



## Progression of Skills in Science at MPS



### Intent

Science teaching at Mickleover Primary School aims to develop the children's sense of curiosity and understanding about the world around them. They will learn, through a wide range of science enquiries, the skills of working scientifically. These investigative skills will be embedded in each topic and be taught alongside knowledge and understanding of biology, chemistry and physics. The progression in science skills document which follows, shows how each science skill is revisited and built on as the children move through school. In addition to this, children build on and develop prior knowledge, understanding and vocabulary by revisiting topics. In the Early Years Foundation Stage, 'Understanding of the World' is taught within cross-curricular topics which cover the Early Learning Goals. In key stage one, science is taught through cross-curricular topics which have clear science content within them and cover the science objectives from the 2014 National Curriculum year group science programmes of study and from the key stage one working scientifically document.

In key stage two, science is taught in weekly discreet science lessons. Each science topic covers one area from the year group programme of study within the 2014 National Curriculum. Science enquiries are embedded in each topic which build the children's investigative skills. Links will frequently be made between science and other curriculum areas, particularly reading and writing. Such activities may include, reading skills lessons which teach new science vocabulary or knowledge and writing tasks such as a science information text or a report on an investigation.

### Implementation

Learning activities in science, are differentiated to meet the needs of the children. Where necessary, learning is supported by scaffolded activities and differentiated resources, additional adult guidance, peer-support and pre-teaching of vocabulary. More able learners are stretched through challenging, open-ended questions and research activities. Science vocabulary is built upon through school, as the children revisit topic areas. It is displayed in the classroom and pre-taught where necessary. Through revisiting topic areas and building in frequent opportunities for science enquiry, children will build up their skills and depth of knowledge. The curriculum is enriched with many further opportunities to develop the children's science knowledge, interest and enthusiasm. This includes extra-curricular science clubs, the Rolls Royce design challenge, visits to the Toyota plant, a zoo, a wildlife park, the 'Think tank' science discovery museum, Rolls Royce workshop days and theme weeks. Assessment takes place through questioning, discussion/teacher observations during practical investigations and various forms of written assessment. A summative assessment grid is updated half-termly and these are passed on to the child's next class teacher.

### Impact

Science attainment and progress through school is recorded on assessment grids and on the pupil tracker. Assessments are passed to the next class teacher to ensure progress in all groups of children from one year to the next and to the next key stage. End of key stage national assessments in 2019 show that we are above the national average, with 85% at ARE at the end of year 2 and 88% at ARE at the end of year 6.

In addition to this, the impact of science teaching can be seen in the working scientifically skills that children build-up throughout Mickleover Primary school, which equip them for secondary school science, where they will build on these science enquiries, vocabulary, knowledge and skills related to them. At every stage through school, children will feel confident in their science knowledge and enquiry skills, will be excited about science and will show that they are actively curious to learn more.



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Strand	EYFS	Key Stage 1		Key Stage 2			
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Grouping and classifying</b>	Children know about similarities and differences in relation to places, objects, materials and living things.	Sort and classify objects into groups with help.	Sort, group and classify materials based on simple physical properties such as flexibility and texture.	Sort, group and classify materials based on appearance and physical properties such as magnetism and permeability.	Sort, group and classify materials according to whether they are solids liquids or gases.  Use classification keys to group, identify and name.	Sort, group and classify materials independently, including using physical and chemical properties such as thermal conductivity and solubility Design simple tests to help them to classify materials.	Use and develop classification keys to group, identify and name.
<b>Research</b>	Enjoys an increasing range of books. Knows that information can be retrieved from books and computers.	Find out information from pictures.	Use simple texts to find information.	Begin to use a range of secondary sources to find information.	Use a range of secondary sources, including the internet, to find information and key facts.	Begin to recognise which secondary sources will be useful to research ideas.	Recognise which secondary sources will be useful to research ideas and decide the most suitable way to present their research.
<b>Comparative &amp; Fair Testing</b>	Looks closely at similarities, differences, patterns and change.	Perform simple comparative tests from ideas suggested to them, 'Which child has the biggest hand span?'	With help, set up simple comparative tests.  Begin to discuss ideas about how to find things out.	With help, set up simple comparative and fair tests.	Set up simple comparative and fair tests.  Begin to explain what makes a test fair.	Plan a fair test to answer a question.  Begin to recognise and control variables	Plan a fair test to answer questions, including recognising and controlling variables with some guidance.
<b>Observing, Measuring &amp; Pattern Seeking</b>	They make observations of animals and plants and explain why some things occur, and talk about changes.	With guidance, identify patterns over time, such as seasonal weather patterns.  Observe closely using simple equipment such	Begin to use their observations to answer questions.  Observe closely using an increasing range of simple equipment such	Begin to see simple patterns in results, such as, all of the magnetic objects are metals.  Use a range of equipment	Begin to make links between two variables, such as, between the pitch of the drum and its size.  Use a range of equipment	Begin to identify patterns and relationships in data.  Taking accurate measurements using a range of scientific	Analyse data to identify patterns and relationships.  Taking measurements with accuracy and precision; selecting and using a range of scientific equipment.

