St Mary's Catholic Primary School

Science Policy

Intent

At St Mary's Catholic Primary School, we recognise the importance of Science in every aspect of daily life. As one of the core subjects taught in Primary Schools, we give the teaching and learning of Science the prominence it requires

It is our vision to distil a lifelong love of science within our pupils. Science has changed our lives and is vital to the world's future prosperity.

We work hard to provide a rich and varied curriculum to challenge and meet the needs of our children. We believe all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science.

From EYFS up to KS2 our pupils will build up a body of key foundational knowledge and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena.

In conjunction with the aims of the National Curriculum, our Science teaching offers opportunities for children to:

- 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;
- be equipped with the scientific knowledge required to understand the uses and implications of Science, today and for the future.
- develop the essential scientific enquiry skills to deepen their scientific knowledge.
- Use a range of methods to communicate their scientific information and present it in a systematic, scientific manner, including I.C.T., diagrams, graphs and charts.
- Develop a respect for the materials and equipment they handle with regard to their own, and other children's safety.
- Develop an enthusiasm and enjoyment of scientific learning and discovery.

The National Curriculum will provide a structure and skill development for the science curriculum being taught throughout the school, which is now linked, where possible to the Creative Curriculum topics to provide a creative scheme of work, which reflects a balanced programme of study.

Children have weekly lessons in Science throughout Key Stage 1 and 2, using various programmes of study and resources. In Early years, science is taught through the children learning about the world around them in their learning through play. Additional opportunities are provided in Science, such as visits from STEM Ambassadors, Newcastle University Outreach Workshops, Science Week in school with workshops provided by Green Shift Science Education and educational visits linked to the science curriculum, such as visits to the Planetarium at the Hancock Museum, Newcastle and Blue Reef Aquarium in North Tyneside.

We endeavour to ensure that the Science curriculum we provide and give children the confidence and motivation to continue to further develop their skills into the next stage of their education and life experiences.

Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;

- Science will be taught in planned and arranged topic blocks by the class teacher. This is a strategy to enable the achievement of a greater depth of knowledge.

- Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning, so that all children keep up.

- We build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.

- Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.

- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and workshops with experts.

- Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.

- Regular events, such as Science Week or project days, such as STEM Day, allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. These events often involve families and the wider community.

- At the end of each topic, key knowledge is reviewed by the children and rigorously checked by the teacher and consolidated as necessary.

Teaching and Learning:

Science teaching in the school is about excellence and enjoyment. Planning for science is a process in which all teachers are involved to ensure that the school gives full coverage of National Curriculum Science and Understanding the World in Reception. Each unit is developed and built on as the children progress through the school. We have adopted the Snap Science units which are in line with the New Curriculum, and have adapted these to our circumstances, ensuring good coverage of each programme of study and progression within each. Scientific Knowledge, Conceptual understanding and Scientific Enquiry are incorporated within each unit of work. Children will develop their range of scientific vocabulary. Science will be taught to the whole class with opportunities to carry out investigative work in small groups on a regular basis.

Where appropriate, all teaching staff are encouraged to develop their knowledge and skills in the teaching of science and have the opportunity to do this though the school's links with local organisations e.g. St. Wilfrid's Secondary School, Green Shift Education, local STEM Ambassadors and Newcastle University Outreach.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. At St. Mary's science lessons provide a quality and variety of subject specific language to enable the development of children's confident and accurate use of scientific vocabulary and their ability to articulate scientific concepts clearly and precisely. They are encouraged and assisted in making their thinking clear, both to themselves and others, and teachers ensure that pupils build secure foundations by using discussion to probing and remedying their misconceptions.

Assessment

Children's progress is continually monitored throughout their time at St. Mary's Catholic Primary School and is used to inform future teaching and learning. 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 as set out in the National Curriculum. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge.

We use assessment to inform and develop our teaching.

- Topics begin with an assessment of what children already know.
- We assess for learning (AfL). Children are involved in the process of self-improvement, recognising their achievements and acknowledging where they could improve. Activities during, and at the end of, each topic record achievement and celebrate success.
- We mark work positively, making it clear verbally, or on paper, where the work is good, and how it could be further improved. Children's work is compared with age appropriate exemplification. We moderate children's work termly to ensure consistency. Assessment records are reviewed regularly.
- We have a tracking system to follow children's progress. The school science coordinator monitors progress through the school by sampling children's work at regular intervals. Children who are not succeeding, or children who demonstrate high ability in science, are identified and supported.
- Assessment data is used to highlight areas where intervention or catch-up work is needed. Equally important is the continuous assessment of children's work, much of which is informal. This assessment is used to inform teaching throughout the school.

- The Y2 & Y6 staff assess children's attainment and progress at the end of each key stage. This is based on assessment records and work samples from across the key stage and is support by the science coordinator and previous class teachers if needed.
- Reports to parents are made verbally each term, and written once a year, describing each child's attitude to science, his/her progress in scientific enquiry and understanding of the content of science.

