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.<br><br>Talk about predictions<br>Make links in their learning.<br><br>Look carefully at objects and changes.<br><br>Review their learning. | Ask simple questions about the world around them and recognise that questions can have different answers.<br><br>Observe closely using their senses and simple equipment (e.g., magnifying glass).<br><br>Perform simple tests with support, focusing on exploring and noticing changes.<br><br>Identify and classify objects or living things by obvious features.<br><br>Use their observations and ideas to suggest possible answers to questions.<br><br>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.<br><br>Observe carefully using simple equipment with more accuracy (e.g., rulers, thermometers).<br><br>Plan and perform simple tests fairly, controlling some variables with guidance.<br><br>Identify and classify objects or living things using more detailed features and sorting criteria.<br><br>Use observations and ideas to explain answers to questions with reasoning.<br><br>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.<br><br>Set up simple practical enquiries and comparative tests with guidance.<br><br>Make careful and systematic observations; take accurate measurements using standard units and simple equipment like rulers or thermometers.<br><br>Gather, record, and classify data in basic ways such as charts and tables to help answer questions.<br><br>Record findings using simple scientific language, drawings, labelled diagrams, and keys.<br><br>Begin to report findings through oral explanations and simple written descriptions.<br><br>Use results to draw simple conclusions, make basic predictions, and suggest simple improvements.<br><br>Identify differences, similarities, or changes related to scientific ideas and processes.<br><br>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.<br><br>Independently set up practical enquiries, including fair tests, controlling variables.<br><br>Make systematic and careful observations; take accurate measurements using a wider range of equipment including thermometers and data loggers.<br><br>Gather, record, classify, and present data in varied formats such as bar charts and tables to help answer questions.<br><br>Record findings using scientific language, drawings, labelled diagrams, keys, bar charts, and tables.<br><br>Report findings including oral and written explanations, displays, or presentations of results and conclusions.<br><br>Use results to draw conclusions, make predictions for new values, suggest improvements, and raise further questions.<br><br>Identify differences, similarities, or changes related to scientific ideas and processes with increasing understanding.<br><br>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.<br><br>Take accurate measurements using a range of scientific equipment, increasing accuracy and precision; take repeat readings when appropriate.<br><br>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar graphs.<br><br>Use test results to make predictions and set up further comparative and fair tests.<br><br>Report findings from enquiries with conclusions, causal relationships, and explanations; present these orally and in writing (including displays and presentations).<br><br>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.<br><br>Take precise and accurate measurements using a wide range of scientific equipment, consistently taking repeat readings to ensure reliability.<br><br>Record data and results in detailed and complex formats such as scatter graphs and line graphs, alongside diagrams, classification keys, and tables.<br><br>Use test results confidently to make predictions, design further comparative and fair tests, and refine hypotheses.<br><br>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).<br><br>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 1/2** | Living Things and their Habitats (Y2)<br><br>Seasonal Change | | Inspired by Science<br><br>Seasonal Change | | Plants (Y1/2)<br><br>Seasonal Change | | Materials (Y1/2)<br><br>Seasonal Change | | Inspired by Science<br><br>Seasonal Change | | Animals including Humans (Y1/2)<br><br>Seasonal Change | |
| **Year 3** | Animals including Humans (Y3) | Forces and Magnets (Y3 | Rocks and Soils (Y3) | Inspired by Science | Light (Y3) | Plants (Y3) | Animals including Humans (Y3) | Forces and Magnets (Y3 | Rocks and Soils (Y3) | Inspired by Science | Light (Y3) | Plants (Y3) |
| **Year 4/5** | Animals including Humans (Y4/5) | | Materials (Y5) | Inspired by Science | Earth and Space (Y5) | Electricity (Y4) | Living Things and their Habitats (Y4/5) | | States of Matter (Y4) | Inspired by Science | Sound (Y4) | Forces (Y5) |
| **Year 6** | Animals including Humans (Y6) | Living Things and their Habitats (Y6) | Evolution and Inheritance (Y6) | Inspired by Science | Light (Y6) | Electricity (Y6) | Animals including Humans (Y6) | Living Things and their Habitats (Y6) | Evolution and Inheritance (Y6) | Inspired by Science | Light (Y6) | Electricity (Y6) |
| **Visits, Visitors & Stimuli** | Autumnal Walk | | Brimham Rocks | Life Centre, Newcastle | | Botanical Garden | Foxglove Covert – Local Nature Reserve | | | Scientist Visits | | |