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		<p>as magnifying glasses.</p> <p>Make some simple measurements of length using standard and non-standard units.</p>	<p>as magnifying glasses, bug viewers and cameras.</p> <p>Make some simple measurements using standard units.</p>	<p>including data loggers.</p> <p>Make careful measurements using standard units</p>	<p>including data loggers.</p> <p>Make accurate measurements using standard units.</p> <p>Make a series of observations and measurements over time, such as, the size of a puddle on the playground.</p>	<p>equipment, such as forcemeters, data loggers and thermometers.</p> <p>Make a series of observations and measurements over time, such as, those during reversible and irreversible changes.</p>	<p>Make a series of observations and measurements over time, such as, heart rate over the course of a day.</p>
<b>Questioning &amp; Predicting</b>	<p>They talk about the features of their own immediate environment &amp; how environments might vary from one another.</p>	<p>Ask simple questions about the world around them with support.</p>	<p>Begin to recognise that questions can be answered in different ways.</p>	<p>Ask their own questions about the world around them.</p> <p>With guidance, make predictions about what might happen.</p>	<p>Ask questions related to observations.</p> <p>Begin to suggest ways of answering their questions.</p> <p>Begin to predict what might happen.</p>	<p>Ask relevant questions and plan scientific enquiries to test them.</p> <p>Begin to use scientific knowledge and understanding to predict what might happen.</p>	<p>Ask relevant questions and select the most appropriate scientific enquiries to test them, making decisions about what to observe and what measurements to take</p> <p>Use scientific knowledge and understanding to predict what might happen.</p>
<b>Recording &amp; Concluding</b>	<p>They develop their own narratives and explanations by connecting ideas or events.</p>	<p>Draw simple pictures about what they see and do.</p> <p>To say what they found out.</p>	<p>Talk about what they found out and whether it was what they expected.</p> <p>Record what they found out using simple scientific vocabulary from a</p>	<p>With guidance, record findings using simple scientific vocabulary, drawings, writing, diagrams and tables.</p>	<p>Record findings using simple scientific vocabulary, drawings, labelled diagrams, keys, bar charts, and tables.</p>	<p>Record findings using scientific vocabulary, drawings, labelled diagrams, keys, bar charts, tables and line graphs.</p> <p>Use the results of an investigation to draw conclusions.</p>	<p>Select the most appropriate ways to record findings using scientific vocabulary, drawings, labelled diagrams, keys, bar charts, tables and line graphs.</p>

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			science display or word bank.	Talk about what they have found out and what they would change.	With guidance, draw simple conclusions.		Explain conclusions, referring to results and showing understanding of scientific ideas.
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### Animals, Including Humans

Strand	EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
<b>Structure</b>		Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1)	Identify that humans and some other animals have skeletons and muscles for support, protection and movement. (Y3)  Many animals have skeletons to support their bodies and protect vital organs. Animals without internal skeletons have adapted other ways to support themselves. Bones work with muscles to help movement. (Y3)	Identify and name the main parts of the circulatory system, and explain the functions of the heart, blood vessels and blood. (Y6)
<b>Reproduction/ Lifecycle</b>	Shows some understanding that good practices with regard to exercise, eating, sleeping and hygiene can contribute to good health. (ELG)  Eats a healthy range of foodstuffs and understands the need for variety in food. (ELD)	Notice that animals, including humans, have offspring which grow into adults. (Y2)		Describe the changes as humans develop from birth to old age. (Y5)
<b>Growth &amp; Nutrition</b>	Knows some basic things that make them unique, and can talk about some of the similarities and differences in relation to friends or family. (ELG)	Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) (Y2)  Describe the importance for humans of exercise, eating the	Identify that animals, including humans, need the right types of nutrition, and that they cannot make their own food; they get nutrition from what they eat. (Y3)  Describe the simple functions of the basic parts of the digestive system in humans. (Y4)	Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6)  Describe the ways in which nutrients and water are transported within animals, including humans. (Y6)

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	Developing an understanding of growth, decay and changes over time. (ELG)	right amounts of different types of food, and hygiene. (Y2)	Identify the different types of teeth in humans and their simple functions, (Y4)	
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### Living Things and their Habitats

