



SCIENCE POLICY DOCUMENT

MERCHANT TAYLORS' PRIMARY SCHOOL

STANFIELD

INTRODUCTION

This policy outlines the teaching, organisation and management of science taught at MTPS and is based on the new primary curriculum (statutory from September 2014) It should be read in conjunction with the scheme of work which details what pupils will be taught in each year group. It was revised in revised in September 2009 and up-dated in February 2016.

The implementation of this policy is the responsibility of all teaching staff.

RATIONALE

At MTPS we believe that the best science teaching fosters and develops pupils' curiosity in the subject whilst also helping them to fulfil their potential. For our pupils to achieve well in science, they need to acquire the necessary scientific knowledge and also be able to enjoy the experience of engaging and purposeful scientific enquiry in order to help them to answer scientific questions about the world around them.

The new National Curriculum 2014 states why we teach science in schools:

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

AIMS

Through high-quality science teaching, we aim to help our pupils understand how major scientific ideas have played a vital role in society. Moreover, we aim to prepare our pupils for life in an increasingly scientific and technological world.

We aim to do this by:

- Delivering high quality, interesting and engaging science lessons to enable pupils to develop skills through a broad range of experiences and gain an understanding of scientific concepts through first-hand experience in a climate which encourages curiosity, perseverance, open-mindedness, critical reflection and co-operation. We will use a range of teaching methods, problem solving and open-ended investigation
- Using scientific contexts to develop and consolidate cross curricular skills in literacy, Maths and ICT. Science is not always taught in isolation and will naturally draw from and contribute towards other areas of the curriculum. Science teaching will be made relevant

by building on pupils' own experience and using contexts from the local environment and the wider world

- Teaching science in a global and historical context; including the contributions made by significant scientists from a range of cultures
- Developing and extending pupils' scientific knowledge and understanding
- Developing pupils' ability to work scientifically and involve pupils in planning, carrying out and evaluating investigations
- Developing pupils' scientific vocabulary and ability to articulate scientific concepts clearly and precisely
- Ensuring that all pupils are appropriately challenged to make good progress in science. Pupils will be taught in ways appropriate to their abilities and in contexts suitable for their age, which allows each individual pupil the chance to succeed to his/her maximum potential
- Attention will be given to planning the science curriculum to make it equally relevant to all children, regardless of race, creed or gender
- We aim to foster an air of exciting discovery where children are well motivated and enthusiastic about science within school and its application in the wider world

OBJECTIVES

- To develop the thinking processes essential in the teaching of Scientific Enquiry
- To acquire scientific knowledge and understanding and relate this to investigations
- To understand and use scientific vocabulary
- To communicate verbally, mathematically and in writing what they have carried out and discovered
- To understand and use scientific method
- To recognise the need for a fair test
- To work with increasing independence and as part of a group
- To stress the need for personal and group safety by the correct and sensible use of equipment
- To develop personal qualities such as politeness, perseverance and initiative
- To give pupils the opportunity to use ICT to collect, store, retrieve and present scientific information

EARLY YEARS FOUNDATION STAGE

Work undertaken within the Foundation Stage is guided by the requirements and recommendations set out in the Early Years Foundation Stage Framework. This specifies requirements for learning and development and for safeguarding children and promoting their welfare.

Science is covered within the specific area of 'understanding the world' but is also linked with literacy and numeracy and technology.

Understanding the World:

- Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world.
- Can talk about some of the things they have observed such as plants, animals, natural and found objects.
- Talks about why things happen and how things work.

- Developing an understanding of growth, decay and changes over time.
- Shows care and concern for living things and the environment.
- Looks closely at similarities, differences, patterns and change.

In class, children learn and develop their skills through a variety of experiences, with direct teaching from adults but also through exploring, challenging and consolidating their acquisition of skills and understanding when accessing resources and equipment independently.

ATTAINMENT

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.

Key Stage 1

The main focus of science teaching in Key Stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about Science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

Pupils should read and spell scientific vocabulary at a level consistent with their reading and spelling knowledge at Key Stage 1.