# IMPLEMENTATION – Progression in Sticky Knowledge

| | YEAR A | | | | | |
|---|---|---|---|---|---|---|
| | Autumn | | Spring | | Summer | |
| Year 1/2 | <u>Living Things and their Habitats (Y2)</u><br>Explain a simple food chain – **using the terms producer, prey and predator.**<br>Identify a range of plants and animals and their habitats, including micro-habitats.<br><u>Seasonal Change</u><br>Know and identify some changes which take place in Autumn. | | <u>Inspired by Science</u><br>Know how to ask simple questions.<br>Observe closely using **scientific equipment.**<br>Use observations to reach a conclusion.<br><u>Seasonal Change</u><br>Know and identify some changes which take place in Spring. | | <u>Plants (Y1/2)</u><br>Know the name of some common plants and trees.<br>Know the name of three parts of a plant.<br>**Know that plants need water, light and warmth to grow.**<br>**Know the name of six parts of a flowering plant.**<br><u>Seasonal Change</u><br>Know and identify some changes which take place in summer. | |
| Year 3 | <u>Animals including Humans (Y3)</u><br>Know that animals, including humans, need the right types of nutrition.<br>Know that animals, and some other animals, have skeletons and muscles for support protection and movement. | <u>Forces and Magnets (Y3</u><br>Know that magnets have two poles.<br>Know that magnet may repel or attract based on the two poles closest to each other. | <u>Rocks and Soils (Y3)</u><br>Know that rocks can be compared and grouped together by appearance or properties.<br>Know that fossils are formed when things that have lived are trapped within rock.<br>Know that soils are made from rocks and organic matter. | <u>Inspired by Science</u><br>Know how to make a prediction.<br>Know how to take simple measurements.<br>Know how to reach a conclusion. | <u>Light (Y3)</u><br>Know how light is formed.<br>Know that shadows are formed when an object blocks a light source. | <u>Plants (Y3)</u><br>Know and describe the functions of different parts of flowering plants.<br>Know the requirements of plants for life and growth.<br>Know how water is transported within plants.<br>**Know why flowering plants need the flower to play a part in their life cycle.** |
| Year 4/5 | <u>Animals including Humans (Y4/5)</u><br>Know the names and position of molars, canines, incisors and premolars.<br>Know the simple functions of the digestive system in humans.<br>Know how to construct and interpret a food chain.<br>**Know the changes as humans develop to old age.** | | <u>Materials (Y5)</u><br>Know how to compare and group together materials based on their properties.<br>Know the difference between reversible and irreversible change and **give examples.**<br>Know 3 / **4** different ways of separating materials. | <u>Inspired by Science</u><br>Record findings in bar charts, tables etc.<br>Know how to use evidence to make conclusions.<br>**Know how to measure liquid, temperature and weight.** | <u>Earth and Space (Y5)</u><br>Know how the Earth and other planets move relative to the sun.<br>Know how the moon moves relative to the Earth.<br>Know how to explain day and night based on the Earth's rotation and **be able to explain the apparent movement of the sun across the sky.** | <u>Electricity (Y4)</u><br>Know 3/**6** common appliances which run on electricity.<br>Know the components needed to make a simple electrical circuit.<br>Know the difference between a complete and incomplete circuit and **be able to suggest ways to fix an incomplete circuit.**<br>**Know some common conductors and insulators.** |
| Year 6 | <u>Animals including Humans (Y6)</u><br>Know how the circulatory system works.<br>Know the key organs within the human body.<br>Know how diet and exercise can impact on body. | <u>Living Things and their Habitats (Y6)</u><br>Know how to classify plants and animals based on specific characteristics.<br>Know that living things can be classified groups depending on characteristics, similarities and differences. | <u>Evolution and Inheritance (Y6)</u><br>Know how animals are adapted to suit their environment.<br>Know how plants are adapted to their environment.<br>Know what features may be inherited or acquired. | <u>Inspired by Science</u><br>Know how to take repeated readings and why this is important.<br>Know how to control variables.<br>Know how to create a fair test. | <u>Light (Y6)</u><br>Know that light appears to travel in straight lines.<br>Know that objects can be seen because they give out or reflect light into the eye.<br>Know that light travels from light sources to our eyes, or from a light source to an object and then our eye. | <u>Electricity (Y6)</u><br>Know how different variables can effect the function of certain components (e.g. brightness of a lamp, volume of a buzzer)<br>Know how to use recognised symbols to represent components from a circuit. |

