



Fir tree Junior School Science Policy

Science encourages children to question the world they live in. Through the framework of the National Curriculum, Fir Tree Junior School aims to teach the knowledge and understanding of natural phenomena through scientific enquiry while inspiring a lifelong desire to question, investigate and explore the natural world.

1. Our aims are:

- To build upon children's enthusiasm and curiosity surrounding the natural world.
- To enable children to develop their scientific knowledge and conceptual understanding through cross-curricular projects.
- To provide children with a school curriculum that develops an understanding of the nature, processes and methods of science through practical scientific enquiries.
- To promote the recognition of science's contribution to all aspects of every-day life and provide children with an appreciation of the uses and implications of science for the world today and in the future.
- To support children to utilise the vocabulary of science.
- To ensure that teachers and children are aware of the health and safety risks and concerns surrounding science learning.
- To encourage children to ask and answer scientific questions.

2. These aims will be achieved in the following ways:

To build upon children's enthusiasm and curiosity surrounding the natural world

- Science teaching instils in children a general sense of enquiry working towards an ability to independently question their science learning.
- Children are encouraged to bring their own ideas and suggestions to their science learning; having the opportunity to share their current knowledge with their peers.
- Children's enthusiasm is heightened by science events such as competitions and organised science days and science clubs.
- Children's curiosity surrounding the natural world is built upon through the chances to investigate their own questions.
- Innovative teaching methods are used to bring children's science learning alive, including science storytelling.
- Children have opportunities to work with external experts to learn more about the natural world.

To enable children to develop their scientific knowledge and conceptual understanding through cross-curricular projects

- As science pervades every aspect of life, our curriculum takes a cross-curricular approach to teaching and learning where children are taught their subjects through projects, which link in a meaningful and purposeful way. Where parts of the science National Curriculum do not fit easily into the projects that are being covered, science is taught discretely. Learning opportunities stem from real-life contexts to maximise children's engagement with and enthusiasm to study science.
- The Working Scientifically aspect of the National Curriculum is incorporated throughout each science area of learning to enrich the children's understanding within an appropriate context.
- On average two hours of science is taught per week.
- Children make links between their science learning. For example, they are encouraged to predict likely outcomes of their investigations through linking with their prior knowledge.

- Teachers begin a new science project by ascertaining what children already know and the following planning and teaching results from this. The methods used may include completing concept maps cartoons and mind maps, playing games, drawing and labelling diagrams.
- Science learning opportunities enable children to apply their mathematical knowledge to their understanding of science including collecting, presenting and analysing data.
- Children are provided with opportunities to develop their English skills through speaking and listening while describing and explaining their science learning as well as writing skills where appropriate.
- Children's science learning is enhanced through developing relevant computing skills. This includes locating and researching information, recording findings, logging changes over time, the use of calculators, digital cameras, laptops, iPads, data loggers and interactive whiteboards. In addition to this, the children have opportunities to share their findings, ideas and data collections using computer software which they can use present their knowledge to their peers.
- Throughout science lessons, children have the opportunity to develop key social skills and values such as teamwork and tolerance by completing investigation and working in groups.

To provide children with a school curriculum that develops an understanding of the nature, processes and methods of science through practical scientific enquiries

- Children are taught the skills of Working Scientifically within the National Curriculum content of biology, chemistry and physics. Working Scientifically focuses on the key features of scientific enquiry and enables children to use a variety of approaches to answer relevant scientific questions.
- The types of scientific enquiry taught include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations) and researching using secondary sources.
- Through these types of scientific enquiry, children are taught to use the following scientific methods:
 - Asking relevant questions and suggesting ways to find answers to them through collecting, analysing and presenting data
 - Planning and setting up practical enquiries, comparative and fair tests
 - Making predictions using previous science learning and experiences
 - Making observations and taking measurements linked to mathematics learning, with a range of equipment
 - Gathering, recording, classifying and presenting data in a variety of ways to answer questions
 - Recording data and results using scientific language, drawings, labelled diagrams, keys, bar and line graphs, classification keys, scatter graphs and tables
 - Presenting findings from enquiries including conclusions, causal relationships and explanations of their results, both orally and written
 - Using results to make conclusions, suggesting improvements, making predictions for further investigations and raising new questions
 - Identifying differences, similarities or changes related to scientific ideas or processes.
 - Identifying scientific evidence and using this to answer questions and to support or refute ideas or arguments
- Children are presented with a range of scientific experiences to enable them to make decisions about their investigations and raise their own questions and ideas about the world around them.
- Children are encouraged and taught to:
 - Make decisions about the most appropriate type of scientific enquiry to answer a question
 - Recognise when a fair test is necessary and decide how to set it up

