



# Parklands Primary School

## Science Policy

### **1. Purpose of Policy**

Science is a core subject in the National Curriculum. This policy will form the basis upon which we map out the statutory orders for science across the primary phase. It will outline the purpose, nature and management of how science is taught and learnt in our school and will inform new teachers of expectations.

All staff are fully aware of their role in its implementation. Staff have access to the Policy via the school's server via the Staff Drive and it is also published on the school website

### **2. Curriculum Statement**

#### **Intent**

The National Curriculum states, '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.'

The national curriculum for science aims to ensure that all pupils:

- 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
- develop an enthusiasm and enjoyment of scientific learning and discovery
- develop the essential scientific enquiry skills to deepen their scientific knowledge

At Parklands Primary School, we recognise the importance of science as a core subject, and we give the teaching and learning of the subject the prominence it requires. The scientific area of learning is concerned with increasing pupils' knowledge and understanding of our world and with developing skills associated with science as a process of enquiry. Science at Parklands develops the natural curiosity of the child and allows them to ask and answer challenging questions and successfully carry out investigations.

The National Curriculum provides a structure and skills development for the science curriculum being taught throughout the school, which, where possible, links to learning across a range of

subjects to allow for a depth of learning. Additional opportunities are provided in science through our enrichment activities and partnership with a leading science specialist school – Royal Liberty.

We endeavour to ensure that the science curriculum we provide will give children the confidence and motivation to continue to further develop their skills into the next stage of their education and life experiences.

## **Implementation**

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:

- Science is taught in planned and arranged topic blocks, using the National Curriculum to provide a structure and skills development for science being taught. Where possible, links to learning across a range of subjects are used to enable the achievement of a greater depth of knowledge. In KS1, science is linked to a theme and science lessons are taught discreetly within that theme.
- In the EYFS, continuous provision is in place to support children in meeting the Early Learning Goals; this is covered through the year, based on themes, children's interests and the time of the year.
- Existing knowledge is checked at the beginning of each topic, asking children what they already know. This ensures that teaching is informed by the children's starting points and allows teachers to adapt planning if current understanding does not align with the learning progression document.
- Through our planning, we involve problem solving opportunities that allow children to apply their knowledge, and find out answers for themselves. Children are encouraged to ask their own questions and are given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom.
- The delivery of science aims to be engaging, often involving high-quality resources 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 make sufficient progress and are prepared for their next stage of learning. Tasks are selected and designed to provide appropriate challenge to all learners, in line with the school's commitment to inclusion.
- To support the retention of knowledge, children are provided with a knowledge organiser at the beginning of every unit which is engaged with regularly during the course of a topic.
- In KS1, teachers have access to a range of questions to ask their children based on their knowledge organiser to support retention of key knowledge; these questions are engaged with throughout a topic studied.
- We build upon the knowledge and skill development of the previous years. As the children's knowledge and understanding increases, they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.
- 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.

- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and workshops with experts.
- Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum; these are purposeful and link with the knowledge being taught in class.
- We have established a partnership with a leading science specialist school – Royal Liberty – who help to inspire children's curiosity in the subject and support the primary to secondary transition.
- Regular events, such as Science Week, allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills.
- At the end of each topic, key knowledge is reviewed by the children and rigorously checked by the teacher and consolidated as necessary.

### **Impact**

The successful approach at Parklands Primary results in a fun, engaging, high-quality science education, that provides children with the foundations and knowledge for understanding the world and supports their future learning. Frequent, continuous and progressive learning outside the classroom is embedded throughout the science curriculum. Through various workshops, trips and interactions with experts, children have the understanding that science has changed our lives and that it is vital to the world's future prosperity. Children at Parklands Primary enjoy science and this results in motivated learners with sound scientific understanding.

### **3. Teaching and Learning**

The science curriculum is mapped to ensure alignment with the National Curriculum content and programme of study. Key knowledge relates directly and builds towards the achievement of end of phase (KS1, Lower KS2 and Upper KS2) 'end points', informed by the National Curriculum statements. Key skills are also mapped so that these are developed systematically and align directly to the specified working scientifically statements as outlined in the National Curriculum for each phase.

