

INGLEBY MILL PRIMARY SCHOOL SCIENCE POLICY



Date of review	Date of next review
September 2015	September 2018

Ingleby Mill Primary School Science Policy Philosophy and Ethos:

We believe that science provides the foundation for children to make advances in biology, chemistry, physics and in technology, providing the basis for improving our future lives. Science fosters a healthy curiosity in children about the world we all live in and the wider universe, additionally promoting respect for living things. Science allows children to develop their own original ideas and a questioning attitude. In science, pupils are encouraged to be open-minded and to try and make sense of what they see and find out through practical investigations and activities.

'A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. 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.'
(Maintaining curiosity 2013)

Through the programmes of study in accordance with the new 2015 National Curriculum, guidelines, children will develop and progress skills throughout their Primary years.

Aims and Objectives:

We live in a scientific and technological age where children need to acquire the knowledge, skills and attitudes to prepare them for life in the 21st century. At Ingleby Mill Primary School we believe that the teaching of science develops in children an interest and curiosity about the world in which they live, fosters in them a respect for the environment and promotes thinking skills and problem solving.

Teaching and learning in science aims to offer each child opportunities to:

1. explore concepts through practical activities or secondary resources including computing
2. participate in practical first hand investigations and science and move towards investigating their own scientific questions.
3. extend and develop specialist scientific vocabulary and technical terminology including notation and symbols;
4. plan a range of fair tests in order to investigate ideas;
5. work safely and take action to control risks;
6. make predictions and hypotheses based upon previous scientific knowledge
7. use the appropriate apparatus and instruments to carry out a test and make accurate measurements using standard measures;
8. observe closely i.e. take careful measurements, watch chemical changes carefully and describe changes over time.;
9. record and present findings in a variety of ways including diagrams, graphs, tables, charts and orally. Ensure children apply an appropriate challenging level of mathematics that demonstrates secure links with concepts.
10. explain events and phenomena in terms of their own ideas and in terms of accepted ideas or models;

11. appreciate investigational techniques and suggest improvements to methods to increase reliability;
12. consider whether results support predictions made;
13. apply what they have learnt to new or similar situations.
14. develop and utilise the 'outdoor classroom' to reinforce green and eco links and support a wide range of concepts studied.
15. see themselves as scientists and relate this to future careers.
16. make appropriate and relevant links with local industry and transitions to Key Stage 3.

Ethos

- Enjoy science, have fun and develop and maintain a sense of curiosity.
- Equip children to use themselves as starting points for learning about science, and to build on their enthusiasm and natural sense of wonder about the world. Children begin to relate new knowledge to their everyday experiences.
- To enable children to appreciate that we do not always know the answers and results when carrying out scientific enquiry.

Learning

- Learn about the ways of thinking and of finding out about communicating ideas; provide all children to work within a range of groupings considered most appropriate for the given task – to develop independence and co-operation.
- Learn through a range of differentiated activities and learning styles.
- Have high expectations of quality of work.
- Select and use appropriate evaluation procedures and retain sufficient records of pupil achievement in Science.
- Develop through practical work the skills of observation, prediction, investigation, interpretation, communication, questioning and hypothesizing, and increased use of precise measurement skills and computing.
- Encourage and enable pupils to offer their own suggestions, and to be creative in their approach to science, and to gain enjoyment from their scientific work. Enable children to develop their skills of co-operation through working with others, and to encourage where possible, ways for children to explore science in forms which are relevant and meaningful to them.
- Teach scientific enquiry through contexts taken from the National Curriculum for science.
- Encourage children to collect relevant evidence and to question outcome and to persevere.
- Stress the need for personal and group safety by the correct usage and storage of resources.
- Record work in a variety of ways to reflect ability, creativity and purpose

Science in the world

- To link appropriate science, computing, maths to engineering projects (for example, annual themed Science and Engineering week)
- Work to reflect cross curricular subjects where appropriate.
- Explore values and attitudes through science.
- Become aware of a historical viewpoint and how science and famous scientists have shaped our world.
- Consider how science influences the world we live in through industrial links with local companies.
- Encourage children to treat the living and non-living environment with respect and sensitivity. Be proactive in their response to care for our local and global environment.
- Develop an awareness of sustainability and environmental issues. (through trips and cultivation of raised beds and garden areas in school grounds)

The aims and purposes to be developed are expanded below

Knowledge and understanding

Children should:

1. be curious about things they observe, and experience and explore the world about them with all of their senses;
2. use this experience to develop their understanding of key scientific ideas and make links between phenomena and experiences;
3. begin to think about models to represent things they cannot directly experience
4. try to make sense of phenomena, seeking explanations and thinking critically about claims and ideas.
5. relate and apply their scientific knowledge to their surroundings and own personal experiences

Processes and skills

Children should:

1. acquire and refine the practical skills needed to investigate questions safely;
2. develop skills of predicting, asking questions, making inferences, concluding and evaluating based on evidence and understanding and use these skills in investigative work;
3. practise mathematical skills in real concepts;
4. learn why numerical and mathematical skills are useful and helpful to understanding.

