



Learning in Science at St Margaret Mary's
We try to follow Jesus in everything we do.

Why is Science important at St Margaret Mary's?

Intent

Our Science curriculum has been specifically tailored to meet the needs of our school community. It is designed to be broad and balanced, providing all pupils with the opportunity to be learned and wise in their knowledge and understanding. To be attentive and discerning in order to make sense of the world around them and give purpose as to why we learn about and from Science. This will help them become faith filled and hopeful in their abilities to change and transform our society.

At St Margaret Mary's we recognise the importance of Science in every aspect in daily life, as one of the core subjects taught in our schools, we give teaching and learning of Science the prominence it requires. The teaching of science at St Margaret Mary's encourages children to explore and appreciate the world, which God has created, providing them with a sense of curiosity and compassion about the world around them. Science will build on pupils' prior knowledge and sense of awe of the natural world as well as an appreciation of all its phenomena. The children will acquire specific skills and knowledge to help them to think scientifically and gain an understanding of the scientific processes.

Our Science learning at St Margaret Mary's RC Primary School is:

1. Exciting and fun for all children
2. Practical with 'hands on' learning
3. Using scientific vocabulary
4. Encouraging us to ask lots of questions
5. Wondering about things in the world around us
6. Learning about different scientists both past and present

The key strands of the subject that pupils will learn through the school's age-related expectations and aim to build high levels of competence in scientific knowledge and conceptual understanding through working scientifically in:

- Biology
- Chemistry
- Physics

Implementation

From the National Curriculum and Early Years Progress Model, Science is on a taught weekly basis as well as additional thematic weeks throughout the year. We follow a curriculum overview based on a yearly/two-yearly cycle of topics (which includes mixed aged groups). Science is organised through a sequence of lessons, which allows for progression and depth using both knowledge & understanding and scientific enquiry skills. Working scientifically is embedded within each science topic and is not taught as a separate strand.

Throughout science teaching at St Margaret Mary's a questioning ethos is developed. This encourages children to become eloquent and truthful in exploring all possible answers while using scientific vocabulary, questioning their learning and the world around them.

Resources

Science is enriched through thematic weeks, celebrating world events, visiting and accessing libraries, museums and places of significant scientific interest both in and around our school, city and its surrounding areas. Teachers have access to a central store of both primary and secondary resources, which support both knowledge and skill based developments. In addition to this, we use on-line resources and investigative equipment to enrich the learning for the children.

Assessments

Assessments are carried out using the TAPS assessment resources. Children are assessed on both conceptual knowledge and areas of working scientifically. This assessment supports teacher judgements and next steps in learning.

Impact

Teaching and learning of science inspires children to be curious about the world and promotes children's enjoyment and enthusiasm for scientific learning and discovery. Children are able to recognise how science has changed our lives and is vital to the world's future prosperity. Children are able to develop a wide variety of skills linked to both scientific knowledge and understanding and scientific enquiry.



St Margaret Mary's - Science Curriculum Overview 2021-22



	<u>Autumn 1</u>	<u>Autumn 2</u>	<u>Spring 1</u>	<u>Spring 2</u>	<u>Summer 1</u>	<u>Summer 2</u>
EYFS	All About Me - human body/senses	Space	How do things work? Materials/forces	Animals	Healthy Eating	Minibeasts/Dinosaurs
Year 1	Animals including Humans	Seasonal Changes (2 lessons - Autumn) Everyday Materials	Seasonal Changes (2 lessons Winter) Animals including Humans	Seasonal Changes (2 lessons Spring) Plants		Seasonal changes (Summer) Animals including humans
Year 2	Animals including Humans	Uses of Everyday Materials	Animals including Humans	Plants		Living things and their habitats.
LSK2	Rocks	Light	Electricity	Animals including humans (Y3)	Living things and their habitats	
Year 5	Animals including humans	Forces	Earth and space	Changing states	Living things and their habitats	
Year 6	Electricity	Light	Animals including humans	Evolution and inheritance		Living things and their habitats

Key dates:

4th - 11th October 2021 - Space Week

11th - 20th March 2022 - Science Week

14th June 2022 - Great Science Share



St Margaret Mary's - Science Curriculum Overview 2022-23



	<u>Autumn 1</u>	<u>Autumn 2</u>	<u>Spring 1</u>	<u>Spring 2</u>	<u>Summer 1</u>	<u>Summer 2</u>
EYFS	People who help us	The World Cup / Festivals	Transport	Changing Planet /Growing	Superheroes	Under the Sea
Year 1	Transition topic: 5 senses/ floating and sinking/forces - pull/push/gravity	Seasonal Changes (2 lessons - Autumn) Animals including Humans	Seasonal Changes (2 lessons Winter) Everyday Materials	Seasonal Changes (2 lessons Spring) Animals including Humans	Plants	Seasonal changes (Summer) Review the changes throughout the year
Year 2	Animals including Humans	Animals including Humans	Uses of Everyday Materials	Plants		Living things and their habitats.
LKS2	Sound (4)	Forces and magnets (3)	States of matter (4)	Plants (3)	Plants (3)	Animals including humans (4)
LKS2 Royal Society Project	How can we encourage more wildlife to specific areas around school?	Does the amount of wildlife vary depending on the location?	How does air quality affect the amount of wildlife around school?	Does the amount of air pollution affect the growth of plants?	How can we protect the current wildlife and encourage more wildlife around our school?	How does air pollution affect the biodiversity around our school?
Year 5	Forces	Earth and space	Animals including humans	Living things and their habitats		Changing states
Year 6	Electricity	Light	Animals including humans	Evolution and inheritance		Living things and their habitats

