



Science Policy

At Rokeby Park Primary School, we strive to deliver high-quality science curriculum which allows our pupils to recognise the significance of science in their everyday lives. We explicitly teach pupils the skills and knowledge they need to become more methodical, analytical and inquisitive scientists. This policy sets out a framework within which teaching and non-teaching staff can work, and gives guidance on planning, teaching and assessment.

It is our intent for the science element of our school curriculum to inspire pupils with a curiosity and fascination about natural phenomena and the uses and implications of science, today and for the future, that will remain with them for the rest of their lives. Teaching should equip pupils with knowledge about biology, chemistry and physics, how science has changed our lives and how it is vital to the world's future prosperity. By revisiting these areas of learning regularly, pupils will remember more, know more and understand more. As pupils progress, their growing knowledge about science should help them to deepen their understanding of scientific concepts, processes and methods and the implications they have on human existence. We want our pupils to gain confidence and have practical experiences of being scientists through developing their knowledge and skills to explain what is occurring, predict how things behave and analyse causes. Pupils will be prepared for the next stages of their lives through understanding the impact of science and the vast range of careers they could explore and aim for.

Aims

The aims of science are:

- 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
- to equip pupils with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Curriculum

At Rokeby Park Primary School, pupil access the EYFS Framework and science National Curriculum. A long-term plan outlines when the programmes of study are taught for each year group. Staff have developed key visions and principles for our science curriculum based on the context of our setting. 'Working Scientifically' disciplinary knowledge is embedded throughout the scheme alongside the substantive knowledge to ensure clear progression towards carefully identified end points.

Our curriculum is centred upon the 'big ideas in science'; this requires deep thinking, exploration, discussion, investigating and researching. The clear progression ensures that children are continually building on their prior learning as they systematically develop their understanding of key ideas and their scientific skills. Pupils have opportunities to ask their own questions and consider which types of scientific enquiry are likely to be the best way of answering them. Our pupils draw conclusions and use scientific vocabulary to discuss and present their findings in a range of different ways.

The substantive knowledge has been organised around a set of key concepts which are revisited as pupils progress through the school. (See progression document).



Across the year, we explore different aspects of scientific enquiry and build pupils' skills and knowledge in each aspect as they progress through the school.

- **Observing over time:** (observing or measuring how one variable changes over time)
- **Identifying and classifying:** (identifying and naming materials/living things and making observations or carrying out tests to organise them into groups.)
- **Looking for patterns:** (making observations or carrying out surveys of variables that cannot be easily controlled and looking for relationships between two sets of data)
- **Comparative and fair testing:** (observing or measuring the effect of changing one variable when controlling others)
- **Answering questions using secondary sources of evidence:** (answering questions using data or information that they have not collected first hand)
- **Using models:** (Developing or evaluating a model or analogy that represents a scientific idea, phenomenon or process)

Key vocabulary is displayed interactivity within a classroom, where subject specific words are referred to consistently throughout a theme. Knowledge organisers have been created to explicitly identify the key knowledge, skills and vocabulary pupils need to acquire and make explicit connections between science and mathematics.

The substantive knowledge 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

The disciplinary knowledge 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

We deliver a broad and balanced science curriculum which stimulates and maintains children's natural curiosity. Key scientists, significant discoveries and theories are also focused on to give the children a real-life understanding of the concepts taught. Where possible, real-life examples are used in lessons to give our children a deeper understanding of these concepts.

Early Years

Early Years explore scientific themes and content through the 'Understanding of the World' strand of the EYFS curriculum. This involves guiding the pupils to develop sense of their physical world, looks at plants



and animals, including humans, seasonal changes and begin to investigate materials. They are assessed in the moment according to milestones within the Development Matters attainment targets.

Key Stage 1

During Key Stage 1, pupils will experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They are encouraged to be curious and ask questions about what they notice. Pupils will begin to supply simple scientific vocabulary to answer their own questions, using scientific enquiries to draw conclusions. The majority of scientific learning in this key stage should be done through practical first-hand experiences with some use of appropriate secondary sources. Pupils will be introduced to significant individuals linked to their programmes of study. Reading is embedded through the use of high-quality texts and fluently reading scientific vocabulary.

Pupils will develop knowledge about biology, chemistry and physics (including earth science), including how this is evident in their local environment. They should understand basic subject-specific vocabulary relating to all disciplines of science and begin to use their working scientifically skills to enhance their scientific awareness.

Pupils will develop their knowledge of **physics** observing changes across the four seasons and describe the weather associated with each season and how day length varies. Pupils will also apply their mathematical understanding making tables and charts to display their findings.

Pupils will develop their understanding of **biology** describing the basic needs of animals, including humans, for survival and the main changes in life cycles. Pupils will be able to describe and compare the features of common animals and discuss the importance of exercise, nutrition and hygiene.

In **chemistry**, pupils will name, compare and group a variety of everyday materials and describe their simple, physical properties. They will then investigate the suitability of these materials for particular purposes.

