



Science Policy

Review Date September 2024

Every Child, Every Chance, Every Day; Working Together



SCIENCE POLICY

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1. What is Science?

1.1 Science is essential to understanding the world in which we live. A high-quality science education provides the foundations for understanding the world through biology, chemistry and physics.

1.2 Science is vital to the world's future prosperity.

1.3 Science is intrinsically linked to the subjects maths, computing and design technology – creating a broad group known commonly as STEM.

1.4 Science is a core subject of the National Curriculum.

2. Aims:

At Crabtree Farm, we ignite curiosity in science by exploring the world through diverse practical tasks and engaging enquiries which develop transferrable skills (STEM) and long-term retention of knowledge. This is done so that our children understand the importance and prominence of science in the modern world.

The overarching aims for science at Crabtree Farm is to ensure that pupils:

2.1 Be taught essential aspects of the knowledge, methods, processes and uses of science.

2.2 To develop scientific **enquiry** skills and make these explicit when teaching (research; observations over time; pattern-seeking; identifying, grouping and classifying; problem-solving; comparative and fair tests).

2.3 To develop scientific skills (**procedural knowledge**) and make these explicit to equip pupils with independence in their scientific explorations: ask questions, make predictions, set up tests, observe, measure, record data, interpret data, communicate results and evaluate.

2.4 To develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.

2.5 To be equipped with the scientific knowledge required to understand the uses and implications of science both for today and the future.

2.6 To make use of ICT, English and Numeracy skills – STEM.

2.7 To ensure the development of skills and knowledge begins in the Early Years Foundation Stage and continues to build on these first encounters, until they leave primary education.



2.8 To ensure that each area of science taught builds on previous knowledge gained and that these connections are made explicit.

In order to achieve these aims we will:

- Provide a safe stimulating environment to promote effective learning in Science.
- Ensure continuity and progression in Science by liaising with colleagues on areas covered, using knowledge organisers and using progression maps across the entire school.
- Give pupils numerous opportunities to develop and apply investigative skills in practical experiments, problem solving tasks and STEM projects.
- Provide necessary resources for the pupils to be taught effectively.
- Ensure staff are well informed and provided with training where necessary.
- Monitor the teaching, planning and assessment of science.

3. Teacher Guidelines

3.1 Early Years Foundation Stage

Principally, science is taught through aspects in a number of Early Years Foundation Stage Areas of Learning: Mathematics, Understanding the World and Expressive Arts and Design. Scientific exploration in this way can take place in the form of practical activities both inside and outside in child initiated play and/or with structured adult led activities.

Teachers should plan a range of activities that support the use of scientific language, scientific knowledge and scientific skill. Verbal communication throughout EYFS is key to development of science. Every child, every day should have access to a range of practical activities that will support their critical thinking and develop their love and curiosity for science.

Early Years practitioners should be aware of KS1 scientific objectives in order to prepare children for moving on at the end of the EYFS key stage to support progression across the school.

The links to science can be seen in aspects of the EYFS areas of learning educational programmes:

➤ **Mathematics**

The curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

➤ **Understanding the world**

Understanding the world involves guiding children to make sense of their physical

world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them. A broad range of literature will foster their understanding of our culturally, socially, technologically and economically diverse world. As well as build important knowledge, this extends their familiarity with words that support understanding across domains.

➤ **Expressive Arts and Design**

The development of children's artistic and cultural awareness supports their imagination and creativity. The frequency, repetition and depth of their experiences are fundamental to their progress in interpreting and appreciating what they hear, respond to and observe.

3.2 Key Stage 1

The focus for teaching science in Key Stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and man-made world around them.

Pupils should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.

Most of the learning about science should be done through the use of first-hand practical experiences. There should also be some use of appropriate secondary sources, such as books, photographs and videos.

Pupils in Key Stage 1 will be taught the following practical scientific methods, processes and skills:

- To ask simple questions and recognise that these can be answered in different ways.
- To observe closely, using simple equipment.
- To perform simple tests.
- To identify and classify.
- To use observations and ideas to suggest answers to questions.
- To gather and record data to help to answer questions.

It is the responsibility of all Key Stage 1 teachers to make links to their previous knowledge (gained during EYFS) explicit in planning and teaching. The use of the 'Ready to progress' document written by the EYFS Phase Leader is available to support understanding of EYFS science.

