? Experiment &amp; Finding Fossils Tuff Tray</i></p> <p><b>ELG</b> Explore the natural world around them, making observations and drawing pictures of animals</p>	<p><b>Cycle 1</b> Understand that animals, including humans, have offspring which grow into adults. 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.</p> <p><b>Cycle 2</b> Identify, name, draw and label the basic parts of the human body/skeleton and which part of the body is associated with each sense 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)</p>	<p><b>Cycle 1</b> 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> <p><b>Cycle 2</b> 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.</p>	<p><b>Cycle 1</b> Describe the changes as humans develop to old age. Draw a timeline to indicate stages of growth and development in humans. They should learn about the changes to the body in puberty. Understand the gestation periods of some animals and comparing it to the gestation period of a human.</p> <p><b>Cycle 2</b> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Dissect a heart to explore the circulatory system 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</p>

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<p><b>Living things and their habitats</b></p>	<p><b>Nursery</b> Begin to understand the need to respect and care for the natural environment and all living things Understand the key features of the life cycle of an animal</p> <p><b>Reception</b> Explore the natural world around them. Describe what they see, hear and feel while they are outside. Recognise some environments that are different to the one in which they live. <i>Aut 2 - Animal Adaption - Blubber Experiment</i> <i>Spr 1 - Recycle Station (human influence on climate change)</i> <i>Spr 2 - Observe the lifecycle of a butterfly and a frog</i></p>	<p><b>Cycle 1</b> 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 a simple food chain, and identify and name different sources of food</p> <p><b>Cycle 2</b> Please see 'Plants' below</p>	<p><b>Cycle 1</b> 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 environment. Consider the difference between vertebrates and invertebrates. Observe and consider how and why the local environment changes during the year and the impact of this on animals and plants. Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things. Explore how humans have an impact in our local area (positive and negative) on the environment and suggest ways the school could help to protect the environment for our local wildlife.</p> <p><b>Cycle 2</b> Please see 'Plants' below</p>	<p><b>Cycle 1</b> 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 animals. Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms and animals Give reasons for classifying animals based on specific characteristics. Explore and use classification keys to help group, identify and name a variety of living things in their local environment compared to the wider environment. Study the life's work of David Attenborough and his impact on the animal kingdom. Observe changes in an animal over time (rearing chicks) and consider the different types of reproduction, (asexual and sexual)</p> <p><b>Cycle 2</b> Describe the life process of reproduction in some plants and animals</p>
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## Science Progression Map

<p><b>Living things and their habitats (continued)</b></p>	<p><b>ELG</b> 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.</p>			<p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms and plants. Give reasons for classifying plants based on specific characteristics Explore and use classification keys to help group, identify and name a variety of living things in their local environment compared to the wider environment. Explore how humans have an impact on the world's environment (positive and negative)</p>
<p><b>Plants</b></p>	<p><b>Nursery</b> Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant. <i>Sum 1 - Plant cress seeds and care for them</i></p> <p><b>Reception</b> <i>Spr 2 - Observe the lifecycle of sunflower</i></p>	<p><b>Cycle 1</b> 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 Grow beans and record in a daily diary. Change the variables to see the effects.</p> <p><b>Cycle 2</b> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p>	<p><b>Cycle 2</b> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p>	

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<p><b>Plants (continued)</b></p>	<p><b>ELG</b> Explore the natural world around them, making observations and drawing pictures of plants</p>	<p>Identify and describe the basic structure of a variety of common flowering plants, including trees. Explore the plants and trees found in the school grounds and in the local area.</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 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 Plant flowers in the school garden and observe them throughout the year.</p>	
<p><b>Seasons</b></p>	<p><b>Reception</b> Understand the effect of changing seasons on the natural world around them. <i>Aut 1 - Scavenger Hunt</i> <i>Aut 2 - Snow Day</i></p> <p><b>ELG</b> Understand some important processes and changes in the natural world around them, including the seasons</p>	<p><b>Cycle 2 ONLY</b> Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies.</p>		
<p><b>Evolution and Inheritance</b></p>				<p><b>Cycle 2 ONLY</b> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p>

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<b>Evolution and Inheritance (continued)</b>				<p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <p>Understand that characteristics are passed from parents to their offspring.</p> <p>Explore how variation in offspring over time can make animals more or less able to survive in different environments.</p> <p>Explore the life and works of Charles Darwin and his work on evolution.</p>
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## Science Progression Map



