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Park Hill Primary School

SCIENCE POLICY

ETHOS

Science is a body of knowledge which is built up through experimental testing and modelling. At Park Hill we endeavour to build on children's naturally enquiring minds about the world around them. Hence, we place equal emphasis on extending knowledge and understanding, building a repertoire of scientific vocabulary, whilst continuing to feed curiosity and a sense of wonder. Children's prior knowledge and perceptions are pivotal to the science curriculum and the starting point of a learning cycle. Furthermore, we believe providing children with high quality direct experiences instil a greater degree of confidence, thereby equipping them to revise or refine their understanding. This approach is all underpinned by a systematic learning cycle which incorporates the rigour and protocol practised by the greater scientific community. We appreciate that children arrive with wide ranging levels of knowledge, technical language and exposure to scientific concepts. However, we strongly believe that all children are able to reach their full potential when provided with a curriculum that is imaginative, purposeful and disciplined and children are offered the appropriate degree of support or challenge in a sensitive manner. We also recognise that the practical aspect of science engages learners at many levels and hence strive to include elements such as play activities, observation and direct practical experience wherever possible. This multi-faceted approach enables all pupils, from the very young to pupils about to those about to embark on Key Stage 3 curriculum, to develop the confidence, competence and enthusiasm across a wide range of scientific concepts.

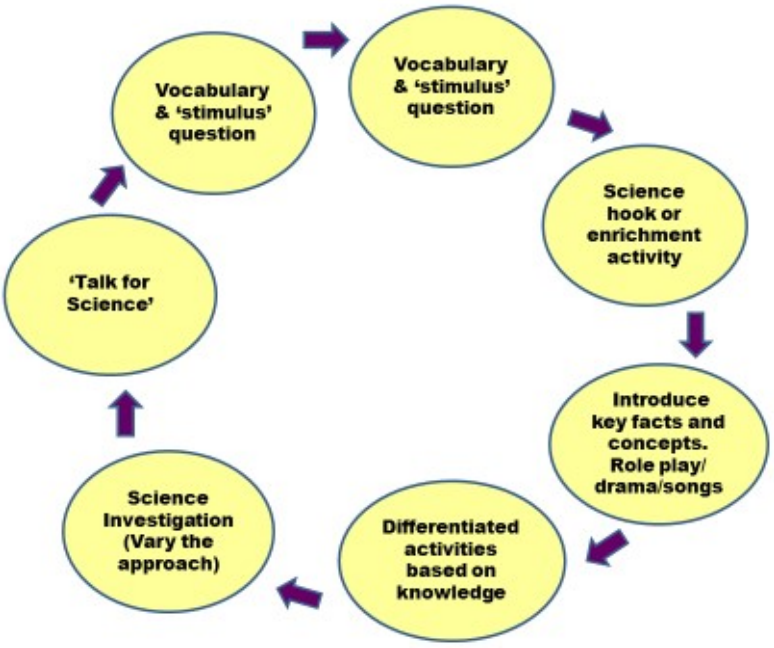
AIMS AND PURPOSES

This will be achieved by:

- giving pupils a progressive knowledge and understanding of scientific concepts and processes
- encourage children to hypothesise and to find ways to test their evidence
- helping pupils to acquire scientific enquiry skills involving, meticulous observation and the design of fair investigations,
- establishing an understanding of science skills in real contexts by the reading and construction of graphs, diagrams, charts and tables using accurate measurements and observations
- to draw conclusions through critical reasoning
- encouraging imaginative and logical learners
- providing interest and enjoyment in a stimulating environment whilst seeking to extend their source of enquiry
- to retaining and developing their natural sense of curiosity about the world around them
- encourage children to work co-operatively and collaboratively, developing children's confidence to communicate ideas.
- promoting cross-curricular ties thus developing a broader knowledge base and appreciation of the wider implications of science.

TEACHING AND LEARNING

Pupils undertake some science activity every week at all key stages and is allocated ten per cent of the taught time. In order to maintain continuity and progression over the key stages, Years 1 to 6 follow a learning cycle (see diagram below); the science cycle ensures all children have consistent access to high quality teaching in conjunction with scientific rigour, excellence and enjoyment. Each new topic commences with the introduction of key vocabulary, in order to ascertain prior knowledge and enable pupils to demonstrate concepts in a personalised manner. Additionally, it gives pupils the opportunity to demonstrate their grasp of scientific language by writing a definition. Following on from these individualised representations, pupils are presented with an enrichment activity or 'hook' designed to stimulate children's curiosity and engage enthusiasm. Furthermore this also serves to allow pupils to reflect and consolidate real experiences they may have encountered. A series of lessons then follow that involve delivering the concepts via explanations and the modelling of theories. The activities linked to these sessions are specifically selected or adapted to maximise a deeper understanding. All topics include an age-appropriate investigative element where children are required to carry out experiments linked to the current area of learning. For each investigations the scientific skills focal point vary, however over the academic year all areas are covered. The learning cycle comes to a conclusion by pupils producing a written piece about the concepts covered, an age-appropriate graph and a review of the key vocabulary covered in the unit of work. Hence, whereby pupils are able to demonstrate concisely and effectively their learning journey by demonstrating a richer understanding of the concepts and associated vocabulary. It also serves as an opportunity for pupils to self-assess their learning as well as acting as a means to inform end of term assessments.



