Policy Title: Science

Policy Folder: Subjects

Last Review: May 2022

Next Review: May 2025

Led By: Paula Hancock/ Amy Perry/ Khajal Mistry

Responsible Committee: SD Committee

Introduction

Alongside our curriculum intent, our CARE values (confidence, achievement, respect, enthusiasm) underpin everything that we do as a school. We all aim for our school to be a happy place, where good behaviour is expected and all children can enjoy their educational journey.

At Lantern Lane, we aim to be a Dyslexia Friendly School. It is our intention that pupils will be able to achieve their cognitive potential in science, regardless of any difficulties spelling, reading, writing or any other traits commonly associated with Dyslexia. In order to achieve this potential, teaching will apply principles of quality first teaching such as reducing cognitive load and providing scaffolding. Where reading is required, appropriate support will be provided (for example, paired reading, pre-reading opportunities, inclusive tech). Pupils will be given a variety of ways to show their understanding across a sequence of learning, appropriate to the learning intention (for example labelled diagrams, cloze activities, oral presentations, group work and simulation work).

In our teaching of science, children will have opportunities to nurture their own spiritual, moral, cultural and social development. Pupils will explore beliefs about the natural world and will explore the part science plays in changing these or challenging these. Pupils will be encouraged to experience natural phenomena first hand, and through secondary sources, developing their appreciation of the world that we share, e.g. the diversity of plant & animal life; the interaction between the Earth & the Solar System; how forces explain why a parachute slows a fall or a boat doesn't sink.
Pupil will develop awareness of how science and technology can affect society and the environment; co-operate in practical activities and develop awareness of the fact that scientific developments are the product of many.

This policy has been written to formally record the teaching, monitoring and assessment of science at Lantern Lane Primary & Nursery School.

The policy aims to:

- Identify what is intended to be taught and how it should be implemented.
- Identify the overall structure and framework of the science curriculum in the school.
- Identify the ways in which we will ensure that children make progress in this subject throughout their time at the school.
- Describe how impact of the quality of education in this subject will be evaluated.
- Identify school procedures to monitor and evaluate the science curriculum.

This policy will be reviewed every three years by the subject co-ordinator, as part of the school's policy review cycle. The policy will, however, be reviewed earlier if there are changes to the National Curriculum, or other significant changes which impact on the teaching and assessment of this subject. The implementation of this policy is the responsibility of all teaching staff

Intent

At Lantern Lane Primary School, we follow the Early Years Foundation Stage Framework (2021) and the National Curriculum (2014). We fully support the purposes of the National Curriculum (2014) in science, which looks to provide every child with:

"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 the learning and opportunities we plan for at Lantern Lane, and through rigorous formative assessment, we aim to support each child in the development of each of the following key aims of the Science curriculum:

- 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 knowledge required to understand the uses and implications of science, today and for the future.

Through our engagement with the National Curriculum and our commitment to providing outstanding provision for every child in the subject of science, we intend the following:

"At Lantern Lane Primary School, we aim to offer a high-quality science education which 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. Pupils explore this idea whilst learning essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are also encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes."

At Lantern Lane, we believe that science makes a valuable contribution towards giving children 'the skills they need to enjoy life and learning', including the ability to observe closely, select important information, evaluate outcomes and ask relevant questions. Based on an enquiry model, science promotes both curiosity and independent thought across the school. It also provides the building blocks, whereby children gain the knowledge they need to stay healthy, be this through an understanding of the benefits of a balanced diet and regular exercise or through understanding the dangers of sunlight and loud noise.

Through looking at the work of a range of scientists, the children start to appreciate the concept that success takes time, sustained effort – and collaboration. Science has many examples of how hard work and resilience – of many diverse individuals and groups - has resulted in outcomes that benefit everyone.

Implementation

We use the National Curriculum* scheme of work as the basis for our planning in science but we have adapted this to our local context, building on the successful units of work already in place.

