

Gillespie Primary School



Curriculum Intent, Implementation & Impact Science

Intent

At Gillespie, we share the ambition of the national curriculum to provide a high quality science education which provides the foundations for understanding the world through learning about biology, chemistry and physics. We encourage children to be inquisitive throughout their time at the school and beyond. The Science curriculum and additional science enrichment through our Lab_13 programme fosters a healthy curiosity in children about our universe and promotes respect for the living and the planet. We ensure that the Science curriculum teaches children to understand and use different types of science processes and methods of enquiries that help them to answer scientific questions about the world around them. Science encompasses the acquisition of knowledge, concepts, skills and helps prepare children for their future.

We share the aim of the national curriculum to ensure all pupils '*are equipped with the scientific knowledge required to understand the uses and implications of science today and for the future*'. To that end we have studied research evidence showing that:

- children and young people's perceptions of science are usually formed before they are 11 years old
- women, working class people and some ethnic minority groups are persistently under-represented in the fields of science, technology, engineering and maths (STEM) due to social inequalities and lack of opportunities within and beyond school science.

We actively address this by seeking to achieve greater equity by building science capital with all pupils and their families and by setting up pupil science leadership so that pupils have agency to apply their science skills and knowledge in different contexts relevant to their own lives. We want children to begin to associate themselves and engage with science beyond the classroom including with possible STEM careers.

Implementation

Our science curriculum is carefully designed to build on the educational programmes set out in the Statutory Framework for the Early Years Foundation Stage and delivered in the early years to teach our nursery and reception pupils the *understanding of the world* programme of study related to the *natural world*. In nursery and reception children experience opportunities to explore the natural world about them making observations and drawings of animals and plants and begin to learn about processes and changes in the natural world around them, including the seasons and changing states of matter.

In KS1 and KS2 children study the national curriculum programmes of study for each year group. Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each

year group. The key knowledge identified by each year group is informed by the national curriculum and builds towards identified phase end points in accordance with NC expectations. Key skills are also mapped for each year group and are progressive throughout the school. These ensure systematic progression to identified skills end points which are in accordance with the Working Scientifically expectations of the national curriculum. At Gillespie these are made explicit for all children.

The curriculum is designed to ensure that children are able to acquire key scientific knowledge through practical experiences; using equipment, conducting experiments, building arguments and explaining concepts confidently. The school's approach to science takes account of the school's own context, ensuring access to people with specialist expertise and places of scientific interest as part of the school's commitment to learning outside the classroom. Cross curricular opportunities are also identified, mapped and planned to ensure contextual relevance. Children are encouraged to ask questions and be curious about their surroundings and a love of science is nurtured through a whole school ethos and a varied science curriculum.

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all pupils are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following:

- Existing knowledge is checked at the beginning of each topic using a topic starter page, which looks at key vocabulary, what children know and what they would like to know. This ensures that teaching is informed by the children's starting points and that it takes account pupil voice, incorporating children's interests.
- In ensuring high standards of teaching and learning in science, we implement a curriculum that is progressive throughout the whole school. This ensures progression between year groups and guarantees topics are covered. Please read our *National Curriculum Science Overview* document and our school science scheme document on the curriculum overview and schemes of works page.
- Children are encouraged to ask their own questions and given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom.
- Teachers plan engaging lessons, using high-quality resources, such as Snap Science and ASE (Association for Science Education), to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess pupils regularly to identify those children with gaps in learning, so that all pupils keep up. Tasks are selected and designed to provide appropriate challenge to all learners, in line with the school's commitment to inclusion.
- Working Scientifically skills are embedded into lessons to ensure that skills are systematically developed throughout the children's school career and new

vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in keeping with the topics. Please read our *working scientifically whole school progression* document on the curriculum overview and schemes of works page.

- At the end of each topic, key knowledge is reviewed by the children and rigorously checked by the teacher and consolidated as necessary.

