Harby Church of England Primary School

Science Policy

Intent

We strive to help children develop the skills and knowledge to be future scientists: explaining and analysing phenomena, making predictions and solving problems. We will widen the children's science capital by giving them a rich and safe range of learning opportunities and they will learn the value of scientific developments and the impact these have on the lives they live. We aim to harness children's natural excitement and curiosity for the world and inspire them to pursue different types of scientific enquiry using a range of working scientifically skills.

Equal opportunities

Inclusion and Equality Statement

Inclusion is an approach and attitude that will help to give all children opportunities for success and development at school, both academically and socially, and will ensure they are valued as part of the school community. We strive to ensure that pupils' unique needs, differing learning styles and requirements are recognised, valued and supported. We recognise the entitlement of all pupils to a balanced, broadly-based curriculum. We have systems in place for early identification of barriers to their learning and participation so that all pupils can engage in school activities with others. We acknowledge the need for high expectations and suitable targets for all children. We actively seek to encourage equity and equality through our teaching. No gender, race, ethnicity, social and economic background, Special Educational Need or Disability will be discriminated against. The school's Disability Equality Scheme will be followed and the use of stereotypes will always be challenged.

Purpose

The purpose of this policy is to:

- Establish entitlement for all pupils;
- Establish expectations for staff and pupils;
- Promote continuity, progression and coherence across the school;
- Promote science within the wider school community.

Our specific aims of this policy;

This policy will ensure pupils:

- practise the skills of working scientifically, including: ***questioning, predicting, planning, setting up, observing and measuring, recording, reporting and concluding***.
- learn about how the science they are studying (biology, physics or chemistry) is used in the **world of jobs**, about significant scientists alive today, and / or famous ones from history within those specific areas.
- have opportunities to have own safe enquiry led investigations throughout their time in primary school from EYFS to year 6 as well as teacher instigated enquiry.
- develop their skills within the 5 enquiry types as topics should be **question** led.
- improve their **observations s**kills by improving their accuracy of **measurements** and observed details as well as looking at **patterns** when observing over time.
- look at different ways they can **identify, group and classify** materials, objects and living things.
- learn about and improve their ability to set up **fair and comparative tests** within the classroom / outside or for home activities.
- use **secondary sources** to research elements of the topic that they are wanting to find out more about.
- expand their understanding and use of **key vocabulary** through class and group discussions and progressively to written work.
- build their knowledge and understanding of topic areas outlined in the National curriculum progressively throughout school, **reviewing prior learning** as they go.
- **recall key knowledge and understanding** from their learning through regular low-stake mini test / quizzes and puzzles.
- Participate in a good range of practical enquiry and knowledge based sessions where they can address areas of **confusion or misconceptions**.

Provision

Provision is made for the full range of abilities in line with the requirements of the National Curriculum and children in EYFS (whilst guided by the non- statutory Development Matters & Birth to five Matters).

The programmes of study are, by necessity, organised into distinct topic areas covering aspects of biology, physics and chemistry, but pupils should make rich connections across areas of science and other topic areas to develop their knowledge, understanding, skills and vocabulary use in science. They should also apply their mathematical and ICT knowledge and skills to science.

The expectation is that the majority of pupils will be given equal opportunities and move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who show 'mastery' of concepts should be challenged through being prompted to develop their questioning further, gather more accuracy by re-testing, by reporting their results with greater clarity and by making more in-depth conclusions. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional support, conversations, directions and practice.

Implementation:

planning, teaching and learning

Time allocation

The time allocated for science and tasks set, are in line with recommendations for the Foundation Stage Profile, Key Stage One and Two.

In addition, it is expected that cross-curricular links will contribute to pupils' love of science, including reflection of character muscles, making links to our Routes to Resilience scheme. These skills will be embedded with continued reference to targets and feedback. Teachers work towards independent learning with appropriate differentiation.

There will be a Science session taught each week or in the early years a choice of continuous provision activities. The EYFS framework sets out the content that should be covered in the early years. Adults working in the setting should aim to identify the starting points of each unique child in terms of their knowledge, vocabulary, ideas and interests relating to the specific area 'Understanding the World'.

Teachers will be familiar with previous and subsequent year groups' content in order to link learning and build on previous knowledge (particular attention to any gaps due to Covid19). They will also be aware of where a unit of work fits in with the bigger picture of the science curriculum across the primary school – this is essential in ensuring key knowledge is taught and assessed to maintain progression through the curriculum.

Teachers will use and refer to the National Curriculum Science Programme of Study for long term planning. In EYFS staff will offer a broad, exciting and ambitious curriculum based on the needs of our children and their understanding of child development. They will be guided by the EYFS framework, and the new Development Matters and Birth to Five Matters for starting points.