We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each unit, and we plan progression into the scheme of work.
As a result, children are increasingly challenged as they move through the school in terms of:
*their scientific knowledge;
*their ability to investigate scientifically;
*their knowledge of how to be a scientist.

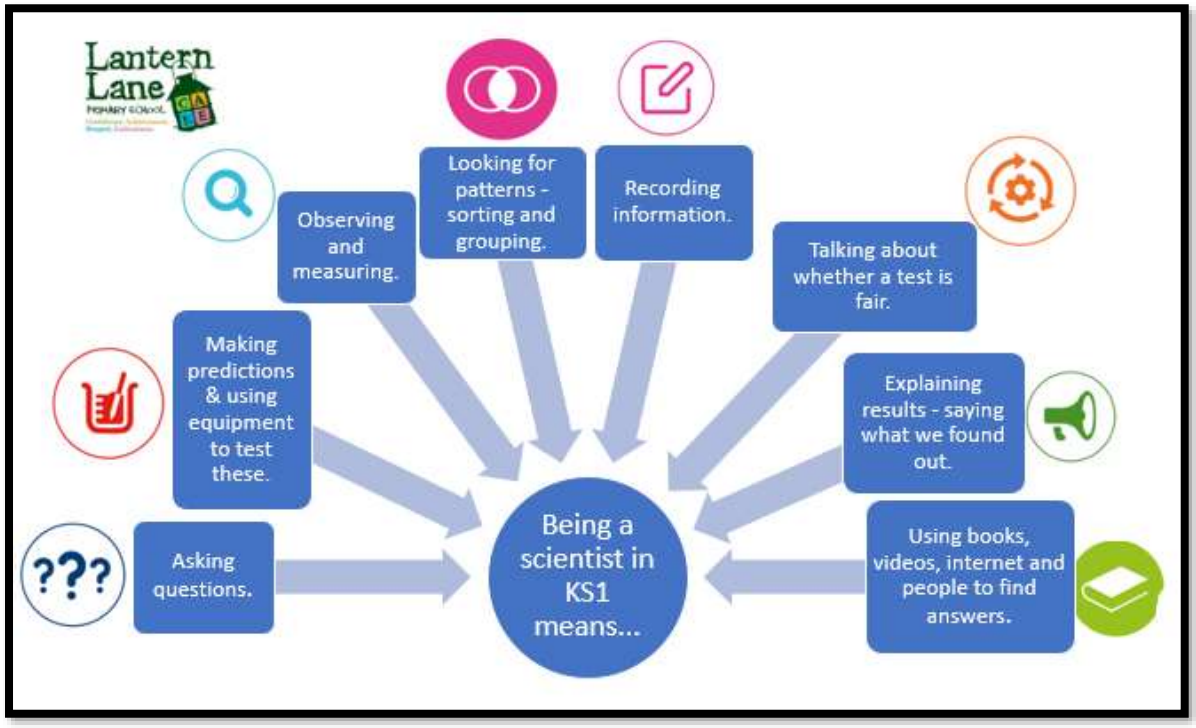
Learning in Year 1 to Year 6 is arranged in units across the year and the children take a 'learning journey' that is enquiry led. Some units last for half a term and some for a whole term; we base these decisions on the amount of knowledge related to different topics and the opportunity for the children to explore in depth, especially in relation to our school intent.

