

HAREWOOD PRIMARY SCHOOL

SCIENCE POLICY

SEPTEMBER 2019

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1. Curriculum Statement

The 2014 National Curriculum for Science aims to ensure that all children:

- 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 skills required to understand the uses and implications of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this

At Harewood, we understand that children are naturally curious and we encourage this inquisitive nature throughout their time with us. Science promotes a healthy curiosity in children about our universe and promotes respect for the living and non-living. We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. Through the programmes of study in the National Curriculum science document children will acquire and develop these skills throughout their primary years. We ensure that the Working Scientifically skills are built-on and developed each year so that they can use equipment, conduct experiments, solve enquiries and explain concepts confidently and continue to ask questions and be curious about their surroundings.

We aim:

- to encourage children's scientific interest and curiosity about the world around them.
- to build on the child's own experiences of everyday life and provide children with a wide variety of scientific experiences.
- to provide children with the knowledge and skills to develop a scientific way of thinking.
- to develop an awareness of scientific language and concepts.
- to ask questions, carry out investigations and to confidently and safely experiment with scientific equipment and materials.
- to use IT to support their investigations.
- to interpret findings critically and draw conclusions.

Implementation

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

- In Foundation Stage Knowledge and Understanding of the World is delivered in small group sessions every week using creative practical experiences and promoting knowledge of the world around them. Children are provided with indoor and outdoor learning experiences and practical tasks linked to knowledge of the world around them.
- Science is taught in planned and arranged topic blocks by the class teacher (usually 1 or 2 weeks), to allow opportunities for cross-curricular links, creative learning and planning of stimulating trips for topics. This strategy also enables the achievement of a greater depth of knowledge.
- Through our planning, we set learning enquiries that allow children to find out for themselves as the topic is taught. Children are encouraged to ask their own questions and given opportunities to use their scientific skills and research to discover the answers. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills. A homework task is also set to allow opportunities for children to research and explore the topic further.
- We build upon the learning and skill development of the previous years. Children are given opportunities at the beginning of a topic to recap what they already know from previous learning. Pupils are also able to demonstrate what they know after the new learning has been taught, using a pupil voice tool. Children are encouraged to articulate what they know and demonstrate their knowledge and understanding.
- Promoting knowledge and understanding of a topic allows the pupils to become more proficient in selecting, using scientific equipment, collating and interpreting results throughout their time at Harewood. They become increasingly confident in their growing ability to come to conclusions based on real evidence and practical results.
- In investigative work, there is a framework for recording outcomes. The basic framework will include Question/Hypothesis, Prediction, Method, Results and Conclusion. Teachers can choose to design an alternative framework if it is more appropriate to a particular lesson.
- 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 opportunities and planning trips. This allows opportunities for children to explore the depth of knowledge that they have received in the classroom and apply it to the world around them. Pupils are encouraged to talk about their experiences and relate it to the knowledge they have gained in classroom sessions.

- Across the key stages visits are to be encouraged to enhance the teaching of the topics and develop community cohesion. Small groups of children regularly visit the local and wider community to enable them to experience science first hand.
- Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the years they are at Harewood. New vocabulary and challenging concepts are introduced through direct teaching, online teaching tools and the use of knowledge organisers. These are developed through the years, in-keeping with the topics.

Impact

This successful approach at Harewood results in a fun, engaging, stimulating, high-quality science education, that provides children with the foundations for understanding the world. Our children learn through varied and first hand experiences of the world around them. Science lends itself to outdoor learning, so we maximize the opportunities for children to experience this. This is carried out through various trips and planned outdoor experiences in school and their local environment. Children understand that investigating and exploring results in finding answers and solutions. Children develop knowledge and understanding of topics and build up a bank of scientific vocabulary. Children have the understanding that science has changed our lives and that it is vital to the world's future prosperity. They are enthusiastic about the impact that science has on the world they live in. Children are aware that scientists contribute to discovering, investigating and solving problems, which lead to global outcomes such as saving the environment and the animals which live in it. Children learn the possibilities for careers and the advancement of knowledge in science at Key Stage Two, through our links with professionals at other organisations. Children at Harewood enjoy science and the engaging, creative curriculum provided. This results in motivated learners who are keen to explore, investigate, solve enquiries and gain knowledge through the variety of opportunities they receive at Harewood.

