Science Policy

Review Cycle;	Annual
Responsible group:	Headteacher (Mrs Moss), Science Subject Leader (Mrs Hayward), Science governor (Mr Coles)
Implementation date:	September 2023
Next Review Date:	September 2024

Vision

We aim to provide educational excellence inspired by the world around us. To develop curious, responsible and confident learners within a caring community, in partnership with our families.

Small steps to big dreams!

Introduction

At Clearwater, all children will have equal opportunities to access the science curriculum throughout the school. Children will learn the skills of working scientifically through the planning and setting up of practical experiments. Children will develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. Children will 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. Children are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Aims

High quality teaching of Science enables children at Clearwater Academy to use a wide the skills of working scientifically and enquiry to understand and question critically the world around them.

The aims of Science:

1.1 Science teaches an understanding of natural phenomena. It aims to stimulate a child's curiosity in finding out why things happen in the way they do. It teaches problem solving, methods of enquiry and investigation to stimulate creative thought. Children learn to ask scientific questions and begin to appreciate the way in which science will affect the future on a personal, national, and global level.

1.2 The objectives of teaching science are to enable children to:

• ask and answer scientific questions;

• plan and carry out scientific investigations, using equipment correctly;

• know and understand the life processes of living things;

• know and understand the physical processes of materials, electricity, light, sound, and natural forces;

• know about the nature of the solar system, including the earth;

• evaluate evidence, and present their conclusions clearly and accurately.

• Know and use the vocabulary of Science

2 Teaching and Learning Styles

2.1 We use a variety of teaching and learning styles in science lessons. Our principal aim is to develop children's knowledge, skills, and understanding. Sometimes we do this through whole-class teaching, while at other times we engage the children in an enquiry-based research activity. Wherever possible, we involve the pupils in real scientific activities, for example, investigating a local environmental problem, or carrying out a practical experiment and analysing the results. The curriculum is enriched with a wide variety of trips, practical activities and visitors into school. These provide powerful experiences to learn in real life situations. A wide range of visitors come to school to provide students with deeper understanding of the area of study and opportunities to learn first-hand from people closely connected to the subject. Forest school is an excellent opportunity for children to explore the natural world in an immersive, practical environment.

2.2 We recognise that there are children of widely different abilities in all classes, and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child.

Teaching and Learning

The Early Years Foundation Stage

During the Early Years, the children will be given creative and hands on opportunities to explore the world around them. This may be linked to a specific science based topic, or it may be part of continuous provision. Children in EYFS will engage in practical experiments to help answer simple questions generated by the group.

Key Stage One

All children in key stage one and two should be taught explicitly the process of how to work scientifically. Each stage should be taught individually until teachers are sure that children are ready to follow the stages independently.

Key Stage One: The focus for key stage one should be creating and answering scientific questions, making scientific observations about the world around them and planning simple experiments. Throughout the year, children in key stage one should be able to:

- Explore the world around them and raise their own simple questions.
- Experience different types of science enquiries, including practical activities.
- Begin to recognise different ways in which they might answer scientific questions.
- Carry out simple tests.
- Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them.
- Ask people questions and use simple secondary sources to find answers.
- Observe closely using simple equipment and, with help, observe changes over time.
- Begin to notice patterns and relationships.
- Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data.
- Record simple data.
- Use their observations and ideas to suggest answers to questions
- Talk about what they have found out and how they found it out.
- With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.

Key Stage Two

Lower Key Stage Two: Children in year three and four should be taught each stage of working scientifically explicitly. Children should develop a growing sense of independence and confidence and apply these skills in a number of different contexts. Children at this stage should be able to:

- Raise their own relevant questions about the world around them.
- Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions.
- Set up simple practical enquiries, comparative and fair tests.
- Recognise when a simple fair test is necessary and help to decide how to set it up.
- Talk about criteria for grouping, sorting and classifying; and use simple keys.
- Make systematic and careful observations.

- Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.
- Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.
- Take accurate measurements using standard units and learn how to use a range of (new) equipment, such as data loggers or thermometers appropriately.
- Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data.
- With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.
- Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions.

Upper Key Stage Two: Children in year five and six should mostly work independently, following the stages of working scientifically to create and investigate questions they have about the world around them. In upper juniors, the children should be able to:

- Use their science experiences to explore ideas and raise different kinds of questions.
- Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions.
- Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.
- Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.
- Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.
- Make their own decisions about what observations to make, what measurements to use and how long to make them for.
- Look for different causal relationships in their data and identify evidence that refutes or supports their ideas.
- Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately as well as take repeat measurements where appropriate.

- Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results.
- Use their results to make predictions and identify when further observations, comparative and fair tests might be needed.