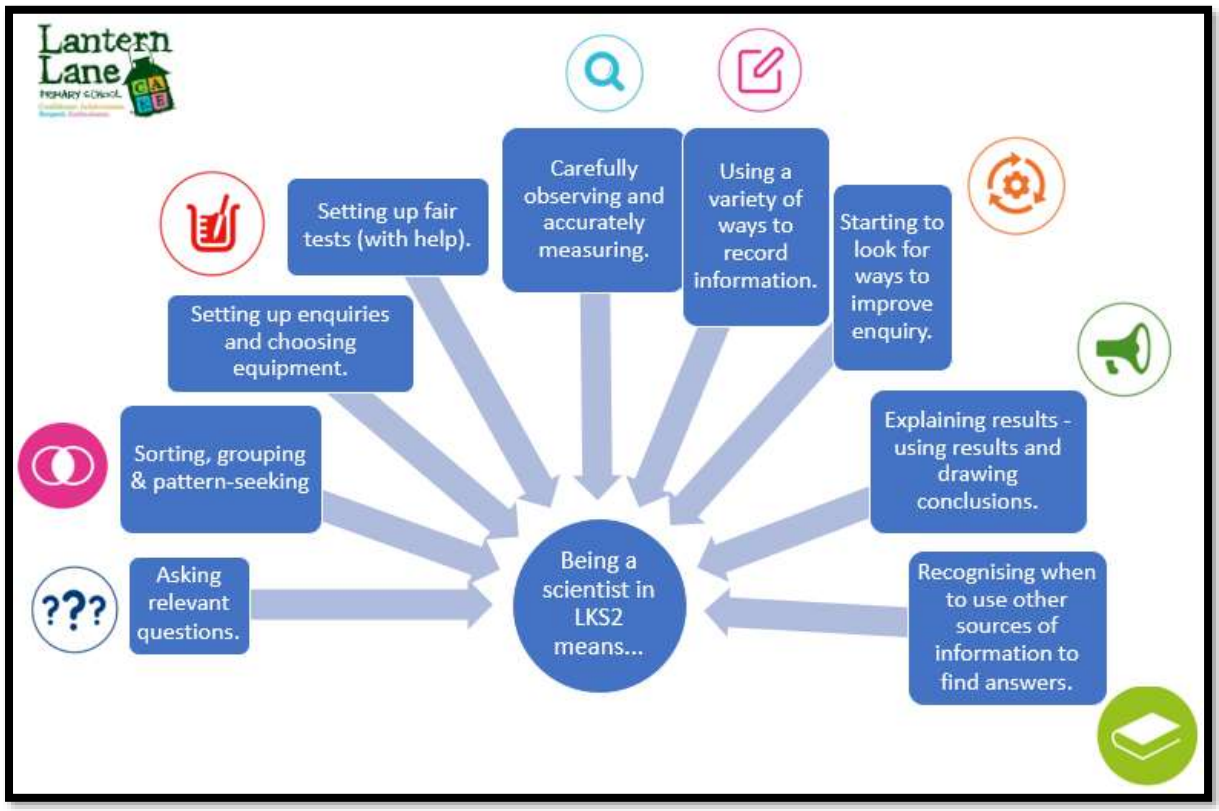
When relevant, further links to other subjects will be made in the interests of deepening understanding, e.g. the study of electricity in Year 6 links to a contrasting locality study that explores different energy sources whilst children in Year 1 investigate the best materials from which to build a house for the Three Little Pigs (when this is being studied in English).

