

SCIENCE Lower Key Stage 2



Our Intent Statement:

At Great Finborough Church Primary School, Science is a core subject. We believe that a high quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics.

Our curriculum aims to ensure that all our children develop scientific knowledge and conceptual understanding. In addition it aims to develop their understanding of the nature, processes and methods of science and ensure that our children are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Through working scientifically we aim to foster a sense of excitement and curiosity for a subject that has, and continues to, change the world we live in. Our children will be encouraged to understand how science can be used to explain what is occurring, using the power of rational explanation, predict how things will behave and analyse causes.

Lower Key Stage 2

At Lower Key Stage 2, our aim is to enable our children to build on the foundations set in Key Stage 1 and to broaden their scientific view of the world around them by exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments and by beginning to develop their ideas about functions, relationships and interactions.

It is our aim to support and encourage our children to ask their own questions, and listen to others, about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them. These may include observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources. They will be supported to draw simple conclusions and use their developing scientific language, first to talk about, and later to write scientifically about, what they have found out.

We aim for the majority of learning about science to be through the use of first hand practical experiences with some use of secondary sources such as books, photos and videos. The children will begin to read and spell their growing scientific vocabulary correctly.

Our Implementation Statement:

Science is planned on a 3 year cycle.

Our planning and delivery is supported by TigTag. We selected this because it has high quality video resources which bring the subject to life, with many of the videos supporting the children's understanding and connection of the science concept to everyday life. The learning objectives are clear and easy to access by everyone. TigTag also provides good quality optional resources to support the children's learning. The lesson plans provide a good structure for lesson delivery, including extension options to support the most able pupils. A key feature of the planning is the range of scientific enquiry options suggested and the resource supports the subject knowledge of

the teacher and provides clear vocabulary to be developed during the lesson. It also has question prompts relating to the videos.

Oracy in Science

The foundations of our Science teaching is 'talk'. To develop ideas, deepen knowledge and enhance experiences and scientific enquiry, the children are provided with the opportunity to participate in regular speaking and listening opportunities. They are encouraged to develop, ask and answer questions of their teacher, visiting specialists and of each other. They are supported to learn, develop and grow their scientific vocabulary and key-words. The children are given opportunities to work individually, with response partners, in small groups and as a class as a whole and to present their work orally to others.

Reading in Science

Every topic has its own age-appropriate bank of non-fiction texts in the school library. These are available in the classroom for the period of time for which the children are studying the unit of work. This enables the children to broaden their subject knowledge and vocabulary, research independently for themselves using secondary sources of information and, with many of the books relating to everyday life, to make links to their own lives.

Writing in Science

The children are taught how to structure their scientific writing. At key-stage 1, this will involve developing their use of captions, labels and simple sentences. The teacher, working with the class, create shared pieces of writing. The children are not only taught how to use the scientific vocabulary in the correct context, they are also taught the structural language of beginners scientific vocabulary for example when writing about the method of an experiment, the children are encouraged to use words such as first, next, after that and finally.

When planning a series of lessons for our Lower Key Stage 2 children, the following basic structure is as follows:

Experience & Time 2 Remember (Prior Learning)

At the beginning of each unit of work, the children are provided with the opportunity to explore and experience a range of resources and materials associated with the topic and/or explore in local areas. They will have access to resources they have used previously to help them recall previous learning and make connections with the next part of their learning.

The children are also given the opportunity to explore online for research. All children are also provided, as part of this process, to use secondary sources of information such as the bank of age appropriate topic books from the library.

Children are encouraged to explain what they are doing and why and formulate questions. They are supported to explain what they have found out and are encouraged to use scientific vocabulary which initially is modelled verbally by the teacher and increasingly independently.

Discover (Developing New Knowledge and Understanding) & Time 2 Remember (Prior Learning)

After providing opportunities for sharing prior knowledge and how this will support our new learning, new subject knowledge and new vocabulary is taught using a range of resources and materials including the use of TigTag.

Scientific Enquiry (Planning & Predicting)

Time is then allocated to the planning of a scientific enquiry, investigation or experiment.

At lower key-stage 2 this involves the children being provided with the opportunity to select from a choice of scientific enquiry, investigation or experiments and supported in identifying the most appropriate type of scientific enquiry they might use to answer their question.

The children will be provided with a key question and will be provided with an opportunity as part of a group to discuss the question and agree possible methods to investigate the question.

