Science Policy

Through respect we will work together in Christ to develop the whole person

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Science at St Matthew's

At St Matthew's we believe that, as our children are living in a highly scientific and technological world, it is essential that we ensure that they acquire and develop the scientific skills, attitude, knowledge and understanding that they need in order to understand the world around them.

We aim to provide a broad, scientific curriculum that develops scientific vocabulary through lessons that encourage discussions that enable children to 'talk like real scientists' by justify, supporting or refuting the evidence.

At St Matthew's, we understand the importance of providing memorable science experiences so that more abstract and difficult scientific knowledge can be embedded into long term memory so that children are becoming learners for life. This philosophy ensures that the science curriculum is accessible to all of our pupils, regardless of their ability or background. Care is taken to ensure progression from the foundation stage and throughout key stages 1 and 2. When topics are revisited another layer of knowledge and skills are added.

Children are given many opportunities to learn practically outdoors so that despite our lack of green space on-site, the children can use our local area of greenery (Windsor Gardens) as an opportunity to enrich science topics such as: plants, life cycles, animals including humans and Living Things and Their Habitats.

The delivery of science teaching at St Matthew's places an emphasis on scientific investigations and practical activities which are based on real world scenarios. Pupils work in mixed ability groups where independence and problem solving is at the heart of enquiry. Through clearly defined roles (experimenter, Co-Experimenter, Lab Technician and Lead Scientist, pupils work together to solve problems.

The aims of this policy are to ensure that all pupils:

Maths links are made through science by improving data handling skills as well as being able to develop the recording of scientific experiments. Ultimately, we want children to enjoy learning all areas of 3 science and many topics will be covered on more than one occasion throughout their schooling in order to embed their knowledge. In teaching science there are a number of key skills and attributes that we will develop. The children are taught to work scientifically, which involves:

- Developing an understanding of science through enquiry and investigation;
- Observing, measuring and undertaking a variety of tests ;
- Developing curiosity and asking scientific questions; • Reading and using scientific vocabulary;
- Testing and developing ideas;
- Making decisions;
- An enjoyment and fascination of science.

- develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and **implications of science, today and for the future.**

Objectives of policy

The objectives of teaching science are to enable children to:

- ask and answer scientific questions;
- plan and carry out scientific investigations, using equipment (including computers) 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 programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science

Spoken language

The National Curriculum for science reflects the importance of spoken language in pupils' development – linguistically, cognitively and socially – across the whole curriculum. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear to themselves as well as others and teachers ensure pupils build secure foundations by using discussion to probe and remedy their misconceptions. The spoken language of our pupils at St Matthew's are developed through regular group and class discussions, use of oral assessment for learning strategies such as concept cartoons, PMI, highly magnified images. By building such strategies into lessons, our pupils are able to confidently discuss their understanding of scientific phenomena. This also allows for teachers to assess understanding and correct any misconceptions.

School curriculum

Each Programme of Study is set out year-by-year in science. All maintained schools are only required to teach the Programme of Study by the end of each key stage. Within each key stage, maintained schools therefore have the flexibility to introduce content earlier or later than set out in the Programme of Study. In addition, schools can introduce key stage content during an earlier key stage if appropriate. All schools are also required to set out their school curriculum for science on a yearly basis and make this available online.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Teaching and learning

We use a variety of teaching and learning styles in science lessons. Our principal aim is to develop children's knowledge, skills, and understanding. Sometimes we do this through whole-class teaching, while at other times we engage the children in an enquiry-based research activity. We encourage 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, for example, investigating a local environmental problem, or carrying out a practical experiment and analysing the results. We recognise that in all classes children have a wide range of scientific abilities, and we ensure that we

We aim to 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:

- 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 or differentiating by support
- Mixed ability groups of 3 and 4 children. Each child is given an individual role to allow them to work independently and cooperatively.
- 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.

We believe that Working Scientifically is integral to all aspects of Science teaching and as such we ensure that practical sessions are core to each topic and children are given opportunities to write up their findings and discuss their learning. The teachers use open-ended questions to explore their areas of strength and development. In KS1, Discovery Dog is used to help structure their scientific writing and in KS2, the scientific reporting process progresses in difficulty and in support and this is clearly written in the planning to help ensure that the children are being suitably challenged.

Educational Visits and Visitors

Whenever possible and appropriate, educational visits are included in a Science topic making use of locations accessible to school such as a new wildflower garden at Windsor Gardens, a short walk from the school grounds. People with an expertise or interest in a particular Science topic can be invited into school to work with the children. Such visitors might include local Health Service workers or people who use science daily in their jobs. This is celebrated during 'Industry Week' where the focus is on STEM (Science, Technology, Engineering and Maths. At St Matthew's, we feel it is important to provide aspirational figures for children to speak to such as those in the field of medicine, dentistry, research etc.

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 science subject leader works this out in conjunction with teaching colleagues in each year group. In some cases we combine the scientific study with work in other subject areas, especially at Key Stage 1; at other times the children study science as a discrete subject.

Our medium-term plans, which we have based on the 2014 curriculum for Science, give details of each unit of work for each term. The Science subject leader keeps and reviews these plans. In this way we ensure complete coverage of the National Curriculum without repeating topics. (See website for all topic taught throughout the year)

The Science Coordinator is responsible for writing the daily lesson plans for each lesson (short-term plans). These plans list the specific learning objectives and expected outcomes of each lesson. The class teacher keeps these individual plans, and adapts the level of support needed for all children to access the curriculum. We have planned the topics in science so that they build on prior learning. 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 curriculum, so that the children are increasingly challenged as they move up through the school.

