



Science Policy & Guidelines

Intent

At Cockfield Primary School the primary aim of our Science studies is to ignite curiosity in our children; we want them to question why things happen and the way things work.

The 2014 national Curriculum for science aims to ensure that all children:

- 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.
- are equipped with the scientific skills required to understand the uses and implications of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this.

At Cockfield Primary School we know that children are naturally curious and we encourage this inquisitive nature throughout their time with us and beyond. Science fosters a healthy inquisitiveness in children about our universe and promotes respect for the natural and life sciences. We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. We ensure that the Working Scientifically skills are built-on and developed throughout their school career so that they can use equipment, conduct experiments, build arguments and explain concepts confidently and continue to ask questions and be curious about their surroundings.

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 to have a project-based approach. We use Hamilton trust and Twinkl to support our planning. This strategy is used to enable the achievement of a greater depth and knowledge and understanding. Links to other curriculum areas are made whenever possible. **(The children will know more and remember more)**
- Through our planning, 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 lesson, 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 local environment visits. Specialist visitors deliver high quality workshops to facilitate and support science learning by building on the children's prior knowledge and aspire them to think of their futures and their prospective career paths.

Impact

The successful approach at Cockfield Primary School results in a fun, engaging, high-quality science education, that provides children with the foundations for understanding the world. Our engagement with the local environment ensures that children learn through varied and first-hand experiences of the world around them. So much of science lends itself to outdoor learning, so we ensure we provide children with many opportunities to experience this. Through various workshops, trips and interactions with experts and local companies, children have the understanding that science has changed our lives and that it is vital to the world's future prosperity. We have links with Primary Futures which enables us to invite volunteers to visit school to discuss possible careers in the field of Science. Children learn the possibilities for careers in science through the opportunities we provide. Children in our school overwhelmingly enjoy science and this results in motivated learners.

Science in the Early Years

Science is explored through the children's understanding of the world and elements of technology. Our outdoor learning environment in the Early Years is key to enhancing child led learning. We provide opportunities for children to question, wonder, explore, discover, experiment and observe through direct experiences. The children are introduced to scientific vocabulary to help them further their understanding and are asked open-ended questions, so that they can make predictions and give them opportunities to question. Our Early Years provision ensures that children have access to a range of materials that work in different ways for various purposes. Children can use resources and the environment around them to notice similarities and differences, changes over time such as a growing plant in the garden and discuss their point of view with their peers.

Overall Aims

The general aims for teaching Science at Cockfield Primary School are:

- To develop an awareness and understanding of the importance of Science in everyday life.
- To enable the acquisition, and application, of progressively developing scientific skills, knowledge and understanding.
- To further personal development through Science activities which include investigation, problem solving, creative thinking, co-operative group work and independent work.
- To nurture inquisitive and explorative minds.
- To encourage safe and careful practice in investigative work.
- To equip children to work scientifically within a range of contexts, including work in other subjects.

Curriculum and School Organisation

The curriculum is delivered in accordance with the National Curriculum Guidelines for Science, providing a range of developmental activities ensuring continuity and progression. Children of pre-National Curriculum age will be offered a variety of scientific experiences through the delivery of the EYFS Framework Curriculum.

The experiences of foundation stage children focus upon the investigation of their immediate environment, providing opportunities to discover, observe, question and record through their coverage of Understanding the World strand of the EYFS Framework Curriculum but covering other strands too through the interconnectivity of concepts and skills (see previous section relating to Early Years).

These experiences are developed further as children progress through the school through the delivery of a developmental curriculum that covers the requirements of the National Curriculum.

It is the school's responsibility to develop an understanding of scientific phenomena relating to biology, chemistry and physics. Within these knowledge-based areas, the ability to investigate must be central to further develop knowledge and understanding of scientific theory and procedure.

Teaching and Learning Processes: Coverage, Progression and Continuity

To ensure continuity, progression and that all aspects of the Science curriculum are covered adequately, a two-year programme of topics is in place where knowledge, understanding and skills are covered in relation to the long-term plan for Science. The long-term plan is devised in such a way that teachers can alter the order of units within their year groups to best fit the school's topic based creative curriculum and allow the development of skills within other subjects. Teachers are to ensure that the elements of 'working scientifically' are taught throughout the year as part of their deliverance of particular units of Science. The long-term plan is based on the Durham LA document, 'Progression in Science' to ensure progression and coverage of the National Curriculum. Teachers refer back to this document and the National Curriculum when planning.

The 'Working Scientifically' aspects of the National Curriculum for Science are concerned with the development of intellectual and practical skills that will enable children to pursue lines of scientific enquiry with increasing sophistication. It is central to the development of pupils' scientific skills and is embedded in all units of work taught. Science is a practical subject and for this reason the majority of experiences offered to children must be of a practical nature providing opportunities to explore at first hand. Wherever possible links are made to other curriculum areas. For example, links between a Science topic on sound could see children explore onomatopoeia write sound poems in English or explore timbre, texture and musical composition in music, to fit in with the school's policy on the creative curriculum.

