SCIENCE POLICY 2022-2023

Science Subject Leader: Miss E Dodson

‘Somewhere, something incredible is waiting to be known’ -
Carl Sagan.

Curriculum Intent Statement

At Owston Park Primary Academy, we provide a bespoke, knowledge-rich curriculum with the purpose of increasing the quantity and quality of what our children know, enabling them to develop a wealth of knowledge and cultural capital to draw upon and build upon throughout their lives. We believe that children need to see how what they are learning is connected to a body of greater knowledge and that knowledge across those bodies is interchangeable. Children need to understand about concepts, and how these concepts inter-relate. Curriculum literacy requires understanding of the meaning, use and justification of curriculum concepts through respecting individual subject traditions. We have created a curriculum based on distributed practise and regular testing which provides coherence and helps knowledge to move into long-term memory, to become declarative and procedural. Through its structure, defined by details not by titles, children are supported to navigate their way through a meaningful, inter-related curriculum rather than one which is random, based on tenuous skills progressions. Our curriculum is about addressing social injustice so that our children leave us with a love of locality, happiness, dignity and strong emotional literacy. They will leave us with the keys to unlock the powers of the powerful. The national curriculum ‘provides children with an introduction to essential knowledge that they need to be educated citizens.’ It introduces pupils to the best that has been thought, said and done and helps engender and appreciation of human creativity and achievement. At Owston Park we are keen also to emphasise to children the way in which ‘the best that has been thought and said and done’ impacts upon their own life, today, living in North Doncaster. We have a clear idea of what knowledge, words and concepts we want children to learn in each subject. Crucially we also know where the ‘horizontal’ and ‘vertical’ links are. Vertical links are those links WITHIN a subject year to year (the concept of ‘empire’ for example, or ‘warfare’ or ‘colonisation’). Horizontal links are those links ACROSS subjects within a year group (such as linking the study of Romans with a study of Christianity, the concept of settlements, the design of villages, the concept of leadership, Roman artwork etc). The impact of our curriculum will be seen not only in measurable attainment and progress, but in that Owston Park Primary Academy’s students are confident, enthusiastic and curious young people, who are equipped with the knowledge and skills they need to live a purposeful and fulfilling life.

The Rose Learning Trust
TRANSFORMING FUTURES COLLABORATIVELY

Curriculum themes

Knowledge Rich

The basis of our curriculum is powerful knowledge – by teaching 'the best that has been thought, said and done', we open up our children's minds, ignite their curiosity and engender an appreciation of human creativity and achievement.

Key knowledge for each subject has been carefully considered by subject leaders alongside class teachers, and is codified in our bespoke Knowledge Organisers.

Evidence based

Our cumulative approach is rooted in neuroscience and educational research. We use regular retrieval practise to help to commit key knowledge to children's long term memory. 'Memory is the residue of thought' – the more we think about something, the more likely we are to remember it.

Our assessment reflects this, measuring the knowledge which children retain, so we can be confident that they've truly learnt it.

Cumulative and coherently sequenced

Children learn explicitly planned interconnected webs of carefully sequenced and discretely taught conceptual knowledge, which are revisited in subsequent contexts enabling children to build up networks of connected information as schema.

Discretely teaching conceptual knowledge means it becomes easier for children to add new information to existing schema, as new knowledge 'sticks' to prior knowledge.

Depth for all

All children receive quality first teaching. Content is not differentiated, so no knowledge is out of bounds for any child, because every student has an entitlement to access powerful knowledge which opens the door to a world beyond our own individual experiences.

New information is introduced in small steps, with lots of modelling and scaffolding, enabling children to build confidence. The culture at Owston Park celebrates mistakes and uses them as a teaching point.

Vocabulary Rich

Vocabulary is explicitly planned for and taught within each unit. Vocabulary is the key to unlocking and understanding the knowledge.

Discussion and structured learning conversations are a key feature of wider curriculum lessons.

Enrichment

Our topics provide the opportunity to bridge our children's cultural capital deficit through enrichment – educational visits, visitors into school and topic launches.

The substance of the knowledge taught inspires awe and wonder.

Community and Identity

Our curriculum is built on meaningful local links to encourage our children to celebrate our rich heritage.

Parents are invited in at least once per term for topic landings to celebrate children's learning.

Core skills developed

Topics are underpinned by a key text which draws upon and builds schema to help contextualise the key knowledge which children have learnt.

