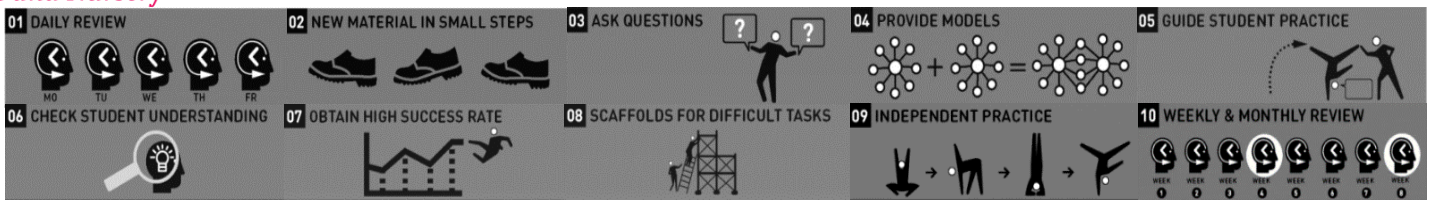
Mount Street Academy
Infant School and Nursery

Science Quality of Education (QED)



Rationale

"Science and everyday life cannot, and should not, be separated" Rosalind Franklin

At Mount Street Academy we are scientists. Science is a vital part of understanding the world around us. Our science curriculum supports both a depth of understanding and skills development, whilst igniting the natural curiosity of all our pupils.

During their time at Mount Street, we want children to develop confidence through the acquisition of knowledge, to question the world around them and to nurture the desire to make a difference and to champion sustainable practices. We want children to recognise the importance of science and develop a sense of excitement and curiosity. Our children will understand how science can be used to predict, observe, discuss and explain what is happening. We want children to gain knowledge and understand the methods and processes of science.

We will:

- Create an environment where children are excited to know more.
- Develop pupils' understanding of the world around them.
- Create future custodians that will look after and appreciate the world they have.
- Encourage children to apply scientific enquiry to enhance their knowledge and understanding.
- Give children the skills, confidence and resilience to experiment, problem solve and find solutions.

Progression

In line with our curriculum design across MSA, our Science curriculum is diligently sequenced to ensure knowledge gained is cumulative. This aids progression as well as frequently allowing children to draw on previously acquired knowledge through retrieval strategies. Learning is sequenced so that established ideas can be linked to new learning, supporting pupils in developing their abilities as a Scientist through understanding the coherent and connected nature of the subject.

By the end of Year Two, a Mount Street child will …

use simple scientific language/vocabulary to share their knowledge and understanding

have an enthusiasm and enjoyment of scientific learning and discovery

make connections between what they have learned – within science as well as between science and other areas of learning

observe scientific phenomena using simple equipment

perform simple experiment - investigate, hypothesis, test, record, and conclude

hold detailed knowledge and skills in the key concepts of science relevant to their age

use their observations to suggests answers to questions using data they have gathered to inform these answers

Intent

At Mount Street Academy, in conjunction with the aims of the Early Years Foundation Stage and 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 lines of enquiry 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.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
- Be curious and ask questions about what they observe to gain a deeper level of understanding
- Develop an enthusiasm and enjoyment of scientific learning and discovery

We intend that our children explore their understanding of the world through innovation and thinking creatively. Skills for working scientifically are key to our science ethos, enabling our pupils to question and investigate through real-life and practical experiences, thus developing knowledge and skills for life. Through our Science teaching, we aim to provide our pupils with the foundations to understand the world around them.

At Mount Street Academy, Science begins in EYFS, with children in Nursery and Reception experiencing, exploring and observing phenomena in the natural and man-made world and beginning to communicate about what they experience and see. Science is embedded throughout the whole EYFS curriculum, with each learning environment allowing children to develop their knowledge of science through Understanding the World – The Natural World, Communication and Language and Physical Development. We use both our indoor and outdoor environment to support the teaching and learning of Science with the children having access daily during continuous provision. These areas are regularly used to develop the children's Science skills and knowledge of plants, animals and habitats. Staff regularly provide new materials and interesting things for children to explore and investigate and encourage children to talk about them. Staff interact effectively with the children to encourage them to use their senses to explore the natural world, materials and forces. Our curriculum in the Foundation Stage is carefully planned to ensure the children have the knowledge and skills to excel in Science in Key Stage 1.