Lower Key Stage 2 – Years 3 and 4

The main focus of Science teaching in Lower Key Stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' must **always** be taught through and clearly related to substantive Science content in the programme of study.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing reading and spelling knowledge.

Upper Key Stage 2 – Years 5-6

The main focus of Science teaching in Upper Key Stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At Upper Key Stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer Science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. Pupils should read, spell and pronounce scientific vocabulary correctly.

'Working and thinking scientifically' must **always** be taught through and clearly related to substantive Science content in the programme of study

TEACHING AND LEARNING

At MTPS, teachers plan and deliver high-quality and engaging science lessons incorporating a range of teaching and learning styles. Teachers will provide opportunities for pupils to:

- Learn about science, where possible, through first-hand practical experiences
- Develop their research skills through the appropriate use of secondary sources and retain knowledge through regular recall time to revisit prior learning.
- Work collaboratively in pairs, groups and/or individually
- Plan and carry out investigations with an increasing systematic approach as they progress through the school
- Develop their questioning, predicting, observing, measuring and interpreting skills
- Record their work in a variety of ways e.g. writing, diagrams, graphs, tables
- Read and spell scientific vocabulary appropriate for their age.
- Be motivated and inspired by engaging and interactive science displays which include key vocabulary and relevant questions. Using the science room for practical investigations and specialised equipment
- Use laboratory facilities at both senior school sites when appropriate and extension activities taught by senior school colleagues.

- Lessons include learning about the work of important scientists and the impact of their discoveries as well as modern day science and current discoveries
- Learn about science using the school garden and poly-tunnel

EDUCATIONAL VISITS & VISITING SPEAKERS

These include opportunities to study:

- the local environment
- the animal and plant life in different habitats
- exhibitions of scientific interest
- school visits are directly linked to on-going work in the classroom

Visits from outside companies also deliver science topics through presentations, drama and music

Extra-curricular activities include Mad Science workshops for both infants and juniors

PLANNING

- Science in the Early Years Foundation Stage is planned using the Early Years Curriculum 'Understanding of the World'.
- Key Stage 1 and 2 teachers plan science lessons using the new National Curriculum (2014). The Programme of Study is covered in units of work using the Hamilton Trust scheme which is the main scheme of work used at MTPS.
- All science lessons have focussed learning objectives, clear differentiation and opportunities to extend learning through personalised research and enrichment tasks.
- 'Working scientifically' is embedded throughout the areas of learning in key stage 1 and 2; this focuses on the key aspects of scientific enquiry which enable pupils to investigate and answer scientific questions.
- Areas of learning within key stage 1 and 2 ensure that statutory requirements are being covered through the specific disciplines of **biology, chemistry and physics** (teachers may also refer to the non-statutory guidance which provide additional support).
- Whole school plans can be accessed via individual year group topic folders on the school computer system.

Teachers supplement their teaching, when appropriate, with their own produced resources as well as added material and extension in some topic areas to ensure a broad and challenging curriculum. Additional schemes of work are also used, including:

- LCP Years 1-6
- 100 Science Lessons Years 1-6

The school is continuing to develop a range of ICT resources suitable for use in scientific investigations, incorporating interactive learning apps, data logging programmes and video clips.

RESOURCES

- Central science resources are stored in the science room and the large cupboards outside the room (any hazardous materials are stored in locked cupboards)
- General resources are stored within classrooms

- A wide range of reference materials are available in the school library
- The subject leader must be informed of any changes regarding science resources i.e missing or broken resources and/or when new or replacement resources are required.

HOMEWORK

Key Stage 1

- No formal homework will be set

Key Stage 2

- Pupils will do one period of homework per week as and when required
- Pupils will be expected to carry out research for the subject from time to time

DIFFERENTIATION

- Activities are planned to follow through a planned module of study, to allow children to develop concepts and to progress according to their ability
- Opportunities are planned to open investigations that allow for differentiation through outcome
- Core, reinforcement and extension tasks are provided within the context of the syllabus
- All pupils are given the opportunity to extend their understanding. Help is provided for children with specific learning difficulties from the SENCO and differentiated exercises within the classroom, to assist with skills needed for their science activities
- Extension tasks are given, where appropriate, to stretch the most able children

ASSESSMENT AND RECORDING OF PUPILS' WORK

EYFS

Teachers assess science against the 'Development Matters' statements in the 'Understanding of the world' area of the Early Years Curriculum. The statements go from birth through to the Early Learning Goals at the end of Reception.

