



All Saints Church of England Primary School
Wigston Magna

Subject Leadership



Science

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2023-2024



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Intent

Vision and Aims: 'Our Science curriculum aims to equip children with the foundations for understanding the world through a scientific lens'.

At All Saints Church of England school, we aim to recognise the importance of science in every aspect of daily life, as well as, to build pupils' knowledge and understanding of our world, whilst developing skills associated with science as a process of enquiry.

At All Saints Church of England Primary School, in conjunction with the aim of the National Curriculum we commit ourselves to providing quality first teaching in science and creating a love of learning for this subject. We strive for our children to be equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

In addition, our science teaching offers opportunities for children to:

- **Develop** scientific knowledge and conceptual understanding through the specific disciplines of physics, chemistry and biology.
- **Opportunity** to work scientifically and develop the essential scientific enquiry skills to deepen their scientific knowledge. These skills are embedded into lessons to ensure they are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the areas of study.
- **Encourage** children to ask their own questions and give opportunities to use their scientific skills and research to discover the answers and stimulate further questions.
- **Are able to** Predict, test theories, present results and demonstrate understanding through a written conclusion.
- **Communicate** their findings clearly using appropriate scientific language.
- **Develop** an enthusiasm and enjoyment of scientific learning and discovery.
- **To celebrate** curiosity within the classroom.

Supporting your child with science

The biggest support you can provide for your child is to take an active interest in what your child is learning about in class and to encourage them to ask questions about what is happening in the world. Some ideas for this are:

- Encourage your child to explain their learning to you
- Keep asking them why something is as it is
- Research areas of science together; help them to formulate questions
- Talk about and perform experiments together (e.g. investigating if all liquids can be frozen)
- Take nature walks in your local area or beyond
- Cook together and discuss the chemical changes (can we change these cooked eggs back into the egg we started with?)
- Search the internet with your child to learn together about how the world works; there are a few useful websites below.

Curriculum coverage and Topics

EYFS

- Understanding the World
- Understanding of the World is about how children get to know about other people, the place where they live and about all aspects of the environment.
 - People and Communities
 - The World
 - Technology

Year 1

- The Human Body
- Animals and their Needs
- Seasons and Weather
- Taking Care of the Earth
- Plants
- Materials and Magnets

Year 2

- The Human Body
- Living Things in their Environments
- Electricity
- Plants
- Materials and Matter
- Astronomy

Year 3

- The Human Body
- Cycles in Nature
- Light
- Plants
- Rocks
- Forces and Magnets

Year 4

- The Human Body
- Classification of Plants of Animals
- Ecology
- Sound
- Electricity
- States of Matter

Year 5

- The Human Body
- Materials
- Living Things and their Habitats
- Forces
- Astronomy
- Meteorology

Year 6

- The Human Body
- Classification of Living Things
- Electricity
- Light
- Reproduction
- Evolution

The PKC Science curriculum aims to equip children with the foundations for understanding the world through a scientific lens. Pupils will be taught units of work that cover and go beyond the requirements of the National Curriculum in the specific disciplines of biology, chemistry and physics. Pupils will encounter people who have made significant contributions to the field of science over time, understanding that science has been a quest for understanding for many years, and will continue to be so in the future. Pupils will build a body of key foundational science knowledge as they work through the curriculum, asking questions and developing a sense of curiosity about the world around us.

Following the PKC Science curriculum will give children an introduction to fascinating content such as the inner workings of the human body, animals and the environments they live in, plants and their features, forces in nature, what lies beyond the visible and what lies beyond the planet we live on. Over time their knowledge will deepen moving from recognising and naming parts of the human body to understanding how our muscles work, how our blood moves around our body and how our nervous system helps us to interact with the world.

Pupils will be encouraged to use the knowledge they learn in Science and apply it to investigations that test a theory or set out to answer a question. Importantly, substantive scientific knowledge is taught first, before pupils are asked to undertake enquiry. This helps them to fully understand the elements of the enquiry first, and to make informed observations about the processes they see. Gathering information, recording data, graphing data and interpreting findings are all essential skills that pupils will apply to new contexts as they work through the curriculum. Enquiries include observing over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing and researching using secondary sources. Scientific enquiries provide children with a wealth of opportunities, but first and foremost they will help to deepen understanding of the nature, processes and methods of science as a discipline and how it differs from other subjects they are studying. Pupils will gain an understanding of the purpose and uses of science both today and in the future.

Throughout the science curriculum, children are taught that scientific discoveries have been made since time began around the world. The children learn about the work of scientists such as Lewis Howard Latimer, who invented the carbon filament that allowed Edison's lightbulb to light up the world. In Year 5 children learn about Jabir ibn Hayyan who is thought to have invented a crucial tool for the distillation process: the alembic. In Year 1 children learn about their senses and reflect upon the challenges faced by Helen Keller who achieved a university degree despite being blind and deaf from her early childhood. Importantly in Science, over time, children learn about scientists and their search for the truth. They learn that the people who have contributed to science, from Ancient Baghdad to Ancient Rome and beyond, are diverse and many voices make up the story of science.