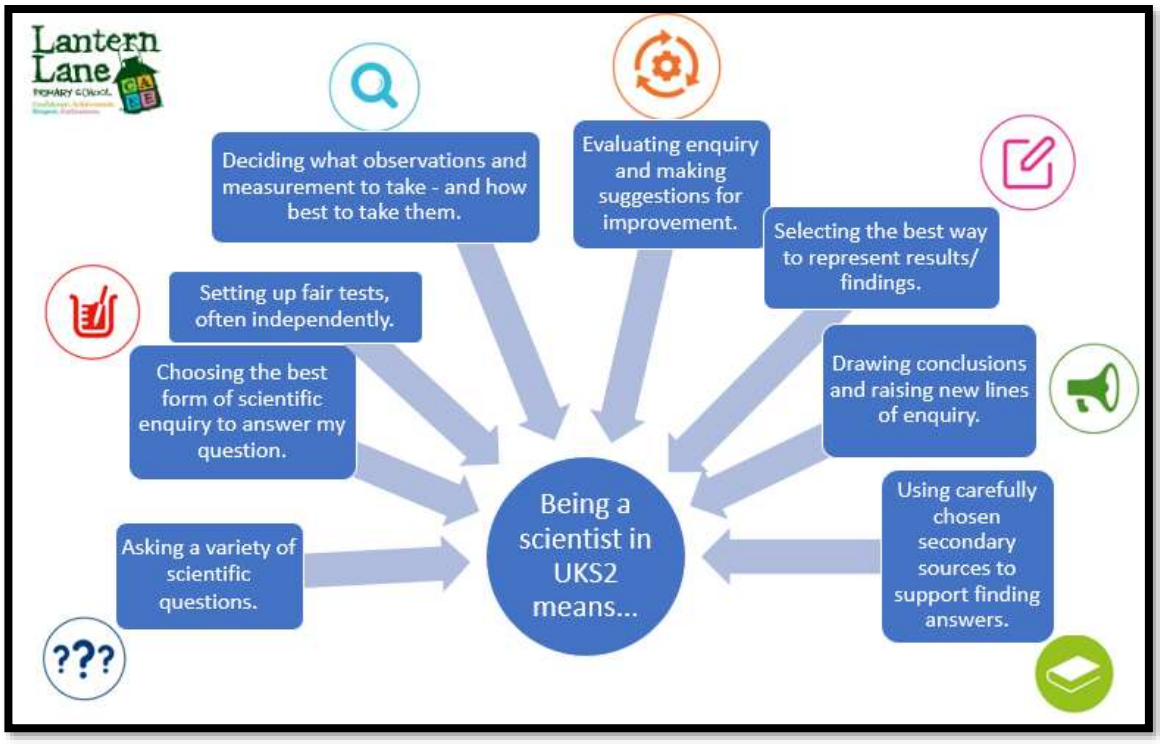
The subject leader has written and continually reviews the curriculum map for science. This details the objectives and skills to be taught for each year group. Teachers use the curriculum map for their year group, and knowledge of prior learning from the curriculum map, in order to develop a coherent and comprehensive conceptual pathway through the new learning.
In science, the key knowledge to be taught for each unit of work is carefully detailed in a knowledge organiser written for the children; this also outlines key vocabulary and the nature of the investigations that will underpin the learning. Key visuals are also included.

We recognise and value the importance of having a variety of teaching strategies which will underpin science lessons to support, extend and motivate pupils, e.g. knowledge can be developed through teacher explanation, demonstrations or simulations, use of secondary sources, discussions and, of course, through investigating scientific questions in a variety of ways.
In addition, a range of contexts are used to maximise pupils' engagement with and motivation to study science, e.g. children in Year 2 investigate why plastic bank notes are now used rather than paper one whilst children in Year 3 investigate the age of a 'skeleton' found in the area (link to King Richard III learning in Year 1).
Science teaching focuses on enabling children to think as scientists by first equipping them with the knowledge and language needed. Regular retrieval of this knowledge and vocabulary supports children to recall this with increasing ease, meaning they can then apply to different contexts or investigations.

Their knowledge of how to be a scientist develops through school as shown below (see later for details of what this looks like in EYFS):







Our aim is to ensure that children have experience of the full range of scientific enquiry, including:
*comparative & fair testing, e.g. which surface creates the most friction?
*observing changes over time, e.g. how does the cherry tree change across the seasons?
*identifying, classifying & grouping, e.g. which of the 5 Kingdoms does this living organism belong to?
*pattern seeking, e.g. is there a link between an animal's gestation period and life expectancy?
*secondary sources, e.g. what materials are different objects made of & why?

We recognise that in all classes children have a wide range of ability in science, and we seek to provide suitable learning opportunities for all children by matching the challenge of/support for the task to the ability of the child.

We achieve this by:
*setting tasks which are open-ended and can have a variety of responses;
*setting tasks of increasing difficulty, some children not completing all tasks;
*providing resources of different complexity, depending on the ability of the child;
*using teaching assistants/teachers to support children individually or in groups;
*allowing children, at times, flexibility in how they communicate their ideas.

