Hunton & Arrathorne Community Primary School

Curriculum Document: 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	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.	Ask simple questions about the world around them and recognise that questions can have different answers. Observe closely using their senses and simple equipment (e.g., magnifying glass). Perform simple tests with support, focusing on exploring and noticing changes. Identify and classify objects or living things by obvious features. Use their observations and ideas to suggest possible answers to questions. Gather and record simple data (e.g., drawings, tally charts) to help answer questions.	Ask more detailed questions and understand that some questions require different types of scientific enquiry to answer. Observe carefully using simple equipment with more accuracy (e.g., rulers, thermometers). Plan and perform simple tests fairly, controlling some variables with guidance. Identify and classify objects or living things using more detailed features and sorting criteria. Use observations and ideas to explain answers to questions with reasoning. Gather and record data using a wider range of methods (e.g., tables, charts) to help answer questions.	Ask relevant scientific questions and explore different types of scientific enquiries to find answers. Set up simple practical enquiries and comparative tests with guidance. Make careful and systematic observations; take accurate measurements using standard units and simple equipment like rulers or thermometers. Gather, record, and classify data in basic ways such as charts and tables to help answer questions. Record findings using simple scientific language, drawings, labelled diagrams, and keys. Begin to report findings through oral explanations and simple written descriptions. Use results to draw simple conclusions, make basic predictions, and suggest simple improvements. Identify differences, similarities, or changes related to scientific ideas and processes. Use straightforward scientific evidence to answer questions or support findings.	Ask more detailed and relevant scientific questions and select appropriate enquiry types to answer them. Independently set up practical enquiries, including fair tests, controlling variables. Make systematic and careful observations; take accurate measurements using a wider range of equipment including thermometers and data loggers. Gather, record, classify, and present data in varied formats such as bar charts and tables to help answer questions. Record findings using scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Report findings including oral and written explanations, displays, or presentations of results and conclusions. Use results to draw conclusions, make predictions for new values, suggest improvements, and raise further questions. Identify differences, similarities, or changes related to scientific ideas and processes with increasing understanding. Confidently use straightforward scientific evidence to answer questions and support findings.	Plan different types of scientific enquiries to answer questions, including recognizing and controlling variables where necessary. Take accurate measurements using a range of scientific equipment, increasing accuracy and precision; take repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar graphs. Use test results to make predictions and set up further comparative and fair tests. Report findings from enquiries with conclusions, causal relationships, and explanations; present these orally and in writing (including displays and presentations). Identify and discuss scientific evidence used to support or refute ideas or arguments.	Independently plan a variety of scientific enquiries to answer complex questions, including controlling variables effectively. Take precise and accurate measurements using a wide range of scientific equipment, consistently taking repeat readings to ensure reliability. Record data and results in detailed and complex formats such as scatter graphs and line graphs, alongside diagrams, classification keys, and tables. Use test results confidently to make predictions, design further comparative and fair tests, and refine hypotheses. Present and report findings from enquiries, including detailed conclusions, explanations of causal relationships, and evaluation of the trustworthiness of results in various formats (oral, written, displays). Critically evaluate scientific evidence used to support or refute ideas or arguments.

IMPLEMENTATION - Progression in Disciplinary Knowledge

	Answering scientific questions	Using apparatus and measuring	Presenting scientific data to draw conclusions	Development of scientific knowledge over time
KS1	Asking simple questions. Identifying and classifying.	Gathering and recording data. Observing closely using simple equipment.	Using their observations to suggest answers to question.	
Lower KS2	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.
Upper KS2	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 – Long Term Plan