It is the responsibility of all Key Stage 1 teachers to make links to their 'next steps' in preparation for their progression into Key Stage 2. Once again, this must be made explicit in planning and teaching.

3.3. Lower Key Stage 2 (Years 3 & 4)

The focus for teaching science in Lower Key Stage 2 is to enable pupils to broaden their scientific view of the world around them. They will 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.

Pupils will develop the skill of asking 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.

Pupils will draw simple conclusions and use some scientific language to talk about and then to write about what they have found out.

Pupils in Lower Key Stage 2 will be taught the following practical scientific methods, processes and skills:

- To ask relevant questions and use different types of scientific enquiries to answer them.
- To set up simple practical enquiries, comparative and fair tests.
- To make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- To gather, record, classify and present data in a variety of ways to help in answering questions.
- To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- To identify differences, similarities or changes related to simple scientific ideas and processes.
- To use straightforward scientific evidence to answer questions or to support their findings.

3.4 Upper Key Stage 2 (Years 5 & 6)

The focus for teaching science in Upper Key Stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.

Pupils will encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.

Pupils will begin to recognise that scientific ideas change and develop over time. They should select 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.

Pupils 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.

Pupils in Upper Key Stage 2 will be taught the following practical scientific methods, processes and skills:

- To plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- To use test results to make predictions to set up further comparative and fair tests.
- To report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.
- To identify scientific evidence that has been used to support or refute ideas or arguments.

It is the responsibility of all Key Stage 2 teaching staff to make clear and obvious links within planning and teaching to previous knowledge and 'next steps' to ensure progression across the whole school. These links should be made explicit to all pupils.

3.5 Vocabulary

Across Key Stage 1 and 2, pupils should read, spell and pronounce scientific vocabulary correctly. This should include words related to scientific experiments, explanations of scientific phenomena and words intrinsically linked to the topic or area they are studying. Vocabulary content and progression can be found in the PLAN documents, in the science curriculum folder on the server.

In EYFS, children should begin to use words that demonstrate an ability to compare and contrast materials and objects. Pupils should also be able to comment on size, position and qualities with confidence and growing accuracy. It is also expected that in EYFS pupils should begin to determine causal relationships through discussion and the use of pictures (they are shown or create themselves and subsequently explain).

4. Teaching Methods

4.1 Teachers will follow the guidelines in the National Curriculum Programmes of Study, which describe a sequence of knowledge and concepts for each block. Crabtree Farm has committed to conducting an enquiry led curriculum for science which ensures that a broad range of scientific skills (procedural knowledge) can be developed.

4.2. Teaching should include (but is not limited to) practical investigations, group discussions, reading sessions, independent research, visits and visitors. It is vital a range of methods are applied to engage learners, ensure progression and coverage.

4.3. Teaching methods should facilitate problem solving, independent enquiry and the development of wider curriculum skills (STEM).

4.4 Where applicable and possible, science should support the teaching and learning of English (both reading and writing). Teachers should demonstrate a consistent and high standard of English when delivering science.

5. Planning

5.1 Science is a core subject in the National Curriculum. We use the National Curriculum for Science 2014 as the basis for implementing the statutory requirements of the programme of study for science.

5.2 The programmes for study for science are set out year-by-year for key stages 1 and 2. However, schools are only required to teach the relevant programme of study by the end of the key stage.

5.4 Over the course of the year science should be planned and taught every half term with at least one lesson per week. The topics will be taught in the order provided by the Subject Leader to ensure that resources are available at all times. A whole school document of progression and coverage can be found in the science curriculum folder on the server.

5.5 On average, at least half of all lessons should contain a practical element – whether that be a pupil activity or a demonstration by the teacher. Where possible, pupils should be conducting scientific practical elements themselves.

5.6 At least two reading sessions (in our linked text reading sessions) should be planned for science each half term. Supporting materials (books) have been provided to each year group for at least one science topic.

5.7 The new planning format should be used consistently by all year groups and all parts of the plan should be completed as fully as possible, paying particular attention to the previous knowledge and next steps sections to ensure progression throughout.

5.8 A separate planning sheet is not required for EYFS but a record of scientific enquiries and skills record will be kept within the records (observations, photographs, activity records etc) for all pupils.