Pupils carry out **scientific enquiry** inside and outside the classroom asking questions, noticing patterns, grouping and classifying, using secondary sources and carrying out simple comparative tests. Pupils develop their communication skills through communicating their ideas about their methods and conclusions. 'Working scientifically' will be developed through the three disciplines along with further developing their mathematical understanding

Key Stage 2

During Key Stage 2, pupils broaden their scientific view of the world around them and extend and develop their understanding of biology, physics and chemistry. They explore, discuss, test and develop ideas about everyday phenomena and the relationships between living things and familiar environment. Pupils analyse functions, relationships and interactions more systematically as they progress through Key Stage 2. They encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. Pupils also begin to recognise that scientific ideas can change and develop over time as technology progresses. They will extend their knowledge of significant individuals linked to scientific exploration and understanding.

Pupils extend their **physics** knowledge when they learn about simple series circuits, recognise and explain why materials are good conductors and insulators and identify common appliances that run on electricity. This is further extended to use simple apparatus to construct and control a series circuit and describe how the circuit may be affected when changes are made to it. Pupils will be able to recognise and use symbols to represent simple circuits in diagrams. Pupils develop their understanding of forces, initially looking at magnetism before exploring gravity, air resistance and water resistance. They will be able to understand the theory of gravity and apply this to their understanding and knowledge of Earth and Space.



Pupils will explore light, discussing its properties and how shadows are created and the patterns in how they change. This is then extended to identify how light travels in straight lines and how it enters our eyes to explain how we see things. Pupils will also identify how sounds are made, vibrations and the relationships of pitch, volume and the source of the sound.

Pupils will build on their understanding of **biology** identifying and describing the functions of different parts of flowering plants, the requirements of plants for life and growth and how they vary from plant to plant. They will investigate how water is transported within plants before extending their knowledge further and explore plant reproduction. Pupils' understanding of animals, including humans, will be deepened with pupils acquiring knowledge about skeletons, muscles, the digestive system, food chains and the circulatory system. Pupils will describe the life cycles of animals, including humans, in more depth and understand the effects of diet, exercise, drugs and lifestyle on the human body. They will classify a wider variety of plants, animals and microorganisms and describe how living things have changed over time and evolved using the basic ideas of inheritance, variation, adaptation and evolution.

Pupils' **chemistry** knowledge is extended through comparing and grouping rocks and soils considering their formation and discussing their physical properties. They will develop an understanding of the different states of matter, how states of matter change (including the water cycle), investigate solutions and how mixtures might be separated through different processes. Investigations will take place to look at reversible and irreversible changes and the uses of everyday materials using comparative, fair tests.

Pupils will continue to develop their **scientific enquiry** skills through these three disciplines where they describe and evaluate scientific ideas, use a range of scientific equipment to take accurate and precise measurements, record data and results using diagrams and statistical representations, draw more in-depth conclusions, explanations and evaluations and further develop their communication skills. Further questions will be raised by the pupils as they further deepen their scientific understanding which could be investigated, based on data and observations.

Assessment and Recording

The successful, collaborative approach to the teaching of science across the Constellation Trust results in an engaging, high quality education that allows pupils to understand the world around them and encourages them to explore science further as they leave primary school.

By the end of the primary school education, pupils will:

- Have an understanding of the key domains of knowledge and can use key concepts to make links between domains
- Ask questions and make observations about the world around them using scientific knowledge
- Analyse data and articulate evidenced conclusions
- Follow and design scientific enquiries
- Have an understanding of some of the major issues facing our planet and an appreciation of the importance of science to wider society

At Rokeby Park, assessment is an integral part of the teaching process. Children record their learning in science books as well as in a class theme book which displays their practical learning. The assessment of children's work is on-going to ensure that understanding is being achieved and that progress is being made. Feedback is given to the children as soon as possible and marking work will be guided by the school's Marking Policy. At the end of each unit, children complete '5 Key Questions' which assess key content, vocabulary and a second order concept explored during the unit. 'Working Scientifically' is assessed within each unit using key assessment activities from TAPS.



Monitoring

Monitoring takes place regularly through sampling children's work, teacher planning, book scrutiny, learning walks and lesson visits.

Roles and Responsibilities

The Head teacher will:

- actively support and encourage staff, praising good practice and supporting staff development, in-service training (particularly for the science leader) and acquiring resources.

The Science Leader will:

- advise and support staff in planning, teaching and learning of science;
- monitor teachers' planning as part of on-going subject monitoring and evaluation of practice;
- use feedback from monitoring to develop an action plan for science with realistic and developmental targets;
- audit, identify, purchase and organise all science resources, ensuring they are readily available and well maintained;
- document and review the agreed ways of working through a written policy document and knowledge and skills progression;
- compile a portfolio of children's science work to evidence progression and examples of good practice for staff to refer to;
- keep up to date on new developments in the use of science in the curriculum and inform staff;
- promote science throughout the school.

The Class Teacher will:

- be responsible for the planning and teaching of science as set out in this policy;
- use 'Key Performance Indicators' to inform teaching and learning as well as assess children's understanding;
- follow the subject's long term plan and develop termly year group medium term plans and pacing sheets;
- embed the science Knowledge and Skills Progression document within planning and quality first teaching;
- create and regularly refer to a key vocabulary display within the classroom linked to each theme.



Resources

We have a wide range of practical resources and interactive boards to access the internet as a class. Visits are planned to enhance learning and give hands on opportunities. The local Hull Curriculum Service is fully available to support learning as is the library service where topic resources can be obtained. In addition, local persons with expertise in particular topics are invited to visit the school and enthuse and inspire our pupils. Where possible, we use STEM Ambassadors to enhance science learning.