	YEAR A						YEAR B					
	Autumn		Spring		Summer		Autumn		Spring		Summer	
Year 1	Animals including humans Seasonal Changes		Materials	Inspired by Science Seasonal Changes	Plants Seasonal Changes		Animals Seasonal Changes		Materials	Inspired by Science Seasonal Changes	Plants Seasonal Changes	
Year 2	Animals including humans	Living things and their habitats	Uses of everyday materials	Inspired by Science	Plants		Animals including humans	Living things and their habitats	Uses of everyday materials	Inspired by Science	Plants	
Year 3/4	Animals including humans	Living things and their habitats.	States of Matter	Inspired by Science	Electricity	Sound	Animals including humans	Forces and Magnets	Rocks and Soils	Inspired by Science	Light	Plants
Year 5/6	Animals including humans	Living things and their habitats	Evolution and Inheritance	Inspired by Science	Electricity	Light	Animals including humans	Living things and their habitats	Earth and Space	Inspired by Science	Properties and changes of materials	Forces
Visits, Visitors & Stimuli	Autumnal Walk		Brimham Rocks	Life Centre, Newcastle			Foxglove Covert – Local Nature Reserve			Scientist Visits		

IMPLEMENTATION – Progression in Sticky Learning

Year 1				Year 2				
Autumn: Animals including humans	Spring 1: Materials	Spring 2: Inspired by Science	Summer: Plants	Autumn 1: Animals including humans	Autumn 2: Living things and their habitats	Spring 1: Everyday Materials	Spring 2: Inspired by Science	Summer: Plants
Sticky Learning: - Know whether an animal is a fish, amphibian, reptile, bird or mammal. - Know whether an animal is an herbivore, carnivore or omnivore. - Identify, draw and label basic parts of the human body.	Sticky Learning: - Distinguish between an object and the material from which it is made. - Identify and name a variety of everyday materials. - Describe simple properties of everyday materials.	Sticky Learning: - Know how to ask simple questions. - Use observations to reach a conclusion.	Sticky Learning: - Identify and name a variety of common wild and garden plants. - Identify the basic parts of a flowering plant / tree. - Describe the function of each part of a plant.	Sticky Learning: - Know that animals including humans have offspring which grow into adults. - Know the basic things animals/humans need to survive.	Sticky Learning: - Know what a habitat is and describe how a habitat is suited to an animal. - Be able to describe a simple food chain.	Sticky Learning: - Know how suitable an everyday material would be for a job or a purpose. - Know how the shapes of solid objects can be changed by squashing, bending, twisting or stretching.	Sticky Learning: - Know how to ask simple questions. - Use observations to reach a conclusion. - Observe closely using scientific equipment.	Sticky Learning: - Describe how seeds and bulbs grow into plants. - Investigate and know how plants need water, light and warmth to grow.
Vocabulary: - mammal, reptile, amphibian, carnivore, herbivore, omnivore	Vocabulary: - properties, material, opaque, transparent, absorbent, non-absorbent	Vocabulary: - question, test, watch	Vocabulary: - evergreen, weeds, plants, root, shoot, petal, stem	Vocabulary: - offspring, reproduce, energy, air, temperature	Vocabulary: - habitat, food chain, producer, predator, prey	Vocabulary: - property, material, purpose, solid, object	Vocabulary: - equipment, measure, record	Vocabulary: - nutrients, absorb, energy, warmth, light

