# GARWAY PRIMARY SCHOOL

# CURRICULUM OVERVIEW

*Science*

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Updated 4 February 2024

## INTENT

### Vision

Science represents a body of knowledge essential to our understanding of ourselves and the world around us.

It develops the concepts, skills and attitudes which enable pupils to engage in scientific activities and investigations.

**Science is important** because:

- It encourages creative and imaginative thought
- It encourages questioning and discussion skills
- It enables us to have a better understanding of ourselves
- It enables us to have a better understanding of our surroundings and the world in which we live
- It provides an understanding of how technological change and medicine have impacted on the development of the world and the quality of our lives
- It is part of modern culture, providing employment and opportunities to shape the future of the world.

**Aims:** Our aims in teaching science are that all children will:

- Be able to access the **scientific** content of the lesson
- Acquire a progressive understanding of scientific ideas, knowledge and skills
- Be encouraged to use their natural curiosity to develop a scientific approach to solving problems
- Become effective communicators of scientific facts and data
- Find science enjoyable

- Be encouraged to care for and enjoy our environment
- Understand that science relates to their lives, to the real world, to everyday situations and will provide employment opportunities for some of them
- Be able to build their self-confidence to enable them to work both independently and co-operatively with others
- Be encouraged to develop a responsible and considerate attitude towards their work, with an awareness of the safety of themselves and others.

## Long term plan

### Early Years (including pre-school)

The Early Years Foundation Stage Framework provides the standards for the learning, development and care of children from birth to 5.

There are seven areas of learning and development, including '**Understanding the world'** which involves guiding children to make sense of their physical world and their community and fostering their understanding of our culturally, socially, technologically and ecologically diverse world.

**Early Learning Goal: The Natural World**

The 'Early Learning Goals' describe the level of development children should be expected to have reached by the end of the Early Years Foundation Stage.

For the Early Learning Goal 'The Natural World', children at the expected level of development will:

• 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.

### National Curriculum Years 1 to 6

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science,

today and for the future.

**Key stage 1**

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them.

- They should be encouraged to be curious and ask questions about what they notice.
- They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.
- They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.
- Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.
- Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

**Lower key stage 2 – years 3 and 4**

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them.

- They should do this through 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.
- They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.
- They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.
- Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

**Upper key stage 2 – years 5 and 6**

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas.

- They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.

- At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.
- They should also begin to recognise that scientific ideas change and develop over time.
- They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information.
- Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.
- Pupils should read, spell and pronounce scientific vocabulary correctly.

**Topics** (See – *'Science Topic Cycle'*)

Across Garway Pre-school and school, the science content is taught through a two year rolling programme of 'topics'.

## Progression

### Knowledge and Skills

Alongside gaining knowledge of the science content, pupils will develop in the following:

**Spoken language**

Developing their scientific vocabulary and articulating scientific concepts clearly and precisely, making their thinking clear, both to themselves and others.

**Working Scientifically**

Understanding the nature, processes and methods of science should not be taught as a separate strand but must always be taught through, and clearly related to, the teaching of the science content in the programme of study.

Pupils learn to use a variety of approaches to answer relevant scientific questions, including:

- observing over time;
- pattern seeking;
- identifying, classifying and grouping;
- comparative and fair testing (controlled investigations);
- and researching using secondary sources.

Pupils should seek answers to questions through collecting, analysing and presenting data.

# IMPLEMENTATION

## Timetabling

Science is taught in every year group and in every term throughout the year.

All year groups have at least one timetabled science lesson each week, during the afternoon session.

## Pedagogy

**Termly planning**

- Teachers' medium term planning of the term's topic takes into account the science activities and content that have previously been taught in that topic.
- Medium term plans are completed by the class teacher.

**Lesson planning**

- Teachers take into account progress made by pupils in the previous week's session.
- Teachers identify learning outcomes for both topic content and working scientifically.
- Key scientific vocabulary is identified for each lesson.
- Teachers will use strategies that are best matched to the content of the lesson and will usually incorporate some practical or investigative activity into every science lesson.
- Teachers identify ICT. Literacy and Numeracy opportunities in their lesson planning.
- The appropriateness of worksheets, particularly those that are commercially produced, will be considered and these will be adapted where necessary.
- Pupils are provided with opportunities to interpret data from charts, graphs, diagrams, and they do not always need to generate this data for themselves.
- Teachers identify an extension question or activity that has a scientific focus to extend higher attainers in this subject and enable them to develop their understanding at 'greater depth'.
- Each lesson ends with a plenary which aims to identify and reinforce key areas of learning from the lesson.

**Lesson organisation**

The organisation of the lesson will vary according to the planned learning outcomes.

Children will be taught:

- As a whole class

- In groups ( often grouped by **science** attainment – similar or mixed attainment )
- In pairs or as individuals.

**Environment**

The school aims to produce a scientifically stimulating environment:

- Through displays and hands on activities that promote scientific thinking and discussion.
- Through displays of pupils' work that celebrate achievement.
- By providing an appropriate range of resources for teachers and pupils to use.
- By providing ICT hardware and software that enables teachers to deliver the requirements of the science national curriculum.
- By providing large font vocabulary prompts for key science words that can then be displayed in the classroom.

**Recording of pupils' work**

In their planning, teachers include a wide range of recording opportunities for pupils to demonstrate their science learning, including records of scientific enquiries, reports, plays, assemblies, presentations, wall displays, debates and discussions.

Written work will be stored in Topic folders or science books.

## Resources

- The majority of the science resources are stored by the science leader in the science and maths stock cupboard and are accessed by all members of staff.
- The outdoor environment (including the school grounds and buildings) provides an excellent resource, particularly for topics linked to the living world and to materials.
- The science leader maintains a list of useful science specific websites.