Language and communication

Children should:

1. think creatively about science and enjoy trying to make sense of phenomena;
2. develop language skills through talking about their work and presenting their own ideas using sustained and systematic writing of different kinds;
3. use scientific and mathematical language including technical vocabulary and conventions, and draw diagrams and charts to communicate scientific ideas;

4. read non-fiction and extract information from sources such as reference books or CD ROMS;
5. involve the use of computing for retrieving information and presenting results and conclusions where possible. Work in accordance with IMPS Internet safety guidelines.

Values and attitudes

Children should:

1. work with others, listen to their ideas and treat these with respect;
2. develop respect for evidence and evaluate critically ideas which may or may not fit evidence available;
3. develop a respect for the environment and living things and for their own health and safety;
4. develop an appreciation of the contribution science makes, and has made, to society and to our surroundings and personal health.

Equal Opportunities:

At Ingleby Mill Primary School we are committed to providing all children with an equal entitlement to scientific activities and opportunities regardless of race, gender, culture or class. (See Equal Opportunities Policy, School Mission Statement and Racial Equality Policy)

Inclusion:

In school we aim to meet the needs of all our children by differentiation in our science planning and in providing a variety of approaches and tasks appropriate to ability levels. This will enable children with learning and/or physical difficulties to take an active part in scientific learning and practical activities and investigations and to achieve the goals they have been set. Some children may require more adult support to allow them to progress whilst more able children will be extended through differentiated activities. Through enhancing and enriching activities, more able children will be able to progress to a higher level of knowledge and understanding appropriate to their abilities.

Children with special needs:

Less able children should be provided with the opportunity to/be encouraged to:

- record ideas diagrammatically or in list form;
- work orally where possible;
- be involved in practical experimentation and/ or investigations as much as possible.

More able and talented children should be provided with the opportunity to/be encouraged to:

- be asked stretching questions during exploration/investigations to encourage hypothesising extending identification of variables, measuring with increasing accuracy, explaining fair tests and drawing conclusions using more complex knowledge and understanding;
- use secondary sources to support conclusions from explorations and investigations;
- be introduced to increasingly specific vocabulary within topics; be encouraged to assess experimental techniques; plan investigations with limited direction from the teacher

Gifted and Talented Pupils

Children with much higher-than-average ability are identified by class teachers, and opportunities are provided to extend their skills by:

- Setting work that is more challenging
- Providing investigational work that encourages initiative, self direction and stimulates originality.
- Developing higher-level thinking skills.

Assessment and Record Keeping:

Assessment for learning is continuous throughout the planning, teaching and learning cycle. Children's progress is continually monitored and tracked throughout their time at Ingleby Mill Primary School School.

However children are more formally assessed half termly in Foundation Stage, KS1 and KS2 using a variety of methods:-

- Observing children at work, individually, in pairs, in a group, and in classes.
- Questioning, talking and listening to children
- Considering work/materials / investigations produced by children together with discussion about this with them.

Assessment for Learning

Planning should provide opportunities for both learner and teacher to obtain and use information about progress towards learning goals.

- Assessment for Learning should be flexible in responding to emerging skills and ideas.
- Planning and marking should include strategies to ensure learners understand their learning goals based on given criteria. What are learners trying to achieve and how they will achieve it. ('I can' statements and Fix It)
- Assessment criteria is communicated through discussions, examples of how criteria can be met and providing opportunities for children to be involved in peer and self-assessment, enabling children to become reflective and responsible for their own learning.
- Children should be able to recognise their next steps in their learning
- Learners should receive feedback through constructive marking comments in line with IMPS marking policy.
- Assessment for learning should encourage motivation through promoting and recognising progress and achievement.

Health and Safety:

All staff are responsible for the safety and wellbeing of children in their care. Activities, lessons and trips should adhere to Ingleby Mill Primary School safety policies and LEA guidelines. Tools, equipment and resources should be used in accordance with these guidelines. Extra caution should be used when using tools, flames, hot water or glass equipment.

Children themselves should also be taught about dangers and hazards, considering risks to themselves and others as part of their investigation process.

