



Elston Hall Primary School

Science Policy

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Science Policy September 2023

This policy should read in conjunction with the Statutory Science National Curriculum Document (2013).

Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. At Elston Hall Primary School we are aware of the lifelong value of science for our pupils: it gives them a chance to learn about the world around them, and to find out how and why things happen. We believe that science is not all about what we know, but how we know it. Through working scientifically our pupils are taught not only the facts of science, but also the use of scientific skills that will enable them to develop into independent young scientists.

Aims

Elston Hall Primary School offers a high-quality science education that supports the aims of Development Matters, the Early Years Foundation Stage, and the National curriculum 'to ensure all pupils:

- *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 knowledge required to understand the uses and implications of science, today and for the future.'* (National Curriculum, 2013)

Intent

Our science curriculum is designed with the intent that all children will become a competent scientist who are inquisitive about the world around them. We intend to provide children with first-hand scientific investigative experiences which inspires children's curiosity and builds their science capital. Our thematic lessons will provide children with numerous opportunities to take their learning across year groups by pre-teaching and revisiting skills and knowledge. This progression within our science curriculum ensures that children can make links to prior learning, develop deeper knowledge of key skills, and master their learning with repetition through stimulating and challenging experiences.

Working and thinking scientifically

Working scientifically specifies the understanding of the nature, processes and methods of science teaching. It should not be taught as a separate strand but must always be taught through and clearly related to substantive science content.

Implementation

Core scientific concepts will be taught during discrete science lessons each week. However, there will be further opportunities through our thematic curriculum for pupils to demonstrate their science understanding.

The curriculum provided through both the discrete science sessions and the thematic sessions allow pupils to embed and recall the key scientific knowledge principles and working scientifically skills needed for pupils to achieve the end of year expectations. The thematic session provides opportunities for teachers to pre-teach some aspects of knowledge and skills before moving onto the core unit of science or in some instances it may be a revisiting session. Using both discrete sessions and thematic sessions for the teaching of science, ensures we are providing clear progression by allowing the children to look back on previous learning and apply what they have learnt to new situations. This approach directly coincides with Ofsted's inspection framework which states:

"People learn new knowledge when new concepts are connected in their minds with what they have already learned. It is more appropriate, therefore, to understand the way knowledge is stored as a complex, interconnected web or 'schema'. Every time a pupil encounters a word they have previously learned, but applied in a new context, it adds to the complexity of their understanding of that concept. In other words, they develop a deeper understanding of that concept and enhance their capacity to use that concept in their own thinking".

Pre-teaching:

Our thematic curriculum touches on elements of science learning, creating memorable experiences that can be referred to in older year groups. For instance, in the dimensions curriculum for year one, they must "recognise that we need light in order to see things and that dark is the absence of light" which is taken from the year 3 curriculum.

In this topic lesson, the children play Blind Man's Bluff and learn simply that light helps us see. However, in their year 3 science lesson, they will remind them of this concept but then conduct further investigations to learn about how light reflects off surfaces, enabling us to see and how shadows form.

Reviewing

Our thematic curriculum also enables children to recap their science knowledge and retain what they have learnt. For instance, in year five science lessons they will learn about the differences in reproduction between amphibians, insects, birds etc... Then, in year 6, they will recap and apply this knowledge by researching animals in Kruger National Park.

Progression document

Our new progression document clearly shows staff what prior learning has occurred before new concepts are taught and whether the topic learning is a pre-teach or a review of a scientific concept. This will enable staff, to pitch lessons correctly and challenge pupils beyond the curriculum where necessary. KWL activities will continue, however, they will show more evidence of prior learning as children can dip into the memorable experiences they have had previously.

Year 1 Dimensions Lesson

- Ask the children to discuss how they think flowers and plants grow.
- Discuss their experiences of growing plants.
- Show them Lima (butter) beans seeds and discuss how they think they will grow.
- Watch the FunKey film about growing. Ask the pupils where would be the best place to put the beans in order for them to grow in the classroom.
- Plant the beans and monitor their growth

Year 3 Science Lessons

Children would take this learning further by:

- Growing a seed and a bulb and producing scientific observations
- Conducting comparative tests with plants in different conditions.
- Learning the technical process and language of germination

Science lessons taught in thematic

If a thematic lesson is purely based on science knowledge, lessons taught through thematic will be evidenced in the science floor book. The purpose of the 'floor book' is to record incidental science teaching that is not linked to their science learning objectives. If a science concept is taught through another subject, then it will go in that subject's book. For example, after teaching the year 1 thematic lesson where pupils discuss living, non- living and never living things, the teacher would be expected to put evidence into the floor book, whereas the lesson where the children learnt about sun safety by designing and making a hat would go into their D.T. book.