Cross-Curricular Links

In order to promote an understanding of science in the broadest sense, units of work have been correlated, where possible, to the curriculum topics. Thus enabling pupils to develop a greater appreciation of the wider implications of scientific principles and allow more scope for a deeper interrogation of the knowledge and content, thereby providing opportunities to extend and consolidate core scientific principles.

YEAR	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
1 Topic Units	Myself & my family	Where we live	Our School & Moseley	Toys	Louisa Ryland & Cannon Hill Park	Planting growing	The United Kingdom	Weather Observe	Seaside
Science Units	The Body & Senses	The Body & Senses	Identifying trees and plants, birds & mammals	Properties of Materials	Structure of plants	Structure of plants	Naming common herbivores, omnivores and carnivores	Weather Change	Weather Change
2 Topic Units	Katie Morag & Gregory Cool	Bonfire Night	Joseph Chamberain	Seacole & Parks	Plants	Columbus and Armstrong	Edgbaston
Science Units	Healthy Life & Humans	Properties of Materials	Properties of materials	Habitats, life cycles and plants	Habitats, life cycles and plants.	Seasonal Change	Seasonal Changes
3 Topic Units	Light & Celebrations	Places and weather around the world.	Stone Age to the Iron Age	Health For Life	Plants	The UK & Europe	The Roman Empire and Its Impact on Britain
Science Units	Light and Shadows	Identifying Plants: growth, water transports and seed dispersal	Rocks, soils and Fossils	Growing Plants	Growing Plants	Skeletons & muscles	Magnets
4 Topic Units	Anglo-Saxons and the Scots	The Vikings to Edward the Confessor.	Local Fieldwork study compare with France and North/South America	Ancient Egypt	Water/Rivers and Water Conservation
Science Units	Sound & Electricity	Reversible and irreversible changes	Variation & Habitat	Teeth	Human body and the digestive	Evaporation and Condensation

					system	Linked to the water cycle
5 Topic Units	Bournville – Economy, land use and trade links	Second World War	The environment, energy uses and conservation	Programming Robots	Ancient Greece	
Science Units	Separating solids , liquids and gases	Properties of materials: thermal insulators and conductors	Life cycles: plants and humans Earth and Space	Gravity Air resistance and Friction	Pulleys levers and gears	
6 Topic Units	The impact of the railways on local and national life	Study Of Baghdad	SATS Revision	Kensuke's Kingdom		
Science Units	Habitat, adaptation and classification/keys (including micro-organisms)	Diet, exercise and functions of the heart.		Light and shadows Circuits	Fossils	

Early Years Foundation Stage

Children entering school will be expected, by the end of their Reception year, to have made a good level of development in prime areas of learning. (Language and communication, Physical development and Personal, social and emotional development) As all the areas of learning and development in the foundation stage are inter-connected developing skills in these areas will also enable children to become more competent in the sub strata of the Prime Areas of Learning, which is the Four Specific Areas. The scientific element of the foundation curriculum is specified in Understanding the World and specifically comes under the Four Prime Areas of Learning. Understanding the World promotes learning through purposeful play and engaging in science activities. Children begin to make sense of the world and the community, to find out about people, places, technology and the environment. This area of the Foundation Stage also prepares children for scientific learning in Key Stage 1 and is consistent with the learning cycles and methodical approach to investigation further up the school.

Key Stage 1 and 2

At Key Stage 1 and 2 the programmes of study set out what the children should be taught; the corresponding attainment targets set out the expected standards for knowledge, skills and understanding that children are expected to have reached by the end of each key stage. Working Scientifically is taught through context taken from the other three programmes of study. Children will be learning about:

- 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 practical activity
- be equipped with the scientific knowledge required to understand its uses and implications today and for the future

The following areas are covered by the end of the **Key Stage 1**:

● Working scientifically by using simple equipment and perform simple tests
● Animals including humans, plants and living things and their habitats
● Everyday material and uses of everyday materials

The work covered in Key Stage 1 builds on the Curriculum Guidance for the Foundation Stage and the Prime Areas of Learning and the World around Us. Pupils go on to observe, explore and ask questions about living things, materials and a curiosity about the world around them. They begin to work together to collect evidence to help them answer questions and to link this to simple scientific ideas. They begin to evaluate evidence and consider its implications. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave and analyse causes. They use reference materials to find out more about scientific ideas. They share ideas and communicate them using scientific language, drawings, charts and tables with the help of ICT as appropriate.