The Foundation Stage

During the Foundation Stage, young pupils are given the opportunities within the Understanding the World to find out more about the world in which they live.

We teach science in the reception classes as an integral part of the topic work covered during the year. As the reception class is part of the Foundation Stage of the National Curriculum, we relate the scientific aspects of the children's work to the objectives set out in the Early Learning Goals (ELGs) which underpin the curriculum planning for children aged three to five. Science makes a significant contribution to developing a child's knowledge and understanding of the world, which is now referred to Our Natural World.

Science has many opportunities for cross curricular learning at St Matthew's:

English

Science contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. Some of the texts that the children study in the Literacy Hour are of a scientific nature. The children develop oral skills in science lessons through discussions (for example of the environment) 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. Interwoven throughout the Science curriculum is the drawing and interpretation of a range of graphs including line, bar and scatter.

Personal, social and health education (PSHE) and citizenship

Science makes a significant contribution to the teaching of PSHE and citizenship. This is mainly in two areas. Firstly, the subject matter lends itself to raising matters of citizenship and social welfare. For example, children study the way people recycle material and how environments are changed for better or worse. Secondly, the subject gives children numerous opportunities to debate and discuss. They can organise campaigns on matters of concern to them, such as helping the poor or homeless. 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, for example, 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 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.

Science and ICT

Information and communication technology enhances the teaching of science in our school significantly, because there are some tasks for which ICT is particularly useful. It also offers ways of impacting on learning which are not possible with conventional methods. 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. Data loggers are used to assist in the collection of data and in producing tables and graphs. Children use ICT to record, present and interpret 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. They also use e-mail to communicate on their scientific findings with children in other schools and countries.

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 Non-Discrimination; Gifted and Talented; English as an Additional Language (EAL).

When progress falls significantly outside the expected range, the child may have special educational needs. Our assessment process looks at a range of factors e.g. classroom organisation, teaching materials, teaching style, and differentiation so that we can take some additional or different action to enable the child to learn more effectively. Assessment against the National Curriculum allows us to consider each child's attainment and progress against expected levels. This ensures that our teaching is matched to the child's needs.

SENCO will work with teachers to provide Intervention that will lead to the creation of an Individual Education Plan (IEP) for children with special educational needs. The IEP 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.

Formative, on-going, Assessment for learning

Teachers will assess children's work in science by making informal judgements during lessons. On completion of a piece of work, the teacher assesses it, and uses this assessment to plan for future learning. Written or verbal feedback is given to the child to help guide his/her progress. Older children are encouraged to make judgements about how they can improve their own work.

Summative Assessment

At the end of a unit of work the teacher makes a summary judgement about the work of each pupil in relation to the National Curriculum levels of attainment. The teacher records the attainment on colour-coded electronic trackers which will be collected at the end of each term. We use this information as the basis for assessing the progress of each child, and we pass this information on to the next teacher at the end of the year. The science subject leader keeps samples of children's work in a portfolio, and uses these to demonstrate the expected level of achievement in science for each age group in the school.

Resources

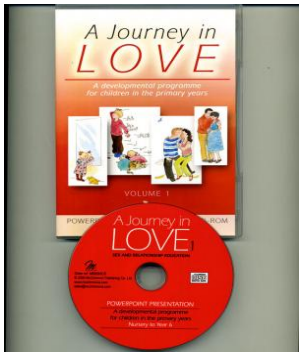
We have sufficient resources for all science teaching units in the school. We keep these in a central area in KS1 and 2. Topic boxes of resources are available for each unit of work. Central/ class library contain a good supply of science topic books to support children's individual research.

Monitoring and review

It is the responsibility of the subject leader to monitor the standards of children's work and the quality of teaching in science. The subject leader 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 science coordinator gives the Head teacher a regular subject leader report in which she evaluates strengths and weaknesses in science, and indicates areas for further improvement. The subject leader has specially-allocated time for fulfilling the vital task of reviewing samples of children's work, and visiting classes to observe science teaching.

Sexual and Relationship Education



Our Sex education is delivered through Journey of Love). This is the recommended scheme of work set out by the Liverpool Arch Diocese.

Please see RE policy and PSHE/Science and RSE curriculum map for full details.

Drugs, Smoking and Alcohol Education will be delivered through the Science curriculum as follows:

Year 1- Medicines and people who help us. Animals Including Humans (Autumn Term)

Year 6- Prevention and early use. Animals Including Humans (Summer Term)

This policy will be reviewed at least every two years.

Appendix

Amendments to Policy may alter throughout 2021-22 depending on Covid-19 guidelines set by the Government.

*Aims of Policy

Please note that with regards to the implications of science and the future, children will continue to learn about how the spread of infectious diseases can be minimised and how society may change in light of the Coronavirus epidemic

*Objectives of policy

Please note that with regards to carrying out scientific investigations, equipment used in practical sessions will only be used within a ‘ learning bubble’. Appropriate sanitisation of equipment before and after use will be conducted.

*School curriculum

All planning will continue to be reviewed to close the gap in lost science learning.

*Educational Visits and Visitors

Educational trips and visits will begin in Autumn 2021, although any necessary safety precautions for spread of Covid will be carried out- in line with current local educational guidelines.