At the end of the Reception year, children are assessed against the **Early Learning Goals**.

Emerging:

- Children know about similarities and differences in relation to places, objects, materials and living things.
- They talk about the features of their own immediate environment and how environments might vary from one another.
- They make observations of animals and plants and explain why some things occur, and talk about changes.

Exceeding:

- Children know that the environment and living things are influenced by human activity.
- They can describe some actions which people in their own community do that help to maintain the area they live in.
- They know the properties of some materials and can suggest some of the purposes they are used for.
- They are familiar with basic scientific concepts such as floating, sinking, experimentation.

Infant and Junior

At Key stages 1 and 2 teachers provide quality feedback to pupils; (verbal or written) which clearly identifies how they might need to improve.

- Pupils self - assess against learning objectives.
- Pupils' science books are kept at school during each year as evidence of the year's activities.
- Assessment techniques include:
 - observation of pupils at work
 - photographic evidence
 - questioning
 - pupils' discussion or oral presentations of their work
 - pupils' written, graphical or pictorial work
 - structured task sheets or questions
- Additional assessment resources are currently being sourced in light of the new curriculum, to assess individual modules taught throughout Key stages 1 and 2.

MONITORING

The science policy of the school is reflected in our practice. The Head teacher and the science subject leader monitor this.

The success of our teaching will be judged by:

- the motivation and interest displayed by our pupils
- the development, over time, of pupils' understanding of scientific concepts and processes
- pupils' ability to apply their understanding of scientific concepts and processes in a variety of new situations

Planning and book scrutiny are carried out annually by the science subject leader and feedback is given to teachers at an appropriate time.

REPORTING TO PARENTS

Science comments for each child will be reported to parents on an annual written report in the summer term detailing the topics covered and specific skills acquired.

THE ROLE OF THE SCIENCE SUBJECT LEADER

- To lead focused planning sessions and, together with the staff, select and order new equipment and book material as appropriate
- To help individual teachers by assisting in detailed planning and monitoring planning in line with school policy
- To provide science equipment and review published materials annually with a view to replacing and updating as necessary
- To attend appropriate courses when necessary, keep up to date with curriculum changes and ICT development

- Support staff with development of interactive science information and activities on the school's online learning resource
- To disseminate new policies to staff
- Organise visiting speakers and extra-curricular activities to broaden and enrich pupil learning
- Promote and share good practice. Maintain strong links with Science departments at MTGS and MTBS to share good practice, resources and expertise.

HEALTH AND SAFETY

All staff teaching science are conversant with the Health and Safety policy and relevant regulations.

- Teachers must plan safe activities for science and complete a risk assessment if necessary.
- All staff need to be aware of health and safety procedures when using specialised equipment/food in science lessons.
- Pupils must be aware of the need for personal safety and the safety of others during science lessons. The children will be taught to recognise hazards and risks when working with living things and materials.

FUNDAMENTAL BRITISH VALUES

Since November 2014, all schools have a responsibility to promote the '**fundamental British values**' of **democracy**, the **rule of law**, **individual liberty**, **mutual respect** and **tolerance** of those with different faiths and beliefs. We aim to promote these values through our science curriculum and our whole school ethos.

INCLUSION, EQUAL OPPORTUNITIES AND DIFFERENTIATION

At MTPS teachers ensure that they adopt an inclusive approach to their science planning and teaching; ensuring that pupils of all abilities and backgrounds have an equal opportunity to make good progress and enjoy science.

- All pupils are given the opportunity to develop their understanding. Support is provided for children with specific learning difficulties by the class teacher or SENCO. These can include frameworks for collecting data, print outs of information and use of ICT to help with presenting graphs
- Additional support, targeted and open questions and differentiated activities are provided according to a pupil's needs
- All pupils will be given the opportunity for extension or reinforcement activities appropriate to their ability
- Homework tasks are differentiated as required