Year 3/4											
Year A						Year B					
Autumn 1: Animals including humans	Autumn 2: Living things and their habitats	Spring 1: States of Matter	Spring 2: Inspired by Science	Summer 1: Electricity	Summer 2: Sound	Autumn 1: Animals including humans	Autumn 2: Forces and Magnets	Spring 1: Rocks and Soils	Spring 2: Inspired by Science	Summer 1: Light	Summer 2: Plants
Sticky Learning: - Describe the basic parts of the digestive system. - Know the names of the different types of teeth and their function. - Make and explain a variety of food chains using prey, predator and producer.	Sticky Learning: - Classify living things. - Group living things in a variety of ways. - Recognise that environment scan change and this van sometimes pose danger to living things.	Sticky Learning: - Compare and group materials into solids, liquids and gases. - Know that some materials change state when heated or cooled. - Describe condensation and evaporation in the water cycle.	Sticky Learning: - Know how to make a prediction. - Know how to make simple measurements. - Know how to reach a conclusion.	Sticky Learning: - Construct a simple electrical circuit, identifying and naming its parts. - Know the purpose of a switch in a circuit. - Recognise some common conductors and insulators and associate metals with being good conductors.	Sticky Learning: - Know how sounds are made. - Recognise that vibrations from sounds travel through a medium to the ear.	Sticky Learning: - Know the purpose of a human skeleton. - Know a wider variety of skeletal parts.	Sticky Learning: - Describe magnets as having two poles. - Know why magnets attract or repel each other. - Predict whether two magnets will repel or attract each other.	Sticky Learning: - Compare and group together different types of rocks based on their appearance and properties. - escribe how fossils are formed.	Sticky Learning: - Know how to make a prediction. - Know how to make simple measurements. - Know how to reach a conclusion.	Sticky Learning: - Know that light is reflected from surfaces. - know why shadows are formed.	Sticky Learning: - Identify and describe the functions of different parts of flowering plants. - Know the way in which water is transported in plants. - Explain the life cycle of the flowering plant.
Vocabulary: - incisor, molar, pre-molar, canine, oesophagus, intestine	Vocabulary: - classification, vertebrate, invertebrate, flowering, non-flowering	Vocabulary: - solid, liquid, gas, condensation, evaporation, particles	Vocabulary: - accurate measurements, observe, conclude, predict	Vocabulary: - appliance, series circuit, component, conductor, insulator	Vocabulary: - vibrate, volume, insulation, sound wave, sound source, pitch	Vocabulary: - carbohydrate, fat, protein, dairy, skeleton, muscle, relax, contract	Vocabulary: - friction, resistance, attract, repel, North/South Pole	Vocabulary: - rock, material, igneous, sedimentary, metamorphic	Vocabulary: - accurate measurements, observe, conclude, predict	Vocabulary: - reflect, transluscent, retina, pupil, refract	Vocabulary: - dispersal, germination, root hair, nutrient, pollination

Year 5/6											
Year A						Year B					
Autumn 1: Animals including humans	Autumn 2: Lining things and their habitats	Spring 1: Evolution and Inheritance	Spring 2: Inspired by Science	Summer 1: Electricity	Summer 2: Light	Autumn 1: Animals including humans	Autumn 2: Lining things and their habitats	Spring 1: Earth and Space	Spring 2: Inspired by Science	Summer 1: Properties and changes of materials	Summer 2: Forces
Sticky Learning: - Identify and name the main parts of the human circulatory system. - Know the main functions of the heart, blood and blood vessels. - Know the impact of diet, exercise, drugs and lifestyle on the body.	Sticky Learning: - Know how micro-organisms, plants and animals are classified into broad groups based on common characteristics. - Explain how you have classified living things into groups.	Sticky Learning: - Know that fossils provide information about living things from millions of years ago. - Explain how animals and plants are adapted to suit their environment. - Explain how adaptation may lead to evolution.	Sticky Learning: - record data of results of increasing complexity. - set up fair tests considering which variables must stay the same/change. - Use scientific evidence to support or refute evidence.	Sticky Learning: - Use recognised symbols when representing a simple circuit in a diagram - Know that you can affect the brightness of a lamp based on the number of volts or cells used.	Sticky Learning: - Explain how light travels. - Explain why shadows have the same shape as the objects that cast them.	Sticky Learning: - Know the different stages of a human life cycle. - Know the changes in humans as they develop to old age. - Know the physical and emotional changes which take place during puberty.	Sticky Learning: - Know how the life cycles of mammals, amphibians, insects and birds are different. - Describe the life process of reproduction in a plant and animals.	Sticky Learning: - Describe the movement of the earth and other planets in the solar system in relation to the sun. - Know the earth's rotation can explain day and night. - Describe the earth, sun and moon as approximate spherical bodies.	Sticky Learning: - record data of results of increasing complexity. - set up fair tests considering which variables must stay the same/change. - Use scientific evidence to support or refute evidence.	Sticky Learning: - Use a wider range of properties to compare and group materials (magnetisms, conductivity, solubility). - Know how solids, liquids and gases could be separated by filtering, sieving and evaporating. - Understand the difference between reversible and irreversible change.	Sticky Learning: - Know the affects of air resistance, water resistance and friction on a moving object. - Know that unsupported objects fall towards earth because of gravity.
Vocabulary: - circulatory system, vessels, arteries, veins, capillaries, oxygenated, deoxygenated.	Vocabulary: - micro-organisms, funghi, microbes, dichotomous	Vocabulary: - evolution, inheritance, variation, selective breeding, adaptation, natural selection	Vocabulary: - data, fair test, comparative, variables, evidence	Vocabulary: - symbol, device, battery, cell, voltage.	Vocabulary: - distortion, beam, ray, shadow, spectrum, prism.	Vocabulary: - embryo, adolescent, hormones, genes, DNA, gestation, reproduction.	Vocabulary: - naturalist, asexual, sexual, pollination, fertilisation.	Vocabulary: - solar system, rotate, seasons, orbit, axis, spherical.	Vocabulary: - data, fair test, comparative, variables, evidence	Vocabulary: - magnetism, conductivity, solubility, reversible, irreversible, states of matter.	Vocabulary: - water resistance, air resistance, gravity, friction, force meter.

