



Science Policy

November 2020

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At Fielding, our aim is to ensure that science nurtures the curiosity that is innate within pupils. We intend for our pupils to become science literate, whereby they can ask questions, challenge theories and prove research based on the knowledge that they have attained. This is achieved through a rich varied curriculum, tailored to the needs of our pupils who become responsible for their own progress and active visible-learners through critical thinking and reflection. We want our pupils to understand and explain the world around them, wherever possible through first-hand experiences.

Our curriculum intends for pupils to make progress and develop their scientific knowledge through a carefully sequenced body of skills and essential knowledge that builds on what has been taught before, engaging and encouraging scientific learning, with the hope that pupils will be motivated to continue to advance their skills into the next stage of their education and life experiences, creating life-long scientific learners.

Science allows pupils to make well informed decisions, which links heavily with our Fielding core values; respect, resilience, empathy and reflection and sustainability. Our teaching and learning is underpinned by these values and we ensure that strong links are made within science to these values. Our vision is to ensure that pupils are provided with as many first-hand experiences and opportunities to explore science at primary level.

Teaching and learning

At the heart of our science challenges (units of work), are the practical experiences that allow pupils to work scientifically, teaching them the uses and implications of science, today and for the future. Through real-life experiences and contexts, our pupils develop an understanding of the wider world around them and an appreciation for their responsibility towards their community and wider environment, underpinning our philosophy as a Values based school.

Planning, resourcing and assessment is accessed through the Collins Snap Science scheme of learning, a comprehensive programme that provides module overviews, sequenced lesson plans, presentations and printable and digital resources. Curriculum statements ensure each unit meets national curriculum objectives. Lessons from the Collins Snap Science programme can be tailored to the needs of specific classes and include differentiated challenges. For example, lessons could be combined or investigations can be developed further to challenge pupils.

In Early Years, pupils begin explore and find out about the world around them and begin to ask questions about it. They build with different materials, know about everyday technology and learn what it is used for.

During key stage 1 and 2, pupils develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. Firmly embedded within these contexts, pupils are also taught the skills of scientific enquiry: 'Working Scientifically', which specifies the understanding of the nature, processes and methods of science. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources.

In addition, pupils are taught to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They build up an extended specialist vocabulary and also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data.

Teaching style and class organisation

Science is taught with a strong emphasis on pupils engaging in practical enquiry that is based in a real-life context. Investigative and practical work is the basis of the scheme of learning, in order to allow pupils to learn through first-hand experience. Teachers use a range of questioning to further pupils' learning, assess their understanding and stimulate their interest in the subject. Within classes, pupils are taught in a combination of ways according to the task, for example through whole class; group work; paired work. The organisation will vary, dependent upon factors such as space, safety, experience of pupils and additional help available.

Curriculum organisation

In order to achieve these aims, Science is organised into strands for each group. Links between science learning and the Fielding Learning Challenge Curriculum have been created to exploit opportunities to over- learn information and make links across explicitly taught subjects. Lessons are planned to develop secure understanding of knowledge and concepts, build upon prior learning, and are sequenced to ensure progression. Teachers ensure that there are opportunities for all pupils of all abilities to develop their enquiry skills and knowledge and understanding of the topic.

Time allocation

Science has a dedicated period on the timetable, taught across the school for 80 minutes per week in key stage one and two. In addition, there are other areas of the science curriculum which have alternating allocations on the timetable, such as forest school, gardening and relationship education.

Planning

Planning is used to:

- set clear learning objectives and achievable goals;
- ensure work is matched to pupils' abilities, experience and interests;
- ensure progression, continuity and subject coverage throughout the school as per our curriculum map.

Special educational needs and/or disabilities (SEND)

In order for all pupils to be able to access the science curriculum, it is essential that any pupils with SEND have provisions made for them, in order to minimise any barriers to learning. This begins with considering pupils' skills and learning preferences to build in appropriate options and flexibility for them to gather and process information and respond in different ways. Knowing each learner's needs will ensure the appropriate activities and teaching techniques are used. Support is planned based on prior knowledge and experience, consistency of approach and building on what works best for individual pupils.

Word banks, knowledge organisers and working wall displays of scientific vocabulary help in acquiring, using and understanding language. Students can communicate their ideas through a variety of methods, such as mind maps, brainstorm and structured exercises. Adopting a multisensory approach to learning can help SEND pupils by allowing them to use a wide range of communication methods including speech, images, graphs, diagrams, computers and hands-on learning. Structured steps to success, built into the planning of lessons, can help in learning new concepts and ideas.

Relationship, sex and health education (RSHE)

The Relationships Education, RSE, and Health Education (England) Regulations 2019 have made Relationships Education compulsory in all primary schools. Sex education is not compulsory in primary schools, however at Fielding we teach aspects of sex education in our RSHE lessons. See RSHE policy for further details.