<u>Key Science Concepts in the EYFS:</u>

- Noticing detailed features in their environment
- Comments and asks questions about aspects of the familiar world e.g. where they live or the natural world
- Can talk about some things they have observed e.g. plants, animals, natural and found object
- Talk 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
- Look closely at similarities, differences patterns and change

<u>Understanding the World: The Natural World ELG</u> Children at the expected level of development will:

• 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

In KS1 children build on their skills developed in EYFS, under the specific focus of Science. Children are taught to ask simple questions, observe closely using simple equipment, perform simple tests, use their observations and ideas to suggest answers to questions, gather and record data and identify and classify. They take part in experiments. Children are taught how to apply a scientific method to their investigations – including investigate, hypothesis, test, record, and conclude – which sets up a good foundation and vocabulary to build their science learning further. The National Curriculum provides the structure and skill development for how we plan for the science curriculum being taught throughout the school.

Through our science curriculum children will be able to develop their skills of scientific enquiry through first hand practical experiences combined with other sources such as video, photographs and books. This will build on the skills previously learned during their early years' experiences and enable children to acquire a firm understanding of each concept; helping them to know more and remember more. We endeavour to offer children the opportunity to develop their knowledge and skills in questioning, observing, recording, classifying and using simple equipment through practical application. At the end of KS1 children should be secure in their scientific knowledge and application of scientific enquiry in accordance with the relevant Programme of Study and our intent is that they will know and understand the following concepts and vocabulary:

	Year 1	Year 2
Working scientifically	Observe, equipment, test, identify, classify, investigate, record, data, properties, magnifying glass	Observe, equipment, test, identify, classify, investigate, record, data, properties, magnifying glass
Animals including humans	Energy, growth, habitat, fish, amphibian, reptile, bird, mammal, offspring, carnivore, herbivore, omnivore, vertebrate, skeleton, organ	Reproduction, birth, pregnant, human, survival, extinct, species, hatch, life cycle, carbohydrates, protein, vitamins, dairy, healthy, exercise, muscles, hygiene, germs
Plants	Deciduous, evergreen, flower, plant, tree, stem, roots, leaf, trunk, flower	Seeds, bulbs, conditions, temperature, nutrients
Y1 Everyday materials Y2 Uses of everyday materials	Wood, plastic, glass, metal, water, rock, bend, twist, waterproof, absorbent, opaque, transparent, shiny, dull, rough, smooth	Solid, purpose, suitable, unsuitable, flexible, rigid
Seasonal change Y1	Spring, summer, autumn, winter, sun, clouds, wind, snow, rain, ice, freeze, melt	
Living things and their habitats		Birth, dead, decay, life cycles, food chains, nutrients, adaption, microhabitats

Implementation

At Mount Street Academy we implement our approach through high quality teaching that provides appropriately challenging work for all individuals. We ensure from the moment that children start at Mount Street:

- Children have the opportunity to observe, explore and perform simple tests
- Science is taught on a weekly basis within the KS1 curriculum.
- Ensure that teaching builds on what the children already know.
- There is clear progression within the KS1 curriculum from Year one to Year two that builds on the knowledge and skills learned in Foundation Stage.

The teaching and implementation of science is based on the programmes of study set out in the 'Understanding the world' section of the Early Years Foundation Stage Curriculum and the 'Science' section in the Key Stage 1 National Curriculum. The subject knowledge in these frameworks is delivered through the chosen topics by each year group and the 'working scientifically' skills are taught by linking them to this subject content. We implement this in accordance with out MSA progression in science as set out in our MSA science curriculum on our Medium-Term plans.

In the Early Years, whole class Science lessons and experiments are planned for by teachers. The children will then be able to further explore and consolidate their knowledge and understanding of the key concept during child and adult initiated learning in provision. Science is explored through looking at 'Understanding the World'. Children are encouraged to explore and investigate the world around them, asking questions such as 'why' and 'how' does something work. Children are encouraged to explore similarities and differences in relation to materials and living things. Simple experiments are conducted to develop these skills, both inside the classroom and in the outdoor learning spaces.