- Think about criteria for grouping, sorting and classifying
 - Look for patterns and relationships and decide how to identify them
 - Make decisions about what observations to make, how long to make them for and what equipment is necessary
- Children are taught how to use a range of scientific equipment appropriately and with increasing accuracy and precision.
 - We recognise the value of experiential and outdoor learning and the school's curriculum reflects this. Teacher's make use of the outdoor areas in the school grounds such as the Fir Tree Forest, Pond, the Sensory Garden and the Kinder Garden.
 - Where experiential learning is not possible or where it would be enhanced by observing the phenomena in more than one way, children are taught through secondary sources including the internet, books and videos. For example, in addition to children growing their own plants, time lapse videos are used to show the speeded-up process of seeds germinating over a period of days.
 - Through Working Scientifically with their peers and independently, children develop life skills and values including perseverance, co-operation, respect and communication.

To promote the recognition of science's contribution to all aspects of every-day life and provide children with an appreciation of the uses and implications of science for the world today and in the future.

- We value the importance of children being able to make contextual links in their science learning and understanding how it relates to their everyday life. Opportunities are made for children to link their learning to their knowledge of how things work as well as how science is used in certain careers. One example of how this is achieved is through the utilization of science experts and enthusiasts including ambassadors from STEM Net and parent volunteers.
- Teachers enable children to develop a knowledge and appreciation of the contributions made by famous and notable scientists from all countries and cultures.
- Teachers make children aware of relevant and current science events or research.
- As part of our Science Club the children have the opportunity to contribute to research for Universities through the BBC Terrific Scientific Programme.

To support children to utilise the vocabulary of science

- We recognise the importance of spoken language in children's development across the whole curriculum.
- Children are taught to use scientific vocabulary. Teachers model the correct use of scientific vocabulary consistently as well as using a variety of engaging methods to teach the meanings Children are taught to read, spell and pronounce scientific words correctly. Incorrect spellings of science words in work books are corrected using the school's marking policy.
- Children describe scientific processes and characteristics using technical terminology resulting in them building up an extended bank of specialist vocabulary. To encourage the children to use this vocabulary, examples of key terminology can be found in the children's science books.
- Children are given opportunities to engage in quality discussions surrounding their science learning in order for them to hear and practice the use of the correct terminology in context while developing their scientific vocabulary and explaining scientific concepts.
- Discussion is used as a valuable opportunity for teachers to help children to clarify their thinking as well as an opportunity to identify any scientific misconceptions.
- To provide consistency with the terminology used in school and at home, science vocabulary sheets are provided on class areas of the school website when the project is covered. In addition to this, all vocabulary sheets are accessible on the science curriculum area of the school website.

To ensure that teachers and children are aware of the health and safety risks and concerns surrounding science learning

- Children are made aware of the need for personal and group safety through the correct usage and storage of resources.
- If teachers have health and safety concerns about any activity, they complete a risk assessment and seek guidance from the School Manager and Headteacher before proceeding. This is also the case for external visitors who complete investigation within school.
- Teachers refer to the guidance provided by the 'Be Safe' document published by The Association for Science Education.
- Where appropriate, children are briefed on the safety considerations before carrying out activities and are given appropriate reminders about the potential hazards relating to the equipment they are using.
- Teachers are aware of the individual allergies of children in their care and take this into account in the planning of their science lessons.
- Any science visits are planned with due regard to the school policy on taking children on visits. Local Authority guidance is sought on visits involving farms.

