



Science Policy

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Science Policy

Our School Vision

Vision

Our vision is to create extraordinary learning, for all of our children to be proud of their achievements, develop resilience and grow as learners so that they can discover their place in the world, where their possibilities are endless!



Curriculum Intent

At Manor Primary School, we all champion primary science and our intent is to make sure that every child has a positive, memorable and first-hand experience of science throughout their primary school education where our children to make concrete links to prior knowledge and build their scientific schema through key experiences and deliberate practice.

Learning is a journey; all children are at different points on their learning journey. As facilitators, experts and coaches in the classroom we must focus on motivating the children and building the knowledge and understanding across our science curriculum. Teachers must tailor their teaching in Science to meet the needs of the learners within the classroom and engage them in the process of learning to enable them to excel as a scientist.

Children will be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. It will provide opportunities for the critical evaluation of evidence and rational explanation of scientific phenomena as well as opportunity to apply their mathematical knowledge to their understanding of science, including collecting, presenting and analyzing data. Children will be immersed in key scientific vocabulary, which supports in the acquisition of scientific knowledge and understanding

At Manor Primary, we are committed to high quality teaching, learning and education in Science which ultimately stems from our ambitious and inspiring Science curriculum. It is through our curriculum that we raise standards of achievement for all children which leads to exceptional outcomes in Science.

In Science, we intend to chant...

Be you, someone that: thinks, wonders, ask questions, observes, explores, experiments, measures, predicts, drawers, events, a scientist in the making!

At Manor Primary School, our intention is to give all children a strong understanding of the world around them and we will do this by creating a Buzz about Science!

Exceptionality

Collaboration

Integrity

Respect



★ Our Curriculum Design

The geography curriculum is designed to ensure **substantive and disciplinary knowledge** is built upon year on year.

Substantive knowledge – this builds progressively to develop children’s understanding of concepts, models, laws and theories. It is organised into the following four areas:

Biology

- Living things and their environment
- Reproduction, inheritance and evolution

Chemistry

- States of matter
- Materials (properties and changes)

Physics

- Energy
- Forces

★ Earth Science

- Earth and space

Disciplinary knowledge – considers how scientific knowledge originates and is revised. It builds progressively to enable children to work scientifically and covers the following aspects:

- Methods used to answer questions
- Using apparatus and techniques
- Data analysis
- Using evidence to develop explanations

So that our pupils are able to learn more and know more, we believe it is vital that our science curriculum develops both categories.

Skills to Gain Knowledge

Our aim is to ensure that our pupils become scientists who can confidently attain knowledge regardless of the subject or topic. In order to do this, we carefully plan our science lessons so that concepts are taught. These skills ensure that children are able to unpick scientific knowledge throughout their life.

The five key science skills that support both knowledge / conceptual development and Working Scientifically are

- Explaining science
- ★ ● Classification
- Designing experiments
- Data tables and graphs
- Making conclusions

Concepts are a means of categorising scientific knowledge

Key concepts:

- Similarity and Difference
- Cause and Effect
- Adaptation
- Function
- Growth
- Changes
- ★ ● Working scientifically
- Processes
- Structure
- Evolution
- Variation

Second order concepts:

- Responsibility – working safely, how science can solve problems, climate change and sustainability
- Similarity and difference – making comparisons, finding patterns, noting differences and drawing conclusions
- Cause and consequence – models and laws, reactions between materials, observing processes
- Continuity and change – observing what changes and what stays the same

- Significance – significant scientists, discoveries, laws, models and theories
- Written and oral expression – using scientific terminology, evaluation, drawing conclusions, objectivity, explaining processes, describing and explaining patterns, presenting and interpreting data

Teaching Sequence in Science:

- Introduction using provocation or stimulus to generate the motivation to find out more and create the need to think scientifically in order to understand more. Retrieval of prior knowledge to elicit understanding.
- Development of scientific understanding – seeking what do we need to do to find out about and to describe, analyse and explain this scientific narrative.
- ★ • Engage pupils in making connections with their prior learning, to refine their thinking.
- Making sense of new learning – Applying learning and developing pupils understanding through learning opportunities that develop their abilities to 'think scientifically' and use scientific terminology.
- Refining thinking – refine and develop their conceptual understanding through communication with others. Presenting in some form their own scientific understanding to others.
- Reflection – reflecting on their own scientific understandings. How have they been challenged to develop their ability to think in new ways?

