



Science Policy

Date: September 2024

Review date: September 2025

Policy Changes

Date	Actions
<p>January 2021 August 2021</p>	<p>Policy implementation <u>Amendments (additions):</u> Teaching and Learning (Outdoor Environment) (page 5): <i>‘To help facilitate effective learning outcomes, outdoor learning, in particular within the school grounds, will be used where possible / appropriate within units of study.’</i></p> <p>Equal Opportunities and Wellbeing (page 8): <i>‘Where feasible, the use of collaboration and the outdoor spaces to facilitate learning will be promoted, helping to respond to the individual needs in an inclusive and supportive manner. This will aid in the promotion and support of both mental health and wellbeing for all stakeholders / pupils.’</i></p> <p>Addition of page numbers.</p>
<p>September 2022</p>	<p>Amendment: p5 Science Books – Removal of references to ‘floor books’. Altered to state that all pupils have individual books in KS1 and KS2, supported through video and photographic evidence via SeeSaw.</p>
<p>April 2024</p>	<p>Amendments: <u>Curriculum Intent</u> Paragraph 2 - Addition of words substantive and disciplinary knowledge. Paragraph 4 – Rewording of reference to the ‘Science Skills and Progression’ document. Paragraph 5 – inclusion of the ‘Science Curriculum Document’, with amendments to the bullet-pointed opportunities for pupils:</p> <ul style="list-style-type: none"> • Bullet point 1: where learning fits within the wider Science NC curriculum. • Bullet point 2: added reference to the Progression in Science Vocabulary document. • Bullet point 6: Addition of ‘and carefully mapped out’ with enquiry types rewritten in bullet points. • Bullet point 8: Addition of ‘measureable’. • Bullet point 9: Addition of the role of Mathematics in presenting data. • Bullet point 10: Addition of identifying and use of a range of common scientific apparatus.

	<ul style="list-style-type: none"> Bullet point 12: Addition of House Team scientist names. <p>Amendments: <u>Teaching and Learning of Science</u> Paragraph 2 – inclusion of ‘substantive’ and ‘disciplinary knowledge’ Paragraph 3 – Corrected wording of ‘Progression in Science Vocabulary’. Paragraph 4 – Inclusion of ‘curious caterpillar’ and references to KS1 and KS2. Paragraph 5: Addition to link with Science Curriculum Document. Removal of Paragraph 7: <i>‘Children’s work is celebrated through the use of a Science WAGOLL display within the communal areas of both buildings, promoting children’s achievements and the general importance and ethos of Science within Red Lane.’</i></p> <p>Amendments: <u>Science Books</u> Removal of bullet point referencing mind-mapping Bullet point 2 - inclusion of KS1 and KS2 working scientifically knowledge organisers. Bullet point 10 – Addition of reference to marking grids containing enquiry types.</p> <p>Amendments: <u>Knowledge Organisers</u> Paragraph 2 – Addition of references to KS1 and KS2 Working Scientifically Knowledge Organisers</p>
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Subject Leader

Date	Subject Leader
September 2012 - 2018	Ian Simmons
September 2018	Ian Simmons / Emma Fisher (KS1)
September 2020	Ian Simmons / Romina Westwell (KS1)
September 2022	Ian Simmons
September 2023	Ian Simmons
September 2024	Tim Charlton

Mission Statement

At Red Lane we believe that all our children can achieve, becoming successful future citizens that contribute positively to a society in which all members are equally valued.

High aspirations, high motivation and high outcomes for all, ensure that achievement gaps wherever they exist are narrowed in order to improve pupils' life choices and future prospects.

We strive for all of our children to be safe, feel valued, develop resilience and continually learn within our nurturing and supportive community.

At Red Lane, our children BELIEVE, ACHIEVE and SUCCEED!

Curriculum

The curriculum, in its widest sense, firmly underpins the school's Mission Statement, Aims and school motto 'Believe, Achieve, Succeed'. At Red Lane, the curriculum is rooted in the needs and context of our community and learners. We provide an enriching and exciting curriculum the foundations of which are rooted in quality first hand experiences, designed to develop vocabulary and cultural capital (which includes science capital) whilst ensuring that knowledge is durable and transferrable allowing pupils to make connections, develop and apply skills and reason.

Our school curriculum design focuses on the knowledge, skills and understanding of our pupils and their needs in order that all children achieve well. Our school curriculum provides for academic achievement but places the role of developing spiritual, moral, cultural and social development at the heart of all we do with the ultimate aim of ensuring all pupils leave Red Lane with the confidence, knowledge and skills to become successful and independent lifelong learners who can make a positive contribution to our diverse and democratic society.

