



Curriculum:

Progression in Science



INTENT - The Science Curriculum

Science teaching at our school aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of Science, today and for the future.

At Hunton and Arrathorne, scientific enquiry skills are embedded in each topic the children study and these topics are revisited and developed throughout their time at school. Topics, such as Plants, are taught in Key Stage One and studied again in further detail throughout Key Stage Two. This model allows children to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this procedural knowledge into the long-term memory.

All children are encouraged to develop and use a range of skills including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and built up, and effective questioning to communicate ideas is encouraged. Concepts taught should be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

IMPLEMENTATION - Progression in Science

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically	<ul style="list-style-type: none"> □ Plan and think ahead about how they might explore objects □ Talk about predictions □ Make links in their learning □ Look carefully at objects and changes □ Review their learning 	<ul style="list-style-type: none"> • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions 		<ul style="list-style-type: none"> • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables <ul style="list-style-type: none"> □ reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes <ul style="list-style-type: none"> □ using straightforward scientific evidence to answer questions or to support their findings. 		<ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests <ul style="list-style-type: none"> □ reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments 	
Plants	<ul style="list-style-type: none"> □ demonstrate how to plant and take care of a seed know that different seeds grow different plants identify and name plants and trees of interest to them label key parts of a plant using scientific vocabulary 	<ul style="list-style-type: none"> • Identify and name a variety of common wild and garden plants. • Identify and describe the basic structure of common flowering plants including trees. 	<ul style="list-style-type: none"> • Observe and describe how seeds and bulbs grow into mature plants • Find out and describe how plants need water, light and 	<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 			

			<p>temperature to stay healthy</p> <p><input type="checkbox"/></p>		
<p>Animals, Humans & Living Things</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name a wide and varied range of animals. <input type="checkbox"/> Talk about what animals eat 	<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name common animals 	<ul style="list-style-type: none"> <input type="checkbox"/> Notice that animals, including humans, 	<ul style="list-style-type: none"> <input type="checkbox"/> 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 	<ul style="list-style-type: none"> <input type="checkbox"/> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

	<ul style="list-style-type: none"> <input type="checkbox"/> Identify and name animal body parts <input type="checkbox"/> Identify and name parts of the human body 	<p>including fish, amphibians, reptiles, birds and mammals.</p> <p>Identify and name a variety of animals</p> <ul style="list-style-type: none"> <input type="checkbox"/> animals that are carnivores, herbivores and omnivores. <p>Describe and identify the structure of common animals</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identify name, draw and label the basic parts of the human body and say which part of the body is associated with which sense. <ul style="list-style-type: none"> <input type="checkbox"/> 	<ul style="list-style-type: none"> <input type="checkbox"/> have offspring which grow into adults <p>Find out about and describe the basic needs of animals</p> <ul style="list-style-type: none"> <input type="checkbox"/> Explore and compare the differences between living and dead things. <p>Identify most living things need habitats and describe how habitats are suited to animals and plants.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identify and name a variety of plants and animals in their habitats. <p>Describe how animals obtain their food, using the idea of a simple food chain.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> identify that humans and some other animals have skeletons and muscles for support, protection and movement <input type="checkbox"/> recognise that living things can be grouped in a variety of ways <input type="checkbox"/> explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment <input type="checkbox"/> recognise that environments can change and that this can sometimes pose dangers to living things <input type="checkbox"/> describe the simple functions of the basic parts of the digestive system in humans <input type="checkbox"/> identify the different types of teeth in humans and their simple functions <p>construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<ul style="list-style-type: none"> <input type="checkbox"/> describe the life process of reproduction in some plants and animals <input type="checkbox"/> describe the changes as humans develop to old age <input type="checkbox"/> 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 <input type="checkbox"/> give reasons for classifying plants and animals based on specific characteristics <input type="checkbox"/> identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood <input type="checkbox"/> recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function <input type="checkbox"/> describe the ways in which nutrients and water are transported within animals, including humans
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Materials	<ul style="list-style-type: none"> <input type="checkbox"/> experiment with a range of materials for different purposes <input type="checkbox"/> Know the effects of water on different materials <input type="checkbox"/> Identify and name common materials <input type="checkbox"/> Choose materials for a purpose 	<ul style="list-style-type: none"> <input type="checkbox"/> Distinguish between an object and the material from which it is made <input type="checkbox"/> Identify and name a variety of everyday materials <input type="checkbox"/> Describe the simple physical properties of a variety of everyday materials 	<ul style="list-style-type: none"> <input type="checkbox"/> Identify and compare the suitability of a variety of everyday materials <input type="checkbox"/> Find out how the shapes of solid objects can be made by twisting, stretching, bending and squashing. 	<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 	<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
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		<ul style="list-style-type: none"> <input type="checkbox"/> Compare and group together a variety of everyday materials based on their physical properties. 			<ul style="list-style-type: none"> <input type="checkbox"/> demonstrate that dissolving, mixing and changes of state are reversible changes <input type="checkbox"/> 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
Seasonal Changes	<ul style="list-style-type: none"> • name the seasons • experience and discuss seasonal changes that occur to trees, plants, animals and weather 	<ul style="list-style-type: none"> <input type="checkbox"/> observe changes across the 4 seasons observe and describe weather associated with the seasons and how day length varies 			
Rocks					<ul style="list-style-type: none"> <input type="checkbox"/> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties <input type="checkbox"/> describe in simple terms how fossils are formed when things that have lived are trapped within rock <input type="checkbox"/> recognise that soils are made from rocks and organic matter