What good teaching and learning looks like in science at Lantern Lane:

	Teachers:	**Learners:**
EYFS	✓ Create a learning environment which encourages children to observe, ask questions and test out their ideas in a curious way. ✓ Provide opportunities for learners to further explore and investigate scientific concepts which arise through direct teaching & their play. ✓ Model age-appropriate scientific language through story and play.	✓ Show curiosity and ask interesting questions. ✓ Look closely at similarities and differences. ✓ Talk about change. ✓ Talk about the features of their environment and how other environments might differ. ✓ Make observations of and show care and concern for living things.
Year 1 to Year 6	✓ Use activities and discussions that bring the 'big ideas' in science to life in the classroom and allow scientific phenomena to be observed wherever possible e.g. light travelling in straight lines – to sustain pupils natural curiosity. ✓ Use activities and discussions that will promote the value of science and explore how it has and will change our world. ✓ Make choices about lesson content & structure that will allow children to operate as scientists, engaging in fair testing; observation over time; pattern seeking; identifying & classifying and research. ✓ Make it clear to children when they are being 'scientists'. ✓ Make the link between core knowledge and the outcomes of practical work explicit. ✓ Model and scaffold the development of key scientific skills through a variety of practical work and fieldwork. ✓ Provide children with a range of activities that will help them learn, retain and use scientific terminology in appropriate context.	✓ Show high levels of awe and curiosity in the phenomena explored – to the point that they are keen to take their understanding further. ✓ Plan investigations to answer both questions given and those that they have posed themselves. ✓ Start to critically evaluate the practical work undertaken and suggest their own next steps. Evaluate their performance as scientists and identify targets for improvement. ✓ Make clear links between the practical work they undertake and the core knowledge that is being taught. ✓ Make clear links between their current topic and previous learning. ✓ Use scientific terminology correctly in context. ✓ Give answers that show they have retained the substantive knowledge taught.

*See below for details of the implementation of the EYFS Framework.

Feedback

Feedback in science should be completed in line with the Lantern Lane Primary School Feedback Policy. When choosing the correct form of feedback, teachers should use their knowledge of their class, individual groups and pupils whilst also considering the main purpose of the feedback they are giving. In addition, it is recognised that the type of feedback chosen is likely to vary accordingly to the age or learning stage of the child.
Feedback should be given as close to the point of learning as possible, e.g. within the lesson; at the end of the lesson, or at the start of the next lesson in the sequence of learning.

The following feedback codes are used across KS1 and KS2 to ensure consistency and a clear message for children. The use of codes is intended to make feedback accessible to all children including our dyslexic children and those with SEND (with this being regularly monitored by the SENCo and/or Dyslexia Lead).

Code	Explanation		Code	Explanation
E	You have used equipment to support your learning.		GW (with initials)	A teacher or teaching assistant guided your work here.
✓ Beside LO.	You are ***developing learning*** in relation to the learning objective.		PW/PW	You worked together with a partner on your work here.
✓✓ Beside LO.	You are ***securing learning*** in relation to the learning objective.		CR	You have a correction to complete here.
✓✓✓ Beside LO.	You are ***mastering learning*** in relation to the learning objective.		CH	You have a challenge to complete here.
●	Answer to individual question is incorrect. Complete a correction in purple pen.		✓	Self-assessed. Answer to individual question is correct.
✓	Answer to individual question is correct.		●	Self-assessed. Answer to individual question is incorrect. Complete a correction in purple pen.
VF	Verbal feedback. Your teacher has explained further to support your progress.		WCF	You will receive your feedback as a whole class in the next lesson.

For written pieces of work in science, both the related enquiry question (see curriculum details on the Lantern Lane website) and the knowledge being taught will be identified. The teacher will indicate the degree that these have been met with the same ✓ system detailed above. Feedback in foundation subjects will predominantly relate to the subject-specific learning but may also feature some response in respect of core subject targets personal to the child, group or class.

A question or challenge may be given to support deeper thinking on the part of the pupil, where the teacher considers this to be appropriate, or a child may be asked to correct their work in some respect. Where this is the case, time will be given in a subsequent lesson for children to respond to the teacher's feedback.

