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Science

Intent, Implementation & Impact Statement

LIVING AND LEARNING THROUGH

FAITH, HOPE AND LOVE.

"But the greatest of these is Love." 1 Corinthians 13:13

At Weeton St Michaels, our curriculum is designed to develop children's character, intellect and curiosity. We have high aspirations for all our children and aim to offer them a broad, challenging and engaging curriculum. It is our aim, that by the time children leave our school they will:

- Be kind, confident, well-mannered, thoughtful members of society who embody our Christian values.
- Be ambitious for their futures.
- Have a love of learning.
- Respect each other regardless of race, religion, ethnicity, culture, gender, disability and wealth.
- Be courageous advocates for the causes they believe in.

Our Intent

At Weeton St Michaels, it is our endeavour to provide a high-quality science education that provides children with the foundations they need to recognise the importance of science in every aspect of daily life. We want our children to appreciate how science has changed the lives of human beings and know that it is vital to the world's future prosperity. Therefore, all pupils will be taught essential aspects of the knowledge, methods, processes and uses of science.

Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. Our question-based curriculum enables children to explore the key work of scientists who have changed the world forever, while a range of experiments give children the opportunity to experience awe and wonder at what the physical world has to offer. Children should be taught to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. Our curriculum also encourages children to become enquiry-based learners, collaborating through researching, investigating and evaluating experiences. It will provide opportunities for the critical evaluation of evidence and rational explanation of scientific phenomena as well as opportunity to apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. Children will be immersed in key scientific vocabulary, which supports in the acquisition of scientific knowledge and understanding. The following types of scientific enquiries are woven throughout our curriculum: Problem Solving, Pattern Seeking, Comparative/Fair Testing, Research, Observation Over Time and Identifying, Grouping and Classifying to ensure that children are gaining a full breadth of opportunities to engage in learning as scientists.

All aspects of 'Working Scientifically' from the National Curriculum are interwoven throughout our curriculum, again, to ensure that children understand what it means to be a successful scientist. All children will be provided with a broad and balanced science curriculum, which builds on prior learning and reflects the equality and diversity policies and practice in school.

At Weeton, we follow the Learning Challenge Curriculum for Science. The Learning Challenge Curriculum's Science scheme of work enables pupils to meet the end of key stage attainment targets in the National curriculum. The aims also align with those in the National curriculum. For EYFS, the I wonder questions allow pupils to work towards the 'Understanding the world' Development matters statements and Early learning goals, while also covering foundational knowledge that will support them in their further Science learning in Key stage 1.

Knowledge in our Science Curriculum

In the Early Years Foundation Stage, Science is delivered to pupils within the 'Understanding the World' part of the EYFS Curriculum. By the end of reception, children will learn to:

- 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.

Our Science curriculum taught from Year One onwards is taken from the Learning Challenge Curriculum and develops pupils' Scientific knowledge and understanding in the following key areas. Each area of learning is summarised below:

Animals including Humans –

Identifying animals, their basic structure and their eating habits as well as their basic needs for survival. Children will learn about the life cycles of animals along with food chains.

Naming parts of the human body and recognising the function of skeleton, muscles, teeth and the digestive and circulatory systems. Learning about the importance of hygiene and the correct type and amount of nutrition. Children will learn about the importance and effects of a healthy diet, drugs and exercise on the human body. They will also study life cycles of humans.

Living Things and Their Habitats –

Identifying something as living and how it is grouped based on its characteristics, similarities and differences.

Name different types of habitat, learn what they provide for life and the impact of habitats changing. Children learn about life cycles and reproduction of animals and plants and how this affects the variation of living things around us both past and present.

Plants

Identify different plants and their structures, grow seeds and plan and understand the requirements for growth. Recognise functions of different plant structures and understand how plants reproduce.

Materials and Their Properties

Naming materials, describing their properties and understanding why materials have specific uses. Identify how materials may change and the factors that may contribute to them, including change of state within the water cycle. Children learn about different mixtures and how they can be separated based on their properties.

Identify different types of rocks and their physical properties and understand how fossils and soil are formed.