Implementation – I think the below can come out if we are using the 3I's document that I have added above.

Foundation Stage

Within the foundation stage, Science is taught as an integral part of the topic work covered during the year. In Nursery and Reception, we relate the scientific aspects of the children's work to the areas of learning set out in the Statutory Framework. Our curriculum is planned around the Development Matters, with our objectives stemming from the Understanding the World area of learning. At the end of Reception, children will then be assessed against the 17 Early Learning Goals (ELGs), with the main scientific focus stemming from The World. Our principle focus of early science teaching is to encourage pupils to have a natural curiosity of the world around them. Almost all teaching is carried out through first-hand experiences using simple scientific language. Pupils are provided with rich learning opportunities both in and outside of the classroom that offers the children the opportunity to

explore, use their senses and be physically active and exuberant. During Child-Initiated learning, observations of the children take place so that additional focused resources and support can be provided to enrich their scientific learning. To ensure that we meet the individual needs of all of our children we make regular observations of the children's interactions, interests, skills, and development of concepts. Incorporating observations on how our children learn through the characteristics of effective learning.

KS1

In key stage one the principal focus of science teaching is to enable pupils to experience and observe phenomena, looking more closely at the world around them. Pupils are encouraged to be curious and ask questions about what they notice. They are helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.

The majority of science teaching is through the use of first-hand practical and outdoor experiences, using secondary sources only when appropriate. Simple scientific language is encouraged at all times to communicate what has discovered and children should communicate their ideas in a variety of ways.

Lower KS2

As our pupils move in to key stage two, the principal focus of science teaching is to enable them to broaden their scientific view of the world around them. Pupils 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 are encouraged to 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. Simple conclusions are made by pupils and the use of some scientific language to talk about and, later, to write about what they have found out is encouraged at all times.

Upper KS2

The principal focus of science teaching in upper KS2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. Pupils do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. They will encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. Pupils will also begin to recognise that scientific ideas change and develop over time. They will select for themselves the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary

sources of information. They will draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. The use of scientific language, that is pronounced and spelled correctly, will be encouraged at all times.

Teaching and Learning

Learning happens when:

- Children can discover for themselves through trial and error.
- Children use scientific vocabulary.
- Teachers are confident about what they are teaching.
- Children talk, ask questions, share ideas, explain.
- Children are inspired to do and know more, transfer knowledge.
- Children work in groups.
- Children work practically.
- Children are engaged, excited, involved.
- Children record their learning in a variety of ways using their own words.

Science Coverage

In the Foundation Stage, science is taught as a part of themed topic lessons each week. From Year 1 onwards science is taught for a minimum of two hours each week, as a standalone subject and where it is appropriate linked to the thematic curriculum.

Elston Hall uses the National Curriculum's Programme of Study for Science as the basis of its curriculum planning. This ensures pupils receive the complete coverage of statutory requirements for primary science education, and that the education delivered is done so progressively through the phases. By the end of each phase, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Planning

The planning of science in the foundation stage is done so through weekly topic planning. It is the class teacher's responsibility to write these plans and discuss them with the subject leader or member of the Senior Management Team when necessary. The planning within this phase will be in line with the school's Early Years Foundation Stage policy and the Statutory Early Years Foundation Stage, the Early Years Foundation Stage Profile and Development Matters.

From Year 1 onwards science planning consists of two aspects: a whole school long-term overview and individual year group smarts.

The whole school long-term plan maps the scientific areas of learning studied in each term. The science subject leader plans this out in conjunction with teaching colleagues in each year group. Although science is taught as a standalone subject, where possible we link scientific study with work in other subject areas including English, Maths and Topic.