Feedback in EYFS…

Children in the EYFS are motivated by their relationships with the adults, who know them best. The everyday conversations and celebrations of learning which take place in the moment are what stands out for the children and how they measure their own success. Class rewards systems are designed to ensure that children are shown what is good about their work in a range of ways that have meaning to them, e.g. receiving a sticker, a house point. A discussion will take place when the reward is given about why it has been earnt.

In respect of areas of development, next steps for children are often put into practice before the child has even left the activity – with them being supported to add detail to their scientific picture or challenged to explain what they can see in even greater detail.

Teaching staff will, however, use the following codes to show the context of the piece of work.
GW – this piece of work has been completed with the help of an adult.
PW – this piece of work has been completed with the help of a peer.
Where neither of these codes appears, the assumption is made that the work was completed independently by the child.

Impact

The curriculum in itself is the progression model. We have a well-constructed, well-taught curriculum mapped out in science at Lantern Lane and this leads to good results because those results reflect what pupils have learned. If children are keeping up with a carefully sequenced, coherent curriculum which builds on prior learning, they are making progress.

The table below provides a framework against which is used to support the evaluation of impact in science.

The curriculum is progressive and is pitched to be appropriately challenging. Therefore, if teachers know that children are coping well and are able to demonstrate their understanding, then our curriculum is having the desired impact and children are making progress.
Subject leaders undertake a full range of monitoring and evaluation is order to establish that our curriculum is having impact based on the below prompts.

How do we monitor that our curriculum is having impact?

Teachers

- Have they become more knowledgeable?
- Do they have high levels of confidence in implementing all areas of the curriculum?
- Can they articulate to senior leaders and subject leaders what is working well?
- Are they keenly aware of how children are coping with the taught content?
- Do they teach consistently well, applying sound pedagogical practices in all lessons?
- Do they plan coherent learning journeys based on the objectives and skills mapped out by the subject lead?
- Do they seek support from subject leads where they are less confident?

Children

- Can they talk with confidence about what they have learned?
- Are they enthused and interested in a wide range of curriculum areas?
- Can they talk about the specific characteristics and skills associated with each subject?
- Can they share examples of their learning and explain the 'why' behind the work they have produced?
- Do they demonstrate good learning behaviours in all lessons?
- Are they able to explain how their learning within a subject builds on previous learning in that area?
- Are they able the make thoughtful links between subjects?
- Are ALL learners able to access, enjoy and make progress within the curriculum – regardless of their starting points or additional needs?

Children's Work

- Does work demonstrate they take pride in what they produce – do children show the same effort as in maths and English for example?
- Does it show increasing understanding of the key concepts within each subject?
- Does it illustrate developing understanding of the discipline of each subject as well as the declarative knowledge?
- Does it show a coherent teaching sequence has taken place?
- Does it show an emphasis on subject specific vocabulary?

Governors

- Do they give positive feedback about behaviour and engagement in lessons?
- Do they comment on seeing high quality work and outcomes?
- Do they report that leaders are clear about strengths and weaknesses and have clear plans to address areas for development?

Ref: Adapted for Lantern Lane based on work by @DynamicDeps

As our curriculum is the progression model, and formative rather than summative assessment and responsive teaching is the most important type of assessment used by class teachers in the wider curriculum, subject leaders and senior leaders monitor this using the quality assurance model detailed below.