Strand	EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
<b>Lifecycles</b>	<p>Comments and asks questions about aspects of their familiar world such as the place they live or the natural world.</p> <p>Can talk about some of the things that they have observed such as plants, animals, natural and found objects.</p>	<p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals) (Y1)</p> <p>Explore and compare the differences between things that are living, dead, and things that have never been alive. (Y2)</p> <p>Notice that animals including humans, have offspring which grow into adults. (Y2)</p>		<p>Describe the differences in lifecycles of a mammal, an amphibian, an insect and a bird. (Y5)</p> <p>Describe the life process of reproduction in some plants and animals. (Y5)</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. (Y6)</p>
<b>Habitats &amp; Adaptations</b>	<p>Developing an understanding of growth, decay and changes over time.</p> <p>Show care for living things and the environment.</p> <p>Looks closely at similarities and differences, patterns and change.</p>	<p>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. (Y2)</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2)</p> <p>Describe how animals obtain their food from plants and other animals, using a simple food chain, and identify and name different sources of food. (Y2)</p>	<p>Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4)</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4)</p>	<p>Recognise that living things have changes over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6)</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Y6)</p>

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<b>Classification</b>	<p>Identify and name a variety of common plants (Y1)</p> <p>Identify and name lots of common animals including fish, amphibians, reptiles, birds and mammals. (Y1)</p> <p>Identify and name different plants and animals in their habitats, including micro-habitats. (Y2)</p>	<p>Recognise that living things can be grouped in a variety of ways. (Y4)</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4)</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, plants and animals. (Y6)</p> <p>Give reasons for classifying plants and animals based on specific characteristics. (Y6)</p>
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### Plants

Strand	EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
<b>Structure of Plant</b>	Comments and asks questions about aspects of their familiar world such as the place they live or the natural world.	Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1)	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. (Y3)	
<b>Reproduction / lifestyle</b>	Can talk about some of the things that they have observed such as plants, animals, natural and found objects.	Observe and describe how seeds and bulbs grow into mature plants. (Y1/2)	Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3)	Describe the life process of reproduction in some plants and animals. (Y5)
<b>Growth &amp; Nutrition</b>	Developing an understanding of growth, decay and changes over time.  Show care and concern for living things and the environment.	<p>Plants need warmth, light and water to grow and survive. (Y1)</p> <p>Find out and describe how plants need water. Light and a suitable temperature to grow and stay healthy. (Y1/2)</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. (Y3)</p> <p>Investigate the way in which water is transported within plants. (Y3)</p>	



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### Materials

Strand	EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
<b>Describing Materials &amp; their Properties</b>	<p>Uses simple tools to effect changes to materials.</p> <p>Handles tools, objects, construction and malleable materials safely and with increasing control.</p>	<p>Understand the difference between an object and the material from which it is made. (Y1)</p> <p>Identify and name lots of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1)</p> <p>Describe the simple physical properties of a variety of everyday materials. (Y1)</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y2)</p> <p>Identify and compare how different materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard are used because of their properties (Y2)</p>	<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3)</p> <p>Compare and group materials together, according to whether they are solids, liquids or gases. (Y4)</p>	<p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. (Y5)</p> <p>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)</p> <p>Understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. (Y5)</p>
<b>Changing Materials</b>		<p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (Y2)</p>	<p>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). (Y4)</p> <p>Identify the part played by evaporation and condensation in</p>	<p>Demonstrate that dissolving, mixing and changes of state are reversible changes. (Y5)</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible (Y5)</p>



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<b>Mixing and Separating Materials</b>			the water cycle and associate the rate of evaporation with temperature. (Y4)	
			Recognise that soils are made from rocks and organic matter. (Y3) Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3)	Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. (Y5)

### Physics

Strand	Lower Key Stage 2	Upper Key Stage 2
<b>Light</b>	<p>Recognise that they need light in order to see things and that dark is the absence of light. (Y3)</p> <p>Understand that light is reflected from surfaces. (Y3)</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3)</p> <p>Recognise that shadows are formed when the light from a light source is blocked by a solid object. (Y3)</p> <p>Find patterns in the way that the size of shadows change. (Y3)</p>	<p>Recognise that light appears to travel in straight lines. (Y6)</p> <p>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. (Y6)</p> <p>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. (Y6)</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. (Y6)</p>
<b>Forces</b>	<p>Compare how things move on different surfaces. (Y3)</p> <p>Understand that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3)</p> <p>Observe how magnets attract or repel each other and attract some materials and not others. (Y3)</p> <p>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. (Y3)</p> <p>Describe magnets as having two poles. (Y3)</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3)</p>	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5)</p> <p>Identify the effects of air resistance, water resistance and friction that act between moving surfaces. (Y5)</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5)</p>
<b>Electricity</b>	<p>Identify common appliances that run on electricity. (Y4)</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. (Y4)</p> <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. (Y4)</p>	<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. (Y6)</p> <p>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. (Y6)</p>





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	<p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. (Y4)</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4)</p>	<p>Use recognised symbols when representing a simple circuit in a diagram. (Y6)</p>
<b>Sound</b>	<p>Identify how sounds are made, associating some of them with something vibrating. (Y4)</p> <p>Recognise that vibrations from sounds travel through a medium to the ear. (Y4)</p> <p>Find patterns between the pitch of a sound and features of the object that produced it. (Y4)</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it. (Y4)</p> <p>Recognise that sounds get fainter as the distance from the sound source increases. (Y4)</p>	