2. Teaching and Learning

Science principles at Harewood are informed by staff and pupil voice.

Pupil Voice

Q1. What do you enjoy most about science?

When we go on trips which allow us to gain more knowledge and see examples of what we have been learning about in the outside world.

Working together to discover the answers and see if our predictions were correct.

Q2. What enhances your learning?

When we have outdoor learning opportunities and explore.

Watching science clips on TigTag (learning resource).

Carrying out investigations with access to good equipment.

Q3. When do you ask questions and share what you know?

We ask questions at the beginning of a topic and work together to discover the answers.

We are involved in making predictions, carrying out investigations and can share and explain our ideas and conclusions.

We share what we know using the pupil voice section at the end of our topic.

Teacher's Overview

Children are encouraged to ask their own questions and be 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.

Planning involves teachers creating engaging lessons, 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 children regularly to identify those children with gaps in learning, so that all children keep up.

New vocabulary and challenging concepts are introduced through direct teaching and through knowledge organisers.

This is developed through the years, in-keeping with the topics.

Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career.

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 by accessing outdoor learning.

The teaching of science is organised in blocks. This promotes depth in the teaching and learning of each science topic throughout the course of each topic block. Science lessons focus on the key features of scientific enquiry, so that children 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. Children are given opportunities to seek answers to questions through collecting, analysing and presenting their findings. Pupils are given an opportunity to share what they know at the end of each topic using a pupil voice section in their workbooks. The programme of study takes account of the children's prior knowledge, understanding and interests. This strategy also ensures that misconceptions are quickly identified and addressed within the teaching sequence. Assessment and review take place throughout the topic and the pupil voice is used to conclude each science topic block. At Harewood, teachers ensure that the quality and variety of language that children hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. Teachers use cross-curricular approaches to ensure that children are able to link the subject to their own experiences. Children are also provided with opportunities to apply their mathematical knowledge to their understanding of science by, for example, collecting, presenting and analysing data.

3. Assessment

Children's progress is continually monitored throughout their time at Harewood Primary School and is used to inform future teaching and learning. By the end of each key stage, children 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 expect to draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge. Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the success criteria. Children are guided towards achievement of the main objective through the use of learning enquiries and progression statements, provided by and explained by the teacher. Children will have learning outcomes and progression statements to refer to in the lesson, where they will be evident in their books and used to identify areas of difficulty by children and teachers when reviewing and assessing work. Assessment for learning is continuous throughout the planning, teaching and learning cycle. Pupil self-assessment and peer review are important aspects of our assessment policy. Opportunities are provided for children to share their learning with peers.

However children are more formally assessed half termly in KS1 and KS2 using a variety of methods:-

- 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.
- Class-based end of unit assessment tests that teachers may wish to create.
- Pupil Voice- What do you know?
- In Key Stage One, teacher assessment of the areas covered is recorded on an assessment for curriculum subjects spreadsheet.
- In Early Years, Knowledge and Understanding of the World experiences are recorded using I-pads 2buildaprofile programs and used to assess their learning against the EYFS profile.

4. Planning and Resources

Planning is a process in which all teachers are involved. Planning should be done in year group teams. All teachers should keep a copy of the long term plan and weekly planning in their files. Teachers try whenever possible to link concepts from within different subjects to give them meaning in a wider context. Cross-curricular links are identified on the long term plan for English, Maths, Creative Arts and Expressive Arts where possible.

We use the “Not As We Know It” Science scheme of work by Clive Davies (Focus Education). This was introduced with the change in curriculum for primary science as a basis for planning.. Teachers are using learning enquiries and create plans to cover the learning challenges and show progression of learning across each topic. Teachers have access of the progression statements across the years in order to consolidate previous learning and teach new content. Teachers also have access to TigTag which Harewood subscribes to. Teachers use this resource to enhance their planning and teaching.

For good science learning to occur, evidence of the following should be carried out in classrooms:

- Children being encouraged to ask questions and discussing their work and ideas.
- Children devising and conducting their own investigations within the context of the relevant curriculum content, but also given the opportunities to develop their working scientifically skills.
- Children recording their findings in a variety of ways.
- Children showing enjoyment in the activities they are undertaking.
- Cross curricular approaches to science.
- Use of ICT to enhance the learning.