Our unit coverage give details of each unit of work for each term and is linked to the coverage given by the National curriculum. Staff are able to assess children against these at the end of a unit.

Class smarts outline a clear learning objective, sticky knowledge starters, our key science principles and how learning links to a stem job.

Science units are planned so that they build on prior learning. We ensure that we build progression into the science programme of study, so that pupils are increasingly challenged as they move up through the school.

Floor Books

Floor books are used within Science learning as a way of developing, recording and assessing children's understanding of scientific concepts and practical science skills that are not the main focus of the science lesson. Floor books will include photographs, children's comments, drawings, table or graphs and annotated diagrams.

Organisation

Science lessons at Elston Hall are delivered to meet the learning styles of our pupils ensuring auditory, visual and kinaesthetic approaches. We do this by providing enriching and engaging opportunities for pupils to learn through a variety of activities such as role-play, computing, observing, testing and discussions.

We recognise that in all classes pupils have a wide range of scientific abilities, and we ensure that we provide suitable learning opportunities for all pupils by adapting the challenge of the task to the ability of the child. We achieve this in a variety of ways:

- setting tasks which are open-ended and can have a variety of responses;
- setting tasks of increasing difficulty (we do not expect all pupils to complete all tasks);
- providing resources of different complexity, matched to the ability of the child;
- using classroom assistants to support the work of individual pupils or groups of pupils

Recording

In the Foundation Stage observations linked to scientific study are made and recorded within the individual pupils' learning journeys. Additional evidence may be recorded by pupils, or in photographic form in the pupils' and class topic books.

Pupils in Year 1 onwards will have a science book to record the working scientifically skill they are focussing on within the lesson. In this book there will be evidence of the specific knowledge taught. Evidence of children's incidental learning will be evidenced in floor books. These books will contain photographic evidence of learning, comments and questions made by the children and group tasks completed.

Marking and feedback

All marking and feedback is in line with the school's marking and feedback policy. Floor books will not be marked but will be monitored by teachers to identify areas for development.

Assessment

Assessment of Science is in line with the school's assessment policy. Children are assessed at the end of each term based on working scientifically age related expectations. Additionally children are assessed based on their knowledge of each topic taught. The topic assessment will be used to inform future planning and ensure that learning is progressive.

The contribution of science to teaching in other curriculum areas

English

Science contributes significantly to the teaching of English by actively promoting the skills of reading, writing, speaking and listening. Some of the texts that pupils study in English are of a scientific nature. The pupils develop oral skills in science lessons through discussions and through recounting their observations of scientific experiments. They develop their writing skills through writing and recording information.

Mathematics

Science contributes to the teaching of mathematics in a number of ways. The pupils use weights and measures and learn to use and apply number. Through working on investigations they learn to estimate and predict. They develop the skills of accurate observation and recording of events. They use numbers in many of their answers and conclusions.

Computing

Pupils use computing in science lessons where appropriate. They use it to support their work in science by learning how to find, select, and analyse information on the Internet. Pupils use computing to record, present and interpret data and to review, modify and evaluate their work and improve its presentation.

The Wider Curriculum

Science makes a significant contribution to the teaching of the wider curriculum within primary education. Science teaching offers pupils many opportunities to examine some of the fundamental questions in life, for example, the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, pupils develop a sense of awe and wonder regarding the nature of our world. Science gives pupils the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches pupils about the reasons why people are different and, by developing the pupils' knowledge and understanding of physical and environmental factors, it promotes respect for other people.

Equality

Elston Hall is committed to equality of opportunity. All pupils will be provided with a progressive, stimulating science curriculum irrespective of gender, ethnicity, social-economic background or special educational needs as in line with the school's equal opportunities policy.

SEN

At our school we teach science to all children, whatever their ability. Science forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our science

teaching we provide learning opportunities that enable all pupils to make progress. We do this by setting suitable learning challenges and responding to each child's different needs. Assessment against the Development Matter, ELG outcomes and the National Curriculum allows us to consider each child's attainment and progress against expected levels.

When progress falls significantly outside the expected range, the child may have special educational needs. Our assessment process looks at a range of factors – classroom organisation, teaching materials, teaching style, and adaptation – so that we can take some additional or different action to enable the child to learn more effectively. This ensures that our teaching is matched to the child's needs.