Quality Assurance Model		
Subject Leaders **Support and Challenge**	**Subject Leaders** **Independent Quality Assurance**	**Subject Leaders and Senior Leaders** **Collaborative Quality Assurance**
Through own teaching, model key pedagogy for colleagues: Whole school development priorities relevant to subject area Key aspects of what a good lesson looks like in science Known areas of development Individual requests from class teachers Support teachers to: Interpret curriculum maps for subject Plan well-constructed sequences of lessons which build on prior learning Develop own subject knowledge Reflect how well teaching meets what a good lesson looks like in science Team teach Keep records of strengths and areas of development for individuals and use this to inform sustained working with colleagues.	Is the curriculum being implemented as intended? Are the elements of what a good lesson looks like in science being used? Are all staff developing key priorities within the subject area (both subject specific and whole school priorities)? Is the curriculum meeting the needs of all staff and pupils? Monitoring and evaluation: Planning audits Lesson visits Looking at books Teacher and pupil voice Update records of strengths and areas of development for individuals/teams and use this to inform sustained working with colleagues.	Discussion of subject leaders' judgements and evidence base through termly subject leader meetings. Joint analysis through: Planning audits Lesson visits Looking at books Teacher and pupil voice Updating of whole school SEF based on improvement priorities identified by subject leaders monitoring and evaluation. Collaboratively establish any CPD priorities which are whole/part school.

Inclusion and Special Needs

Lantern Lane aims to meet the needs of all, taking into account gender, ethnicity, culture, religion, language, disability, age and social circumstances. The provision for children with special needs is detailed in the SEND Policy. SEND pupils may be supported by additional adults, different resources or differentiated activities. We have high expectations of all children and strongly believe that all children are able to achieve in science. Some may take longer to grasp concepts and may need careful scaffolding or extra time/support.
By its nature, science – with its emphasis on discussion, exploration and investigation – is very inclusive and all learners are given the opportunity to direct or lead in practical work. Recording findings in writing is just one part of working as a scientist; lots of different recording methods are used in science and, where written recording is needed, different support is made available for all learners so that everyone is able to demonstrate their knowledge and thinking.
When the subject leader works with pupils to assess the impact of teaching in science, they will always ensure that the work and views of a diverse range of learners are included.
The focus on developing knowledge in small steps, checking knowledge regularly and applying this through carefully chosen investigations support all children to progress regardless of their starting points.

Early Years Foundation Stage (EYFS)

In EYFS, most intended topics are taught over half a term with links made, where appropriate, between both the prime and specific areas of learning. The specifics of what is taught is directed - in part - by the children themselves and their particular interests.
The EYFS framework (2021) states that 'Understanding the World' and 'physical development', the two areas of learning which incorporate science, require children to make sense of their physical world and their community. Children in EYFS explore scientific concepts through active exploration and their everyday play-based learning.

Children will begin to create a sense of awe and curiosity about the world they live in by:

- talking about what they have observed in their local environment and the impact their behaviour has on this.
- demonstrating their understanding of how things work and why things happen.
- beginning to talk about and explore different scientific concepts including forces, states of matter and sinking and floating.
- exploring the natural world around them, making observations and drawing pictures of animals and plants.
- observing the lifecycle of different living things (frogs, chickens, butterflies) largely first-hand.
- knowing some similarities and differences between the natural world around them and contrasting environments, drawing upon their experiences and what has been read in class.
- Understanding some important processes and changes in the natural world around them including the seasons and changing states of matter.

They will be encouraged to ask questions (of both adults and peers) about what they observe and test out their ideas in a range of age-appropriate ways. They will make predictions about what will happen next when engaging in play in their varied environments and when enjoying stories.

Role of the Subject Leader

• Ensures teachers understand the requirements of the National Curriculum and supports them to plan lessons. Leads by example by setting high standards in their own teaching.

• Leads continuing professional development; facilitates joint professional development; provides support and feedback for teachers to improve pupil learning.

• Leads the whole-school monitoring and evaluation of teaching and learning in science by observing teaching and learning in science regularly; planning whole school improvement; conducting work scrutiny to inform evaluation of progress; conducting pupil interviews.

• Takes responsibility for managing own professional development by participating in external training, independent private study, engaging in educational research and scholarly reading and keeping up-to-date with scientific developments.

• Keeps parents informed about science as appropriate.

• Ensures that the school's senior leaders and governors are kept informed about the quality of teaching and learning in science.

• Works in close partnership with the school's senior leaders to ensure the learning needs of all pupils in science are met effectively.

• Keeps the school's policy for science under regular review.