Curriculum Intent for Science

Science embodies the acquisition of knowledge and understanding of the natural world and beyond through the process of rigorous testing, observation and experimentation, which constantly challenge and build upon prior discoveries. This process results in technological advancements through the application of Science within engineering, which in turn has a profound impact on the world around us. Consequently, we believe that it is our duty to further develop this Science capital through the study of a diverse range of scientists, noting how these key individuals contributed to their fields.

Our '**Science Vision and Principles**' document challenges us to develop children who understand what Science is, what it is for and its relevance in the world around us. We aim to nurture and develop their inquisitive nature in order to advance their substantive knowledge using scientific vocabulary in order to discuss and confidently question the world around them, as they explore new concepts using a practical, 'hands-on' approach through scientific enquiry (disciplinary knowledge). Overall, we strive to expose the children to have a deeper understanding of the world, widening their opportunities for science capital and fostering a life-long love of Science and STEM.

At Red Lane, Science is taught as a discrete subject in order that the development of knowledge, vocabulary and scientific enquiry skills are taught both meaningfully and explicitly. Naturally, links are

made to other areas of the curriculum, especially English, Mathematics, Design Technology and Computing, but this does not dilute the quality and entitlement of high quality Science teaching.

The school's long-term plan for Science follows the Key Stage 1 and Key Stage 2 National Curriculum (2014) and sets out the content of teaching within in each year group. The school's **Science Skills and Progression** document supports this, which demonstrates learning outcomes and expectations for Biology, Chemistry, Physics and Working Scientifically within each Science stand and subsequent units of work.

Short term planning is derived from Red Lane's **Science Curriculum Document**, which details how this content is developed over a series of lessons within the unit of work. The organisation of the Science curriculum provides structured opportunities for pupils to:

- Understand where their science learning fits within the wider Science National Curriculum including opportunities to revisit prior learning.
- Develop and use key scientific vocabulary within their correct contexts (linked to the document, **Progression in Science Vocabulary**, adapted from PLAN).
- Explore concepts and dispel common misconceptions through the use of investigation.
- Explore the world around them, developing their understanding of key physical and biological processes.
- Approach Science through practical scientific enquiry, through the process of enquire, explore, record and explain.
- Opportunities for working scientifically are provided and carefully mapped out, using a combination of:
 - Observation over time
 - Pattern seeking
 - Identifying, classifying and grouping
 - Comparative and fair testing
 - Research using secondary sources of information.
- Devise their own lines of enquiry, which can be planned and subsequently implemented.
- Understand the essential role of Mathematics as a measurable, quantifiable source of evidence for scientific understanding.
- Understand the role that Mathematics has in the presentation of data.
- Recognise and understand how to use a range of common scientific apparatus in order to explore lines of scientific enquiry.
- Understand the role of Science in the wider world, including its cultural impact on our everyday lives.
- Develop their Science capital through their understanding of the work of scientists and naturalists, from a range of times and cultures, understanding how their discoveries contribute to the cumulative nature of scientific understanding. This is covered through year-group unit linked scientists and Red Lane's four House Teams (Marie **Curie**, Stephen **Hawking**, Isaac **Newton** and Katherine **Johnson**).

Teaching and Learning Science

In addition to the conscious structure and design of the Science curriculum, great consideration has been paid to the design of the implementation of the curriculum in the classroom. Teaching delivery will vary according to the activities being undertaken, but will follow the principles set out in the Teaching, Learning and Implementation policy and will include class, group and individual instruction and guidance, exposition and demonstration, and the use of questioning and discussion. The following resources and approaches are adopted across all year groups in order to ensure effective delivery of the intended curriculum.

The teaching of scientific substantive knowledge (Biology, Chemistry, Physics) and working scientifically (disciplinary knowledge) are, where possible, taught in unison, rather than as separate entities, within the majority of Science lessons.

The school's **Progression in Science Vocabulary** document provides a clear focus for the development and exploration of key words, working in conjunction with knowledge organisers, classroom displays of key vocabulary and the use of varied concept and vocabulary exploration activities outlined in the document: **Science Concept and Vocabulary Discussion Ideas**.

For consistency of approach, the use of Curious Caterpillar (KS1) and Lancashire Planning Posters (KS2) (physical and electronic) are used to support the teaching of planning practical investigations, guiding pupils to generate focussed scientific enquiry questions.

All year groups undertake a biographical study of a famous scientist linked to specific, identified units of work outlined in the long-term plan within the **Science Curriculum Document**.