Forces, Earth and Space

Identify changes across seasons, and the weather and day length associated with each. Recognise different types of forces, ad understand their effect on objects including pulleys, levers and gears. Children learn about magnetic materials and magnets that attract and repel.

Learn about movement of planets and moons within the solar system and how this relates to day and night.

Energy

Learn about light and its properties, and how it enables us use to see and how shadows are formed. Identify relationship between sounds, volume, pitch and vibration and how sound travels.

Electricity

Recognising electrical appliances and the components that make up different circuits, Building electrical circuits and identifying factors that affect the output.

Making Connections

We will make connections between new learning and what pupils have already learned. This will be done using reflection time and retrieval tasks within our curriculum.

Year A

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	What are the materials around is called? Use senses in hands on exploration. Explore and discuss similarities of properties, talk about what they see using new vocabulary.	**Light and dark. Making shadows. Different places to find light. Torches/dark tent/puppets (observing).**	Changing states. Melting of ice and how Arctic animals stay warm. Melting experiments (comparative/fair testing)	Floating and sinking boats. Materials. Testing for suitability. Making predictions and building boats (problem solving).	How do things grow from seeds?	How many creatures are on our Earth?
Year 1 & 2	Season Change	Materials	Animals	Human Body	Plants	Season Change
Year 3 & 4	Skeletons	Rocks	Forces	Forces	Plants	Light/Dark
Year 5 & 6	Rev/Irev Changes	Rev/Irev Changes	Human life cycles	Plant life cycles	Earth/Space	Forces

Year B

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	What are the materials around is called? Use senses in hands on exploration. Explore and discuss similarities of properties, talk about what they see using new vocabulary.	**Light and dark. Making shadows. Different places to find light. Torches/dark tent/puppets (observing).**	Changing states. Melting of ice and how Arctic animals stay warm. Melting experiments (comparative/fair testing)	Floating and sinking boats. Materials. Testing for suitability. Making predictions and building boats (problem solving).	How do things grow from seeds?	How many creatures are on our Earth?
Year 1 & 2	Habitats	Healthy Humans	Materials	Materials	Plants & Trees	Plants & Trees
Year 3 & 4	Electricity	Digestive System	States of Matter	Sound	Living things (Classification)	Living things (Classification)
Year 5 & 6	Electricity	Electricity	Eyes	Heart	Living things (Classified)	Evolution over time.

Our progression documents (appendix 2) detail the precise knowledge taught in each unit of work.

The Leaning Challenge Curriculum follows the National Curriculum for Science. Therefore, at the end of the two-year cycle, pupils are expected to understand the knowledge, skills and processes in their year group's strands for Science.

Working Scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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.

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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
- 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.
- using straightforward scientific evidence to answer questions or to support their findings.

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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.

- 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.

Implementation

In the EYFS this is taught through a balance of adult directed input and group activities as well as time to explore materials and resources in continuous provision. Children will have opportunities in adult-led groups to develop skills and knowledge and then there will be an opportunity to revisit these through activities and continuous provision.

From year one onwards, Science is taught as a discrete subject discipline for approximately 90 minutes per week. Science is taught in mixed age classes, following a two-year rolling programme.

Our Science curriculum is taught over a two-year rolling programme, to mixed age classes. One year group, objectives are taught in year A and the other in Year B. This means that at the end of the two-year programme children have learned the essential knowledge and skills needed. They will have been revisited in new contexts with a higher degree of complexity, allowing pupils to revise and add to their existing knowledge. Cross-curricular links are included throughout each unit, allowing children to make connections and apply their Science skills to other areas of learning. Teachers are familiar with the whole school progression document and revisit prior learning at the beginning of, and regularly throughout, units of work. At the beginning of each unit of work the children will discuss and write what they already know about the topic, using retrieval tasks, this is followed at the end of the topic by a short assessment to check for subject knowledge and sticky learning.

Pupils explore knowledge and conceptual understanding through engaging activities and an introduction to relevant specialist vocabulary. As suggested in Ofsted's Science research review (April 2021), the 'working scientifically' skills are integrated with conceptual understanding rather than taught discretely. This provides frequent, but relevant, opportunities for developing scientific enquiry skills. The scheme utilises practical activities that aid in the progression of individual skills and also provides opportunities for full investigations.