We have sufficient, high-quality science resources to aid and support the teaching of all units and topics taught, from EYFS to Y6. We keep these in year group storage boxes, where they

are labelled with resources specific to their topics and easily accessible to all staff. EYFS have a range of resources kept in classes, for simple access for children during exploration. The library contains a good supply of science topic books to support children's individual research.

5. Organisation of Topics

Science will be taught in planned and arranged termly topic blocks by the class teacher, to have a project-based approach. In KS1, there are 4 topics and in KS2 there are 5 topics. These topics can be covered at any point throughout the year. Children should be able to access the resources, work scientifically and investigate a learning question. These units are reviewed as taught. There will be curriculum links in other topics taught and opportunities to engage in trips and experiences for Science to promote their curiosity, exploration and enrich their knowledge and experiences.

Year	Term 1		Term 2		Term 3	Wks	
1	Everyday materials: Which materials should the Three Little Pigs have used to build their homes?		Plants and Animals: What birds and plants would Red Riding Hood find in our park?	Plants and Animals: Why are humans not like tigers?	Seasonal Change: Why can we play outside for longer in the summer?	6	
2	Plants: What can we grow in our garden?	Animals including humans: How will 5 a day help me be healthy?	Living things and their habitats: Why would a giraffe not make a good pet?		Uses of Everyday Materials: What did they use to build our school?	6	
3	Plants: How did that blossom become an apple?	Animals including humans: How can you be a record breaker?	Forces and Magnets: Is it attractive enough?	Rocks: Do rocks have a story to tell?	Light: How far can you throw your shadow?	6	
4	Living things and their habitats: Where do the wild things live in Thornaby?	Electricity: How important is electricity?	Animals including humans: What happens to the food we eat?		Sound: Why do like to make music?	States of Matter: How would we survive without water?	6
5	Living things and their habitats: Do all animals and plants start life as an egg?	Animals including humans: Why do most humans live longer than their pets? How different will you be when you are as old as your grandparents?	Earth and Space: Will there ever be another man on the moon?		Properties and changes of materials: Could you be a CSI investigator?	Forces: Can you feel the force?	6
6	Living things and their habitats: Why is a whale a mammal?	Animals including humans: What would a journey through your body be like?	Evolution and Inheritance: Have we always looked like this?	Light: How can you light up you	Electricity: Could you be the next Nintendo apprentice?	6	

6. EYFS

The Foundation Stage deliver science content through the 'Understanding of the World' strand of the EYFS curriculum. This is delivered in small group sessions every week. This involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment. They are assessed according to the EYFS attainment targets.

7. KS1 and KS2

KS1:

The principal focus of science teaching in KS1 is to enable children to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to 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. They should 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. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of 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.

Children should read and understand scientific vocabulary at their age related expectations for each topic.

Lower KS2:

The principal focus of science teaching in lower KS2 is to enable children to broaden their scientific view of the world around them. They should 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. They should 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 should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. 'Working 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.

Children should read and understand scientific vocabulary at their age related expectations for each topic.

Upper KS2:

The principal focus of science teaching in upper KS2 is to enable children to develop a deeper understanding of a wide range of scientific ideas. They should 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 KS2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should 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 should 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.

Children should read and understand scientific vocabulary at their age related expectations for each topic.

8. Equal Opportunities

At Harewood Primary School, all children, regardless of race, culture, gender or special needs, are provided with equal opportunities to access Science within the Curriculum. Mixed gender, ability grouping and seating plans have encouraged greater participation in investigative work. Our aim is to create a school atmosphere in which every child feels secure and highly motivated to work as well as to develop confidence, self-respect, tolerance and respect for others.

