



Sleights Church of England
(Voluntary Controlled) Primary School

Science Policy

February 2022

**This policy was reviewed in February 2022, following careful consideration of the science research review, Covid-19 and its implication on the curriculum delivery.*

*Working together to be happy; to flourish; to succeed
through our Christian Values of
perseverance, respect and trust.*

“A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. 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. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.”

The National Curriculum for Science in Key Stage One and Two, 2014

The teaching of science at Sleights is underpinned by the ongoing development and acquisition of knowledge and skills. This development and acquisition occurs as a result of our own school’s curriculum sequence and progression, which maps out the core knowledge and skills children need to be highly effective scientists.

About this policy

This policy intends to outline the policy and procedure for teaching and learning in science at Sleights Church of England (Voluntary Controlled) Primary School.

This policy will identify the intent, implementation and impact expected within the teaching of science at Sleights.

In our Church school, our vision is to “work together to be happy; to flourish; to succeed”. Our Christian Values of are firmly rooted in this policy.

Christian Value	How is this value lived out in our Science policy?
Perseverance	<p><i>I can do all things through Christ who strengthens me (Philippians 4:13)</i></p> <p>As a school, we recognise entirely that learning is a journey and something that requires the input and support of the entire school community. It is this input and support that will enable all children to have the confidence to persevere. When completing scientific investigation, children will learn that not everything happens as expected and they will need to persevere to achieve the answers they need.</p>
Respect	<p><i>So in everything, do to others what you would have them do to you (Matthew 7:12)</i></p> <p>Science is the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. We aim to guide learners so they become scientifically knowledgeable, scientifically literate and methodical problem solvers, by fostering a spirit of independent inquiry, nurturing curiosity and bringing current, relevant, real world science into the classroom, developing a respect for the world around us.</p>
Trust	<p><i>My God is my strength in whom I trust (Psalm 18:2)</i></p> <p>At Sleights, we involve the children at all levels of scientific planning and investigation using a variety of resources. The children are carefully guided and can be trusted to use all equipment safely and accurately within their learning, carrying our investigations to support and develop their scientific knowledge.</p>

Science at Sleights

Science at Sleights involves:

The opportunity for practical, hands on investigation, so that children can explore concepts and ideas.

Sequenced learning experiences, which build on prior knowledge and understanding.

Developing a secure knowledge and understanding of models, laws and theories (substantive knowledge)

Acquisition of skills and knowledge about how practices of scientists (disciplinary knowledge)

Intent of our Science curriculum

The children at Sleights will be provided with a Science curriculum offer designed to:

- identify crucial learning, which is placed in context and connected to other knowledge.
- build on and develop scientific knowledge and skills in a well sequenced and structured progression across their time at Sleights.
- support children's acquisition and progressive understanding of substantive and disciplinary knowledge.
- instil a love of science.
- inspire children to ask questions and explore ideas.
- equip children with the skills needed to investigate an idea, before drawing conclusions.
- teach children to take the lead in planning investigations.
- facilitate rich, exploratory investigations of all science topics.
- support children to make links with the taught science curriculum and the wider world.
- utilise core skills from across the curriculum, for example, mathematics skills when recording or analysing results from an investigation.

Science at Sleights is exploratory and investigative. It poses questions, as well as prompt children to consider questions of their own. We aim to develop a passion for science and a lifelong interest in the subject. Children are posed with statements or questions to explore and investigate, taking the lead in discovering ideas and findings.

Implementation of our Science curriculum

Science is implemented at Sleights through:

- timetabled, high-quality lessons, which enable children with the time and opportunities to develop their scientific knowledge, understanding and skills over time.
- the use of a progressive long term plan, which builds on new knowledge and skills, that children can gain an increasing understanding of scientific concepts.
- identified opportunities for practical investigation.
- explicit and ongoing opportunities for low stakes assessment, to identify that children know more and remember more.

Learning in science is recorded in a variety of ways. Children enjoy a range of practical activities to support their understanding of science topics, concepts and enquiry. Children's work for science is recorded in their individual learning journeys, which illustrates their time across Sleights.

Science Implementation: The content of the curriculum at Sleights

The science curriculum at Sleights is designed so that:

- children will engage in well sequenced planning, which enables the acquisition and build up of skills.
- meaningful links are made with science topics and other areas of the curriculum. However, where links are tenuous, science will be viewed discreetly.
- children engage in well planned science lessons that have clear intent and skills to be taught.
- science is practical and enables children to use real life opportunities to draw conclusions and discover science in action.
- children engage in thorough practical investigations, with a clear process for investigation, regularly throughout the study of any topic.
- science outcomes are recorded through photographs, discussions, written evidence etc. across individual pieces of work and class 'Big Books'.