Our science curriculum builds knowledge incrementally. Pupils have multiple opportunities to secure and build on their knowledge and understanding as subject content is revisited at points throughout the curriculum. This helps children to master the knowledge and concepts whilst building up an extended specialist vocabulary. This incremental approach helps teachers to identify knowledge gaps and look back at previous content if they need to close gaps in knowledge or understanding. Our curriculum enables children to understand the important role that science plays in the sustainability of life on earth. We want children following this curriculum to be equipped to go forth into their secondary education with curiosity, passion and a desire for discovery.

Working Scientifically KS1	Year 1							Year 2				
	Human Body	Animals and their Needs	Seasons and Weather	Taking Care of the Earth	Plants	Materials and Magnets	The Human Body	Living Things and their Environment	Electricity	Plants	Materials and Matter	Astronomy
Statutory												
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			✓		✓	✓				✓	✓	✓
Notes and guidance												
use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships		✓			✓	✓						✓
ask people questions and use simple secondary sources to find answers	✓			✓			✓		✓			
use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out			✓		✓					✓	✓	✓
record and communicate their findings in a range of ways and begin to use simple scientific language (with help)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Working Scientifically Lower KS2	Year 3						Year 4					
	The Human Body	Cycles in Nature	Plants	Light	Rocks	Forces and Magnets	The Human Body	Classification	Ecology	Sound	States of Matter and the Water cycle	Electricity
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	✓				✓	✓						
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					✓	✓						
Notes and guidance												
recognise when a simple fair test is necessary and help to decide how to set it up					✓	✓				✓	✓	✓
talk about criteria for grouping, sorting and classifying; and use simple keys	✓		✓		✓		✓					
collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data			✓		✓				✓			
make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	✓				✓	✓			✓	✓	✓	
how to use new equipment, including thermometers and data loggers		✓				✓					✓	✓
collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data					✓	✓						
look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions		✓			✓			✓	✓	✓	✓	✓
making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done						✓			✓	✓		
use relevant scientific language to discuss their ideas and communicate their findings		✓				✓		✓		✓	✓	✓

Working Scientifically Upper KS2	Year 5						Year 6					
	Human Body	Materials	Living Things	Forces	Astronomy	Meteorology	The Human Body	Classification	Electricity	Light	Reproduction	Evolution
Statutory												
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 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	✓	✓	✓	✓	✓				✓	✓		
Notes and guidance												
plan the most appropriate type of scientific enquiry to use to answer scientific questions	✓	✓	✓	✓			✓					
recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why	✓	✓		✓					✓			
use and develop keys and other information records to identify, classify and describe living things and materials		✓	✓					✓		✓	✓	✓
make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them	✓	✓		✓	✓		✓		✓			
choose the most appropriate equipment to make measurements and explain how to use it accurately		✓				✓	✓					
decide how to record data from a choice of familiar approaches		✓		✓					✓			
look for different causal relationships in their data and identify evidence that refutes or supports their ideas	✓	✓		✓	✓				✓			
use their results to identify when further tests and observations might be needed	✓	✓		✓			✓		✓			
talk about how scientific ideas have developed over time	✓				✓					✓		

Implementation

After the informal introduction to Science in EYFS. Sciences is taught weekly for approximately 60 minutes. All Saints C of E will use a range of strategies to introduce, explore, and fully understand scientific learning. When required, this will be adapted to best suit each class and each individual learner so that they are able to make their personal best progress with their learning. Each year group's learning intentions will come from the National Curriculum and these have been aligned to fit with the associated topics, within an appropriate time of year and within the children's developmental stages so that they are best able to access the learning. All science learning will be taught in a block to enable the children to focus on one subject at a time and to make links within their subject learning.

At the beginning of each unit, children should have the opportunity to reflect on their existing science knowledge through discussion and explicit links to previous learning will be made. Each science lesson is to be planned with one overarching lesson intention for all children and learning then differentiated to reflect this. Learning is planned and taught in blocks with a clear progression of learning across lessons and between key stages.

If possible, teachers will also encourage members of our local community such as parents, STEM Ambassadors, secondary school teachers etc. to support aspects of topics. Where possible, lessons should also refer to real world scenarios where scientific learning applies or show the children the types of occupations that might use this learning. Key learning that aim to:

- draw out and deepen understanding;
- move learning along;
- or address potential misconceptions should be planned for in advance.