Learning mats are provided for children at the start of each unit of work. These include key knowledge and vocabulary as well as links to prior learning. These are shared with parents via our school website.

Science lessons begin with a recap of prior learning, from prior year groups, terms or lessons. Key vocabulary is included in lesson starters, modelled by adults within lessons and displayed on classroom Science displays. Lessons incorporate various learning strategies, including independent work, paired or team work, practical tasks and tasks using ICT. Teachers adapt lessons to best meet the needs of their class.

Written work is completed in Science exercise books in line with our Presentation, Marking and Feedback Policy. Practical work is photographed and placed in the children's workbooks. Written work is marked prior to the next lesson following, the main focus of marking will be scientific, knowledge and vocabulary based.

Children with Special Educational Needs and Disabilities

Our Science curriculum is inclusive and ambitious for all learners and we expect that all children should be successful, regardless of any special educational need. All learners are given full access to the Science curriculum. Class teachers will adapt teaching inputs and provide additional support through scaffolding for any child who requires support. Strategies to support children with Special Educational Needs or Disabilities might include adaptation of resources, adult support, pre-teaching of vocabulary or content and alternative ways of recording understanding. Teachers will use the child's pupil passport to ensure the correct support is in place.

More Able Children

Teachers may identify children as more able in Science, either through end of unit summative assessments or through questioning, discussion and formative assessments. We seek to plan for specific questioning opportunities which require higher order thinking skills. Children who are considered more able in Science may:

- Be interested in the world around them and learning more about themselves.
- Ask questions and are willing to hypothesise and ask "What if...?"
- Consider alternative strategies and suggestions for investigations.
- Analyse data and spot patterns easily.
- Make connections quickly between facts and concepts they have learned and use a wide variety of vocabulary.

Impact

The expected impact of our curriculum is that children will:

- Develop a body of foundational knowledge for the Biology topics in the National curriculum: Plants; Animals, Including Humans; Living Things and Their Habitats; Evolution and Inheritance.
- Develop a body of foundational knowledge for the Chemistry topics in the National curriculum: Everyday Materials; Uses of Everyday Materials; Properties and Changes of Materials; States of Matter; Rocks.
- Develop a body of foundational knowledge for the Physics topics in the National curriculum: Seasonal Changes; Forces and Magnets; Sound; Light; Electricity; Earth and Space.
- Be able to evaluate and identify the methods that 'real world' scientists use to develop and answer scientific questions.
- Identify and use equipment effectively to accurately gather, measure and record data.
- Be able to display and convey data in a variety of ways, including graphs.
- Analyse data in order to identify, classify, group, and find patterns.
- Use evidence to formulate explanations and conclusions.
- Demonstrate scientific literacy through presenting concepts and communicating ideas using scientific vocabulary.
- Understand the importance of resilience and a growth mindset, particularly in reference to scientific enquiry.
- Meet the 'Understanding the World' Early Learning Goals at the end of EYFS, and the end of key stage expectations outlined in the National curriculum for Science by the end of Year 2 and Year 6.

The impact of our curriculum is constantly monitored by class teachers through both formative and summative assessment opportunities. Our scheme of work includes guidance for teachers in assessing pupils against the learning objectives and any relevant scientific enquiry skills. Teachers use lesson starters (recaps) to identify gaps in children's knowledge and subsequently plan opportunities to close any identified gaps.

At the end of each unit of work, assessment tests are undertaken and allow children to demonstrate what they have learned and remembered. At the end of each unit of work, children are assessed based on their performance in lessons and summative assessment and recorded on the school's internal tracking system as working below the expected standard, working at the expected standard or exceeding the expected standard. Assessments are moderated in staff teams annually.

Standards of teaching and learning in Science are monitored by the subject leader, the headteacher, as well as the SENDCo who will monitor Science provision for children with Special Educational Needs and Disabilities. Monitoring may include: pupil interviews, work scrutiny and lesson observations.