9. Inclusion

In school we aim to meet the needs of all our children by differentiation in our science planning and in providing a variety of approaches and tasks appropriate to ability levels. This involves providing opportunities for SEND children to complete projects, with support, to develop speech and language skills, as well as scientific skills and knowledge. This will enable children with learning and/or physical difficulties to take an active part in scientific learning and practical activities and investigations and to achieve the goals they have been set. Some children will require closer supervision and more adult support to allow them to progress whilst more able children will be extended through differentiated activities. Children with strengths in Science are

identified on the Gifted and Talented register. By being given enhancing and enriching activities, more able children will be able to progress to a higher level of knowledge and understanding appropriate to their abilities. Teachers will ensure that a range of strategies are used which include and motivate all learners, ensuring that optimum progress is made throughout each part of the lesson.

10. Role of the Subject Leader

It is the responsibility of the subject leader to ensure that teachers monitor the standards of children's work. Subject leaders will collect examples of work from each year group to ensure that differentiation, progression and content is covered effectively. The subject leader is also responsible for supporting colleagues in their teaching, for being informed about current developments in the subject, and for providing a strategic lead and direction for science in the school. The subject leader monitors the resources, science topics and books, trips and workshops to support learning. The subject leader allocates time for fulfilling the task of reviewing samples of children's work, book scrutinising, observing teaching and learning, training, liaising with other subject leaders from other schools and organising science activities.

11. Role of the Teacher

Teachers should know the ability range of all children in their groups and set learning expectations as working towards, in line and greater depth. These need to be met through effective planning, organisation and teaching for each learning enquiry. Teachers assess children against progression statements. The role of the teacher is also to plan and organise first hand, practical investigations which build on each child's own experiences of everyday life. This leads to conceptual understanding as well as developing skills and attitudes that are important to the learning of Science.

12. Role of the Teaching Assistants

Teaching Assistants are used primarily to support children with Special Educational Needs to enable them to have equal access to the learning objectives of the lesson. They may work alongside the children to provide additional explanations or they may provide specific support in activities to meet the particular special needs of an individual child. They work under the guidance of the class teacher and are part of the planning for the lessons. Teaching Assistants develop knowledge and understanding of how the SEND children in their group learn and this experience is valued greatly. Higher Level Teaching Assistants can plan, prepare, deliver and assess specified work under the supervision of a qualified teacher.

13. Role of the Governing Body

The School Improvement Committee has the role of approving all curriculum policies.

14. Parents/Carers

Parental input is highly valued and parents are regularly invited and welcomed into school to share homework projects and given parent views questionnaires. Children are given termly homework topics and may also receive science homework based on their current topic. Homework supports learning in school and provides parents with enough information to enable them to be clear about the purpose of the activity and their role. Children are also provided with knowledge organisers to support their knowledge, build up their vocabulary and support their learning. Parents are kept informed about the areas of study within science so that they can make the most of any opportunities to apply the scientific concepts learnt at school within the home environment.

15. Health and Safety

Trips

All school visits are carefully planned with safety in mind and consideration of the age and ability of the children. Field trips are well supervised. Staff should refer to the Educational Visits Guidelines.

Handling Equipment and Safety

Children will be taught how to use and handle scientific equipment safely and with care and respect. There are a range of materials unsuitable for use with primary age children and LEA guidelines concerning specific health and safety issues are regularly updated and kept in school for staff reference. Staff are requested to consult the Science Curriculum Leader for information. All investigative work should be closely monitored by a responsible adult and risks assessed at the planning stage.

- *No glassware to be used unsupervised – use plastic alternatives where possible.*
- *Use only candle, hairdryer or hot water as a heat source. Candles should be embedded on a sand tray.*
- *Careful consideration should be paid to keeping animals in school. Only consider animals that are suitable for the classroom. Animals should always be fed correctly and appropriate arrangements made for the holidays. Teach the children to handle animals properly, carefully and with respect.*
- *Plants need to be carefully chosen for the classroom. Some have poisonous parts or can cause asthma or allergies. Children should never taste parts of plants, such as berries or leaves.*
- *Never look directly at bright sunlight sources, such as the sun or a projector beam.*

- *Children should never use mains electricity unless closely supervised. They should be regularly warned about the dangers of using mains electricity. Never cut open batteries and always dispose of old batteries in case of leakage.*
- *Magnets can cause damage to equipment such as watches, televisions, computers and tape recorders.*
- *When tasting food always ensure that utensils, hands and work surfaces have been thoroughly cleaned beforehand.*
- *Food cannot be allowed to develop mould on it in the classroom.*

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