## Vocabulary

*See 'Scientific Vocabulary – National Curriculum England'* which lists the scientific vocabulary linked to all the science topics within the National Curriculum.

Language is vital for communication of scientific concepts and ideas. Children should be able to use the scientific vocabulary of preceding topics as well as those listed for their current science topic.

## Personalisation

In general, teachers plan around a core theme for the majority of pupils, ensuring that all pupils, regardless of attainment in other subject areas (e.g. literacy skills), are able to access and engage with the scientific content of the lesson.

Support for pupils (including lower and higher attainers) may be provided by adaptive teaching and the use of teaching assistants, additional resources and extension activities.

## SEND Inclusion

**Special Educational Needs** (see SEND policy for more details)

- All pupils take part in the science lesson.
- Teachers plan (using adaptive teaching approaches) so that all pupils can be included and can make progress in lessons.
- In oral and discussion work, teachers plan a range of differentiated questions, with some targeted at specific pupils or groups, in order to identify and address misconceptions.
- Teachers ask open questions that encourage and promote discussion and provide speaking and listening opportunities.
- Teachers use a wide range of teaching styles and resources.
- Risk assessments are completed as necessary to ensure inclusion of all pupils into activities.
- Some IEPs may incorporate targets relating to science.

## Enrichment

- The school has a collection of 'Story Sacks', some of which will contain books and activities to support science learning in Pre-school, Year R and KS1.
- The contribution of science to pupils' spiritual, moral, social and cultural education is considered in topics, e.g. those relating to environmental or health issues.
- Every year group enjoys Forest School sessions for at least one term in the school year. These sessions include outdoor activities linked to the current science topic.
- Activities take place in the school grounds and include planting and growing, eg in the polytunnel and wellbeing garden.
- The school offers various after school clubs which provide activities with a scientific or environmental theme, e.g. Science Club, Engineering Club, Gardening Club, Green Club.
- The school provides occasional visits with a science theme for pupils in both key stages, usually to support a current topic (e.g. Techniquest; Sea life Centre; Madley Environmental Study Centre).
- Pre-school and Year R participate annually in a 'Lambing Live' visit to experience lambing on a local farm.

- Years 5 and 6 participate annually in a schools' Science Festival hosted by St. Mary's High School, Hereford.
- The whole school participates annually in British Science Week.
- The whole school participates in science theme days, e.g. 'Mars Day'.
- Whole school assemblies are used to explore science themes. (E.g. World Water Day, Charles Darwin, Recycle Week, World Space Week).
- The school encourages visitors into school to share their science expertise with the children.

## Learning Outside The Classroom

**Homework** provides opportunities for children

- To practise and consolidate their skills and knowledge.
- To share their science learning with their family.
- To carry out simple investigative work.
- To carry out research from web sites and other sources.
- To have fun with science.

In KS1, homework is occasional and may involve the collection of data or children may be asked to bring in resources or materials to support a topic.

In KS2 homework may also involve investigational work in preparation for classroom activities.

## Parents/ Carers

Parents/ carers are informed of the current science topics in each class at the start of each term via the school newsletter.

A science information session for parents/ carers is held every few years to give parents/ carers an overview of how science is taught and the importance of 'working scientifically'.

# IMPACT

## Formative Assessment

**Formative Assessment** takes place continuously, in all lessons, and includes:

- Orally through questioning
- By observation of children at work
- During the plenary part of the lesson
- Marking children's work.

**Marking of written work** (See Marking policy for further details):

- All work should be marked in relation to the main science learning objectives for that task and comments should be developmental – What would have happened if? If you had changed X instead of Y what would have happened?
- Marking of diagrams should ensure that carelessness and inaccuracy does not lead to error (e.g. gaps in an electrical circuit).
- Accuracy with scientific spelling is encouraged.

## Summative Assessment

**Summative Assessment** takes place periodically:

- Often at the end of a unit of work or topic
- Through planned assessment activities, linked to learning outcomes, e.g. 'tests' and quizzes.
- Includes assessment of outcomes that relate specifically to 'working scientifically'.
- Teachers and teaching assistants use checklists of children's names and key learning objectives to record the attainment observed in lessons and tests, including whether individual children have met/ exceeded/not achieved expectations.

**Reporting procedures**

An 'interim' report is sent out to parents mid-way through the Autumn term. This report identifies individual targets for the academic year.

There is an annual report which is sent out to parents towards the end of the Summer term. This is a detailed summative account of how the child has performed in all curricular areas, including science.

Informal meetings are arranged when necessary if the teachers feel that there are any concerns with a child's learning.

## Statutory Assessment

Year R teachers make and record an 'end of Early Years' assessment of each child against the Early Learning Goals in the Early Years Foundation Stage Profile.

Year 6 teachers make and record an 'end of KS2' assessment of each child against the KS2 Science Assessment Framework. This framework contains a number of 'pupil can' statements. To judge that a pupil is working at this standard in science, teachers need to have evidence that the pupil meets all of the 'working scientifically' statements and all of the 'science content' taught in the final year of the key stage.

## Monitoring, Evaluation and Review

**Monitoring and evaluation** activities will be carried out by the Headteacher and science leader.

This could include:

- Learning walks and lesson observations
- Scrutiny of medium and short term planning
- Scrutiny of work in children's books
- Talking with the children about their work, including asking them to discuss what they have recorded
- Homework monitoring
- Analysis of test data and assessment records
- Questionnaires: pupils/ staff/ governors/ parents/ carers
- A 'Deep Dive' into the science curriculum, teaching and learning.