



### Science Policy

#### Rationale

*"Science has changed our lives and is vital to the world's future prosperity, and all pupils should 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. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes." – National Curriculum*

Children are naturally curious about their environment. Through science we aim to promote curiosity and open mindedness. Children develop knowledge of the world in which they live. They gain skills of observing, questioning and communicating. They learn to work collaboratively and learn to reflect on their attitudes and opinions.

#### Purposes

- To teach the essential elements of knowledge outlined in the National Curriculum.
- To develop investigative skills of: planning, predicting and testing.
- To develop children's ability to observe closely using simple equipment, a skill needed across the curriculum.
- To encourage children to ask questions and recognise that they can be answered in different ways. Children who ask questions are self-motivated and can direct their own learning.
- To provide opportunities for children to think, logically, intuitively and to be reflective.
- To problem solving, by finding ways to answer scientific questions.
- To identify and classify into specific groups.
- To applying number, through collecting and considering data.
- To develop children's ability to communicate by listening, giving verbal explanations, questioning and recording with drawings, charts or in writing.
- To working collaboratively, discussing ideas and outcomes.
- To acquire knowledge of objects and phenomena of our world; knowledge of why objects and living things in our environment behave as they do and acquire the knowledge of 'how to' e.g. make a circuit.
- To improving own learning and work, by reflecting on what they have done.
- To encourage attitudes of perseverance, concentration, independence, responsibility and open mindedness.
- To create an atmosphere in which children have confidence to try out their ideas.
- Ensure that all children have equal opportunity for practical experiment.
- To provide an exciting and stimulating environment.
- Ensure that activities are carried out with due regard to safety.
- To read and spell scientific vocabulary



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### Guidelines

1. Science will be taught for a minimum number of hours per week:

- **Key Stage 1:**  
Years 1 and 2: 2 hours per week

*The teaching of Science should take place within a learning environment, in which all children make as much academic ('maximised value added') progress as possible. It should be taught systematically and methodically each week, adhering to the governing principles, detailed below - within a caring and supportive climate, providing all children with an equitable, standardised, balanced, child-centred, ICT-rich curriculum. However, with time and maturity, and the rise in contextual value added progress that children and teachers will make as a result, progressively more reflective practitioners will utilise 'assessment for learning' information to engender an increasingly more diverse, rich and personalised learning culture within this framework. Accordingly, practitioners may well decide, within this context, to customise their own planning and teaching. Teachers may use assessment for learning information to provide a more reflective and responsive curriculum for their class, engendering personalised learning opportunities to identify and tackle the needs of individuals and groups of children to maximise learning opportunities. Similarly, teachers may decide within their year group to adjust the timings of individual lessons. On occasion, it will be appropriate to have a series of short lessons and, at others, children may require time to develop ideas, and refine and consolidate learning within a more sustained period.*

2. In Key Stage 1 teachers will refer to the School's Scheme of Work. Programmes of study references are attached to each unit along with relevant attainment targets. In the Foundation Stage, teachers will also refer to the EYFS Curriculum when mapping the provision for this subject.
3. The Medium Term Plans map out the learning intentions for each unit from the National Curriculum. Each topic begins by giving children the opportunity to explore from their own experiences situations, which embody important scientific ideas, the 'Starter Activity'.
4. In Key Stage 1, Science is taught by means of a "Whole Class Interactive" approach to learning, employing a lively pace and an episodic style of teaching, with a high emphasis on oracy, class participation and effective pupil/teacher demonstration and modelling.
5. Science will be taught *systematically* yet within a caring and supportive climate, where children feel sufficiently secure to take risks.
6. Within the different episodes of the Whole Class Interactive Teaching lesson, teachers will skilfully use differentiated questioning to:
  - i. engage children in effective pupil demonstration and modelling;
  - ii. scaffold children through extended dialogue, to improve oracy skills, enhance self-esteem and to extend their children's learning through giving extended responses;
  - iii. identify assessment for learning information, to gauge understanding and to re-focus teaching, if necessary;
  - iv. offer children focused feedback.
7. Teaching experiences, through which pupils acquire an understanding of Science, must be wide and varied; and will include teacher exposition, guided practise, consolidation of skills and routines, practical and investigative work, discussion and recording.