### CHEMISTRY

	Foundation Stage	Key Stage One	Lower Key Stage Two	Upper Key Stage Two
<b>Everyday Materials</b>	<p><b>Nursery</b> Use all their senses in hands-on exploration of natural materials Explore collections of materials with similar and/or different properties.</p> <p><b>Reception</b> <i>Spr 1 - What makes the best boat? Experiment</i></p>	<p><b>(uses of)</b></p> <p><b>Cycle 1</b> Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p> <p><b>Cycle 2</b> 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>	<p><b>Cycle 1</b> Please see 'Rocks' below</p> <p><b>Cycle 2</b> Please see 'States of Matter' below</p>	<p><b>(properties and changes of)</b></p> <p><b>Cycle 1 ONLY</b> 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 Recognise 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</p>

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<p><b>Everyday Materials (continued)</b></p>				<p>associated with burning and the action of acid on bicarbonate of soda. Study the work of chemists who create new materials such as, Ruth Benerito and Spencer Silver. Consider how these new materials have impacted our lives today</p>
<p><b>Rocks</b></p>			<p><b>Cycle 1 ONLY</b> 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>	
<p><b>States of Matter</b></p>	<p><b>Nursery</b> Talk about the differences between materials and changes they notice. <i>Spr 1 - Introducing Ice Experiment</i></p> <p><b>Reception</b> <i>Aut 2 - Can we speed up/slow down melting? Experiment</i></p>		<p><b>Cycle 2 ONLY</b> 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</p>	



## Science Progression Map

<b>States of Matter (continued)</b>	<b>ELG</b> Understand some important processes and changes in the natural world around them, including changing states of matter.			
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## Science Progression Map

### PHYSICS

	Foundation Stage	Key Stage One	Lower Key Stage Two	Upper Key Stage Two
<b>Forces and magnets</b>	<p><b>Nursery</b> Explore and talk about different forces they can feel. <i>Sum 2 - Explore how things sink and float and carry out an investigation.</i> <i>Use magnets to find buried treasure and explore magnetic and non-magnetic materials and discuss the feeling the magnet has upon a magnetic material.</i></p>	<p>To understand that all objects shall fall to earth and that gravity causes this. To begin to understand that when jumping, gravity makes us come back down. To begin to understand what friction is. To understand what effect friction has on moving objects. To understand that wind is a force and what effect it has on things. To understand that direction and force of wind changes.</p>	<p><b>Cycle 1 ONLY</b> Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance 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>	<p><b>Cycle 1 ONLY</b> 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. Explore the work of Galileo Galilei and Isaac Newton and their theory of gravitation.</p>
<b>Electricity</b>	<p>Identify objects in school that use electricity.</p>		<p><b>Cycle 2 ONLY</b> Identify common appliances that run on electricity. Understand how to stay safe when working with electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p>	<p><b>Cycle 2 ONLY</b> 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</p>

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			<p>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.          Understand the difference between current and voltage.</p>	<p>Use recognised symbols when representing a simple circuit in a diagram.          Learn how to wire a plug.</p>
<p><b>Sound</b></p>	<p>Explore the different sounds instruments make.</p>		<p><b>Cycle 1 ONLY</b>          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.          Explore music around the world; specifically looking at how</p>	

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<p><b>Earth and Space</b></p>	<p>Can name the planets in the solar system. Beginning to describe and compare them to Earth.</p>			<p><b>Cycle 1 ONLY</b> 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. Create a simple model of the solar system. Describe how the Sun is a star at the centre of the solar system and it has eight planets. Understand the moon is a celestial body that orbits a planet. Consider the history of understanding the solar system and explore how Scientists such as, Ptolemy and Copernicus have fed into our knowledge today. Consider how and why structures like Stonehenge were used as astronomical clocks in previous centuries. Study early Chinese astronomy and how they used it for timekeeping.</p>
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## Science Progression Map



<p><b>Light</b></p>	<p>Explore shadows and what is needed to make them.</p>		<p><b>Cycle 2 ONLY</b>                  Recognise that he/she needs 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 eyes                  Recognise that light from the sun can be dangerous and that there are ways to protect eyes                  Find patterns in the way that the size of shadows change.                  Explore what happens when light reflects off reflective surfaces.                  Look for, and measure shadows.                  Explore how shadows are formed and what might cause the shadows to change.                  Investigate the way light behaves (light sources, reflection and shadows) and observe patterns between light sources and shadows.</p>	<p><b>Cycle 2 ONLY</b>                  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.                  Investigate and make predictions about the way light behaves, (light sources, reflection and shadows)</p>
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