A working wall is used to support and celebrate learning throughout each unit of work. This will also be used to support the acquisition of key knowledge and will support the accurate use of an extended specialist vocabulary. To ensure a common ethos in the teaching and learning of science, staff and children were involved in the creation of the Parklands' Science Principles:

#### Science is good when:

- We are given the responsibility and independence to lead our own investigations
- We ask questions and work together to discover the answers
- We accumulate scientific knowledge and develop our conceptual understanding through a range of scientific enquiries

- We are involved in creating and carrying out investigations and can share and explain our ideas and conclusions
- We apply our 'working scientifically' skills to solve problems, explore and investigate
- We are able to link our learning to the real world and are provided with a sense of purpose
- We build on our prior learning, enabling us to progress and develop our scientific knowledge further
- Our learning is enhanced through the outdoors, specialist visitors and access to high-quality resources

Posters are on display on the working wall in science and referred to throughout the coverage of each science topic.

To ensure excellence across the school in the teaching and learning of science:

- Children are encouraged to ask their own questions and are given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom.
- Teachers ask a range of questions which enable all children to take part, listening carefully to answers and taking learning forward, using open and closed questions and allowing children time to think.
- Short-term plans strive for engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Schemes such as Rising Stars, Hamilton and Twinkl are drawn upon and adapted to ensure learning is accessible for all pupils.
- 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 make good progress. Gap analysis is undertaken to fill any gaps in learning
- New vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
- Working scientifically skills are embedded into lessons and these focus on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils are given opportunity to seek answers to questions through collecting, analysing and presenting data.
- The key knowledge for each topic and across each year group is mapped across the school and checked at the end of each science topic.
- Teachers demonstrate how to use scientific equipment, and the various working scientifically skills in order to embed scientific understanding.
- Teachers find opportunities to develop children's understanding through learning outside the classroom.

- Science lessons provide a quality and variety of subject specific language to enable the development of children's confident and accurate use of scientific vocabulary and their ability to articulate scientific concepts clearly and precisely. Children are encouraged and assisted in making their thinking clear, both to themselves and others, and teachers ensure that pupils build secure foundations by using discussion to probe and address their misconceptions.

#### **4. Assessment**

As part of the introduction to each new science topic, teachers review what the children know already. This informs the programme of study so that it takes account of children's starting points.

Lessons are planned to ensure that key knowledge is developed over time, over the course of each science block and in a progressive sequence. Key knowledge is reviewed by the children and rigorously checked and consolidated by the teacher at the end of each unit of work.

Lessons within each unit are also planned to ensure the systematic development of the key identified skills across the school.

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge.

Teachers provide children with effective feedback, both orally and written, in relation to the aim of the lesson. Work in books is marked weekly with a comment. Marking indicates whether the child has gained a shallow or secure understanding in regards to the lesson objective. Where misconceptions arise, these are addressed by the teacher. Accurate spelling of topical vocabulary is also identified in books.

Ongoing assessment also includes:

- Observing children at work, individually, in pairs, in a group, and in classes
- Questioning, talking and listening to children
- Considering work/materials/ investigations produced by children together with discussion about this with them
- Retrieval quizzing
- Target Tracker is used to record children's progress. Statements are updated on a weekly basis, both in relation to the knowledge and skills pupils have acquired in lessons; pupil steps are updated termly to document pupil progress.

In EYFS, we assess the children's Understanding of the World according to the Development Matters statements.

## **5. Planning and Resources**

In EYFS and KS1 planning is completed by the phase leaders and reviewed and adapted by the subject leader and class teachers. In KS2, planning is undertaken by the science subject leader and adapted by class teachers to meet the needs of their children. 'Planning Matrices' are used to inform lesson content, specialist vocabulary and key knowledge and to ensure an appropriate emphasis on skills through practical experiences and approaches.

Teachers also have access to a schemes of work such as Rising Stars and Hamilton trust to inform planning and lesson design; these schemes are available for adaptation.

Key knowledge and skills, in line with the National Curriculum are mapped on the whole school 'Science Knowledge and Skills Progression Map' and this shows the key knowledge and skills of each unit and how they build through the school. The school's own context is also considered and opportunities for learning outside the classroom, including the use of specific school resources (such as the quad area), are included on plans. Cross curricular links are also mapped to further support the contextual relevance of the science curriculum.

High-quality science resources to support the teaching of all units and topics from EYFS to Year 6, are used consistently and maintained by the subject leader. These are kept in the science cupboard and are labelled and easily accessible to all staff. As well as these, the EYFS classes have a range of resources for easy access to children during exploration. The library contains a rich and varied supply of science topic books to support children's individual research and all classes have access to these during their weekly allocated library slot.