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8. Short term plans should state clearly the learning intention in 'child speak' and the learning intention must be shared with the class, so that children know what they are expected to learn. The teacher must be sure of the learning purpose of the lesson.
9. Wherever possible, questioning and discussion should be encouraged between pupil and adult, and pupil and pupil.
10. Ensure that the classroom environment supports the work of each unit with pictures, objects, and displays and practical activities to support learning. Using first hand experiences wherever possible. Displays can stimulate enquiry and classification e.g. a table with objects to sort or present recorded results or display successful work. Make equipment easily accessible and ensure that children are taught how to use it carefully and safely.
11. Observation is a skill central to all scientific activities. Observation cannot be taken for granted and needs constant reinforcement. Children need help to observe effectively and to notice detail. Give children plenty of time and encourage the use of all the senses when making close observations. Talk about observations; draw attention to detail; ask questions about e.g. size, shape, texture, colour, smell, changes that occur, and movement. Children usually offer more differences than similarities in their observations. They will need help and encouragement to notice similarities. When children begin to see similarities they are moving towards classifying objects and phenomena. Children should be helped to expand their skill by measuring weight, and length, using a magnifying glass and making records of their observations. Establish a positive environment where all observations are valued is one of the best ways to encourage children to express their ideas.
12. Questioning skills help us cope with the complexities of our environment. The more questions children ask, and follow up, the more they make sense of the world.
  - Teachers should provide children with examples of questions, through the questions they ask. Allow time for children to frame their own questions.
  - Make displays with questions for children to ponder and explore.
  - Have a question of the week.
  - Make questions to link to information books,
  - Use class discussion to encourage children to talk about something interesting they have observed and consider the questions it prompts.
  - Asking questions can be daunting. Questions can sometimes reveal ignorance, or inattention and can leave the questioner feeling vulnerable. Children's questions must be valued by showing approval for all questions.
13. Teacher's questioning can be either productive or unproductive in encouraging children's learning in science. Productive questions lead children to enquiry. They come in different forms:
  - **Attention focussing questions:** e.g. 'Have you seen?' 'Did you notice?'
  - These types of questions draw children's attention to detail.
  - **Measuring and counting questions:** 'How many?' 'How heavy?' 'How often?'
  - Children can learn new skills for using apparatus. There are many situations in which these questions arise and they lead to comparisons.
  - **Comparison questions:** 'How are these alike?' 'How do these differ?'



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- Action questions 'What do you think will happen if?'

14. Teachers will need to model the skills required to carry out investigations. Demonstrating by 'thinking aloud' how to plan an investigation, predicting what might happen and showing enthusiasm and open mindedness when carrying out the enquiry. Questions, which begin 'I wonder why?' will develop an enquiring classroom.
15. Children need a wide range of opportunities to practise and develop classifying skills. Give the children opportunities to classify objects in different ways. Children who lack confidence should be given a reduced number of objects to classify.
16. Children need opportunities to share their knowledge with others, through, brainstorming, discussions, reporting at the end of a task, written records, displayed work. Written tasks must be planned and purposeful, with a range of tasks e.g. diaries, descriptions, written questions, labelled drawings, maths sets and graphs, photographs and iPads.
17. Ensure that all living things are respected, handled with care and returned to their natural habitat. School pets must be treated with the greatest care.
18. Formative assessment is based on the children's performance against the learning intentions for each lesson and should be recorded on the teacher's short-term plans.
19. "End of Unit Assessments" will take place at the end of each Unit of Study. Teachers will give a "best fit" level for the attainment of each child in the Unit of Study previously taught. This judgement will be based on a combination of the teacher's own knowledge of that child's achievements in the Unit of Study as a whole, their formative assessment notes, as well as any formal or informal observations that might take place. Teachers will need to decide on a "best fit" level, drawing upon their own 'assessment for learning' information.
20. Equal opportunities must be given in the design and implementation of the Science curriculum. Certain scientific concepts (e.g. ourselves) encourage the need for sensitivity to others, value the individual and highlight similarities between us. Learning materials should reflect diversity of cultures. Exploring food and diet provides an opportunity for gaining knowledge of other cultures, by using diverse foods such as mangoes, pitta bread, and hummus. Similarly work on sound gives opportunities to use instruments from different cultures.
21. All children need positive feedback to reinforce their knowledge and self-confidence and activities may need to be modified to ensure that all children can participate.
22. When marking children's work, teachers should focus on the correct *scientific terminology*. Where children have used incorrect scientific terminology, the class teacher will need to amend as appropriate. On occasion, a question might be a good prompt to extend or deepen children's thinking. Where possible, teachers should also provide a literacy-based writing target. Care must be taken to ensure that recorded work is scientifically accurate; we want children to write as Scientists! Teachers should be mindful that writing with misplaced literary effect can overshadow, distract or dilute scientific content and accuracy.





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23. It is the class teacher's responsibility to familiarise themselves with any safety precautions relevant to experiments in class, found in the Nuffield Teachers' Guides. Teachers are responsible for the safety of children in their class and must ensure that equipment is used safely and that care is taken when handling living creatures.

24. Teachers will integrate ICT wherever appropriate into all lessons:

- a. Within the various episodes of the Teaching & Guided Practice Segment:
    - as a tool to aid the teaching of key skills; engage children, engender pupil modelling & demonstration and to enhance oracy.
  - b. Within the Child Consolidation Segment:
    - enabling children to undertake an ICT-based alternative activity, directly consolidating the learning intention for that lesson;
- or
- to provide an activity which consolidates the lesson's learning intention, whilst at the same time embedding skills linked to that week's ICT lesson.

Within this manner, ICT will be employed as a vehicle to engender oracy, independent and collaboration worked and personalised learning, linked to this subject.