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**BRIDGEWATER**  
PRIMARY SCHOOL

# Science Policy

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## **Intent - Aims**

Science teaches an understanding of natural phenomena. It aims to stimulate a child's curiosity in finding out why things happen in the way they do. It also satisfies this curiosity with knowledge. Because science links direct practical experience with ideas, it can engage learners at many levels. It teaches methods of enquiry and investigation to stimulate creative thought. Children learn to ask scientific questions and begin to appreciate the way in which scientific ideas contribute to technological change – impacting on industry, business and medicine to improve quality of life.

The objectives of teaching science are to enable children to:

- Ask and answer scientific questions
- Plan and carry out scientific investigations, using equipment (including technical devices) correctly
- Know and understand the life processes of living things
- Know and understand the physical processes of materials, electricity, light, sound and natural forces
- Know about the nature of the solar system, including the earth
- Evaluate evidence and present their conclusions clearly and accurately

The philosophy of teaching science:

- Children are naturally fascinated by the world around them. Science provides a means by which they can begin to make sense of the phenomena they encounter.
- By starting from children's first hand experience we aim to teach them how to formulate and answer their own questions. Children will learn that they can work scientifically without the need for specialised equipment or knowledge.

Children will learn about the tentative nature of scientific theories and the reflective and analytical nature of scientific thinking. These aims will run throughout the science curriculum. As children move through the school they will be taught more complex scientific skills and knowledge enabling them to enquire with an increasing depth of understanding.

## **Implementation - Teaching and Learning**

At Bridgewater we use a variety of teaching and learning styles in science lessons. Our principle aim is to develop children's knowledge, skills and understanding through enquiry and investigation.

Sometimes we do this through whole class teaching, while at other times we engage the children in an enquiry-based research activity. We encourage the children to ask, as well as answer, scientific questions. Children have the opportunity to use a variety of data, such as statistics, graphs, pictures and photographs. They use ICT in science lessons because it enhances their learning. Wherever possible, the pupils are involved in real scientific activities where they can work scientifically, for example when investigating a real problem in practical experiments and when analysing the results.

At Bridgewater we recognise that in all classes children have a wide range of scientific abilities, and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways:

- We set tasks which are open-ended and can have a variety of responses.
- We set tasks which can be adapted for different children either to increasing difficulty or support them.

- We group children by ability for some tasks, in mixed ability groups for others and independently for some tasks. Sometimes each type of grouping will have different activities, other times this may just include having additional support offered to them.
- We provide resources of different complexity, matched to the ability of the child.
- We use adults in the classroom to support the work of individual children or groups of children.

## **Curriculum Planning**

At Bridgewater the science curriculum is taught and planned as a discrete subject. We carry out our curriculum planning in science in three phases (long-term, medium-term and short-term).

- The long-term plan maps out the science topics studied each term during each year group.
- The medium-term/short term plans which we follow are primarily based on the Focus challenge curriculum. This has been adapted to plan for each lesson to have either a key knowledge or skills focus. Within each lesson, questions will be discussed relating to a specific objective. The outcomes may be differentiated for certain children in each class to ensure key objectives are covered.

Our science curriculum is planned in topics so that it builds on prior learning and ensures all the basic skills are developed. We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each topic. All children have access to knowledge mats for reference and consolidation of skill information and vocabulary.

## **Impact**

### **Foundation Stage**

The teaching of science in the nursery and reception classes is an integral part of the topic work covered throughout the year as part of their work towards the Early Learning Goals of Understanding the World. This is evidenced in photographs and tasks in a class floor book.

### **Key Stage One**

Pupils will observe, explore and ask questions about living things, materials and phenomena. They begin to work together to collect evidence to help them answer questions and to link this to simple scientific ideas. They evaluate evidence and consider whether tests or comparisons are fair. They use reference and ICT resources to find out more about scientific ideas. They share their ideas and communicate them using scientific language, drawings, charts and tables. Within each unit of work, the children will plan and record an investigation using the discovery dog format.