## **6. Organisation**

Within the academic year, children study science in blocks, as outlined in the overall curriculum framework overview.

In KS2, children enhance their scientific knowledge and develop working scientifically skills through focused lessons (1.5 hours weekly) throughout the duration of each block.

In KS1, science is linked to a theme and lessons are taught discreetly within that theme.

This model promotes the achievement of a greater depth of understanding by the end of a unit.

## **7. EYFS**

The teaching of science in EYFS is in accordance with the EYFS national framework. Children are guided to make sense of their physical world and community through opportunities to explore, observe and find out about people, places, technology and the environment. They are assessed according to the Development Matters attainment targets.

## **8. KS1 and KS2**

### **Key Stage One:**

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. At Parklands, children are encouraged to be curious and ask questions about what they notice. Their understanding of scientific ideas is supported through the use of different types of scientific enquiry so that children can answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. Children are supported to begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways, including wider school forums such as science week. Most of the learning about science is done through first-hand practical experiences, and children are also to begin to use appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the National Curriculum programme of study, but is always taught through and clearly related to the teaching of substantive science content in the programme of study. The knowledge and skills progression maps outline how the specific skills of each unit progressively build between years and towards the overarching 'end point statements'. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Opportunities are provided for the children to read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

### **Lower Key Stage Two:**

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. Children are encouraged and supported to ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

As in KS1, 'Working scientifically' is described separately in the National Curriculum programme of study, but is always taught through and clearly related to the teaching of substantive science content in the programme of study. The knowledge and skills progression maps outline how the specific skills of each unit progressively build between years and towards the overarching 'end point statements'. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Opportunities are provided for the

children to read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

### **Upper Key Stage Two:**

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. At Parklands, children do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. Children are also supported to begin to recognise that scientific ideas change and develop over time. The school curriculum provides opportunities for children to select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Children learn to draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Opportunities are provided for the children to read, spell and pronounce scientific vocabulary correctly.

### **9. Equal Opportunities**

At Parklands Primary School, we are committed to providing a teaching environment which ensures all children are provided with the same learning opportunities regardless of social class, gender, culture, race, special educational need or disability. Teachers use a range of strategies to ensure inclusion and also to maintain a positive ethos where children demonstrate positive attitudes towards others.

### **10. Inclusion**

Science teaching considers the needs of different individuals and groups for learners and tasks are designed and differentiated as appropriate to ensure an appropriate level of challenge. Supporting adults are also deployed effectively to ensure focussed support where this is necessary.

Teachers use a range of inclusion strategies, including paired work, open questions and direct, differentiated questioning and the activation of prior knowledge and contextual learning. This support the inclusion and motivation of all learners ensuring that optimum progress is made throughout each part of the lesson.

### **11. Role of the Subject Leader**



- The subject leader's responsibilities are:
- To ensure the high profile of the subject and provide a strategic lead and direction for science in the school.
- To maintain and ensure use of the central supply of science resources, in accordance with those specific to each year group and topic
- To support colleagues in their teaching of science and support the CPD of others
- To ensure progression of the key knowledge and skills identified within each unit and that these are integral to the programme of study and secure at the end of each age phase.
- To monitor books and ensure that key knowledge is evidenced in outcomes.
- To monitor planning and oversee the teaching of science
- To lead further improvement in and development of the subject as informed by effective subject overview
- To ensure that the science curriculum enables the progress and raises the attainment of all pupils, including those who are disadvantaged or have low attainment
- To ensure that approaches are informed by and in line with current identified good practice and pedagogy; to attend regular opportunities for CPD, including borough forums.
- To establish and maintain existing links with external agencies and individuals with specialist expertise to enrich teaching and learning in science.
- To organise an annual whole-school science week, in accordance with the national theme, ensuring a focus on practical and investigative activities.

## **12. Health and Safety**

Teachers should be following the Parkland Primary School's health and safety policy in lessons that require children to handle items such as:

- batteries
- wires
- glass
- lights/torches
- sharp objects
- magnets
- liquids and food-based items that include but are not limited to – oil, vinegar, rice, bicarbonate soda and ice

Teachers need to ensure that children are aware and prepared for any potential risks. Teachers will be required to undertake a CPD course on the Reach Out CPD website yearly. Additionally, a copy of 'Health and Safety in School Science and Technology for Teachers of 3-12 Year Olds' by The Association for Science Education will be available to teachers to consult throughout of the school year.

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