Light			<ul style="list-style-type: none"> <input type="checkbox"/> 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 <input type="checkbox"/> recognise that light from the sun can be dangerous and that there are ways to protect their eyes <input type="checkbox"/> 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"> <input type="checkbox"/> 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 <input type="checkbox"/> use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
Forces			<ul style="list-style-type: none"> <input type="checkbox"/> compare how things move on different surfaces <input type="checkbox"/> notice that some forces need contact between 2 objects, but magnetic forces can act at a distance <input type="checkbox"/> observe how magnets attract or repel each other and attract some materials and not others <input type="checkbox"/> 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 2 poles <input type="checkbox"/> predict whether 2 magnets will attract or repel each other, depending on which poles are facing 	<ul style="list-style-type: none"> <input type="checkbox"/> 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

Sound			<ul style="list-style-type: none"> <input type="checkbox"/> identify how sounds are made, associating some of them with something vibrating <input type="checkbox"/> recognise that vibrations from sounds travel through a medium to the ear <input type="checkbox"/> find patterns between the pitch of a sound and features of the object that produced it <input type="checkbox"/> find patterns between the volume of a sound and the strength of the vibrations that produced it <input type="checkbox"/> recognise that sounds get fainter as the distance from the sound source increases 	
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Electricity			<ul style="list-style-type: none"> <input type="checkbox"/> identify common appliances that run on electricity <input type="checkbox"/> construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers <input type="checkbox"/> 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 <input type="checkbox"/> recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit <input type="checkbox"/> recognise some common conductors and insulators, and associate metals with being good conductors 	<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
Evolution & Inheritance				<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
Earth & Space				<ul style="list-style-type: none"> <input type="checkbox"/> describe the movement of the Earth and other planets relative to the sun in the solar system <input type="checkbox"/> describe the movement of the moon relative to the Earth <input type="checkbox"/> describe the sun, Earth and moon as approximately spherical bodies
				<ul style="list-style-type: none"> <input type="checkbox"/> use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

<p>Progression in Vocabulary</p>		<p>question answer observe observing equipment identify classify sort diagram chart map data compare contrast describe biology chemistry physics group record</p>	<p>research relevant questions, scientific enquiry, comparative and fair test, systematic, careful observation, accurate measurements equipment thermometer, data logger data gather, record, classify, present record drawings, labelled diagrams, keys, bar charts, tables, oral and written explanations, conclusion, predictions, differences, similarities, changes, evidence, improve, secondary sources</p>	<p>plan, variables, measurements, accuracy, precision, repeat readings record data scientific diagrams, labels, classification keys, tables, scatter graphs, bar graph and line graphs, predictions, further comparative and fair test, report and present conclusions, causal relationships, explanations, degree of trust, oral and written display and presentation evidence support, refute ideas or arguments, identify, classify and describe, patterns, systematic, quantitative measurements</p>
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IMPLEMENTATION - Progression in Disciplinary Knowledge

	<u>Answering scientific questions</u>	<u>Using apparatus and measuring</u>	<u>Presenting scientific data to draw conclusions</u>	<u>Development of scientific knowledge over time</u>
<u>KS1</u>	Asking simple questions. Identifying and classifying.	Gathering and recording data. Observing closely using simple equipment.	Using their observations to suggest answers to question.	
<u>Lower KS2</u>	Using different types of scientific enquiry to answer questions. Setting up fair tests and make predictions.	Take accurate measurements using standard units, use a range of equipment inc. thermometers.	Recording findings using bar charts, keys, tables, labelled diagrams. Draw conclusions. Make predictions and suggest improvements.	Use scientific evidence to support findings.
<u>Upper KS2</u>	Planning different types of scientific enquiries. Recognising and controlling variables.	Taking measurements with increasing accuracy and precision. Taking repeated readings.	Scatter graphs, line graphs, causal relationships. Degree of trust in results.	Identifying scientific evidence used to support or refute ideas or arguments.

