



Science Rationale

“The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them.”
William Lawrence Bragg

Science at primary level provides the foundations for understanding the world around us. At Lothersdale Primary School, science promotes children to seek answers to ambitious questions and wonder about how things work. Science plays an important and progressive role within the school’s curriculum and it is essential that children build knowledge about how science has changed our lives and is vital to the world’s future prosperity. A fundamental role of science at Lothersdale Primary School is to allow children to discover, explain and develop their knowledge and skills through exploring collaboratively in investigations and working scientifically.

Intent
<ul style="list-style-type: none"> • Children are provided with the knowledge to enable them to formulate questions, plan their own investigations and work scientifically. • Engage children to discuss ideas with increasing curiosity and understanding. • Pre-assessments prior to new learning are used to ensure children’s misconceptions are addressed from previous topics before new learning is taught. • Sequences of learning are carefully planned and delivered through thoughtful practice to expand children’s fluency before gaining mastery and an alteration to retain more knowledge within the long term memory. • Ensure children are alert and aware of the science around them in their own lives and are able to explain how and why science is important. • To engage children with cross curricular links so they can apply language knowledge and mathematics to enrich their understanding of all subjects.
Implementation
<ul style="list-style-type: none"> • Teachers plan units of work that will challenge prior knowledge in order to construct a good, new understanding of substantive knowledge. • Teachers will plan lessons to deepen children’s knowledge further and will allow sufficient time to fully investigate topics before moving on to new learning. This is achieved through blocked learning. • Blocking enables children to become fluent in their knowledge by allowing sufficient time to immerse themselves with the new learning as well as knowledge recalls provided throughout the year to aid knowledge to be embedded into their long term memory. • Teachers planning will include and show a substantive and disciplinary approach to science. This therefore allows children the increasing opportunity to apply knowledge in an appropriate but inventive ways. • To have a balanced curriculum that has a clear sequence of learning with natural links to other curriculum areas. • Prior knowledge will be assessed before introducing new ideas, and misconceptions actively diagnosed and discussed. • The use of visits and visitors is used to enhance delivery appropriately.
Impact: to be reviewed at the end of the year

Substantive and disciplinary knowledge in science

“It is important to view knowledge as sort of a semantic tree – make sure you understand the fundamental principles, i.e. the trunk and big branches, before you get into the leaves/details or there is nothing for them to hang on to.”
Elon Musk

Knowledge refers to the theories and concepts making up science, the method of posing questions and carrying out investigations. Although there is no fixed way in which scientists work, all investigations tend to have aspects of common processes such as observation, classification, hypothesising, data collection, interpretation of data and evaluation.

Scientific knowledge should:

- be based on children’s existing concepts in science
- arouse curiosity about natural phenomena which stimulates the posing of questions about such phenomena
- be a systematic means of enabling the children to ask and attempt to answer questions arising from observations
- provide models of scientists who have contributed to the field of science
- expose students to the various strands of specialisation but which are still related
- recognise that different students experience science differently

Substantive knowledge

Within science, substantive knowledge is produced by the academic subject. This involves concepts which form the underpinning structure of the subject e.g. plants, digestion and electricity as well as scientific vocabulary needed. The list of substantive knowledge for subjects is expensive and must be carefully sequenced over time. The substantive knowledge is progressive through development from Reception to year 6.

Disciplinary knowledge

In science, disciplinary knowledge is whereby science is collected, investigated, understood and evaluated. This is the scientific method i.e. changing one variable in an experiment to keep the process a fair test. Within disciplinary knowledge, children are able to make predictions and observations, record measurements, gather and analyse data as well as carrying out and communicating their investigations.

Creativity in science

At Lothersdale Primary School, we believe children need to have the necessary experiences and capabilities to face the ever-changing future; they need to become innovative and critical thinkers. With teachers taking the children’s natural curiosities and encouraging independent enquiry ensures that our approach to science in enabling children to:

- Think about things in different or unexpected ways
- Make connections between new ideas/experiences and old ones
- Finding new solutions to problems
- Testing out new ideas which enable children to learn from their own misconceptions.

Assessment

Tracking children’s progress throughout their school life is vital in order to establish their acquisition of knowledge. At Lothersdale Primary School, learning always starts with the children’s prior knowledge and any misconceptions that they may have. This can be undertaken in several different ways e.g. through low stakes quizzes; teachers decide upon the most appropriate, age related way of obtaining the children’s prior knowledge. Units of work are then personalised to the needs of the groups of learners. Any misconceptions that arise throughout the unit are identified and address appropriately. End of topic assessment take place at the end of the topic. Two further recalls take place approximately six weeks and then twelve weeks later in order to embed knowledge in long term memory.

Subject leader and staff CPD – member of CASTLE STEM Network group meeting termly.

Reviewed February 2022 NK