To help facilitate effective learning outcomes, outdoor learning, in particular within the school grounds, will be used where possible / appropriate within units of study.

Science Books

Individual Science books are used throughout the school (KS1 and KS2) to regularly record their learning and practical investigations. The Science book is an essential and personal record of a child's Science journey each year, working in direct conjunction with pupil voice and other forms of evidence (video, photographic etc.) using SeeSaw.

Presentation, layout and marking expectations within Science follow the procedures outlined in the school's marking policy.

The contents of a Science book may include:

- KS1 or KS2 Working Scientifically Knowledge Organisers
- Unit knowledge organisers.
- Evidence of the use of vocabulary and concept discussion activities.
- Practical investigation plans covering a range of the five types of scientific enquiry.
- The use of Mathematics through measuring and data (results tables), including both age-appropriate and content-appropriate graphical representations (Example: Bar charts – discrete data; Line graphs – continuous data; Scatter graphs – data correlations).
- Evidence of forming conclusions, linking data, scientific knowledge and where possible, real-world contextualisation.
- Written explanations of images and questions.
- Cross-curricular writing (non-chronological reports, explanation texts etc.).
- Photographic evidence (if not on SeeSaw) of practical tasks and concept modelling.
- Marking Grids, which include references to the five scientific enquiry types available.

Science books are an essential record of an individual pupil's experiences and ideas throughout each year and will be seen as evidence for assessment and reporting purposes.

Seesaw

Seesaw is an online portfolio that collates pupil's work that has been completed digitally or where evidence of a pupil's work is recorded using photographic evidence. This software allows teachers and pupils to give feedback verbally. This may accompany a pupil's Science book with photographic and video evidence of the pupil's work.

Knowledge Organisers

Each unit of work has a corresponding knowledge organiser, which has been designed purposefully alongside the subject content and progression. These are used by all year groups in each lesson. They are used in a variety of ways in the classroom:

- To draw pupil's attention to the facts they will learn and how these fit into the bigger picture. This gives pupils a sense of perspective and coherence.
- To assess pupils understanding about a unit.
- To support learning at home through homework tasks and projects.
- To check previous knowledge by revisiting at regular intervals (knowledge days).
- To make clear links with prior and future learning.
- To ensure progression of key concepts and vocabulary.

Separate knowledge organisers for working scientifically (KS1 and KS2 versions), which include scientific enquiry types and the identification of common scientific equipment / apparatus are also used and placed within science exercise books for pupil reference.

Knowledge Days

The development of pupil's memory is an integral part of everything we do. Long-term memory is now viewed as the central, dominant structure of human cognition. Everything we see, hear, and think about is dependent on and influenced by our long-term memory. Therefore we must ensure pupils have the opportunity to develop their memory each day and give them activities that allow them to practice previously learnt knowledge. Knowledge Days take place each half term. These are planned in advance so teachers have time to prepare resources.

Pupils revisit learning using low-stake quizzes and presentations. LBQ is used for retrieval practice and group presentations are used to share understanding of a previously learnt topic. It is expected that each group within a class will focus on different areas of previously learnt knowledge then share their understanding of this with the rest of the class.

Learning by Questions (LBQ)

LBQ is used as a diagnostic tool at the start of a unit of work in order to assess and revisit prior learning within a curriculum strand. It is also used as one part of the end of unit assessment. During knowledge days, LBQ is used to revisit and/or reassess previous learning.

Presentations and exhibitions

The celebration of pupil's work and the sharing and articulation of knowledge and experiences is a fundamental part of the curriculum. Knowledge days support this alongside spaced retrieval with peers in the classroom. In addition, within each year group, pupils will showcase their work and their learning to the other classes in their key stage.

Assessment

Progress and attainment in Science is tracked using the school's own assessment system which is based upon a progressive subject criteria that is assessed within each area of learning. Teacher assessment of the Science work undertaken is assessed alongside key subject knowledge, key vocabulary knowledge and working scientifically skills for each unit of study.

The assessment of knowledge takes place through the use of Learning by Questions (LBQ). Pupils answer a series of questions specific to the unit of Science they have studied for example, 'Evolution and Adaptation'. This **retrieval practice** allows pupils to retrieve previously taught information from the long term memory. This assessment, alongside assessment of pupils' written work and digitally recorded work (SeeSaw) is used to make an overall assessment of learning. This is recorded on the cohort's Science tracker.

The assessment of working scientifically is further supported through the periodic use of TAPS (Teacher Assessment in Primary Science) tasks, alongside observations made of the children's application of working scientifically skills within practical lessons.