Opportunities for extended writing are built into the curriculum. There are high expectations of core skills across the curriculum.

Science Intent, Implementation and Impact

Intent	Implementation	Impact
To develop scientific knowledge and conceptual understanding through specific disciplines of biology, chemistry and physics.	• We have a clear and comprehensive coverage of science in line with the National Curriculum where teaching and learning show progression within the strands of Science. • Teachers develop knowledge organisers for each science topic where new learning, vocabulary and key knowledge/skills are clearly planned. Our Science concept map is used when planning to ensure that key concepts of biology, chemistry and physics are well covered and developed on.	Children will have a good understanding of key concepts in biology, physics and chemistry. Children's science curiosity will be strong and celebrated.
Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer specific questions about the world around them.	Children will use a range of resources to develop their knowledge and understanding that is integral to their learning and develop their understanding of working scientifically. Teaching of regular 'SNAP Science sessions' where children have opportunity to work on working scientifically skills, practice new learning, application of skills and problem solving questions regularly. We plan for problem solving and real life opportunities that enable children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills to discover the answers.	Children will be able to question ideas and reflect on knowledge. Children will be able to explain the process they have taken and be able to reason scientifically. Children will work collaboratively and practically to investigate and experiment. Children will have a wider variety of skills linked to both scientific knowledge and understanding, and scientific enquiry/investigative skills

To equip children with the scientific knowledge required to understand the uses and implications of science, today and for the future.	Science lessons are knowledge rich, and our bespoke curriculum has been carefully designed to provide opportunities for children to revisit and build upon their prior learning, through concepts – these concepts enable children to draw vertical links (learning linking to learning in a prior year group) and horizontal links (learning from other topics or other subjects within their year group). Vocabulary is explicitly taught in science to enable children to develop an understanding of key concepts, which are covered in multiple year groups to ensure prior knowledge is being built on. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning where possible in our Forest school. Through enrichment days, such as 'science week', we promote the profile of Science and allow time for the children to freely explore scientific topics. Children learn the possibilities for careers in science as they study famous scientists of today and the past.	Children will retain knowledge about relevant information. Children will have a rich bank of scientific specific vocabulary. Children will have high aspirations, which will see them through to further study, work and a successful adult life. Children will develop scientific skills which equip them to progress from their starting points, and use within their everyday lives. Children at Owston enjoy science and this results in motivated learners with sound scientific understanding.
Develop Core skills	• Science lessons provide opportunities for children to develop core skills - children are encouraged to use maths to record/ analyse data found in a variety of ways and writing skills are used to evaluate investigations. • Children are given feedback on language and literacy skills and expected to correct spelling, punctuation or grammar mistakes in green pen.	Children's science work reflects the same high expectations of core subject work. Children are proud of their work – this is reflected in their presentation and the quality of the written work.

To enable all children to receive the same quality of Science education, ensuring that children are supported where support is necessary and that all children are challenged and stretched within their learning.	In science, this looks like: • Setting tasks of increasing difficulty. Not all children complete all tasks, and additional resources are available to scaffold children's learning. • Using classroom assistants to support children individually or in groups. • Children may be taught in small groups for intervention, and vocabulary or keyinformation from knowledge organisers may be pre-taught to specific children for a keep up, not catch up approach. • Collaborative, group and paired work, which necessitates discussion is used, regularly, wherever possible. Mixed ability groupings, enabling children to learn from their peers and engage in high quality conversation.	A large proportion of children reach age related expectations in science. SEN children and children working towards year group expectations feel supported and enjoy science lessons. Data monitoring ensures children are targeted for intervention when not on track. Enrichment opportunities are subsidised for pupil premium and disadvantaged children.

THE FOUNDATION STAGE

Science is a significant part of the EYFS framework through 'The world' statements. Children use their discovery time to explore to world around them, ask questions and follow their natural curiosity to experiment and find their own answers.

At Owston EYFS children learn for one day per week in our Forest school. Throughout these sessions children learn how to care for living things and to look after the natural environment. Children complete activities such as planting and gardening. Children learn about the natural environment and make observations, they also compare this to other environments. Children are taught to ask questions and to 'explore' their curiosity through 'having a go' and taking risks. Children are given the opportunity to work

collaboratively to tests things out and find answers for themselves. Both Nursery and Reception classrooms are equipped with investigation areas. The resources in these areas are planned carefully to ensure children's early 'science' skills are developed. Enhancements are made to the EYFS environment regularly to spark children's natural curiosity, wonder and awe of the world. Children experience hands on learning in all seasons.