The national curriculum for science also includes subject content in related areas that we need to teach, including the main external body parts, the human body as it grows from birth to old age (including puberty) and reproduction in some plants and animals. While parents can withdraw their child from sex education lessons, they cannot withdraw them from science lessons.

Gardening

In parallel to our science curriculum, pupils Years 1 -Year 6 have up to six opportunities each year to work closely with our teaching assistant gardener to plant, tender, maintain and harvest crops in the school kitchen garden. Within these sessions, the pupils also learn how to look after our school chickens and become aware of how eggs are produced.

Gardening lessons are complemented by cooking lessons (DT) in the school house kitchen with their class teacher. This gives pupils a practical experience of how plants grow and how plants can be transformed into a nutritious meal. Providing our pupils with these first-hand experiences are carefully linked to science, in particular to learning about plants, living things and habitats.

Fielding Forest

Within science, pupils will be given opportunities to articulate, test and change their scientific ideas in order to investigate and solve problems. Our Fielding Forest provides our pupils with the opportunity of an outdoor space where they can put their classroom learning into practice. There are a range of trees, plants, fire pits and logs where the pupils can explore and build habitats for living things. They can also explore the effects of the four seasons on trees and plants. Through the use of Fielding Forest, pupils are able to work scientifically and have a better understanding of the skills that encompass scientific activity. It allows for our pupils to be creative and imaginative

and allows for them to explore the world we live in. Please refer to Appendix A for Health and Safety outdoors.

Early Years

Children in the Early Years learn by playing and exploring, being active, and through creative and critical thinking which takes place both indoors and outside. They actively reach out to interact with other people, and in the world around them. Our kitchen garden, cookery and Fielding Forest are an integral part of the Early Years curriculum giving children the prerequisite skills and knowledge for the science National Curriculum.

UN Sustainable Development Goals

There are many opportunities within Science teaching and learning to make strong links to The United Nation's Sustainable Development Goals (SDG), detailed in the Curriculum Policy. Within Fielding, we aim to ensure that our pupils are aware of how to achieve a better and more sustainable future for all. SDG's such as climate change and life on land are critical to incorporate into Science teaching. By seizing opportunities to weave these goals into our pupils learning, allows for our pupils to recognise their impact on the current and future world.

Assessment in Science

Assessment is important as it provides crucial information about the abilities of the pupils, informs future planning and provides information for reporting to parents. Pupils are assessed using a range of strategies:

- Ongoing formative assessments are made by class teachers throughout the year, by observing during science lessons, questioning pupils and marking their work in line with the Marking and Feedback Policy.
- In both key stage 1 and 2, pupils will use Knowledge Organisers (detailed in the Curriculum policy) to support their learning, they also act as a self-assessment tool for their learning. Within the Knowledge Organiser, there is a section which details the skills of working scientifically within the challenge. Pupils will be able to self-assess their progress of such skills and will be able to understand how they are progressing through the enquiry skills.
- Pupils will engage in regular low-stakes quizzes throughout each half termly challenge, along with pre and post learning quizzes at the start and end of each challenge. These quizzes will be planned appropriately by teachers in each year group who will take into consideration the learning that has occurred in previous terms and the age group. This could be carried out through annotations, paired investigations and multiple-choice questions.

Marking & feedback

Marking follows the guidance set out in the [Marking and Feedback Policy](#).

Subject leadership

The subject leader is active in, and responsible for:

- reviewing and contributing to teacher planning
- developing the science policy and schemes of work
- preparing a subject action plan
- planning/leading CPD
- providing consultancy /advice
- analysing pupil's access to the subject
- scrutiny of work and pupil discussion
- lesson visits

- reviewing assessment
- attending Leadership team meetings as required
- liaising with the Leadership team and Governors, as required

Equality and inclusion

It is the responsibility of all teachers to ensure that all pupils, irrespective of gender, ability, ethnicity and social circumstance, have access to the curriculum and make the greatest progress possible. Science provides opportunities to raise awareness and to value cultural and ethnic diversity.

Health and Safety

Subject Leaders are responsible and accountable to the Head Teacher for all matters relating to health, safety and welfare within their subject areas. When carrying out scientific investigations, certain work is potentially hazardous. Normally, this work is carried out in the classroom and no special facilities are provided. A risk assessment should be completed by the class teacher for any hazardous activity. Appendix A outlines potential hazards and how to prepare thoroughly to ensure a safe environment.

Links to other policies

This policy needs to be read in conjunction with other related policies, e.g. the Relationships and Sex Education Policy, Curriculum Policy and Marking and Feedback Policy as issues may be cross-referenced.

The Governing Board

The Governing Board will monitor the implementation of the Science policy through its Pupil and Achievement committee. The science governor and link governor for curriculum will also include Science lessons and book looks as part of their link visit.