Tasks should show a clear differentiation between groups of children to allow them all to show their understanding of the learning objective. Differentiation should be by supporting a variety of learning styles and recording mediums. It should not be by literacy ability/written output or degree of adult support. All children should have an equitable opportunity to show their level of understanding, regardless of literacy ability. Any children with specific SEN requirements need to be planned for, so they also have the same opportunities to learn and show understanding. Provision for extension within the lesson or between different ability groups should be provided for where possible, to ensure all children have the opportunity to show a developing understanding with the lesson. Across the year, children should have the opportunity to complete relevant investigations that engage them with their learning and further their understanding. They should have the opportunity to focus on particular working scientifically objectives and develop their skills in these areas. These will progress across the year and also between year groups. Children must have the opportunity to use a variety of practical equipment. Links should be made between relevant literacy and maths objectives where these have already been taught, to support the embedding of this learning and show the practical application of these skills. Children need to be shown that there are a variety of types of scientific investigations and be taught these across their time in school:

- Fair testing
- Surveys and patterns in data
- Classification
- Exploring and observing over time
- Problem solving
- Investigating a 'model'
- Secondary research

They will develop an understanding of what the differences are between these types of investigations, the pros and cons of each, as well as when it is best to select a particular approach. As children move through KS2 they may then be given opportunity to choose their own approach to learning and how best to investigate. Where possible, a display will be in class to support new scientific learning and could include:

- Relevant diagrams
- Supporting imagery
- Useful scientific vocabulary
- Definitions
- Real-life examples of the application of the learning
- Relevant examples of scientists/occupations in this field, particularly from minority groups/female representatives

The subject coordinator will conduct regular monitoring to check coverage and progression, giving timely and focused feedback to all staff. Staff members will have access to ongoing training and the Primary Knowledge curriculum to support the teaching of the subject. In common with the whole curriculum at All Saints our core curriculum is underpinned by the research driven and evidence based 'Primary Knowledge Curriculum'

Depth

- The teaching and learning for the Science curriculum area has developed from year on year. From KS1 pupils will start to learn and grasp the basic knowledge and skills of Scientific topics. From this, they will develop their knowledge by using their basic skills from year 1 and add onto it each year. Pupils will start by learning the basics of Chemistry, Biology, Physics and Working Scientifically and build on this throughout the years.
- Pupils will have the opportunity to work scientifically throughout all topics and to conduct investigations. They will be taught the knowledge and skills and will be given the opportunity throughout the lesson to apply what they have learnt. As a school, we plan to ensure the children retain their knowledge by applying their skills during their Science sessions and developing it each year, which will enable pupils to activate their prior knowledge. Pupils will be able to manage new content as they are taught in steps, if they have not mastered a step then they should keep practicing before they move onto the next step.
- Staff will be kept up to date with the Science curriculum by being able to view the long-term plan and regular advice and input from the science leader.

Inclusion

Every pupil at All Saint primary school primary Science lesson. Teaching material is delivered in a variety of ways to meet the needs of all pupils and the cumulative nature of our curriculum ensure that need child is disadvantaged.

Children with SEND, including those attending footsteps receive lessons which match their learning styles.

- Late entrants may have less exposure to topic specific vocabulary but key skills are revisited in every unit to ensure all children succeed.
- Assessment is tailored to children's strengths to ensure less confident children are not singled out.

Provision

In order to ensure that our science provision continues to be of the highest possible quality, the subject leader is committed to continually developing, monitoring, evaluating and improving provision. This is done through:

- staff, pupil and parent voice surveys.
- Visits to other art leads to discuss, observe and share good practice.
- Keeping up to date with new initiatives and attending training courses.
- Observing children and analysing assessment/performance data trends.
- Annual action plan which is matched to the outcomes of all of the above and tailored to the needs of our children.

Purpose

Our science curriculum provides meaningful and purposeful learning through a wide range of experiences;

- science lead visits to observe lessons, look at pupil books, talk to pupils etc
- Meet ups with other schools in Leicestershire
- Opportunities for children to share their learning and work with other year groups
- Transition work with KS3 teachers
- science based trips and visits We incorporate spiritual, moral, social and cultural development through;
 - Learning and acceptance of other cultures
 - Socialising with children from other schools within the county
 - Building social capital and the motivation to travel and try new things
 - Opportunities to experience trips and visit

Impact

If our intent and implementation are successful, then at All Saints C of E Primary we would expect to see:

- A broad and engaging curriculum that makes use of a range of resources, such as visitors and local attractions
- Children and staff who are enthusiastic about scientific learning
- Children and staff who can speak confidently about science, including uses in the real world
- Children who can use appropriate scientific vocabulary in oral and written form
- All children being successful in sharing their understanding of scientific concepts
- Children who can make links between different areas of science and other subject areas
- Children who can recall prior scientific learning when required and use this to understand new learning
- Children increasingly being able to instigate their own investigations confidently and interpreting their findings
- Staff who are able to anticipate potential misconceptions and address these confidently
- Children meeting their age-related expectations in science consistently

What are the standards and progress in your subject?

Date:

% at expected at Key stage 1	% at expected at Key stage 2
73%	64%