The following areas are covered by the end of the **Key Stage 2**:

● Working scientifically by using simple equipment and perform simple tests
● Animals including humans, plants and living things and their habitats
● States of Matter and Properties and Changes of Materials
● Electricity, Forces and Magnets, Light, Sound and Earth and Space
● Evolution and inheritance

Pupils learn about a wider range of living things, materials and physical phenomena in Key Stage 2. They make links between ideas and explain things using simple models and theories. In addition to this, they apply their knowledge and understanding of scientific ideas to familiar phenomena, everyday things and their personal health. They think about the effects of scientific and technological developments on the environment and in other contexts. They carry out more systematic investigations, working on their own and with others. They use a range of reference sources in their work. They talk about their work and its significance, using a wide range of scientific language, conventional diagrams, charts, graphs and ICT to communicate their ideas.

Planning

Science is planned through long, medium and short term planning. Long term planning is an overview of the key stage, whereas the medium term focuses on learning outcomes, development of key skills and assessments. The short term planning is carried out on a weekly basis and considers specific learning outcomes, differentiation and organisation of activities and evaluation of the work.

A variety of teaching and learning styles are employed in science lessons with the principle aim of developing children's knowledge, skills, and understanding. Cross curricular skills are heavily encouraged and so pupils have the opportunity to use a variety of data, such as statistics, graphs, pictures, and photographs. The ICT programs offer the children the opportunity to manipulate experimental conditions

and explore the outcomes, particularly when there are practical limitations such as equipment required. Hence ICT is present in lessons when it is deemed that it will enhance learning. At least one thorough investigation for each topic is to be taught.

Science lessons will include some or all of the following:

- whole class teaching
- group activities/tasks
- enquiry based research activities
- asking and answering questions
- paired tasks (working with a partner)
- talking partners
- role-play/hot seating
- ICT activities
- discussions
- formal written tasks
- teacher demonstration
- supported and independent activities
- different stimuli to initiate questions and investigations
- Talk For Science
- planned progression of skills appropriate to age and ability of pupils
- sufficient practice and consolidation in a variety of contexts
- the provision of frequent opportunities for pupils to make choices and take decisions collaboratively and independently.
- a focus on the development of specific skills: observing over time, looking for patterns and relationships, identifying and classifying things, comparative and fair testing and researching and using secondary resources.

Assessment and Recording

Science is assessed at the end of each term for Years 1 to 6 Y6 through teacher evaluations. Information is collated from several sources in order to make rounded allocations of individual pupil including: looking at and marking pupils' work, setting assessment tasks that incorporate investigations and end of topic mind maps. In order to make judgements that accurately reflect pupils' ability, teachers are also provided with end of unit expectations which provide descriptions of achievement and current levels within each unit. A more formal assessment is given to Years 3 to 5 the end of the year. Year 6 will sit formal SATS testing, if selected as part of sample schools moderation process, alternatively pupils will partake in the internal

assessment program. Information regarding levels is formally passed on to the next teacher at the end of the year. The children are also involved in assessing their own learning and that of their peers by commenting upon the end of unit mind maps. Thereby developing pupils' knowledge of the curriculum and engenders a positive attitude to learning. Individual pupil progress is tracked using the data tracking system. This highlights children who are at expected standards, as well as those children exceeding or not meeting national expectations.

Differentiation

Due consideration must also be given to the diversity of ability within a class. A range of experiments must be provided to ensure the fullest involvement of the whole class that encourage the less able and fully challenge the more able. In order to match the work contained within the science curriculum to children's previous experiences and ability differentiation is evident by:

- TASK: different numbers of tasks can be set, relating to one science objective or one task provided with support and materials available to challenge, extend or support learning.
- OUTCOME: open ended activities or science investigations are provided to allow children to show their ability and understanding by the results achieved.
- ORGANISATION: children may work in mixed or similar ability groups/pairs to support and extend learning.
- ADULT SUPPORT: children are given a different level of support from the teacher, L.S.A. or other adults in the classroom.

The Learning Environment

Science is one of the core subjects and it is therefore expected that all the classes should have a display area related to the current topic via some of the following:

- an active learning environment
- examples of pupils' work.
- Scientific vocabularies linked to the topic
- Questions to be used in order to raise children's comprehension skills as well as inquisitiveness
- annotated fair planning template linked to the most recent investigation work

ROLE OF THE SUBJECT LEADER

Take the lead in policy development and help in the production of schemes of work designed to ensure progression and continuity in science throughout the school. Support colleagues in their development of detailed work plans, their implementation of the scheme of work and in assessment and record keeping activities. Monitor progress in science and advise the head teacher on action needed. Take responsibility for the purpose and organisation of central resources for science and stimulating their use; keep up-to-date with developments in science education and disseminate information to colleagues as appropriate.

To promote high standards of teaching and learning; to oversee the general planning of science schemes of work; to have a pivotal role in supporting and guiding staff; to scrutinise standards of pupils' work; to monitor and evaluate pupil achievement; to write and review the Science Action Plan; manage science

budget allocation to maintain resources; audit resources for science; use monitoring techniques to ensure science progression and standards; the formation of schemes of work