

Lanesfield Primary School



Science Policy 2020 - 2021

Review date: September 2022

Science Policy

This policy was updated and reviewed by Teri-leann Roberts June 2021.

Aims

The 2014 national curriculum for science aims to ensure that 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 skills required to understand the uses and implications of science, today and for the future.

Intent

Science teaching at Lanesfield aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them think scientifically, gain understanding of scientific processes and the use of and implications of Science, today and for the future.

At Lanesfield, we understand that it is important for lessons to have a skills-based focus; therefore, scientific enquiry skills are embedded in each topic and developed throughout their time at school. This means, they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions and be curious about their surroundings. Another key aspect of our Science curriculum at Lanesfield is the implementation of the Cornerstone's approach to learning (Thinking Actively in Social Context) because we believe science encompasses the acquisition of knowledge, concepts and skills through communication. This model allows children to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this procedural knowledge into the long-term memory. Ultimately, our Science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living.

Implementation

Science is taught throughout the school in weekly lessons and is delivered by class teachers. Lanesfield has incorporated Cornerstone TASCs which covers units of study linked to the National Curriculum, supports teachers with their lesson planning and encourages independent learning in social texts.

At Lanesfield, we understand that implementation teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all pupils are capable of achieving high scientific standards. Our whole school approach to the teaching and learning of science involves the following;

- Science will be taught, planned and arranged in topic blocks by the class teacher, to have

an investigation-based approach. This is a strategy to enable the achievement of a greater depth of knowledge

- Through our planning, we involve problem solving opportunities that allow children to apply their knowledge, and find out answers for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom
- Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge.
- Teachers use precise questioning in class to test conceptual knowledge and skills, and assess pupils regularly to identify those children with gaps in learning, so that all pupils achieve NC aims
- We build upon the knowledge and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence
- TASCs are incorporated into our science curriculum to support independent learning in social contexts. This means, children use their taught knowledge to: plan, conduct, complete and evaluate a scientific experiment within their group independently.
- Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the investigations
- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding
- Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.

Impact

The successful approach at Lanesfield results in a fun, engaging, high-quality science education, that provides children with the foundations and knowledge for understanding the world. Our early years engagement with the local environment ensures that children learn through varied and first-hand experiences of the world around them. Additionally, frequent, continuous and progressive learning outside the classroom is embedded throughout the science curriculum. Through various workshops, trips and interactions with experts and local charities, children have the understanding that science has changed our lives and that it is

vital to the world's future prosperity. Children at Lanesfield thoroughly enjoy science and this results in motivated learners with sound scientific understanding.

Teaching and learning

EYFS

In Early Years, children engage in scientific activities through their study and acquirement of Understanding the World (UW). Reception pupils follow the Early Years Curriculum for UW and are assessed initially against Cornerstone's criteria, moving to the Early Years Profile towards the end of their Reception year.

Key Stage 1

The principal focus of science teaching in Key Stage 1 is to enable pupils to experience and observe phenomena looking more closely at the natural and humanly-constructed world around them. During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Asking simple questions and recognising that they can be answered in different ways
- Observing closely, using simple equipment
- Performing simple tests
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions.

These will be taught through the following topics:

- Plants
- Animals including humans
- Seasonal changes
- Living things and their habitats
- Uses of everyday materials.

Lower Key Stage 2

The principal focus of science teaching in years 3 and 4 is to enable pupils to broaden their scientific view of the world around them. They should do this through:

- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings.

These will be taught through the following topics:

- Plants
- Animals including humans
- Everyday materials
- Rocks
- Light
- Forces and magnets
- Living things and their habitats
- Electricity
- Sound
- States of matter.

Upper Key Stage 2

The principal focus of science teaching 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:

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

These will be taught through the following topics:

- Living things and their habitats
- Animals including humans
- Earth and Space
- Properties and changes of materials
- Forces
- Evolution and Inheritance

- Light
- Electricity.

Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Children’s starting points are identified at the beginning of each science topic through KWHL grids, key vocabulary grids for children to convey and record what they know already. At the end of the block, children’s knowledge is checked in line with the key knowledge identified prior to the teaching block. Pupils should be able 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 should build up an extended specialist vocabulary and teachers ensure that this is developed within each lesson and throughout each science topic. Children also complete a TASC wheel at the beginning of all their “prove it” investigations. They begin by applying their taught knowledge to plan a scientific investigation with their group. After carrying out the investigation, they record and use their TASC wheel to evaluate their results. Our Lanesfield science curriculum ensures that children are provided with regular opportunities to apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data.