In the Early years, Scientific skills and knowledge will be developed through the prime areas, for example discussing and sharing ideas and experiences in response to stories and non-fiction texts and role-play (C&L); appreciating the importance of exercise, healthy diet and dental care (PD) and developing a positive self-image and respect for living things

(PSED). Teachers are encouraged to follow children's interests and lines of inquiry without explicitly teaching content from other year groups.

Within key stage 1 and 2, teachers will refer to the whole school plan, classes cycle of planning related to a 2 year planning cycle. They will use the ASE PLAN matrices:

https://www.planassessment.com which will support planning in depth coverage of each objective, identify key vocabulary for each topic, possible misconceptions that need addressing and suggestions for further learning applications. In the light of this, they may adapt other medium term planning from other sources to suit the needs of the class and children being taught *(some sources such as Twinkl need to be checked for accuracy and appropriateness).*

Scientific enquiry in the early years is driven by children's own questions and adult-led provocations. Children are supported to notice similarities and differences, environmental features, make observations of living things and explain why some things occur. The EYFS setting will provide a rich language environment for children. Adults identify and model scientific vocabulary appropriate for the topic and age. They further embed vocabulary using simple definitions, images and actions which can be repeated. Children should be encouraged to say the words for themselves and use them in context. These will be displayed / accessible to the children as part of the '*Scientific classroom'* (see appendix 3).

In Key stage 1 and 2, clear objectives, including a knowledge based one and at least one area of working scientifically (see appendix 1), are set and shared with pupils. One of the 5 enquiry skills (see appendix 2) will be planned for and vocabulary will be accessible through displays / word mats and stem sentences provided. A non-fiction / curriculum book is used by pupils in and they will have access to knowledge organisers / topic vocabulary either in books or through / displays. In addition, classes may have a floor book, wonder walls and Seesaw in which questions are posed and children's voice shared, along with shared / group work and or photos (see appendix 4).

Lessons will have regular opportunities for pupils to check how well they are learning what they have been taught (for example through no-stakes quizzing, vocabulary checks, concept cartoons, multiple choice hinge questions). This develops metacognitive awareness and self-regulation strategies in pupils and informs the teacher in planning next steps in learning, making adjustments as needed.

Pre assessments will be undertaken through activities such as concept cartoons, quizzes, drawings, checklists and similarly post assessments. ICT is used to enhance and compliment teaching and learning. Opportunities for doing Science outside will be taken, along with using drama, to encourage a multi-sensory approach. STEM and Discovery Learning* are opportunities for pupils to apply, practise and embed what they have been taught. Cross curricular science will be used where possible but not exclusively and LSAs work to support

the teaching of Science alongside the guidance of the teacher. Any significant changes to planning or timetabling should be discussed with the subject leader beforehand.

**Discovery learning is an enquiry-based, constructivist learning theory that takes place in problem solving situations where the learner draws on his or her own past experience and existing knowledge to discover facts and relationships and new truths to be learned[1]. Students interact with the world by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments.*

Inclusion in science

All children receive quality first science teaching on a weekly basis (for some parts of the year the teacher may choose to block this time) and activities are differentiated accordingly. In addition, where identified pupils are considered to require targeted support to enable them to work towards age appropriate objectives, interventions will be implemented – these may include pre learning discussions or tasks or provision made within sessions to enable success. Teachers and LSAs work together and monitor progress of these pupils. Pupils with a strength in science, are planned for carefully, enabling them to further develop their knowledge and skills without teaching areas to be covered in other year groups. The needs of children with English as an additional language will be met through planning and support where necessary. This is supported by our equal opportunities policy.

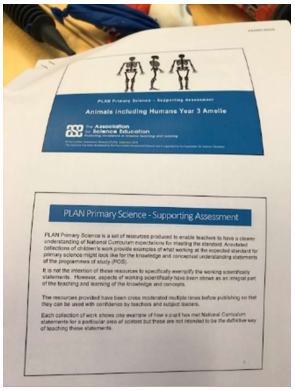
Parental and community involvement

We value parental and community involvement and promote this in the following ways:

- Sharing information – newsletters, school website and curriculum workshops.
- Celebrations – achievements, science days / week, displays, whole school events .
- Homework – in line with our homework policy.
- - Welcoming parents to support science in school through sharing their expertise and experience.

Impact - Assessment, recording and reporting

Assessments are made in line with our school Assessment Policy, please refer to this for further information. Teachers provide formal feedback to parents three times a year via parents' evenings or in the annual report to parents. Children are assessed on entry and are formally assessed at the end of each key stage.