To encourage children to ask and answer scientific questions

- Children are encouraged to ask questions about their science learning to enable them to investigate areas of their science learning which interest them personally. This enables them to have more control over their learning and to take ownership of it.
- Children's questions are recognised and given the value and importance that they deserve.
- Children's questions enable teachers to make judgements about their understanding and indicate any misconceptions.
- Our curriculum enables children to develop valuable life skills to enable them to grow into adults who have the confidence to question the world that they live in.

3.Planning, Assessment and Progression

- Teachers continuously assess children's learning formatively against the learning outcome in each science lesson; through learning evidence in children's science workbooks, teacher observation and through targeted and open questioning.
- Teachers are provided with short term planning sheets outlining the National Curriculum requirements for each project, which is then broken down into the learning outcomes for each lesson. This is used as a working document where teachers are able to make formative notes and judgements on children's learning to inform their summative assessments.
- We recognise the importance of Assessment for Learning strategies so that teachers and children are aware of the next steps and how to improve. This includes making the learning outcomes explicit and shared with the children; the use of peer and self-assessment and the assurance that children are actively engaged with their learning and given verbal and written feedback.
- Children are involved in their own target setting. Their targets come from the National Curriculum which are broken down in to key areas of science learning for each year group. Within each curriculum area, the children have an opportunity to select a target which they feel is appropriate to them using the 'Beginner, Competent, Proficient and Expert' challenge levels. These targets are stuck in the front of children's books so that they are accessible at all times to teachers and children. At the start of each project, the child will discuss the targets for this science project with their teacher and select the most appropriate target for their current knowledge and what they would like to achieve during the project. This will then be reviewed by the teacher and child at the end of each science project to show the progress that has been made.
- There is an Annual Science Plan that covers the different science projects that each year group will complete. This is available on the school website.

- The class teachers use the Annual Science Plan to inform their medium-term and short-term science planning.
- Parents and carers are informed of the coverage of science through project maps that outline the content taught to each class in each project. In addition to this, information about the coverage of science over the year for each year group can be found on the parent overviews that are on the class pages of the website.
- Teachers moderate expectations for assessment three times a year during the assigned assessment weeks.

4. Marking and Recording

- Teachers mark science work following the school's marking policy.
- Due to the practical nature of science learning, recording can take many forms:
 - Investigations can be recorded as a wall display using photographs of the children and photocopies of the data
 - Photographs in children's science workbooks
 - The explicit teaching of science vocabulary may be through activities such as word searches, poems, quizzes or games
 - Children's science books will have evidence of science learning that develops mathematical and computing skills and science learning that links to English skills. This may include instructions or explanation writing
- Teachers are aware that recording should not be a barrier to science learning; therefore teachers adapt recording methods to suit individual children. For example children may present their learning through voice recordings, photographs and videos using iPads and cameras.
- Where science learning is practical and not reflected in physical evidence, children demonstrate their learning through writing the learning outcome in their science workbooks along with a sentence to clarify what they have learnt or what they have improved.
- Where appropriate, children may self-assess or peer-assess their own or other's work.

5. Inclusion and Equal Opportunities

- This policy should be read in conjunction with the Special Educational Needs Policy and the Equality Policy.
- Planning and the teaching of science is differentiated according to ability and need, including Gifted and Talented needs. Resources and a range of teaching methods are used to promote inclusion for all children.

6. Role of the Science Subject Leader

The Science Subject Leader is responsible for:

- Providing professional leadership and management for science. This includes feedback from courses attended.
- Monitoring the teaching and learning of science through book scrutinies, learning walks and discussions with teachers and children.
- Managing and maintaining the science resources by ensuring that they meet the needs of the curriculum; are available for use and are in safe working order.
- Ensuring that there is coverage of the National Curriculum for science through creating an Annual Science Plan that is distributed to members of staff and is available on the school website.
- Liaising with other Science Subject Leaders within the partnership to share methods of good practice.
- Organising STEM Net Ambassadors and external visitors or agencies to visit children in each year group to promote the learning of science within school and the links to the professional world.