5.9 A copy of science planning must be kept on the server each half term for monitoring purposes and to ensure progression. Once a topic is completed the second half of the planning form must be completed and provided to the science subject leader – which will aid the development of science within our school i.e. What went well, even better if etc

5.10 It is vital that teachers record on the planning which scientific skill is being developed each lesson and which scientific enquiry skill is being carried out to ensure that coverage across all areas is sufficient. Details of each skill and enquiry type can be found in the folders supplied to each class teacher and on the school server.

6. Assessment

6.1 Assessment of learning will be carried out at the end of each topic using a robust assessment system that measures directly against the National Curriculum objectives (substantive knowledge is assessed using the Developing Experts forms and working scientifically will be assessed using TAPS). This assessment should be completed in the penultimate week allowing for the review or revisit of any lesson objective where progress is considered insufficient by the AoL.

6.2 Assessment for learning will take place each lesson (at the start, during and at the end of each lesson). This will be completed in a range of ways:

- Talking to the pupils and asking questions
- Discussing the work with the pupil
- Looking at the work and marking against the learning objective
- Observing the pupils carrying out practical tasks
- Pupils self-evaluation of their work
- Mini quizzes at the start of every lesson
- Completing the KWHL grid
- Dating/highlighting the knowledge organiser
- Summative assessments in the form of Developing Experts end of unit tests
- TAPs assessments each term to measure skill in procedural knowledge (working scientifically)

Assessment of learning should lead to changes/adaptations in the lesson plans for each half term where applicable i.e. the need to reteach or explore further depending on the lesson outcomes.

6.3 Teachers are expected to use the 'I can' statements in each pupil's book to help assess whether each objective has been met throughout a topic for each pupil individually.

6.4 Pupils should be taught to self-assess in order to develop independent learners in science i.e. children may choose their own challenge level etc

6.5 Assessments as tests (both substantive and procedural knowledge assessment) will be recorded on the school's own spreadsheet. A whole year record will be kept in paper form along with supporting documents and passed to the next year group teacher at the end of the year. Assessment folders for science must be kept across a key stage (years 1 and 2 and years 3 to 6). Assessment records are key to supporting our data records and supporting teacher assessments. They provide essential evidence that children have met the standard in each year they attend.

7. Marking

7.1 Will be in line with the school's marking policy. Pupils will also have verbal feedback.

8. STEM – Science, technology, engineering and maths

Computing, DT, maths, geography, PE and science leaders will work together to ensure a number of opportunities are provided for pupils:

8.1 Pupils will be taught to use a range of ICT equipment to enhance their scientific learning.

8.2 Pupils may use a variety of computer programmes to create graphs and charts to record their results.

8.3 Pupils will complete a range of tasks/activities that require scientific knowledge to solve problems and create solutions through DT.

8.4 Pupils will use mathematical skills and tools to record their findings in science.

8.5 Beyond the subjects listed above, children will be supported to develop their scientific knowledge and skill in whole school initiatives that may include (but is not limited to) Food for Life, Eco Warriors and STEM club.

9. Health and Safety

9.1 Health and safety guidance is outlined in the National Curriculum Programmes of Study for each block as appropriate. It is the teacher's responsibility to read and apply this guidance.

9.2 Guidance from CLEAPS is also provided to support the safe delivery of practical elements of science and can be accessed via the website with log in details which the subject leader holds.

9.3 Teaching staff should seek guidance from the subject leader or SLT in relation to health and safety in science when they are unsure to guarantee the safety of pupils and staff.

10. Displays

10.1 A display/area should be evident within each classroom. Examples of work, photos of children undertaking experiments, photos of scientists and equipment to support understanding of working scientifically should be presented. The topic knowledge organiser and vocabulary should be changed for each half term on the display. Whilst the core content of the display may remain on the topic of working

scientifically, photos, work and displays should be updated and annotated throughout the year to reflect the work that has been undertaken.

10.2 Displays should include (but are not limited to) relevant scientific vocabulary, examples of pupils' work, photographs to support learning and of learning and physical/visual aides to support learning.

10.3 A whole school science display will be located in school and children should be referred to it so that they can extend their scientific knowledge.

11. Review

11.1 Acceptance of the science policy implies commitment to it.

11.2 The science policy will be reviewed annually – with the next review period planned for September 2024.

Mrs Wilson
Science Subject Leader
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