Science at Sleights focuses on the acquisition of new knowledge and building on prior learning relating to:

- knowledge about science concepts, laws, theories and models (described as **substantive and conceptual**).
- knowledge about how scientific knowledge is generated and grown, including links to 'working scientifically' (described as **disciplinary knowledge**).

Further information about teaching and learning relating to substantive and disciplinary knowledge can be found in this policy.

Implementation in Early Years

At Sleights, the teaching of science begins in the Early Years, where children explore the concepts of the natural world. Using the expectations for scientists set out in the Early Learning Goals, carefully identified curriculum intent for our Early Years' children recognises the incremental steps in knowledge and skill acquisition that is expected across our Pre-School and Reception classes. This ensures that, before children embark on their Key Stage One journey, they have already acquired a simple understanding of simple scientific concepts and vocabulary, in preparation for further learning in Year 1. This is achieved through ongoing access and carefully planned opportunities across the Early Years curriculum.

Implementation in Key Stage One and Key Stage Two

Building on the scientific understanding gained in Early Years, children across Key Stage One develop an increasing knowledge of concepts and ideas. This knowledge is gained and developed across units of work, taught across the school on a two year cycle.

Objectives (underpinned by substantive and conceptual knowledge – sometimes referred to as sticky learning) have been carefully identified for each scientific area to enable progression across the school. Teaching and learning activities, including investigations are designed to support children in deepening and extending their understanding of scientific knowledge and concepts. This knowledge and content is organised and sequenced, so that children gain new knowledge and build on prior learning over time.

The curriculum is organised into Year A and B for children in Key Stage One and Key Stage Two.



Implementation: Substantive and Conceptual Knowledge

In addition to mapping out the topics and historical periods to be taught at Sleights, our school's long term and medium term plans identify the **substantive and conceptual knowledge** (sometimes referred to as 'sticky learning') taught across school from Key Stage One to the end of Key Stage Two. This knowledge and content is organised and sequenced, so that children gain new knowledge and build on prior learning over time.

Substantive knowledge in science refers to biology, chemistry and physics.

At Sleights, each unit of work maps out the substantive knowledge identified for teaching at that time. Common concepts, such as plants, run through the whole school, but individual year group plans carefully identify the concepts and substantive knowledge (sticky learning) to be built upon and acquired.

Each unit has identified knowledge and a teaching sequence mapped out on the grids, as depicted here:

Key Vocabulary	component, energy, growth, deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower
Lesson	Identified key knowledge
Pre-Assessment	<ul style="list-style-type: none"> Vocabulary self-evaluation and definition list
Week 1	<ul style="list-style-type: none"> Know a rose bush, a sunflower and a dandelion by sight. Know an oak tree, a birch tree and a horse chestnut tree by sight.
Week 2	<p>What are the different types of trees?</p> <ul style="list-style-type: none"> Know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn. Know that plants and animals produce offspring that grow into adults.
Week 3	<p>What are the parts of a flower?</p> <ul style="list-style-type: none"> Know that a flowering plants consist of roots, stem, leaves and flowers, and that a tree's stem is called a trunk.
Week 4	<p>How do bulbs and seeds grow?</p> <ul style="list-style-type: none"> Know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions (water, warmth)
Week 5	<p>How do bulbs and seeds grow? continued</p> <ul style="list-style-type: none"> Know that plants that are deprived of light, food or air will not grow and will die.
Week 6	<p>Who was Beatrix Potter?</p> <ul style="list-style-type: none"> Know that Beatrix Potter was an illustrator and botanist. Beatrix Potter's work helped save and preserve huge parts of the countryside.  <p>OR</p> <p>Who was Anna Atkins?</p> <ul style="list-style-type: none"> Know that Anna Atkins was a botanist, who is best known for first illustrations and photographs of plants. 
End of unit assessment	<ul style="list-style-type: none"> Vocabulary self-evaluation and definition list End of unit assessment paper

Across the full progression, scientists have been identified to support children in understanding the knowledge they are learning in a real life context.