TASC wheel

At Lanesfield, we encourage children to complete ‘Prove it’ investigations throughout their topics to apply and demonstrate their taught skills scientifically. To do this, children work collaboratively in small groups to plan, carry out, record, evaluate and repeat (where necessary) investigations with little adult input. Their TASC wheel supports their learning during these lessons.

KS1 TASC wheel example



What's on my wellies?

<p>What did you actually do in the investigation? What did you find out from the investigation?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>What do we know about this task? What do we have to do?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<div style="display: flex; justify-content: space-around;"> <div style="background-color: #f08080; border-radius: 50%; padding: 10px; text-align: center; width: 40%;"> <p>Let's tell somebody. What have I learnt?</p> </div> <div style="background-color: #ffff00; border-radius: 50%; padding: 10px; text-align: center; width: 40%;"> <p>What is the task? What do I know about this?</p> </div> </div>	
<p>What do you want to do to carry this investigation out? How did the investigation go?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>How many ideas can I think of? Which one is the best?</p> <p>How many ways can we think to prove this? Which of these ideas is the best and why?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

KS2 TASC wheel example

Why do birds have different beaks?

<p>What were your findings from this investigation? Were your predictions accurate or inaccurate? Why do you think this?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>What do we know about this already?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
<p>Explain what you ACTUALLY did. Did you plan to change your investigation at all? Why was this?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>What have you been asked to do?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
<p>How do you think this investigation went? Explain why</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>How many different ideas can you think of to investigate this?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
<p>What do you plan on doing to carry out this investigation?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>Which of the ideas above is the best one and why?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	

The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group and this is embedded within lessons and focuses on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer

relevant scientific questions. These types of scientific enquiry include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing; and researching using secondary sources. Pupils are given opportunity to seek answers to questions through collecting, analysing and presenting data.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. At Lanesfield, science lessons provide a quality and variety of subject specific language to enable the development of children's confident and accurate use of scientific vocabulary and their ability to articulate scientific concepts clearly and precisely. They are encouraged and assisted in making their thinking clear, both to themselves and others, and teachers ensure that pupils build secure foundations by using discussion to probing and remedying their misconceptions.

Assessment

Children's progress is continually monitored throughout their time at Lanesfield Primary School and is used to inform future teaching and learning. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge. Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the success criteria. Children are guided towards achievement of the main objective through the use of process based 'success criteria', provided by and explained by the teacher. Children will have these to refer to in the lesson, where they will be evident in their books and used to identify areas of difficulty by children and teachers when reviewing and assessing work. Assessment for learning is continuous throughout the planning, teaching and learning cycle. However, children are more formally assessed half termly in KS1 and KS2 using a variety of methods:

- Observing children at work, individually, in pairs, in a group, and in classes
- Questioning, talking and listening to children
- Considering work/materials/investigations produced by children together with discussion about this with them.

Planning and Resources

Planning is a process in which all teachers are involved. Planning should be done with parallel teachers using the MTP to support them and ensure NC coverage and progression. Additionally, teachers embed the Cornerstone Science scheme of work within their planning to assist our children's 'Prove it' investigations.

Further evidence of 'good science' taking place in classrooms includes:

- An active learning environment, showcasing the Lanesfield Science principles
- Children being encouraged to ask and answer questions and discuss their work and ideas
- Children devising and conducting their own investigations within the context of the relevant curriculum content, as well as being given opportunities to develop their working scientifically skills
- Children recording their findings in a variety of ways
- Children showing enjoyment in the activities they are undertaking
- Children making mistakes and applying their taught knowledge to re-plan investigations.

At Lanesfield, we have a range of resources which are accessible to all staff.

Roles and responsibilities

It is the role of the Science co-ordinator, under the guidance of the Head teacher:

- To organise Science coverage within the curriculum and to ensure progression and development.
- To assist with and monitor planning and quality of delivery within the curriculum.
- To review standards of work within the school by reviewing samples of work from learning journals, display work, showbie and pupil interviews
- To ensure resources and equipment is available to staff
- To advise staff in their planning where needed

Review: This policy will be reviewed in September 2022