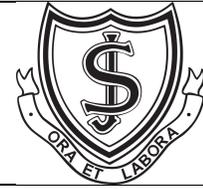


St. Joseph's In The Park



Policy Title Science/STEM	Date Summer 2021
Owner GRAEME ELLIS	Date for review Summer 2023 (Education Committee)

This policy is for whole school including EYFS.

1 Aims and objectives

In Science we aim to stimulate children's curiosity in finding out why things happen in the way that they do in the world around them. It teaches progression of knowledge, methods of enquiry and investigation to stimulate creative thought, knowledge and understanding. Children learn to ask scientific questions and begin to appreciate the way in which science will affect the future on a personal, national and global level.

Our objectives in the teaching of science are for our children in EYFS, KS1, Lower KS2 and Upper KS2:

In Kindergarten and Nursery –

Understanding the World (The World)

- 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.

Communication and Language

- Listen attentively and respond to what they hear with relevant questions, comments and actions.
- Make comments about what they have heard and ask questions to clarify their understanding when being read to and during whole class discussions and small group interactions.
- Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate.

Personal, Social and Emotional Development

- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.

In Reception (including the above) –

Communication and Language

- Learn new vocabulary.
- Ask questions to find out more and to check what has been said to them.
- Articulate their ideas and thoughts in well-formed sentences.
- Describe events in some detail.
- Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen.
- Use new vocabulary in different contexts.

In Key Stage 1 (KS1)

Working Scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

Lower Key Stage Two (Years 3 and 4)

Working Scientifically

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Upper Key Stage 2

Working Scientifically

- planning different types of scientific enquiries to answer questions, including
- recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.

2 Teaching and learning style

We use a variety of teaching and learning styles in science lessons. Our principal aim is to develop children's interest, knowledge, skills, and understanding. We encourage the children to ask, as well as answer, scientific questions. They 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. They take part in role-play and discussions, and they present reports to the rest of the class. They engage in a wide variety of problem-solving activities. Wherever possible, we involve the pupils in real scientific activities, e.g. investigating a local environmental problem, or carrying out a practical experiment and analysing the results. In Years 3,4,5 and 6 the children undertake end of unit tests on the topics they have just studied. This helps to reinforce their practical work and can highlight concepts that may need revisiting.

The children are given the opportunity to see how their work in Science can lead to future career paths through our links with industry. The children visit and are supported by STEM (Science, Technology, Engineering and Maths) ambassadors participate in a wide range of hand on science and STEM activities.

The school is fortunate to have a large outdoor resource in its grounds. There are wood and grassland areas as well as a pond. The children are encouraged to physically explore and investigate all aspects of the grounds both large and small and have resources to facilitate this. They participate in identification, observation, growing and recording of the living world around them. They have the opportunity to pursue independent work if they have a particular interest

The children in Infants are taught whole class with a full time LSA to support them. The focus of these lessons is to experience practical Science activities within a context they understand.

Junior children are taught whole class and the emphasis remains on carrying out practical, hands on Science activities, usually in small groups. Practical tasks are encouraged for all children but the presentation of findings may be differentiated according to their ability. We aim to provide a suitable learning opportunity for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways:

- setting tasks which are open-ended and can have a variety of responses;
- setting tasks of increasing difficulty (we do not expect all children to complete all tasks);
- grouping children by ability in the room, and setting different tasks for each ability group;
- providing resources of different complexity, matched to the ability of the child.
- using classroom assistants to support the work of individual children or groups of children.

3 *Science curriculum planning*

Science is a core subject at St. Joseph's In The Park and we use the national scheme of work for science as the basis of its curriculum planning. We carry out our curriculum planning in science in three phases (long-term, medium-term and short-term). The long-term plan maps the scientific topics studied in each term during the Key Stage. The curriculum is based on the TwinklPlanIT scheme.

Our medium-term plans, which we have based on the national scheme of work in science, give details of each unit of work for each term. The Head of Science develops and reviews these plans.

Long- and medium-term plans for STEM reflect topics taught in Science, Design and Technology/ Engineering and Computing. For example, in circuits and electricity the children would research and construct a torch.

We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each unit, and we also build progression into the science scheme of work, so that the children are increasingly challenged as they move up through the school.

4 *The Foundation Stage*

Children in the Early Years, Reception and Pre School work through the learning outcomes towards the Early Learning Goals. The children learn through carefully

planned first hand experiences and through a balance of adult-led and child-initiated activities.