At the start of each topic children complete a short topic test to help identify what they know already about each topic, as well as what they would like to know. The programme of study taken is responsive to the children's starting points, as well as their specific interests. It also ensures a focus on the key identified knowledge of each topic, which is mapped within and across year groups to ensure progression. At the end of each blocked science topic, this key knowledge is checked.

In EYFS, we assess the children's Understanding of the World according to the Development Matters statements and some aspects of Expressive Arts Design are also science based.

Planning and Resources

Planning is a process in which all teachers are involved in. All teachers should keep a copy of the termly and weekly planning in their files. In line with changes in school supporting home learning, science lessons must be presented using PowerPoint presentations and uploaded weekly to the school server.

We use Collins Connect Snap Science as a Science scheme of work. The key knowledge and skills of each science topic is also informed by the Associate of Science Education's 'Planning Matrices'. Teachers also have access to the Hamilton resources and are able to source further support and resources, in line with national pedagogy, from the National Stem Centre.

We have sufficient, high-quality science resources to aid and support the teaching of all units and topics taught, from EYFS to Y6. We keep these in a central store, where they will be labelled and easily accessible to all staff. EYFS have a range of resources kept in classes, for simple access for children during exploration. The library contains a good supply of science topic books to support children's individual research.

Records and Assessment:

- The school is following the National Curriculum and Statutory Assessment materials to track individual pupil progress in Science.
- At the end of each topic area, class teachers will use these summative assessments to indicate whether a pupil is working below, towards or at the expected stage according to their age related expectations.

Progress:

- These results are entered into the online tracking system iTrack to monitor progress across year groups.
- Judgements about pupil performance are based on this assessment and can be supported by teachers' formative assessments where appropriate and a variety of AfL strategies where the children are involved in the process of self-improvement, recognising their achievements and acknowledging where they could improve. Activities during, and at the end of, each topic record achievement and celebrate success.

Monitoring of Science:

- The monitoring of Science takes place by the science coordinator and SLT.
- Standards in Science across the school are monitored through lesson observation, work sampling and evaluation of planning

Monitoring and Review:

- This policy will be monitored and reviewed by the Governor's Curriculum Committee.

Enrichment Activities:

Wherever possible, the teaching and learning of science is enhanced by educational visits using the local area as a resource or visitors to the school. Science week helps to raise the profile of science in school and allows the children to experience a range of exciting activities and mini projects. The school also often runs a very popular science club as an extra-curricular activity.

Safety:

It is important that children are taught the rule of safety in science from a young age so that it becomes integral to their experiments and investigations. Materials and equipment need to be treated with respect and care and we endeavour to make sure all children do this. When carrying out scientific activities, children should treat their classroom as though it is a fully equipped science laboratory.

Equal Opportunities:

Science is planned to meet the varied needs of all learners regardless of their gender, background, and culture, physical or cognitive development. Learning objectives are set to meet these needs in line with our Special Needs policy. Our expectations do not limit pupil achievement and assessment does not involve cultural, social, linguistic or gender bias. We recognise that science may strongly engage our more able children, and we aim to challenge and extend them.

Organisation

Science will be taught in planned and arranged into topic blocks by the class teacher, to have a project-based approach. Where applicable science will be linked and taught through other national curriculum subjects.

There are 5 topics (4 topics for Year 1 and 2) that can be covered at any point throughout the year.

<table>
<tr><td colspan="6">These topics will be covered for each year group</td></tr>
<tr><td rowspan="2">Year 1</td><td colspan="2">Animals</td><td colspan="2">Plants</td><td>Materials</td></tr>
<tr><td colspan="5">Seasonal Change is taught throughout the year</td></tr>
<tr><td>Year 2</td><td>Living things and their habitat</td><td>Animals including humans</td><td></td><td>Uses of everyday materials</td><td>Plants</td></tr>
</table>

Year 3	Rocks	Light	Forces and magnets	Animals including humans	Plants
Year 4	Living things and their habitats	States of matter	Animals including humans	Sound	Electricity
Year 5	Forces	Earth and space	Living things and their habitats	Animals including humans	Properties and changes of materials
Year 6	Animals including humans	Evolution and inheritance	Electricity	Light	Living things and their habitats

EYFS.

The Foundation Stage deliver science content through the 'Understanding of the World' strand of the EYFS curriculum. This involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment. They are assessed according to the Development Matters attainment targets.

Key Stage 1

The principal 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.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower Key Stage 2

The principal 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 comparative and 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' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

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

Upper Key Stage 2

The principal 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 comparative and 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.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Use of ICT:

We use ICT widely in science. Children are given the opportunity to practise science skills and enhance their presentation using carefully-chosen software, as well as the Internet. ICT equipment is used for enquiry work, including microscopes with digital cameras, video capture of images and activities, and data logging.

Links with other subjects:

In our topic-based teaching approach, we use cross-curricular links to science wherever we can. Science relates especially well to curriculum subjects such as English, Mathematics, ICT, Art and Design and Technology.

Homework:

We use homework to support school and class activities. This relates to the school's overall Homework policy.