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 such as 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 a 'Rocks' and 'Light' are particularly carefully positioned to align with the history and Religious Education curriculum.

IMPLEMENTATION – A CODIFIED APPROACH TO SCIENCE

<table>
<tr>
<td>Science lessons begin with all children putting on their science shirt which show previous taught vocabulary.
 </td>
<td>A specific retrieval and vocabulary activity based on previously taught content, either from the current or previous unit, introduces the lesson.
</td>
<td>Looking at the front sheet and placing the lesson in the sequence.
 </td>
<td>Use the science characters to focus the children's attention on the specific scientific skill.
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</tr>
<tr>
<td>Teach the lesson following the science scheme of work.
</td>
<td>Reflection activity – work is recorded in big books and should showcase a sample of all pupils' work
-It could be linking back to the SC1 characters
-It could be adding vocabulary to science shirts.
 </td>
<td colspan="2">Are we giving enough time to 'read as scientists?'
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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.

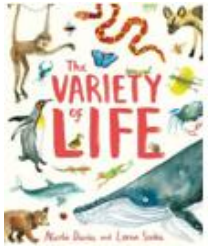
Knowledge and Understanding of the World

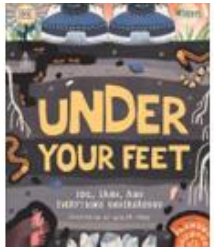
- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

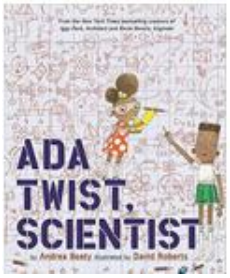
IMPLEMENTATION – Reading as Scientists…

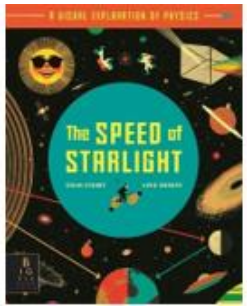
As Lifelong Readers, we want to inspire our children to ‘read as scientists’. We have a carefully planned and sequenced reading spine to further engage the children and provide them with high-quality texts in-line with their current topic in Science.

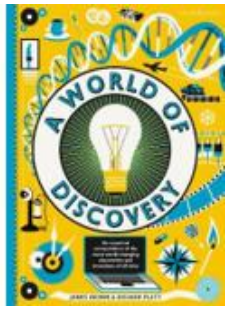
Please see a sample of our core texts for Science.











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.