### **Key Stage Two**

Pupils learn about a wider range of living things, materials and phenomena. They begin to make links between ideas and to explain things using simple models and theories. They apply their knowledge and understanding of scientific ideas to familiar phenomena, everyday things and their personal health. They begin to think about the positive and negative effects of scientific and technological developments on the environment and in other contexts. They carry out more systematic investigations with a focus upon the way factors affect each other working on their own and with others.

They use a range of reference sources in their work, including text books, online resources and technology to support their learning. They talk about their work and its significance and communicate ideas using a wide range of scientific language, conventional diagrams, charts and graphs. Within each unit of work, the children plan and record an investigation.

## **Science Across the Curriculum:**

### *English*

Science contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. The children develop oral skills in science lessons through discussions and through recounting their observations of scientific experiments. They also learn new and specific scientific language. The children develop their writing skills through writing reports and projects and by recording information.

### *Mathematics*

Science contributes to the teaching of Maths through work in investigations. They learn to estimate and predict. They develop accuracy in their observations and recording events. Many of their answers and conclusions include numbers. The children also have the opportunity to record their result using various graphs and tables.

## **Science and Technology**

ICT enhances the teaching of Science in our school significantly, because there are some tasks for which ICT is particularly useful. It offers ways of impacting on learning which are not possible with other methods of teaching. Software is used to animate and model scientific concepts and allows children to investigate processes which would be impossible to do directly in the classroom otherwise. Data loggers are used to assist, in the collection of data and in producing tables and graphs. Children use devices to record, present and interpret data, to review, modify and evaluate their work. Children learn how to find, select and analyse information on the internet.

## **Science and Inclusion**

At Bridgewater we teach science to all children, whatever their ability and individual needs. Science forms part of the school curriculum policy to provide a broad and balanced education to all children and we acknowledge that learners with additional needs are likely to experience difficulties within their learning which may act as barriers. Through our science teaching, we provide learning opportunities that enable all pupils to make good progress by the adapting teaching of Science to suit the needs of all pupils. We strive hard to meet the needs of those pupils with special educational needs and those pupils with disabilities, those with special gifts and talents and those with English as an additional language. Teachers carefully consider these adaptations – see below.

| <b>Cognition and Learning:</b>  |  |
|---|--|
| <b>Barriers</b>   | <b>Provision</b>   |
| Information may not be understood or retained<br><br>Memory/ consolidation skills | <ul style="list-style-type: none"><li>• Prepare the children prior to the lesson with a pre- teach introducing key knowledge/vocabulary.</li><li>• Consider the accessibility of science demonstrations. Plan the demonstration area so that it is clearly laid out, uncluttered and gives all children a clear view.</li><li>• Use the working walls and whiteboard to show the focus of each lesson and how it fits in the sequence of lessons. How do lessons link together to develop their scientific knowledge?</li><li>• Use symbols, images or objects to make it more accessible.</li></ul> |