Additional Science Enrichment

Implementation of the national Curriculum is deepened, and enhanced by our Science enrichment programme led by our resident Scientist. Following studying action research on young people's Science and career aspirations from The Aspires survey by Kings College London (2013) and visiting schools in the Midlands who had developed the Lab_13 network; the school, governors and parents decided to raise funds to set up a designated science and technology classroom in our school in 2013. We recruited a part time Scientist in Residence to work with children across the school from 2014 onwards. Pupils are supported by the Scientist in Residence to take the lead through the formation of a student Management Committee. They take co-responsibility for helping to plan science enrichment. In Lab_13, pupils are involved in various ways. They work collaboratively to investigate answers to their own science questions; engage in enquiry-led, hands-on learning, within and beyond their usual Science lessons; undertake authentic scientific research; plan and participate in collaborative science events with families and pupils from participating schools; run in-school and after school science clubs and learn about STEM careers by engaging with STEM ambassadors in and out of school. Pupils present their work by communicating in a variety of ways with the wider community.

Impact

By the end of their schooling with us children have developed a love for learning about the scientific world and are curious and inspired to find out more about Science and relate it to their own lives and aspirations. They have gained a coherent body of knowledge and conceptual understanding about science through the study of the foundations of biology, physics and chemistry and are confident in understanding and using the processes and methods of scientific enquiry to explore and answer questions about the world around them. Pupils have developed a broad vocabulary of science which will enable them to articulate their understanding of taught concepts and are able to use a range of investigations and practical activities giving them a greater understanding of the concepts and knowledge of science. Children leave school equipped with the knowledge required to appreciate and understand science's contribution to all aspects of everyday life. Pupils have developed the skills, knowledge, understanding and the motivation to prepare them to successfully engage with Science disciplines at Secondary school.

Measuring Impact of Science learning and engagement

○ *Feedback in lessons*

Through careful questioning and assessment for learning strategies, teachers monitor pupils' understanding. Children receive instant feedback through individual, group or whole class feedback throughout lessons from teachers. Teachers use their assessments within lessons to help gauge the pace of the lesson, and if they need to provide any additional scaffolding or guidance. After the lesson, the teacher uses the outcomes of their instant feedback and assessment to help plan next steps in the teaching sequence over a unit of Science.

A focused assessment approach embeds assessment within classroom primary science activities across each term. It is a tool for both assessment for learning (formative assessment) and summative assessment. A focused assessment increases the validity of teacher judgments. Specific areas for children's development can be identified and subsequent teaching can take this into account; the assessment is formative. These focused assessments also contribute to an ongoing summative record of children's attainment in scientific enquiry.

○ *Monitoring of teaching and learning and work surveys by subject leaders and senior leaders*

> Termly detailed surveys of outcomes in pupil workbooks provides information about the progress and understanding of individual pupils and enables leaders to give quality feedback to teachers on the impact of their sequence of lessons and to plan INSET to secure whole school improvement .

Staff regularly moderate by sharing work in books focusing on outcomes and progression between year groups and within a year.

> Lesson observations provide insight into how effectively science knowledge, skills and concepts are taught to ensure all pupils are able to make progress. Individual feedback is given to support professional development and a summary of all lessons observed enables the staff team to share strengths and areas for development to secure improvement in the teaching and learning of Science

○ *Pupil Science /STEM attitude surveys*

We use pupil surveys to gauge pupil attitudes towards science and to find out pupil perspectives and experiences of science outside school .This informs how we plan science enrichment experiences and learning to impact positively on our aspiration to build up Science capital with our pupils. We now use *The Primary Science Capital Teaching Approach (PSCTA) capital survey* * as a reflective tool to improve and refine our approach to consulting with pupils about Science and Science related experiences.

* *PSCTA is based on action research carried out between 2019 -2021 based at University College London (UCL) and KINGs College London working in collaboration with primary teachers and funded by the Primary Science Teaching Trust and the Ogden Trust*