IMPLEMENTATION – WHOLE SCHOOL

	YEAR A						YEAR B					
	Au 1	Au 2	Sp 1	Sp 2	Su 1	Su 2	Au 1	Au 2	Sp 1	Sp 2	Su 1	Su 2
Y1 & Y2	Animals, Humans & Living Things		Inspired by Science...	Seasonal Change	Plants		Materials		Inspired by Science... <i>(Including changes of matter)</i>	Animals	Plants	
Y3 & Y4	Animals, Humans & Living Things		Inspired by Science...	Forces	Plants		Materials	Rocks	Inspired by Science...	Electricity	Light	Sound
Y5 & Y6	Animals, Humans & Living Things		Inspired by Science...	Forces	Evolution and Inheritanc		Materials		Inspired by Science...	Electricity	Light	Earth & Space
Visits, Visitors & Stimulus	Y1-6 Foxglove Covert Visit				Y1-4 Harlow Ca	rr	Y1-6 Life Centre / Eureka				Y1-6 STEM Visit	

IMPLEMENTATION - Rationale

We want our children to love Science! As a result, we place a high level importance on the subject. Children are taught science in smaller groups. The long term plan for science allows children to gain a greater depth of knowledge over time. At the start of the topic teachers make explicit links where the children have covered that topic before; drawing on our curriculum progression document. Teachers use low-stakes quizzes and check-ins to ensure facts are kept in the long term memory.

Scientific enquiry skills are developed throughout the units. We are committed to ensuring that science is as hands-on and interactive as possible; as such lots of resources are new and suitable for purpose. We have developed characters to link with the key scientific enquiry skills – these are displayed in every classroom and referred to explicitly when a particular scientific enquiry skill is taught. This continuation of skills means that children are able to build upon the use of them in each session.

Children are given ‘Science Shirts’ which take the place of laboratory coats. These are taken by the children throughout the school and are a way of recording key vocabulary – this also helps children see where they have developed skills significantly in the past.

To ensure the children see the value of science in everyday life, we plan visits which are at the heart of our community. We use local scientists to inspire and talk to the children, for example electricians, nurses and engineers; we use local places of interest for example Brimham Rocks when studying ‘Rocks’ and our local nature reserve ‘Foxglove Covert’ when finding out about animals. We know that linking science to our community helps raise the profile of the subject.

Our long term plan is carefully organised – often the whole school teaches the same theme in science but with the key progression document in mind. As a result, topics are celebrated at the end and children can see links between what they have learnt in the past, now and what they will learn in the future. Other topics such as ‘Rocks’ and ‘Light’ are particularly carefully positioned to align with the history and Religious Education curriculum.

IMPLEMENTATION – EYFS

Why do we teach Science? Why do we teach it the way we do?

At Hunton & Arrathorne Primary School our Science Curriculum intends to allow our children to explore their understanding of the world through thinking creatively. Our children have real-life and practical experiences to investigate. This supports children to develop their knowledge and skills for life. In Reception we use both the indoor and outdoors environments to support the teaching and learning of Science. The staff regularly provide new materials and arrange experiences for the children to explore and investigate. The children are encouraged to use their senses when exploring natural and man made materials in the 'Investigation' areas in Reception.

What do we teach? What does this look like?

At our school, the local area and our school grounds are at the heart of our Science curriculum. The children explore the seasons, nature, plants and materials. Throughout half termly topics such as Animals, Seasons, Ourselves, Growing Healthy Lifestyles and materials the children have opportunities to observe, explore and question their experiences.

What will this look like? By the time children leave our EYFS they will able to:

Communication & Language

- Make comments about what they have heard and ask questions to clarify their understanding.

Personal, Social & Emotional Development

- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.

Knowledge and Understanding of the World

- Explore the natural world around them, making observations and drawing pictures of animals and plants.

- 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.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

IMPACT

We aim for all of our children to leave us as scientists- they should have an excellent understanding of scientific concepts and facts. They should also develop key scientific enquiry skills which are built upon progressively throughout their time at our school. Impact is measured through science journals which the pupils carry with them from Y1-Y6. We record the attainment and progress impact on our school tracker. We celebrate science through whole school displays which share the progress children make across aspects of science and celebrate how science is a part of life in our school.

However, more-so than data, we strive for the impact of our science teaching to be that our children love science. They are inspired by visits, visitors and the application of science into real-life contexts. They can appreciate how scientists have changed the world for the better and have a rich enthusiasm to explore and wonder. Through visits and visitors we aim for the children to not only see themselves as scientists, but also consider careers in science in the future.