Each KS1 science lesson begins with a science board which allows the children to recall/retrieve their knowledge about all of the key concepts and areas of Science and to then identify which of these will be covered in that lesson. This allows the children to build links with previously learned work and to set clear outcomes.
As a school we ensure scientific vocabulary is incorporated into science lessons and teachers know what vocabulary is relevant and necessary for their teaching topics. Similarly, questions to support the different areas of the science curriculum are presented to the children during all science lessons. These questions are based on 'What', Why', 'How' and 'When' and show progression throughout school by incorporating more in depth content and vocabulary.
In addition, the children are regularly given access to objects or quick experiments that ignite their natural curiosity and encourage the use of questions and scientific vocabulary. Experiments are delivered in the classroom; these involve children and create awe and wonder whilst developing their scientific thinking.
Ways of working scientifically are carefully considered at the planning stage of all lessons to ensure children are developing their skills along with their knowledge.
We wish to create young scientists who can predict, observe, question and share opinions. When planning Science lessons, staff continually consider how to make adaptations to approaches where necessary to ensure equity and inclusive practice for all learners e.g. those with SEND

Cross curricular links are made where possible and in particular our 'Fit to Fly' week with its links between Science with PE. In this week, children are able to observe the effects of exercise on their body, learn the importance of food groups and the need to limit certain foods in order to live a healthy lifestyle. Children are encouraged to make healthy choices and use their scientific knowledge to make a healthy snack for their friend during. DT lessons.
The local environment is used around the school to promote scientific enquiry. Children embark on minibeasts hunts searching out micro habits around our pond area. We utilise the shrubbery growing within our grounds to promote the learning of plants.

Impact

We expect that when we have implemented all of the above, by the time the children leave us at Mount Street they will have:

- developed detailed knowledge and skills in the key concepts of science and have achieved the expected standard for each year group.
- gained a deeper level or understanding of the world around them and will use this understanding as a foundation to their learning in Key Stage Two.
- had the chance to develop the ability to make connections in science lessons to other areas of learning.
- pride in what they have achieved and present this in a positive manner, whether in books, through pictures or in conversations.

Children will have a clear understanding of the scientific processes behind the investigations they have experienced, and they will know the correct terminology to discuss their observations. We will be able to see that the children know more and remember in more in Science, through evidence in Tapestry (EYFS) and in topic folders (KS1) and through discussions with children (pupil voice). We will also see they are able to recall prior learning and apply it. Children will then start their next year of learning with the necessary skills and knowledge to build upon.

Assessments throughout Key Stage 1 are ongoing and recorded on the Science assessment grid. This helps identify the children who are working towards the expected level, at the expected level and exceeding the expected level in Science. Teachers also use assessment information from individual lessons to inform future lessons, ensuring children are supported and challenged appropriately, highlighting strengths and achievements as well as any improvements, knowledge and skills that still need to be embedded.
Throughout Y1 and Y2 teachers currently use statements provided by the MSA Science Assessment tool which links to what has been taught and when within each year group to record children's progress. As well as observation of children within Science lessons, staff use of retrieval practice strategies such as brain dumps and science quizzes to reinforce the children's knowledge and to inform teacher planning and assessments.

At the end of KS1 teachers use the pupil I can statements from within the statutory teacher assessment framework to inform their judgements. This will be based on evidence gathered within the classroom that shows that the children have grasped all the 'working scientifically, statements and all the 'science content' taught during KS1. This evidence may also come from work produced in different curriculum subjects.
Teachers will consider a range of evidence such as:

- Children's responses to practical work
- Teachers' notes relating to practical work
- Answers to questions from science quizzes/brain dumps and other retrieval opportunities

The Science subject leader has a clear role and overall responsibility for the progress of all children in science throughout school. Regular book/topic folder looks, learning walks, planning scrutiny and child voice interviews provide the overall picture of Science across school and supports the monitoring and evaluation of the intent and implementation outlined above, allowing for exploration and challenge. The key focus for this is to seek:

PUPIL VOICE	EVIDENCE IN KNOWLEDGE	EVIDENCE IN SKILLS	BREADTH AND DEPTH
Through discussion and feedback, children talk enthusiastically about their science lessons and speak about how they love learning. They can articulate the context in which Science is being taught and relate this to real life purposes.	Pupils know how and why Science is used and is evident in the outside world and in the workplace.	Pupils use acquired vocabulary in science lessons. They have the skills to use methods independently, show resilience, follow lines of enquiry and ask relevant questions.	Teachers plan a range of opportunities to use science inside and outside school.