We enable pupils to have access to the full range of activities involved in learning science. Where children are to participate in activities outside the classroom, for example, a trip to a science museum, we carry out a risk assessment prior to the activity, to ensure that the activity is safe and appropriate for all pupils.

Environment

A science display linked to the children's current unit of work should also be displayed in each of these classrooms. The display should support the children's learning and may include key scientific vocabulary, questions, mind-maps/concept cartoons sharing the children's thoughts and ideas or examples of their science work. Each classroom will also display a copy of the scientific enquiry cycle and the Science principles. A school science display will also be displayed showing evidence of science learning across the school.

Resources

An extensive range of equipment and resources are stored in the science resource room. Science reference books can be found in the library. It is primarily the responsibility of the subject leader to ensure resources are stocked and maintained. All staff are responsible for the day-to-day safe storage and maintenance of resources.

Health and Safety

This section should read in line with the Department For Education's (DFE) Health and Safety: advice on legal duties and powers for local authorities, school leaders, school staff and governing bodies, February 2014.

The Leadership team take the responsibility for ensuring staff have the necessary health and safety training to minimise risks within everyday lessons.

For school staff "*common sense should be used in assessing and managing the risks of any activity.*" (DFE, p.4, 2014) It is therefore the responsibility of the class teacher to ensure

- they work in line with the school's current Health and Safety Policy
- they indicate any possible health and safety risks on their lesson plans
- they inform pupils/staff of any hazards or safety issues related to their science lesson and advise them how to minimise any risks
- they implement behaviour management strategies in line with the school's current behaviour policy to help minimise any risks to health and safety

Assessment

In science, activities and tasks are carried out prior to, during and after teaching a unit in a variety of ways to inform planning or how far ideas have progressed after a period of teaching. Formative assessment is continually on going in the form of marking pupils work in order to inform planning for the next lesson. These assessments are linked to the key learning objectives for the lesson.

At the end of each science unit Nursery and Reception pupils are assessed to be emerging, developing or secure for their age band. Pupils in KS1 and KS2 are assessed using ARE's for working scientifically. Pupils are assessed for their knowledge of units at the end of each unit based on beginning, developing and secure. This assessment is used to inform future planning.

Monitoring

It is the responsibility of the science subject leader and Leadership Team to monitor the standards of pupil's work and the quality of teaching in science. The science subject leader is also responsible for supporting colleagues in the teaching of science, for being informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school. The science subject leader has specially-allocated time for fulfilling the vital task of reviewing samples of pupil's work and visiting classes to observe teaching in the subject.

Impact

The science curriculum is designed to ensure pupils are able to recall and embed scientific skills and knowledge throughout their time at primary school and prepare them for the future. The progression document provides clear end points for pupils at each stage of their learning and enables teachers to provide opportunities for pupils learning which are pitched appropriately. In order for teachers to be able to plan and adapt learning to meet the needs of pupils they regularly assess the pupils recall of their knowledge during starter lessons, KWL grids, quizzes and key questioning. Pupil's 'knowledge' understanding is teacher assessed at the end of each unit. Teachers use the age-related expectations to establish whether in the knowledge aspect of the unit children are working below, at the expected level or above. This is then shared with the receiving teachers at the end of the year to ensure future planning is reflective of pupil's knowledge especially when units are revisited. Scientific enquiry is the aspect of the science curriculum that we use as the key indicator to assess pupils' science ability. This is embedded in all science units. Teachers collate evidence from a variety of sources such as floor books, science books, questioning, marking and planning to make teacher assessment judgements each term. There are also opportunities across the Trust and within school for shared moderation sessions to ensure the accuracy of these judgements. However, alongside the summative assessments, teachers use daily formative assessment to identify and address any misconceptions. This is reflected through marking, questioning and differentiated activities where teachers will offer further support to pupils who require further reinforcement but also provide challenge to those pupils who need activities which require them to apply 'deeper thinking' in order to apply their learnt skills and knowledge in a variety of ways. By the time pupils leave Key Stage 2, their Science Capital will be developed sufficiently for them to gain an understanding of future opportunities and careers.

Review

This policy will be reviewed annually or earlier if necessary.