Any trips should be planned with due regard to the school policy on taking children on outings. Risk assessments for trips should be completed and passed to senior management before trips commence in line with school policy. LEA guidelines should be considered with regard to trips to farms and industrial links. A risk assessment should also be included from the proposed site, where appropriate. LEA guidance may need to be sought on trips involving farms etc

In school Health and Safety must always be an important consideration in the teaching and learning of science and some practical sessions do require particular precautions to be observed. Any particular safety implications should be considered and highlighted in long and short term planning. Teachers are also advised to follow guidelines set out in the 'Be Safe' booklet that is published by the Association for Science Education

Teachers should take particular care when using the following,

- Flames, hot water and other hot items.
- Tools with sharp points and edges.
- Glass (this should only be used with years 5 and 6 when the activity requires it and no alternative can be used.)
- Animals and micro organisms (always find out what the special precautions required are).

Activities that are safe on a Monday morning may be less so on a Friday afternoon, or after a wet play and this should be taken into consideration when planning. Particularly important safety points should be noted down on the planning for the lesson.

Safety precautions should be explained to the children, as this is good training for the hazards they will meet in future and is required by the National Curriculum Programme of study for Science.

Planning: progression and continuity

Progression

Progression throughout the school will be achieved through the New National Curriculum skills and knowledge based topics.

Experimental and Investigative Science

Children lacking experience of investigations and explanations will need to be taught these skills. A child cannot be given a free choice in how to display their results unless they know the forms of display available to them. They cannot plan a fair test if they do not understand the principle. Children need a model on which to hang their own planning, recording and concluding.

As children become more experienced with investigations, explorations and research, the nature of how an activity develops can be more openended. Children should be given the experience in planning experimental work, obtaining evidence and considering evidence every year.

Science in the Foundation Stage

In the Foundation Stage the children will learn through role-play based upon termly themes. They will follow the objectives outlined in the Development Matters, referenced as Understanding of the World. Teaching, exploring and structured play will introduce and develop the key concepts outlined in the 'exploration and investigation' section.

Planning

Annual and termly themes have been developed by the whole staff. The termly topics have key objectives based upon teaching scientific enquiry, which underpins all topics and runs throughout the year. Science skills and knowledge are central to all pupils' achievements, and the teachers give priority to these key objectives when planning work and assessing it. Medium Term planning can be found on staff shared documents for each year group and classes.

Marking

A marking policy has been agreed which offers consistency of approach and presentation. This also encourages pupils to set individual targets based on their teacher's detailed marking. When appropriate, depending on the age of pupils, verbal and written feedback is given to pupils, suggesting how to improve and progress in their science understanding.

Resources

Each team shared area has centrally stored, topic specific science equipment. This enables staff and children to easily select appropriate resources and materials. Additional materials are centrally stored in the science cupboard and teacher reference books are located in the staff room.

A variety of computer software is available on the school shared system.

Resources are regularly monitored and evaluated with team leaders and staff to ensure that the science budget is spent effectively and fairly. Requests for resources are communicated through staff end of term evaluations, verbal discussions and annual science purchasing completed by the science co-ordinator.

Role of the Science Co-ordinator

- To take the lead in forming the science policy that ensures progression and continuity throughout the school.
- To determine school priorities for science through the School Development Plan.
- To monitor the standards of the children's work and of the quality of teaching in science, working with the Head teacher, team leaders, assessment co-ordinator, SENCO, staff and pupils to raise attainment.
- To support and advise colleagues in the teaching of science.
- To take responsibility for the science budget to purchase and organise resources for this subject.
- To keep informed about current developments in the teaching of science, and provide a strategic lead and direction for the subject in the school.
- To monitor the effective use of agreed schemes of work.
- To read evaluations of individual teachers regularly, responding to needs as they arise.
- To organise INSET, either through staff meetings, courses or demonstration lessons, with the support of the Head teacher.
- With the SMT to carry out an audit each year and set targets for the future.

Monitoring

It is the role of the Science co-ordinator to monitor the teaching and learning of Science throughout The Foundation Stage, Key stage One and Two. Monitoring will be carried out on a half-termly basis. The Science co-ordinator will monitor half-termly plans from each year group to ensure adequate coverage of the curriculum and feedback to the year teams when necessary. The co-ordinator will have two half days a term to visit classrooms and ensure that standards in teaching and learning Science are met. The Science co-ordinator will also collect examples of work and photographic evidence to ensure that the children are receiving the same curriculum in every classroom and the work is of a consistent and high standard. The Head teacher and Governors will be informed of the Science co-ordinators findings after visits to classroom and monitoring of work.