Curriculum Implementation

At Manor Primary School our science curriculum delivers full coverage of the National Curriculum, provides progression of knowledge from EYFS to year 6 and has been injected with a golden thread of memorable, investigative opportunities to enable all children to explore, experience, observe and discover Science first-hand. Our curriculum is built around the principle of greater learner involvement in their work. It requires deep thinking and encourages our children to learn and discover using a question as the starting point, considering

★ different avenues for further research. Our children 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 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 draw simple conclusions and use scientific language to talk and write about what they have found out.

Each science unit begins with a hook for learning, developing a sense of excitement and curiosity for children. Teachers systemically check on what children already know and then invite children to think of their own questions. Children will be able to build on prior knowledge and link ideas together, enabling them to question and become enquiry based learners.

Memorable knowledge and skills have been identified for each of the units to provide progressive acquisition of knowledge. This is supported by the use of 'sticky vocabulary and sticky knowledge' which are displayed within

the learning environment and subject specific knowledge mats. Teachers regularly refer to this knowledge and key vocabulary with meanings so that it 'sticks'. This enables children to readily apply knowledge and vocabulary to their written and verbal scientific communication.

Children are also asked to review their learning at the end of each unit. These 'reflection' opportunities provide children with an opportunity to share their learning more widely through a variety of means e.g. learning presentations, talks and report writing.

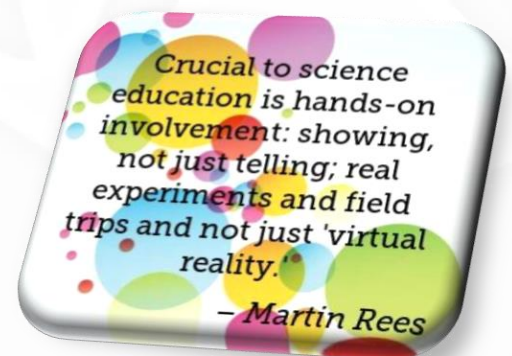
Each scientific unit will enable our children to grow up understanding how to work scientifically whilst fostering positive attitudes such as curiosity, perseverance, striving for accuracy. They will have the knowledge they need to succeed in all science subjects (biology, chemistry and physics) in further and higher education; develop important life-skills in relation to the world they live; and have high aspirations for their future careers.



Each class across EYFS, Key Stage 1 and Key Stage 2 will provide children a weekly science lesson.

Great science teaching builds progressively on pupils existing knowledge. In order for effective delivery of science education, across weekly lessons there should develop opportunities for:

- ✓ Finding out children's prior knowledge and ideas using a variety of elicitation opportunities.
- ✓ Analysing children's knowledge and starting points and how this can be built upon with new knowledge.
- ✓ Activating opportunities to explore science, work with scientific equipment, test out a question.
- ✓ Providing opportunities for testing ideas, thereby possibly changing them and making predictions based on their own thinking and articulating why they think this.
- ★ ✓ Providing opportunities for developing process skills so that testing is scientific.



Scientific learning opportunities for all children will be appropriately differentiated to match children's relative starting points but will ensure that all children can access challenge so that there is 'no lid on the learning'.

Exceptionality

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Respect

Across science lessons, children will be working interdependently to support each other through collaborative and peer learning and children will be challenged with open-ended investigative opportunities that will enable them to take locus of control for their learning. Across lessons, all staff will act as an activator and facilitator of learning, skilfully intervening, scaffolding, questioning and moving learning on in all parts of the lesson so they make rapid progress.