| | YEAR B | | | | | |
|---|---|---|---|---|---|---|
| | Autumn | | Spring | | Summer | |
| Year 1/2 | <u>Materials (Y1/2)</u><br>Know the names of everyday materials.<br>Know how to identify everyday materials.<br>**Know how to identify and compare the suitability of everyday materials.**<br>**Know how the shape of solid objects can be made by twisting, bending, stretching and squashing.**<br><u>Seasonal Change</u><br>Know and identify some changes which take place in Autumn. | | <u>Inspired by Science</u><br>Know how to ask simple questions.<br>Observe closely using **scientific equipment.**<br>Use observations to reach a conclusion.<br><u>Seasonal Change</u><br>Know and identify some changes which take place in Spring. | | <u>Animals including Humans (Y1/2)</u><br>Know the basic parts of the human body.<br>Know the difference between carnivores, herbivores and omnivores and give examples of each.<br>**Know that animals including humans have offspring which grow into adults.**<br>**Know the basic needs of animals, including humans, for survival (water, food and air)**<br><u>Seasonal Change</u><br>Know and identify some changes which take place in summer. | |
| Year 3 | <u>Animals including Humans (Y3)</u><br>Know that animals, including humans, need the right types of nutrition.<br>Know that animals, and some other animals, have skeletons and muscles for support protection and movement. | <u>Forces and Magnets (Y3</u><br>Know that magnets have two poles.<br>Know that magnet may repel or attract based on the two poles closest to each other. | <u>Rocks and Soils (Y3)</u><br>Know that rocks can be compared and grouped together by appearance or properties.<br>Know that fossils are formed when things that have lived are trapped within rock.<br>Know that soils are made from rocks and organic matter. | <u>Inspired by Science</u><br>Know how to make a prediction.<br>Know how to take simple measurements.<br>Know how to reach a conclusion. | <u>Light (Y3)</u><br>Know how light is formed.<br>Know that shadows are formed when an object blocks a light source. | <u>Plants (Y3)</u><br>Know and describe the functions of different parts of flowering plants.<br>Know the requirements of plants for life and growth.<br>Know how water is transported within plants.<br>**Know why flowering plants need the flower to play a part in their life cycle.** |
| Year 4/5 | <u>Living Things and their Habitats (Y4/5)</u><br>Know the difference in life cycles of mammals, amphibians, insects and birds.<br>Know that living things can be grouped in a variety of ways.<br>**Know that animals and plants can reproduce in different ways.** | | <u>States of Matter (Y4)</u><br>Know and identify whether materials are solids, liquids or gasses.<br>Know the difference between evaporation and condensation.<br>Know how materials change state – **and the importance of 100 degrees**. | <u>Inspired by Science</u><br>Record findings in bar charts, tables etc.<br>Know how to use evidence to make conclusions.<br>**Know how to measure liquid, temperature and weight.** | <u>Sound (Y4)</u><br>Know how sounds are made and the importance of vibration.<br>Know how the pitch and volume can be effected by the sound source.<br>**Know which materials provide the best insulation against sound.** | <u>Forces (Y5)</u><br>Know how air resistance and friction effect moving objects.<br>Know the effect gravity has on falling objects.<br>**Know how gears, levers and pulleys can impact forces.** |
| Year 6 | <u>Animals including Humans (Y6)</u><br>Know how the circulatory system works.<br>Know the key organs within the human body.<br>Know how diet and exercise can impact on body. | <u>Living Things and their Habitats (Y6)</u><br>Know how to classify plants and animals based on specific characteristics.<br>Know that living things can be classified groups depending on characteristics, similarities and differences. | <u>Evolution and Inheritance (Y6)</u><br>Know how animals are adapted to suit their environment.<br>Know how plants are adapted to their environment.<br>Know what features may be inherited or acquired. | <u>Inspired by Science</u><br>Know how to take repeated readings and why this is important.<br>Know how to control variables.<br>Know how to create a fair test. | <u>Light (Y6)</u><br>Know that light appears to travel in straight lines.<br>Know that objects can be seen because they give out or reflect light into the eye.<br>Know that light travels from light sources to our eyes, or from a light source to an object and then our eye. | <u>Electricity (Y6)</u><br>Know how different variables can affect the function of certain components (e.g. brightness of a lamp, volume of a buzzer)<br>Know how to use recognised symbols to represent components from a circuit. |

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

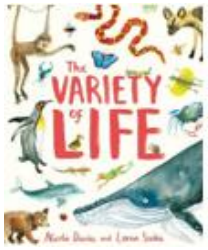
### Knowledge and Understanding of the World

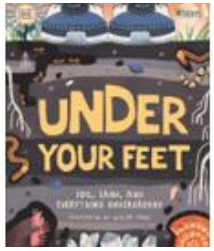
- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand some important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

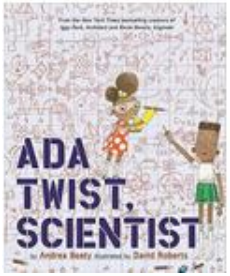
## IMPLEMENTATION – Reading as Scientists…

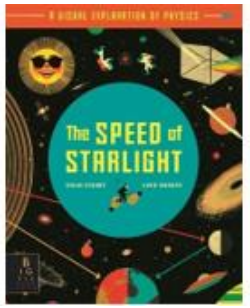
As Lifelong Readers, we want to inspire our children to 'read as scientists'. We have a carefully planned and sequenced reading spine to further engage the children and provide them with high-quality texts in-line with their current topic in Science.

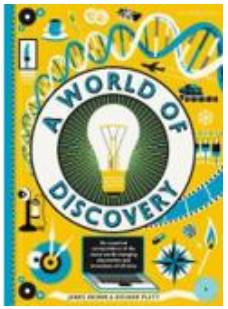
Please see a sample of our core texts for Science.











## 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.