TIME ALLOCATION

One hour of science is taught per week with two SNAPPY science sessions.

PLANNING AND ASSESSMENT

The planning process at Owston Park Primary begins with the national curriculum and our curriculum drivers. From these, subject leaders alongside class teachers have worked together to develop knowledge organisers, which ensure that the key, knowledge is being taught rather than just 'doing' a subject. The knowledge organisers are then considered alongside the skills progressions and conceptual knowledge maps to create a series of coherently sequenced lessons to map out the learning journey for each topic. Our assessment system is based on low-stakes quizzing. Low-stakes quizzing is a regular part of our practice across the curriculum so children are familiar with the format, and are happy to have a go. Teachers build regular retrieval practice into each and every lesson in different forms, and use assessment for learning to deliver instruction tailored to the identified need. Children's learning journey throughout a topic culminates in an end piece. This is an opportunity for children to showcase their learning. This may then be used as part of the topic landing, e.g. by showcasing their end piece to parents. Formative assessment is an integral and continuous part of the teaching and learning process at Owston Park Primary and much of it is done informally as part of each teacher's day to day work. Teachers integrate the use of formative assessment strategies such as: effective questioning, clear learning objectives, the use of success criteria, effective feedback and response in their teaching and marking and observing children participating in activities to scaffold and challenge learning. Planning may be annotated and those who need more support can be identified on plans through use of A.F.L. Findings from these types of assessment are used to inform future planning.

MARKING & FEEDBACK

- Marking should always be focussed on the Learning Objective.
- Children are given opportunities to self-assess their learning against the Learning Challenge where possible, using the metacognition colours familiar to them.
- Feedback should perform 3 purposes; ensure children understand what they have done well; ensure children are clear about how to improve; ensure children make visible signs of improvement.

- Marking should always ‘close the gap’ and give an improvement suggestion; of which there are 4 types ○ a challenge prompt ○ a reminder prompt;
    ○ a scaffold prompt e.g. a questions or unfinished questions, steps to complete tasks ○ an example prompt
- Children to have opportunities to self and peer assess their work, when appropriate. This should be recorded.
- When the arrow icon is shown it indicates what the next step for the child will be or action to complete, either as a consolidation activity or an opportunity to extend learning.
- Wherever possible, the checking or marking of work will be done with the child who will be given the opportunity to ask questions and self-correct.

MONITORING AND SUBJECT LEADERSHIP RESPONSIBILITIES

The subject leader’s role is to empower colleagues to teach wider curriculum lessons to a high standard and support wider curriculum subject leaders in the following ways. Their role includes leading, managing, monitoring, motivating, training and guiding colleagues.

- Knowing the curriculum requirements of their subject throughout school, and using their knowledge of their subject to create road maps of the learning journey and assist teachers in developing knowledge organisers, ensuring that the content maintains fidelity with the national curriculum.
- Subject leaders monitor medium term plans and work alongside class teachers to ensure that pupils receive full coverage of the National Curriculum.
- Showcasing and raising the profile of their subject throughout school, e.g. through thematic days, displays etc.
- Monitoring their subject through book scrutinies, lesson observations, data analysis and pupil interviews to ensure comprehensive monitoring of wider curriculum subjects and to inform them of the quality of the wider curriculum provision across the school.
- Keeping up to date on current issues; disseminating relevant information and providing training for staff members (either directly or through other professionals).
- Identifying and acting on subject specific development needs of staff members with support from SLT - books are scrutinised by SLT throughout the term with a compliance check completed half termly and feedback is provided.
- Monitoring expectations, provision and attainment across the school and providing feedback to develop practice further in order to raise standards.
- Providing necessary equipment and maintaining it to a high standard, managing the subject budget effectively.

WIDER CURRICULUM NON-NEGOTIABLES

- Topic launches to be an exciting, awe-inspiring event to engage and excite children. The classroom environment should reflect the topic, and classroom entrances should advertise the topic being taught. Key vocabulary should be displayed within the classroom, as should resources which support key knowledge e.g. timelines, diagrams. Learning objectives and titles to be present in children's books. The title should contain a context. The learning challenge should be highlighted in the corresponding colour according to the metacognitive level achieved.
- Vocabulary should be explicitly taught within the lesson.
- Presentation expectations in wider curriculum lessons to mirror expectations in core subjects.