Science Curriculum

Through our science curriculum, pupils at Ferham Primary will explore the world as and of scientists. In weekly lessons, they will learn about how the physical and natural world works, what its components are, and how the world got to be the way it is now. Science at Ferham is exciting, engaging and challenging. Children learn by asking questions arising from their natural curiosity and knowledge of the world around them.

INTENT

Alignment to National Curriculum

At Ferham , we follow the National Curriculum withing Ark Curriculum + as this ensures that there is progression and cohesion throughout the year groups.

End Points

There are three clear end points for working scientifically in the National Curriculum; end of KS1 (focusing on experience, observation and exploration of the world around them), end of lower KS2 (scaffolded enquiry) and end of KS2 (investigating with more precision). When children leave primary school, they will be able to generate and answer their own scientific questions by selecting and carrying out one of the five types of enquiry.

Sequencing

The National Curriculum for science follows the Bruner model of a spiral curriculum and so has been carefully sequenced to provide progression through the domains of biology, chemistry and physics. This knowledge begins in KS1 laying the foundations of naming and classifying and is then extended in KS2 through asking the children to use the knowledge to explain different phenomena. The enquiry-based approach will help children to develop and progress from 'small ideas' to the 'bigger ideas' of science during and beyond their school journey (Harlen and Qualter, 2018).

Addressing Social Disadvantage

Pupils going on to study STEM subjects post-16 education fall into the same gender, ethnic and social groups as they did 20 years ago. We recognise that children come to our school with wide differing amounts of science capital (knowledge, experiences, skills and attitudes). We therefore follow the 'science capital teaching approach' in order to help address this inequality (Kings College London, 2015). Subject specific vocabulary is used in all lessons, with explicit teaching of tier 2 and 3 vocabulary (Alex Quigley, 2018). With the right support, we expect that all children will be able to master the science curriculum.

IMPLEMENTATION

Pedagogical Approaches

According to Sherrington (2020), the experience of doing is more likely to build schema and make it stick as children are able to make links to what they have seen or done. Using the enquiry-based approach to learning in science, children will be supported in making connections between the 'smaller ideas' from prior learning and 'bigger ideas' they are currently studying (Harlen and Qualter, 2018). Sherrington (2020) refers to Rosenshine's principles and retrieval strategies. As such, lessons will usually begin with a recall of previous learning, whether this be from the last lesson, last topic or when the topic was last studied in a previous year group.

Teachers' Expert Knowledge

Before delivering a unit of science, teachers have online CPD sessions to build their own subject knowledge. . If teachers need to build their subject knowledge in order to meet the requirements of the teaching standards and successfully teach the unit, support is available to address this (e.g. Reach Out CPD or via JMAT or via RoSIS)). Teachers must be confident in their subject knowledge to ensure delivery is accurate and that misconceptions can be anticipated and addressed.

Promoting Discussion and Understanding

Within science lessons, teachers present subject knowledge in small chunks and make explicit links to prior learning. Carefully crafted questions are used to check for understanding in order to gain more awareness of the learning in the classroom, rather than just individual learning. Questioning allows children to make links between their previous and current learning (Sherrington, 2020). According to Harlen and Qualter (2018), talk in science is critical in supporting the individual to make their understanding clearer and deeper, but also in supporting others to understand. Through an element of hands-on science in each lesson, children are frequently discussing their findings and building their understanding.

Knowing More and Remembering More

Knowledge organisers are used to set out the core vocabulary and big ideas that all children are expected to master in that unit. At the start of each unit, teachers will revisit the 'smaller ideas' from previous learning in order to help map out how to build and develop these further. A first lesson for each unit of work is used to review the 'smaller' ideas mastered in previous units, ready for their development in the new unit. Opportunities for retrieval practice are included in science lessons to ensure knowledge is transferred into long-term memory. Teachers' use of retrieval

IMPACT

Approach to Assessment

Using formative assessment throughout lessons and via retrieval and recall strategies will support the teacher to monitor children's understanding on the knowledge taught. They can be used to help provide summative judgements at the end of KS1 and KS2.

Performance Data

End of Key Stage teacher assessment is shared with the DfE. This will be as a final judgement based on learning in class, retrieval activities and professional judgement, rather than individual learning indicators. Within science, there is no greater depth level as all children are building the same ideas.

Pupils' Work

Children's work will be used as a way of securing and showing learning and not as simply a record of activities done in class as this does not necessarily evidence the learning that has taken place.

Talking to Pupils

The subject leader will measure impact through termly book scrutiny, alongside talking to teachers and pupils. Pupils will be asked what they know now that they didn't know before. The subject leader will carry out interviews with pupils using the knowledge organiser to identify if the knowledge has been understood and transferred to the long-term memory.

We help to build children with science capital through scientific experiences, fieldtrips and opportunities to work with experts in the scientific field. We believe that if we do this, all children will feel empowered and their life chances will increase AC+ resources are amended or scaffolded as needed to make them accessible to SEND and EAL pupils.

Local Context

We use our school environment; which includes woodlands, field and grassland to support our learning in science when appropriate. Our immediate local area (which includes Ferham Park) is used to support scientific fieldwork across key stages. We recognise that science occurs in all aspects of the world around us and through using these resources in our science teaching, we are building up the children's science capital. We supplement the AC+ Science curriculum with learning about Scientists of all Nationalities and genders to reflect and empower our diverse community.

strategies help children to make connections, or to find any gaps and re-teach content when needed. The Ark+ workbooks support this as knowledge-based retrieval quizzes are included at the start of each lesson.

Teacher Assessment

Children's understanding will be measured through specific focused activities such as those shared on the PSST website and through the use of retrieval strategies. The use of retrieval strategies such as quizzes will allow the class teacher to identify if children have transferred key knowledge to their long-term memory. Retrieval strategies, along with questioning, allow the teacher to gauge pupil understanding and address any misconceptions that may have arisen before moving on (Sherrington, 2020).

Links / References

https://arkonline.org/