The children will then be given the opportunity to discuss, agree and verbalise their method including deciding what observations to make, what measurements to use, how long to make them for, and whether to repeat them. They will be supported and encouraged to decide on one variable to change and which variables must remain the same. They will also be encouraged to discuss why and how they will make the experiment a fair test.

They will be introduced to scientific equipment that is available and make group decisions about the best equipment to use. They will be given opportunities to practise using the equipment safely and correctly.

In groups, they will, through discussion, finalise the method required for carrying out their experiment and the most suitable way to collect and record their results.

Finally, the children will develop their ability to make their own predictions ready for investigation.

The children will then participate in writing a method for their experiment including the key question/ title, equipment list, labelled diagram, methodology, statement on how it will be a fair test and a statement relating to their prediction.

At this point they will also create any formats required to collect and record their data.

Investigate & Gather Results

The children are then supported to carry out their scientific investigation, test or enquiry task.

They are then supported to set up their experiment using a range of scientific equipment and explain how and why they are setting up their experiment in this way and how they plan to use the equipment safely and correctly.

The children then, with support, carry out their investigation making close and careful observations, take measurements and gather and recording data.

Throughout this process the children are supported to verbalise what they are doing, how they are using their equipment safely and correctly, what they are observing is happening including, with support, noticing patterns and relationships as they develop. They will also be supported to verbalise what they are doing to make the experiment fair and initial thoughts whether on what is happening is what they were expecting.

Present and Interpret Results:

The children are provided with an example set of data and, through shared tasks, are supported in a presenting the data in a number of ways and supported in interpreting and discussing the data to answer key questions.

This is then replicated with their own data.

Conclusions (what happened and why)

The children are given the opportunity to draw simple conclusions by discussing what happened, why and how they know.

They will be supported in making new predictions for new values.

The children are then provided with time to write up or present their conclusions in a variety of ways.

Evaluate:

The children will be provided with the time to discuss how successful their experiment had been and how reliable the results are.

They will be supported in identifying and suggesting improvements and raising further questions.

The children are then provided with the time to write up or present their evaluation in a variety of formats.

Home Learning & Study of Scientists (From Year 4):

The children are provided with a Home Learning project for each unit of work to help them develop and deepen their knowledge about influential scientists from the past and present, to explore and research how science and scientific ideas and concepts can vary and change over time and how the work and discoveries of scientists has influenced their daily lives.

The children will be encouraged to use secondary sources of information and evidence as part of their research including considering the validity of the information and whether it is fact or opinion.

Open ended projects enable the children to have the opportunity to present their work in a variety of different ways.

Throughout the children are encouraged to and to use their growing scientific vocabulary in their oral and written work.

Recording of Pupils' Work Assessment:

The children in Year 1, 2 and 3 are provided with a red and black Science Topic book. For children in Year 4, 5 and 6, they are provided with a dark green A4, lined exercise book. Throughout all year groups, the children will be given a Learning Objective sticker for each lesson which also outlines the specific Success Criteria to be achieved. All Learning Objectives and accompanying Success Criteria will match the Science Skills Progression Document.

Cross Curricular:

Cross curricular outcomes in science are specifically planned. In science, there are close links to their learning in English (Speaking and listening), reading and writing scientifically. Analysing and presenting data links closely to data handling in maths. Links are also made to other subjects such as RSE and PSHE when studying topics such as their changing bodies, healthy eating etc.

Resourcing:

The science provision is also well resourced and specific resources are mapped to specific year groups and topics to support effective teaching and learning. The local area is fully utilised to achieve the desired outcomes, with extensive opportunities for learning outside the classroom embedded in practice.

How do we monitor our science curriculum?

The Science Lead, the Senior Leadership Team and the Curriculum Governors will monitor the curriculum in a variety of ways, such as:

- Pupil voice opportunities
- Science Topic book scrutinies
- Lesson observations that demonstrate and show clear links to the Science Curriculum

Our Impact Statement:

High quality oracy, reading and writing opportunities will allow the children to articulate and communicate their knowledge, understanding and skills increasingly using more scientific vocabulary.

Through exploration, discovery of new knowledge and understanding, scientific enquiry and research the children will deepen their skills, knowledge and understanding in the areas below:

End of lower key-stage 2:

Working scientifically, the children will be able to:

- ask relevant questions and using different types of scientific enquiries to answer them.
- set up simple practical enquiries, comparative and fair tests.
- make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- gather, record, classify and present data in a variety of ways to help in answering questions.
- record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- report on their findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- identify differences, similarities or changes related to simple scientific ideas and processes.
- use straightforward scientific evidence to answer questions or to support their findings.