The Science tracker provides a cohesive picture of Science attainment for each cohort and clearly identifies pupils requiring additional support. The information provided is valuable for class teachers in supporting their pupils but also to the subject leader and senior leaders about the strengths and weaknesses in Science across cohorts, groups and the whole school.

Through targeted intervention and revisiting learning through 'Knowledge Days', assessment remains functional and fluid and is updated to reflect the impact of intervention and also the further progress pupils have made.

Resources

The organisation and deployment of resources is the responsibility of the subject leader. Assessing risk in Science is the responsibility of all teachers, with a general risk assessment for Science being created by the subject lead, with more specific and specialised health and safety guidance provided through CLEAPSS (<http://science.cleapss.org.uk>).

Safe and appropriate equipment and resources for Science are stored within a central location and are organised to promote effective use by all pupils.

The school is committed to expanding, and when needed, replacing present equipment wherever necessary and possible, and to organising human and physical resources, with the aim of motivating both staff and pupils to take part in creative, engaging and practical activities.

The class teacher is responsible for ensuring the safety of the children during the lesson by instructing them in the safe and appropriate use of any equipment. The class teacher is responsible for the general care of the equipment during the lesson by instructing the children in the correct use of the equipment and by replacing them safely after use. The class teacher should report damage to equipment to the Science Leader as soon as possible.

Continuing Professional Development

In order to ensure the highest quality teaching and learning in Science, the school is committed to the continuing professional development of both teachers and teaching assistants. The focus of this is determined by the Science subject leader who has the responsibility for coordinating, delivering or sourcing the relevant development opportunities for staff.

Subject Leadership

The role of the subject leader and supporting documentation is detailed in the school's Subject Leader Handbook. The provision of allocated subject leadership time ensures that teachers have the dedicated time to fulfil their roles and responsibilities which include:

- supporting and guide the practice of teachers and support staff;
- ensuring coverage, continuity and progression in planning;
- monitoring and evaluate the effectiveness of Science teaching and learning;
- updating documentation where necessary;
- producing action plans for the School Development Plan, preparing bids and managing the Science budget effectively;
- liaising and consulting with outside agencies where appropriate;
- preparing and leading INSET;
- attending relevant INSET training;
- reviewing regularly the contribution made by Science to a meaningful curriculum;
- reporting to senior leaders, local governors and external reviewers about the position and development of Science across the school.

Spiritual, Moral, Social and Cultural Development

Our pupils are taught how Science has an impact on our history, culture, health and wealth of just our nation, but the whole world. The curriculum also seeks to address possible conflicts which can arise between Science and other areas of cultural significance, especially religion, treating these as separate, valid viewpoints to be explored. For example: Evolution and Inheritance.

Aspects of the morality of Science and the acknowledgement of historical sexism within Science are also addressed through a more balanced study of both male and female Scientists who have contributed towards our greater understanding of the world.

Parents, carers, governors and members of the community will be invited to view the children's work during our parent showcases. Every child's work is displayed at this event.

Equal Opportunity and Inclusion

At Red Lane, we endeavour to provide all children with an equal opportunity to maximise their individual potential; this is regardless of ability, gender, cultural background, race, religion, or disability. Activities both within and outside the classroom are planned in a way that encourages full and active participation by all children, matched to their knowledge, understanding and previous experience. Our teaching attitudes, published materials used in instruction with pupils and this policy are guided by these respective policies. Equal emphasis will be given to the roles of both men and women in society, without reinforcing gender, religious or cultural stereotypes. In the planning stage, teachers ensure there is appropriate differentiation for all abilities—including gifted and talented, SEN and EAL. All children are challenged at an appropriate level for the individual.

Where feasible, the use of collaboration and the outdoor spaces to facilitate learning will be promoted, helping to respond to the individual needs in an inclusive and supportive manner. This will aid in the promotion and support of both mental health and wellbeing for all stakeholders / pupils.

We have carefully considered and analysed the impact of this policy on equality and the possible implications for pupils with protected characteristics, as part of our commitment to meet the Public Sector Equality Duty (PSED) requirement to have due regard to the need to eliminate discrimination, advance equality of opportunity and foster good relations.

Review

This policy is monitored through:

- Regular scrutiny of children's work
- Regular monitoring and evaluation of planning
- Evaluation and analysis of assessment evidence
- Lesson observations to monitor the quality of teaching and implementation of planning
- Pupil interviews and questionnaires

This policy is reviewed by staff and governors annually.