<u>Guidance</u>

Year groups one to six should focus on teaching Scientific Enquiry Skills. Throughout the year, each skill should have been covered and 'TAPS Working Scientifically Wheels' are used to ensure a breadth of skills have been taught.

1. Ask questions and plan enquiry.
2. Set up enquiry.
3. Observe and measure.
4. Record
5. Interpret and report.
6. Evaluate.

EYFS should adapt these skills to their curriculum. This should be incorporated in a practical way and introduce children to basic scientific vocabulary such as prediction and experiment. The emphasis should be on exploring the world around them in a fun and engaging way.

To ensure that there is equal opportunity for all pupils, lessons will be differentiated to include high levels of challenge for the most able as well as scaffolding support for the less able. Children with SEND will also have personalised support.

Teaching will include marking according to the whole school policy. It is expected that some work in books will include next steps or teacher questioning to deepen children's understanding. Children will then be given opportunity at the start of the next Science lesson to respond to marking.

A Science glossary could be used to support children's learning. A Science display, including the vision, subject specific vocabulary and a working scientifically wheel, could also be used to further reinforce teaching.

Science is a core subject and therefore the expectation is that a discreet science lesson will be taught for at least one hour on a weekly basis

Progression and Continuity

Our curriculum is carefully planned to engage and excite all our learners. Our long-term and medium-term plans map out the objectives covered each term for each key stage. These plans define what we will teach and ensure an appropriate balance and distribution of work across each term.

Long-term plans for Science now include 'prior learning' and 'future learning.' Both of these areas will be carefully considered by the class teachers so that progression is clearly seen from Reception up to Year 6. Additionally, retrieval practices (using prior learning from past year groups) will be included regularly in Science lessons. Recapping previous knowledge will help children to build connections with new their learning which will improve the likelihood of the knowledge reaching the long-term memory.

There is a strong focus on the practical side of science with a clear progression of the skills of working scientifically through hands on experiences. All of the 5 different Scientific Enquiries will be covered in each year group throughout the year. The subject lead will monitor the range of Scientific Enquiries so that there is a breadth of enquiry types throughout the KS1 and KS2 Science curriculum.

We recognise the fact that we have children of differing ability in all our classes, and so we provide suitable challenge or support to enable all children to succeed. We achieve this through a range of strategies which are differentiated by task, expected outcome and/or support from peers or adults. Dual-coding maps and pre-teach sessions are used regularly to support children with SEN.

Assessment

At Clearwater Academy, assessment is used effectively to inform planning and to facilitate differentiation. Teachers have been asked to use different forms of assessment strategies throughout the unit, e.g. a sorting activity, writing a letter, Concept Cartoons, labelled diagrams etc.

At the beginning of the unit of work, an elicitation is carried out which gives each child a starting point. This will be used to inform planning of the next sequence of lessons for that unit as well as identifying any misconceptions children may have. The assessment of

children's work is on-going to ensure that understanding is being achieved and that progress is being made.

All classes will complete a TAPS focused assessment around two thirds of the way through the unit they are on. This will focus on one Scientific Enquiry skill and will allow teachers to assess children's understanding on the current unit as well as assess their application of the focused enquiry skill. Any weaknesses or areas of development can then be addresses before the end of the unit.

Each child has a Science book which serves as a cumulative record of their work. Samples of children's work are also collected and whole class activities are presented in a Floor Book. Monitoring takes place regularly through sampling children's work, teacher planning and lesson observations.

Resources

We keep resources for Science in a central store. Visits are planned to enhance learning and provide opportunities for hands on activities. Forest school sessions are planned for each year group and there is an expectation that activities are science-based. People with an interest, or expertise, in a particular topic or area of Science are invited into school to work with the children. These might be parents, grandparents, other family members, neighbours or representatives of the local community.

Subject Leadership

1. The Science subject leader will support and monitor the subject and will receive an adequate budget to do this.
2. The Science subject leader will ensure that his/her subject knowledge and expertise are kept up to date by means of regular training. The Primary Science Quality Mark has now been achieved (September 2021).
3. The Science subject leader will ensure that staff receive adequate training in teaching and assessment.
4. The Science subject leader will regularly monitor the quality of Science teaching across the school.

5. The Science subject leader will continue to keep the profile of Science high across the school. Planning enriching opportunities in Science week, inviting visitors into the school and organising STEM incentives will ensure children remain excited and enthusiastic about their Science learning.
6. The Science subject leader will liaise with the governor who holds responsibility for Science and they will report regularly to the governing body on progress and attainment.

Review

This policy will be reviewed regularly. Its effectiveness will be monitored by the Science Subject Leader and will be based upon discussions with other members of staff, observation of children's work and re-evaluation of teaching plans. The outcome of the review will influence the future school development plan for Science.