In addition, other subjects will play a part across lessons in lesson where children will be able to develop and apply their mathematical, English and computing skills. For example using mathematical skills for repeated testing of results to calculate averages in science and in EYFS using high quality literacy texts to explore and expose children scientific concepts and vocabulary that makes connections to the real world.

★ Organisation and Planning

In Early Years children will work from the Understanding of the world curriculum and framework. This aims to develop children's crucial knowledge, skills and understanding that helps them make sense of the world. It provides opportunities for the children to explore scientific vocabulary and learning opportunities based on first hand experiences that encourage exploration, observation, problem solving, prediction, critical thinking, decision making and discussion. It provides the foundations and knowledge for the science KS 1 and then the KS 2 curriculum.

The science units of work for KS 1 and 2 continue to build connections on knowledge, concepts and process skills ensuring that all knowledge and understanding programmes of study are covered at least once in Key Stage 1 and at least twice at Key Stage 2, and that all the process skills programmes of study are constantly being reflected on, visited and developed as each science unit of work is taught.

Inclusion

★ When planning for teaching and learning we take into account the wide range of abilities of our children. Where necessary children are identified as having additional needs support is given and the Science curriculum is differentiated to meet their individual needs, whilst ensuring access to a full, rich and varied curriculum along with their peers. Reasonable adjustments will be made to that every SEND child can fully access the curriculum.

Assessment

Assessment is an integral part of high quality teaching and learning, we believe that it lies at the heart of the learning process and starts and ends with the learner. Assessment is inextricably linked to planning and all assessments in science are used to inform future planning in order to impact on future teaching and learning.

In science elicitation opportunities are carried out prior to, during and after teaching in a variety of ways to inform planning or how far ideas and knowledge have progressed after a period of teaching.

Formative assessment is continually on going in the form of observations, in the moment marking and feedback and making notes on weekly planning in order to inform planning for the next lesson. These assessments are linked to the key learning objectives for the lesson.

In Early Years. Learning journeys and on line portal 'Evidence Me' capture observations and are kept up to date with summative assessments of children's achievements and progress.

For each Key stage 1 and Key stage 2 units of work, day-to-day formative assessments are used across science lessons as well as children's building blocks are used in science to enable children to take ownership of their learning as well as enable staff to assess what each child has achieved in line with national expectations. All assessments inform future teaching and starting points to lessons.

Health and Safety

When working with science equipment and materials during practical learning opportunities like dissecting fish or a pig's heart, all staff will ensure that children understand the hazards and learn how to control them, ensuring the safety of themselves and others. The school's "Health and Safety Policy" should be consulted for details regarding scissors, craft tools, electrical equipment, wet areas, heavy equipment and use of other tools.

Our Children's Charter

We champion each child at Manor to gain entitlement to

- ✓ Memorable and first-hand learning and experience 'the BUZZ of Science'
- ✓ An understanding that Science is relevant to everyday living and a lifelong skill, by solving problems that are set in a real life context.
- ✓ Have a voice and be able to choose how they wish to learn and think like a scientist– the resources and approaches they feel are most appropriate; giving them autonomy to lead learning forward
- ✓ Develop critical thinking and the confidence to question ideas in order to deepen their understanding.
- ✓ Become metacognitive learners, understanding their own abilities, what they need to do that will enable them to develop their abilities and the skill to review their learning accurately.
- ✓ Experience trips and visits (ThinkTank, STEM, and Careers 2030) to enrich and enhance learning in science, build children's cultural capital and expose children to the world of science.
- ✓ Ignite the spark for personal development of children through making links that develop future aspirations and careers in Science (engineering, medicine, biomedicine, forensics)
- ✓ Celebrating science through science days, British Science week, displays and pupil voice and leadership.



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