Through their knowledge and understanding of plants, the children will:

- be able to identify and describe the functions of different parts of flowering plants: roots, stem/ trunk, leaves and flowers
- know, and be able to explain, about the requirements of plants for life and growth (air, light, water, nutrients, from soils, and room to grow) and know how they vary from plant to plant
- know, and be able to explain, the way in which water is transported within plants

- know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Through their knowledge and understanding of animals, including humans, the children will:

- know that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- know that humans and some other animals have skeletons and muscles for support, protection and movement
- be able to describe the simple functions of the basic parts of the digestive system in humans
- be able to identify the different types of teeth in humans and their simple functions
- be able to construct and interpret a variety of food chains, identifying producers, predators and prey

Through their knowledge and understanding of states of matter, the children will:

- be able to compare and group materials together, according to whether they are solids, liquids or gasses
- be able to describe how materials change state when they are heated or cooled and the temperatures at which this happens

Through their knowledge and understanding of sound, the children will:

- have identified how sounds are made, associating some of them with something vibrating
- know that vibrations from sounds travel through a medium to the ear
- have found patterns between the pitch of a sound and features of the object that produced it
- have found patterns between the pitch of a sound and features of the object that produced it
- have found patterns between the volume of a sound and the strength of the vibrations that produced it
- know that sounds get fainter as the distance from the sound source increases

Through their knowledge and understanding of electricity, the children will:

- have identified common appliances that run on electricity
- have constructed a simple series electrical circuit, identifying and naming the basic parts, including cells, wires, bulbs, switches and buzzers
- be able to identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- know that a switch opens and closes a circuit and associates this with whether or not the lamp lights in a simple series circuit
- know some common conductors and insulators, and associate metals with being good conductors

Through their knowledge and understanding of rocks, the children will:

- be able to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- be able to describe, in simple terms, how fossils are formed when timings that they have lived are trapped within rock

- Know that soils are made from rocks and organic matter

Through their knowledge and understanding of light, the children will:

- know that they need light in order to see things and that dark is the absence of light
- know that light is reflected from surfaces
- know that light from the sun can be dangerous and that there are ways to protect their eyes
- know that shadows are formed when the light from a light source is blocked by an opaque object
- have found, and be able to explain, patterns in the way that the size of shadows change

Through their knowledge and understanding of forces and magnets, the children will:

- have compared how things move on different surfaces
- know that some forces need contact between two objects, but magnetic forces can act at a distance
- have observed how magnets attract or repel each other
- have observed how magnets attract some materials and not others
- have compared and grouped together everyday materials on the basis of whether they are attracted to a magnet, and identified some magnetic materials
- know that magnets have two poles
- have predicted whether two magnets will attract or repel each other, depending on which poles are facing

Through their knowledge and understanding of living things and their habitats, the children will:

- know that living things can be grouped in a variety of ways
- have explored and be able to use classification keys to help group, identify and name a variety of living things found in their local and wider environment
- know that environments can change and that this can sometimes pose dangers to living things

Home Learning & Study of Scientists (From Year 4)

Through the study of a number of scientists, the children will:

- have a good knowledge of influential scientists from the past and present
- have developed an understanding of how science and scientific ideas and concepts can vary and change over time
- know how the work and discoveries of scientists has influenced their daily lives
- have used secondary sources of information and evidence as part of their research including considering the validity of the information and whether it is fact or opinion
- have presented their work in a variety of different ways to a variety of audiences
- have developed their use of scientific vocabulary in their oral and written work

Careful recording of their work and use of clear learning objectives with accompanying skills based success criteria enables the teacher to track progress and the children to record how their confidence, skill, knowledge and understanding is developing. When passed on to the child's next teacher, this enables initial learning the following year to be more closely matched to the correct new starting point.

Making links between Science and other areas of the curriculum enables the children to make connections, transfer skills, deepen their knowledge and understanding and enables the children to make further connections to their everyday life.

Our monitoring will provide a clear understanding on the strengths and weaknesses of the curriculum will become evident, as well as highlighting additional CPD needs. This will also enable the school's Governors to develop a better understanding of the Science Curriculum.

Ultimately, we want our children to have developed a love and passion for scientific enquiry and have a broader knowledge, understanding and scientific skills set to not only be ready for the next stage of their learning but also to have a lifelong and growing passion for the subject.