Key dates:

4th - 11th October 2022 - Space Week

10th - 19th March 2023 - Science Week

13th June 2023 - Great Science Share



St Margaret Mary's - Science Curriculum Overview 2022-23



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Year Group	Biology	Chemistry	Physics
1	Plants Animals (including Humans)	Everyday Materials	Seasonal Changes
2	Living Things in their habitats Plants Animals, including Humans	Uses of Everyday Materials	
3	Plants Animals, including Humans	Rocks	Light Forces and Magnets
4	Living Things and their Habitats Animals, including Humans	States of Matter	Sound Electricity
5	Living Things and their Habitats Animals, including Humans		Earth and Space Forces
6	Living Things and their Habitats Animals, including Humans Evolution and Inheritance		Light Electricity

What Science looks like at St Margaret Mary's

What a science lesson looks like at our school:

Planning:

Teachers follow the long-term plan which shows the units that should be covered over the academic year in line with the requirements of The National Curriculum.

When planning, teachers refer to the progression skills which outlines the subject content for each year group and topic. These skills ensure the full coverage of The National Curriculum with sequential knowledge planned out within each topic. Topics are sequenced so learning is built upon and provides a foundation for other areas of the curriculum. For example, in Year 3 and 4 rocks is taught in the autumn one term so that the skills and knowledge can be applied to the study of 'The Stone Age to the Iron Age' which is taught in the autumn two term. The progression skills also outlines what the children should know from the previous year group and should be used to assess the children's prior knowledge before beginning a new topic. To ensure there is sufficient coverage of each enquiry type, a document outlines the topic and the enquiry types which are best suited to a particular topic. This also supports the explicit teaching and learning of the working scientifically skills as this is embedded into the lessons and is not taught as a separate strand. Subject knowledge should be taught and applied to practical investigations to develop the children's working scientifically skills. These investigations are carefully planned so they enhance the children's knowledge and understanding. A vocabulary map is used by staff to support them with planning to ensure the correct age-related vocabulary is taught for each topic and previous vocabulary is reviewed to ensure the children are secure before learning new vocabulary.

A knowledge organiser is provided for each topic and year group. The knowledge organiser includes: The National Curriculum objectives, key vocabulary linked to the topic, conceptual knowledge, questions to consider during the topic and any pictures/diagrams that can support the children's learning. The knowledge organiser provides a simple overview of the topic.

Teaching:

Science is recognised as a core subject and is taught weekly, with the exception of seasonal changes, which is taught throughout the year to maximise children's learning experience. Teachers should aim to cover a topic each half term with four units in KS1 and five units in KS2. Some units will extend over two half terms due to the length of a half term within the academic year.

The children's science journey begins in EYFS through 'Understanding the World'. Understanding the World involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them - from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will provide them with a foundation for their science journey. The EYFS curriculum directly links to the Year 1 science curriculum to support transition.

At the start of a new topic, the children complete an activity which assesses the children's prior knowledge. This may be in the form of a formative assessment activity, discussing a 'big question' or the exploration of previous vocabulary. The knowledge organiser will be shared with the children and included in their book at the beginning of the topic.

At the start of each lesson, the 'I can statement' is shared with the children and the children review the vocabulary they will need in the lesson. Vocabulary is included on the notebook at the start of every lesson and is taught explicitly. This can be through: exploring the meaning of words, similar words, matching the word to the definition or creating a vocabulary map.

Where appropriate, learning from a previous topic is recapped and any misconceptions can be addressed at the start and during the lesson. Possible activities to review previous learning could include: odd one out, big questions, concept cartoons, true or false statements. These activities are used to formatively assess the children's knowledge and understanding.

The children will then focus on the conceptual knowledge they require for their learning and working scientifically skills are explicitly taught. This knowledge is then used in the children's learning which often links to one of the enquiry types. The children cover a range of enquiry types throughout the year to ensure there is broad and balanced coverage of each one. The symbols of the chosen enquiry type are included on the notebook so this is consistent across the school and helps raise awareness and understanding to the different types of enquiry.

The children's learning is enriched through a wide range of equipment and appropriate texts to support the children's learning. In addition to this, topical events take place throughout the year including: Science Week, The Great Science Share and projects with the University of Manchester.

Working Scientifically:

We want to develop children's scientific knowledge and conceptual understanding through opportunities to be biologists, chemists and physicians during their science lessons. We look to equip children with the scientific knowledge and enquiry skills they require to help them answer questions about the world in preparation for the implication of science today and for the future. We are committed to developing children's curiosity about the subject, as well as an appreciation of the possibilities and power of science in the world around them.