A range of teaching styles are employed in order to ensure quality education within the area of Science. These styles include illustrative practice, discussion, experiential and observational work, investigative work, practice in basic skills and investigative work.

The class may work together, in small groups or individually depending upon the nature of the activity.

The predominant method of delivery within the school is practical, investigative work undertaken within the small group framework.

To enable children to carry out investigations successfully a framework is required, this framework should be introduced in the early years and developed as children progress. Children should also be encouraged to develop and carry out their own investigations.

To investigate successfully certain issues must be addressed: -

Planning

- Making hypotheses.
- Predicting.
- Planning tests and investigations by answering a series of related questions.
- What are you trying to find out? How will you do the test?
- What equipment will you need?
- Controlling variables - leading to the ability to plan and carry out a fair test.

Implementing

- Investigating.
- Classifying, sorting and grouping.
- Observing:
 - Using all five senses;
 - Looking for similarities and differences; - Looking for Change.
- Classifying, sorting and grouping.
- Measuring:
 - Using non-standard measures;
 - Using standard measures.
- Selecting and using appropriate equipment.
- Collecting data:
 - Recording results and observations.

Concluding

- Interpreting results and observations.
- Looking for patterns.
- Analysing data.
- Communicating findings:
 - Orally;
 - Pictorially;
 - In written and diagrammatic form.

The above criteria should be at the heart of the majority of Science teaching irrespective of the body of knowledge being pursued. It is not expected that every Science lesson will show every single characteristic of investigative work as listed above but teachers should plan for a full investigation to be carried out every half-term. Teaching and learning should become more demanding as pupils approach new levels of knowledge, understanding and skills.

Differentiation

It is the policy of the school to meet the needs of all children. Within the area of Science activities may be broken down to accommodate the less able and extended for the more able and talented. Differentiation may be by outcome – the quality of a child’s response- or by task when pupils are set specific activities matched to their ability. It may also be by other methods such as teacher or adult support or scaffolding of resources and tasks.

Marking and Presentation

Within the area of Science children will have opportunities to present work in a variety of forms. These forms should include, but not be limited to, written reports, charts, graphs, diagrams, drawings and oral reports. It could also be presented through Computing, for example, as annotated photographs or simple videos created on iPads. All children complete Science work in their Science books. Work should be dated and titled, both of which should be underlined. In Key Stage 2 the learning objective should be present at the top of the page. Work should be marked in accordance with the school's marking policy.

Assessment, Monitoring, Recording and Reporting

Assessment is a key element of effective teaching and learning being that it informs the successful deliverance of future lessons in a continuing cycle. As such teachers should undertake the task of assessing the children's work in accordance with the school's policy.

At the end of each lesson teachers should make note of those children who have made less, expected or more progress than expected. For those that have achieved less or more than what was to be expected the teacher may choose to alter the following lessons to cater for this as necessary or provide intervention sessions. Teachers will assess pupils' attainment at the end of each unit of learning and indicate against the objectives being taught, which children are below expectations, in line with expectations and above expectations thus allowing teachers to ensure future learning is correctly pitched with an appropriate level of challenge and that the subject leader can successfully develop the subject.

Concept mapping is a valuable method for assessing children's existing knowledge and understanding and may be carried out by the teacher alongside written tests to better inform a teacher on the needs of their class. If carried out at the beginning of a topic the map will serve as a record of children's 'initial' ideas. After the completion of a Science topic, the process can be repeated and should show the child's increased knowledge and understanding. For children who experience difficulty with reading, pictures may be used instead of key words.

At the end of each year class teachers are required to report to parents on their child's/ children's attainment in Science. Foundation stage teachers will complete the Foundation Stage Profile. Ongoing assessment of curriculum delivery is an integral part of ensuring high quality Science delivery. The subject leader will assess delivery, progression and attainment regarding Science with targets and changes to the curriculum made in light of this where necessary. In Year 2 and Year 6 it is a statutory requirement for teachers to report pupils' attainment in Science against the criteria set out in the Key Stage 1 and Key Stage 2 End of Key Stage Frameworks. This information must also be reported back to the DfE.

Staff Development

All members of staff are entitled to relevant in-service training through L.A. courses, support and development time and professional development days to ensure all staff reach their full potential.

Responsibilities

Each class teacher is responsible for planning within the EYFS Framework Curriculum or National Curriculum Guidelines, depending on the age of the class, to provide the children with activities that are differentiated, developmental and provide rich opportunities for development based on accurate assessment.

The Science subject leader is responsible for the monitoring of continuity and progression of skills across the key stages, ensuring adequate and appropriate resourcing, the development of suitable programmes of study and the provision of staff guidance.

The Head-teacher has responsibility for ensuring the delivery of the National Curriculum in accordance with guidelines, monitoring the work of the subject leader and, where appropriate, setting targets with the subject leader.

The Governors are responsible for ensuring the Science policy meets the needs of all children and is delivered in accordance with National Statutory requirements within the parameters of the school budget.

Updating and Reviewing

This policy and guidelines are subject to continuous monitoring, evaluation and review. It will be updated as necessary to take account of recommendations by the subject leader, senior management, LA advisors and OfSTED.