|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• Invite children to list the key points from the lesson under specific headings – e.g. in an investigation: what they were trying to find out, how they went about it, how they controlled the variables, what happened, suggested reasons for what happened and what they will do next? Review the key knowledge from the lesson.</li> <li>• Use mnemonics to help children remember things like the order of the colours in a rainbow or the orders of the planets.</li> <li>• Encourage the use of mind maps/pictures/flow charts.</li> </ul>   |
| <b>Communication and Interaction</b>   |  |
| <b>Barriers</b>  | <b>Provision</b>   |
| Understanding and using scientific vocabulary  | <ul style="list-style-type: none"> <li>• Recognise that the language of science may be challenging for many children – for example: The specific scientific use of everyday words such as ‘weight’, or terms specific to science, such as ‘electrical circuit’.</li> <li>• Pre-teach key vocabulary, then ensure multiple and regular exposure to these words including referring to knowledge mat and make them clearly visual in the classroom environment.</li> <li>• Label equipment with a symbol and word (dual coding)</li> <li>• Explicitly teach the meaning of key scientific vocabulary in lessons.</li> <li>• Check children’s’ understanding by inviting them to reformulate explanations in their own words or in other ways. For example, after an investigation of floating and sinking, ask children to explain what happened using diagrams, as well as explaining it orally or in writing. Use vocabulary flashcards and prompts.</li> <li>• Use real objects where possible as a starting point for developing the concepts and the language needed to describe, discuss and explain what pupils have observed or experienced.</li> <li>• Give children time to process and formulate their answers to questions before responding.</li> </ul> |
| <b>Physical and Sensory</b>  |  |
| <b>Barriers</b>  | <b>Provision</b>   |
| Difficulties impacting eyesight, hearing, movement, touch etc.<br><br>Sensory processing difficulties. | <ul style="list-style-type: none"> <li>• Check safety procedures are understood.</li> <li>• Label new equipment and processes to help develop vocabulary.</li> <li>• Colour water so it is easier to see.</li> <li>• Consider ventilation and positioning of children for anything that may have an odour.</li> <li>• Pre-teach showing/experiencing anything that may have sensory implications -eg videos of heart, handling different materials.</li> <li>• Consider children hard of hearing when teaching sound – follow guidance to develop children’s understanding of how sound travels.</li> <li>• Use of sensory aids as part of usual provision eg gloves, audio/visual support.</li> <li>• Consider pupil sensory audits and adaptations.</li> <li>• Use of standing desks, wobble boards, flexibility over where children write, thera-bands, writing slopes.</li> </ul>  |

| <b>Social Emotional and Mental Health</b>               |  |
|---|--|
| <b>Barriers</b>   | <b>Provision</b>   |
| Anxiety<br><br>Participation/ safety/<br>practical work | <ul style="list-style-type: none"> <li>• Consistency of approach reduces children’s anxiety - it allows children to predict what will happen.</li> <li>• Provide an overview of the lesson elements so the children know what is coming.</li> <li>• Pre-teach the child some of the elements of the lesson etc.</li> <li>• Consider carefully the groupings – prepare the children by ensuring they are aware of the group they will be working in. Assign roles to each member of the group with a clear outline of job roles.</li> <li>• Specifically teach the skills of cooperation and interaction for practical work.</li> <li>• When organising a practical session consider: - how you establish investigation routines - the level of supervision needed - consider the resources available – does there need to be close supervision? Do some resources need limiting? - how will resources be organised in the classroom – from a central point or at the table? - how the task can be broken down into manageable steps and the best way to present any instructions e.g. some children prefer diagrams, others a checklist.</li> <li>• Opportunities to develop social skills including being taught these discretely to support engagement in group work and collaborative learning.</li> <li>• Use of PSHE to discuss healthy relationships, promote wellbeing and explore emotive topics within learning.</li> </ul> |

## **Health and Safety**

Children at Bridgewater are taught how to use equipment safely and handle things with respect. They are taught how to use materials economically and to clean up after themselves with regard to the needs of other people.

## **Assessment for Learning**

At Bridgewater teachers are assessing children’s work by making informal judgements during lessons continuously. On completion of a piece of work, the teacher assesses it and makes a judgement about that pupil which informs future planning. Written and verbal feedback is given to each child to help guide their progress. Older children are encouraged to make judgements about how they can improve their work.

### *Formative and Summative Assessment*

Teacher assessments are carried out at the end of each year where the teacher states on the schools assessment system (O Track) if the children are working below, at or above age related expectations.

### *Statutory Assessment*

Teachers make an assessment of science work at the end of Key Stage One and Key Stage two.

## **Resources**

Resources are stored in topic boxes which are kept in a resource cupboard. It is the responsibility of staff to ensure that resources are cared for and if anything is needed, this is monitored by the science co-ordinator. Teachers can make a request to the Science co-ordinator if additional / replacement equipment is needed.

### **Monitoring and Review**

It is the responsibility of the Science Co-ordinator to monitor the standards of children's work and the quality of teaching in science. The co-ordinator is also responsible for supporting colleagues in their teaching, for being informed about current developments in the subject and for providing a strategic lead and direction for science in the school. The coordinator gives the head teacher an annual summary report in which the strengths and weaknesses of science are evaluated and indicates areas for further development.

This policy will be reviewed annually.