Implementation: Disciplinary Knowledge

At Sleights, children develop **disciplinary knowledge** through skill progression plans, which carefully set out how children will establish knowledge through scientific enquiry. Skills for working scientifically are organised and designed to be taught within a unit of work. These are transferable, lifelong skills that children can utilise across the full curriculum and beyond. These core skills are:

		Core 'Working Scientifically' Skills				
		Identify, Classify and Group	Observe over time	Pattern seeking	Comparative and fair testing	Researching using secondary sources
Disciplinary Knowledge and Skills	Knowledge of methods to answer questions	X	X	X	X	X
	Knowledge of apparatus and techniques, including measurement.		X	X	X	
	Knowledge of data analysis	X	X	X	X	X
	Knowledge of evidence to develop explanations	X	X	X	X	X

Disciplinary knowledge is taught alongside substantive knowledge. Neither aspect are taught in isolation, but instead knowledge of procedures and concepts are side by side to establish meaningful context and understanding.

Implementation: Working Scientifically and Planning Investigations

Providing children with opportunities for enquiry and investigation is included in science teaching and learning. The school uses a consistent model and framework for science investigations, which enables children to build up their understanding and develop skills, focused on core investigative skills, over their time at Sleights.

Teaching the specific skills needed for investigation is a vital element of our core science offer. These skills and investigations as a whole drive the curriculum, providing children with practical questions to explore and investigate, with increasing ownership and leadership as they move through school.

Each term, it is expected that children across school will engage in a focused investigation and write this up. This may include a full write up of the process, of a focus on particular elements or ideas that have been selected for focus.

Implementation: Recording

Recording for science will take place in a variety of ways. This will include practical activities, which may be recorded through photographs and videos. Children will also record work in writing, using prompts and support from teaching staff.

Children each have a science learning journey, which is used as a tool to gather children's evidence and assessment information over time.

Implementation: Use of Curriculum Resources

Science resource boxes are organised into different topics and themes. These are stored in the staff room.

In addition to resources for science sessions, the school has a curated book list of high quality texts, designed to support curriculum delivery across the full school.

Implementation: Supporting pupils, including pupils with special educational needs and/or disability

Ensuring access to the curriculum for all children, regardless of background, special educational need and/or disability is an essential aspect of teaching and learning at Sleights. Our approach to the curriculum for children with special educational need(s) and/or disabilities aims to ensure that children with differences are able to learn about a subject, remain focused, manage and complete tasks with a sense of achievement, whilst also being challenged.

This will be supported and achieved through a range of ways, including:

- Additional repetition of learning to support embedding the knowledge (to help the children to remember the knowledge). Repetition to take the form of retrieval tasks and learning the same information in different ways over several lessons.
- A wider range of practical activities in the curriculum to support children's individual needs, including a range of recording methods.
- Reading differentiated to support lower-level readers.
- A range of practical resources and support tools to enable access to the curriculum.

Impact: How do we ensure that children are making progress and learning?

Assessment for learning is fundamental to raising standards and enabling children to reach their potential. Assessment in science takes place during and after each taught session, using a range of strategies such as marking and feedback, verbal discussions with children and response time.

Vocabulary

Children start each unit with an assessment of how much vocabulary children know already. Children colour code the focus vocabulary. This is used to support teaching and learning for the remainder of the unit.

	I don't know it.		I know what it means.		I can use it in a sentence.
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Children revisit the vocabulary during the unit to demonstrate the impact of teaching and learning.

End of unit assessments

In addition, children complete regular 'low stakes' assessments, to provide an ongoing overview of the impact of science. These include ongoing assessments to inform teaching and learning activities during the unit.

At the end and throughout the taught unit, children are provided with a variety of retrieval opportunities in a formal end of unit assessment. These opportunities are used as assessments for the impact of teaching and how effectively children have remembered taught substantive knowledge. Each taught unit provides a scaled score, which is used to inform ongoing teaching and learning.

In addition to identifying the impact of teaching and learning of substantive knowledge, assessment of children's disciplinary skills is also made. These transferable skills are taught alongside substantive knowledge and assessed formally each term (assessments recorded on the half term). Teachers make informed assessment decisions based on activities and learning. These assessment decisions identify whether a child is demonstrating that they are meeting the expected standard, working towards it or exceeding it.

Health and Safety

- The North Yorkshire adopted guidelines for safety - ASE 'Be Safe' 4th Edition are a **minimum** requirement of health and safety standards. Teachers should notify the science subject leader of any suggested amendments.
- Free H&S advice is available from the CLEAPSS hotline 01895 251496
- Pupils will normally be organised into small groups and encouraged to work co-operatively for science work. The group size will be determined by the age, task and ability of the pupils.
- Equal opportunities in science will be given to all pupils. (See equal opportunities policy).