Appendix A

Safety in Science in Primary Schools

When carrying out scientific investigations, certain work could create a potential hazard. The following notes give guidance to teachers who are carrying out scientific investigations. Normally this work is carried out in the classroom and no special facilities are provided. In all instances the potential areas of hazard are likely to be:

- Storage and use of chemicals and equipment;
- Fire hazards where heating is required;
- Transport of materials;
- Electrical hazards;
- Ponds and water courses;
- School visits for environmental studies.

Chemicals

- Chemicals should be locked away in a cupboard until required.
- Careful, permanent labelling is required.
- If testing is necessary, only those chemicals normally used in household cooking should be used under the careful supervision of the teacher e.g. salt, bicarbonate of soda.
- Some household chemicals commonly in use and other used in crystal gardens can present a hazard and great care must always be taken, e.g. washing soda.
- Chemicals should always be stored in appropriate sealed containers.
- There are many hazards associated with the use of modern adhesives and care must be taken when using such substances.
- Manufacturers' instructions/warnings must be read carefully and strictly adhered to.

Equipment

- Equipment should always be stored in an orderly fashion.
- Whenever equipment in which steam generated under pressure is used, it must be thoroughly checked to ensure that all valves are working correctly and only used by a teacher.
- Although glassware will have to be used in certain circumstances, it is recommended that whenever possible substitutes be used, e.g. plastic beakers, tin lids etc.
- An electric kettle should be used to obtain supplies of hot water. Where individual heating is required, a candle or night-light of appropriate design in metal should be used.
- **Electrical hazards** – dry cells should be used to supply electricity for simple experiments. Batteries should be checked for leakage before use. Rechargeable batteries should be used with care.

Candle/flame - Recommended Practice

- If a large candle is used, it should be placed in a holder which will prevent it from falling and this should be placed on a large metal tray filled with sand.
- Heating devices which produce naked flames should not be positioned in close proximity of loose curtains.
- A flame against a bright light, e.g. a window, is difficult to see and therefore constitutes a hazard.
- Any group of pupils using naked flames should work at a table where the teacher can easily monitor what is happening. A fire extinguisher should be readily available. Pupils with long hair should be instructed to tie it back securely.

Micro-organisms – Recommended Practice

It is natural that during science studies it may be sensible and exciting to show pupils certain micro-organisms such as moulds on breads or cheese. Examples of the type of material which might be available include:

- Mildew and rust on weeds and garden plants
Soil
- Baker's Yeast
- Pond material
- Mouldy bread, cheese or fruit.

A hand lens or simple microscope may be used to look at the material mentioned above and further studies, for instance, with respect to the use of moulds in cheese. A mould garden using bread on a bed of moist sand in a large screw-top jar may be used to show the variety of colonies which can develop. **Disposal of such materials needs special care.** It is neither advisable nor necessary in the early primary school years.

In later primary years, some pupils become ready to carry out further investigations, using mould gardens, or observing moulds on seedlings and the effect of different growth conditions, for instance. Often baking will be carried out which will possibly lead to a study of baker's yeast and its use in bread making. The association of the activities of moulds and the conditions of the growth related to the preservation of food stuffs might also be studied. During the primary school years, the stress will be on observation and the carrying out of simple experiments, as those described.

It is not necessary, nor advisable, to grow cultures on petri dishes since the appropriate conditions for safe handling of the sort of organisms which might appear on a growth medium are not to be found in primary schools. Furthermore, special training and techniques are required for such work. This type of work with micro-organisms should not therefore be carried out in primary schools.

Animals

As part of the Science curriculum, and in conjunction with RSHE, pupils are taught how to care for a variety of animals and learn about animal welfare. As mentioned in Gardening and Cooking, the pupils have the opportunity to look after chickens and they should be dressed appropriately for this activity. Pupils must be supervised by the Gardening Teaching Assistant at all times. The TA will always brief the pupils on their expectations of behaviour and will also ensure that the pupils understand the behaviours of a chicken to ensure for safe and fun learning.

The pupils should wash their hands thoroughly after these sessions to avoid any bacteria spreading.

Fielding Forest, Ponds and Water courses

Ponds and streams are a rich educational resource but have associated hazards. It is perfectly proper for schools to use ponds and streams as long as a risk assessment is carried out prior to the task. Within Fielding's Garden, there is a wildlife pond that the pupils have access to in their termly gardening sessions. Clear behaviour expectations should be emphasized to the pupils when using this area and they should be made fully aware of hazards. Risks should also be highlighted to the pupils prior to entering the Forest and pupils should be made very clear of the task at hand to ensure that they remain on task, thus avoiding any hazards. As aforementioned in recommended practice for micro-organisms, pupils should be made aware of the mildew within these areas and its potential hazards.