Over the years, children develop many scientific enquiry skills:

In KS1, children are taught to use practical scientific methods, processes and skills to ensure they can ask simple questions and recognise that these questions can be answered in different ways. They are taught to observe closely and use simple equipment through practical experiences when performing simple tests. Over the two years, children will be taught how to identify and classify and will gather and record data using tables to help them answer questions that are presented to them.

In lower KS2, children are taught to use practical scientific methods, processes and skills to ensure they can ask relevant questions and use different types of scientific enquiries to answer them. Children will begin to plan for practical enquiries and comparative and fair tests, from which they will make systematic and careful observations, taking accurate measurements, using a range of equipment, including thermometers and data loggers. Children draw upon their mathematics and English skills in a variety of ways through given opportunities to gather, record, classify and present data using bar charts, graphs and tables and when writing explanations, results and conclusions.

In upper KS2, children are taught to use practical scientific methods, processes and skills to ensure they can plan different types of scientific enquiries that answer their own questions. Children should begin to recognise and control variables and use equipment to take

measurements with increasing accuracy and precision, including the use of repeat readings. When recording data and results, children are introduced to more complex methods of presenting data, including labelled diagrams, scatter graphs and classification keys to highlight causal relations. Over the two years, children will develop their skills when identifying scientific evidence that has been used to support or refute ideas of arguments.

Displays:

Each science display contains:

- The title of the topic
- Key vocabulary used within the topic (Age-related vocabulary)
- Symbols and names of the five enquiry types
- Child-led questions - gathered at the beginning of the topic or during the topic
- Examples of work that links to the appropriate enquiry type and celebrates the children's learning journey

Assessment:

Teachers regularly assess children's progress in science through observations, verbal discussions and evidence of tasks in books. Assessment is broken down into formative assessments and summative assessments.

Formative assessments are carried out during and immediately after lessons. This is done through targeted questions, quizzes, explanations and focused tasks to assess the children's knowledge and understanding and working scientifically skills. Formative assessments allow teachers to address any formed misconceptions and bridge any gaps in learning before moving on. They also inform planning, future lessons and interventions where required. Teachers regularly provide verbal feedback to children during lessons and after marking work to identify the next steps.

Summative assessments are completed at the end of each topic. Teachers use the TAPS assessment which focus on a specific area of conceptual knowledge and an area of working scientifically which has been covered within the topic. In addition to this, working scientifically skills are assessed through the use of observation and questioning during and immediately after a lesson. Summative assessments are used to inform future planning, measure progress and provide updates for the subject leader, future teachers and parents. This data is recorded at the end of each topic to provide an overall attainment judgement for each child at the end of the academic year.

Inclusion:

Science is planned for according to the individual needs of the children - in line with the whole school policy surrounding equal opportunities and based upon our school aim to recognise that each child is unique. There are many ways in which SEND children can access the science curriculum including:

- Ensuring familiarity with scientific equipment
- The use of small steps during practical tasks
- Differentiated tasks that are adapted to meet the needs of pupils
- Additional adult support to ensure the development of working scientifically skills, especially for tasks that require a high level of skill or accuracy
- Suitable resources that support learning and allow full participation during investigations
- Opportunities for children to present their work in different ways including oral or written work, diagrams, photographs, voice recordings
- The use of mind maps to help pupils see patterns and relationships linked to their current and/or prior learning
- Opportunities for children to revisit learning and make links to develop their understanding of concepts
- Recognise that the language of science may be challenging for pupils and ensure new language is explicitly taught
- Using ICT to support with taking measurements e.g. temperature log, or ICT to document investigations through photographs and videos

Monitoring:

To monitor the science curriculum and the children's progress and attainment, the subject leader completes a number of monitoring activities throughout the year including: book monitoring, pupil and staff voice, analysis of assessment data and learning walks.

After monitoring, evaluations are carried out and recorded. Findings are shared with staff as appropriate and individual feedback from monitoring is provided to both teachers and SLT.

Parents:

Parents are encouraged to get involved with whole school science events and homework projects that children are given to complete over a period of time. Parents are provided with updates through the school website, Twitter and the weekly newsletter. At the end of the academic year, parents are provided with an update on the children's attainment in science and comments relating to the children's science learning.

How do we know our children have made progress?

We know children have made progress by measuring their learning against the objectives outlined in The National Curriculum for each year group. The children's attainment is assessed and monitored each half term to assess the children's knowledge and understanding through a particular topic. Children's learning is also assessed prior to the beginning of a new topic to ensure prior knowledge and language is secure. A whole school progression document outlines subject knowledge and working scientifically skills to ensure they are taught sequentially through each year group to ensure knowledge and skills are built upon. Increasing complexity of language and precision is expected as the children move through their science learning.

Priorities:

- Complete the PSQM - we have previously been awarded the PSQM and we feel that we are ready to achieve the PSQM Gilt award.
- Develop outdoor learning which is embedded into the science curriculum. This has been outlined within topics and National Curriculum objectives that have strong links to outdoor learning.
- Provide further CPD for staff, focusing on working scientifically.