Children are supported in developing the knowledge, skills and understanding that help them to make sense of the world. Opportunities are planned for them to use a range of tools safely; encounter creatures; people, plants and objects in their natural environments and in real-life situations; undertake practical “experiments”; and work with a range of materials.

Children are given a wide range of opportunities to ask questions about aspects of their world such as the place where they live or the natural world. We help them to talk about some of the things they have observed such as plants, animals, natural and found objects. We help them to talk about why things happen and how things work. We give children experiences where they can develop an understanding of living things and the environment. The children have opportunities to observe things closely through a variety of means, including magnifiers, binoculars and photographs. They are taught skills and knowledge in the context of practical activities, e.g., learning about the characteristics of liquids and solids by involving children in melting chocolate or cooking eggs. They look closely at similarities, differences, patterns and change.

5 *The contribution of science to teaching in other curriculum areas*

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 (e.g. of the environment), questioning and through recounting their observations of scientific experiments. They develop their writing skills through writing reports and projects and by recording information.

Mathematics

Science contributes to the teaching of mathematics in a number of ways. When the children use weights and measures, they are learning to use and apply number. Through working on investigations, they learn to estimate and predict. They develop accuracy in their observation and recording of events. Many of their answers and conclusions include numbers. The children use graphs and tables to present their findings.

Personal, social and health education (PSHE) and Citizenship / Sex and Relationships

Science makes a significant contribution to the teaching of PSHE and Citizenship. The subject matter lends itself to raising matters of citizenship and social welfare. For example: recycling, sustainability, Sex and Relationship Education or Drugs Education. Science thus promotes the concept of positive citizenship.

Spiritual, moral, social and cultural development

Science teaching offers children many opportunities to examine some of the fundamental questions in life, e.g. the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the teaching of science, children have the opportunity to discuss, for example, the effects of smoking, and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the

planet, and how science can contribute to the way in which we manage the Earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

6 *Science and Computing*

Computing enhances the teaching of science in our school there are some tasks for which ICT is particularly useful. It also offers new ways of impacting on learning. Software is used to animate and model scientific concepts, and to allow children to investigate processes which it would be impracticable to do directly in the classroom. Children use ICT to record and present data, to review, modify and evaluate their work, and to improve its presentation. Children learn how to find, select, and analyse information on the Internet and on other media.

7 *Science and inclusion*

At our school, 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. Through our science teaching, we provide learning opportunities that enable all pupils to make good progress. We strive hard to meet the needs of those pupils with special educational needs, those with disabilities, those with special gifts and talents, and those learning English as an additional language, and we take all reasonable steps to achieve this. For further details, see individual whole-school policies: Special Educational Needs; Disability Discrimination; Able, More Able and Talented; Inclusion.

When progress falls significantly outside the expected range, our assessment process looks at a range of factors – classroom organisation, teaching materials, teaching style, differentiation – so that we can take some additional or different action to enable the child to learn more effectively. Assessment against age-related expectation allows us to consider each child's attainment and progress. This ensures that our teaching is matched to the child's needs.

Intervention through the SEN policy may lead to the creation of an Individual Target Form (ITF) for children with special educational needs. The ITF may include, as appropriate, specific targets relating to science.

We enable all pupils to have access to the full range of activities involved in learning science. Where children are to participate in activities outside the classroom (a trip to a science museum, for example), we carry out a risk assessment prior to the activity, to ensure that the activity is safe and appropriate for all pupils.

8 *Assessment for learning*

At the end of a unit of work both summary judgements and topic assessments are made in relation to the pupils' achievement against the learning objectives for the unit. Attainment grades are recorded in an assessment file. These grades are used as the basis for assessing the progress of each child.

Teacher assessment, based on observing and marking the children's work throughout the year, underpins the reports to parents throughout the year.

9 Resources

In our Science Room we have well-stocked resources for all science teaching units in the school. The library contains a good supply of science topic books and computer software to support children's individual research. The school has a large outdoor resource in its woods, pond and garden.

10 Monitoring and review

The coordination and planning of the science curriculum are the responsibility of the Head of Science, who also:

- keeps informed about current developments in science and providing a strategic lead and direction for this subject;
- reviews progress with the Head annually, who in turn reports to the Governing body.

This policy will be reviewed at least every two years.