Teachers use the PLAN supporting assessment documents to have a clear understanding of the expectations for each year group to meet the standards. They keep class records and any other information that enables the teacher to deliver an effective, relevant curriculum which builds on prior attainment and meets the needs of pupils. Pixl can be used to provide pre and post assessments or alternative methods maybe used. In addition, we carry out regular moderation (book scrutiny) in staff meetings, with local and regional network groups where possible. Teachers use assessment for learning to ensure planning is based on prior attainment and that pupils know what they need to do to achieve the next steps. Class / group or individual targets are set accordingly. Marking is in line with the school marking and feedback policy.

Expectations

By the time children leave our school, we expect that they will have confidence to participate in discussions about what is happening in the world of science, using appropriate vocabulary and making links with their learning in the classroom. We expect them to have a good level of knowledge and understanding in science so that they can further develop their skills in the next stage of their learning. We aim to inspire a love of science, for children to see themselves as scientists and be excited about the possibilities that science holds for all our futures.

Staff development

Teachers are expected to keep up to date with relevant research and subject knowledge. We are committed to developing and engaging with training. Training needs are also identified as a result of whole school monitoring and evaluation, performance management and through induction programmes. These will be reflected in the School Development Plan. The science co-ordinator will arrange for relevant advice and information, such as feedback from courses or newsletters, to be disseminated and guide staff to CPD opportunities, particularly online https://www.reachoutcpd.com/where needed. In addition, the science co-ordinator leads or organises school based training including science sessions which can be for both teachers and support staff.

Resources

A comprehensive range of resources are available in school. Science tools and resources are stored centrally so that classes can access them when needed. EYFS store their own separately. The school updates and adds to its stock when needed. Digital resources are stored centrally in the hub, including recordable devices and ICT programs. CLEAPPS website used to support safe delivery of lessons.

Monitoring and evaluation

Science is monitored by all teachers, the science Co-ordinator, the Head teacher and science Governor. Having identified priorities, the science Co-ordinator constructs an action plan that forms part of the School Development Plan. This forms the basis for any monitoring activities and will clearly identify when, who and what is to be monitored and how this will take place e.g. classroom observation, planning scrutiny, pupil interviews, work sampling, learning walks, work with named governors.

Review

This policy will be reviewed every two years. Date of next review: April 2023

Appendix 1 – Working scientifically- Skills

Skills for Working Scientifically

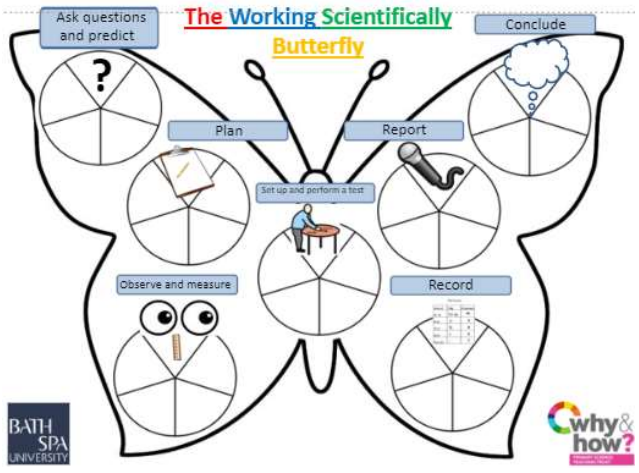
If you look at the English National Curriculum for Science, you'll find these skills identified within the Programme of Study, particularly within the statutory requirements for Working Scientifically:

- Questioning
- Predicting
- Concluding
- Observing
- Identifying and classifying
- Measuring
- Testing
- Recording

*see visual on next page – list slightly altered - observing and measuring have been places together.

These skills can be grouped into two groups.

- **Functional skills:** observing, identifying and classifying, measuring, testing and recording.
- **Reasoning and thinking skills:** questioning, predicting and concluding.



There are various ways these can be recorded to make it explicit to children which element the session is focusing on and to monitor a range of skills is being covered over time.

Visual thanks to Primary Science Teaching Trust

Teachers should facilitate opportunities for children to develop these skills in science. Very often this is done through children's written work: children are asked to write down what they will do, what they have done and what they found out.

However, not all children have writing skills that match their science skills.

Evidence of children's thinking and reasoning in science can be done **orally** and a record of children's ideas can be kept in a **floor book**.

Appendix 2 –

The five enquiry types

The National Curriculum for Science for England explains that,

"'Working scientifically' specifies the understanding of the nature, processes and methods of science…"

This needs to be embedded within our teaching of the biology, chemistry and physics content. Through a variety of enquiry driven activities, children can work scientifically, working to answer scientific questions.

The National Curriculum for Science for England clearly lists **5 different types of enquiry t**hat children should be familiar with across the primary school.

These are:

- Observation over time
- Pattern seeking
- Identifying, classifying and grouping
- Comparative and fair testing
- Research using secondary sources

What are the benefits of scientific enquiry?

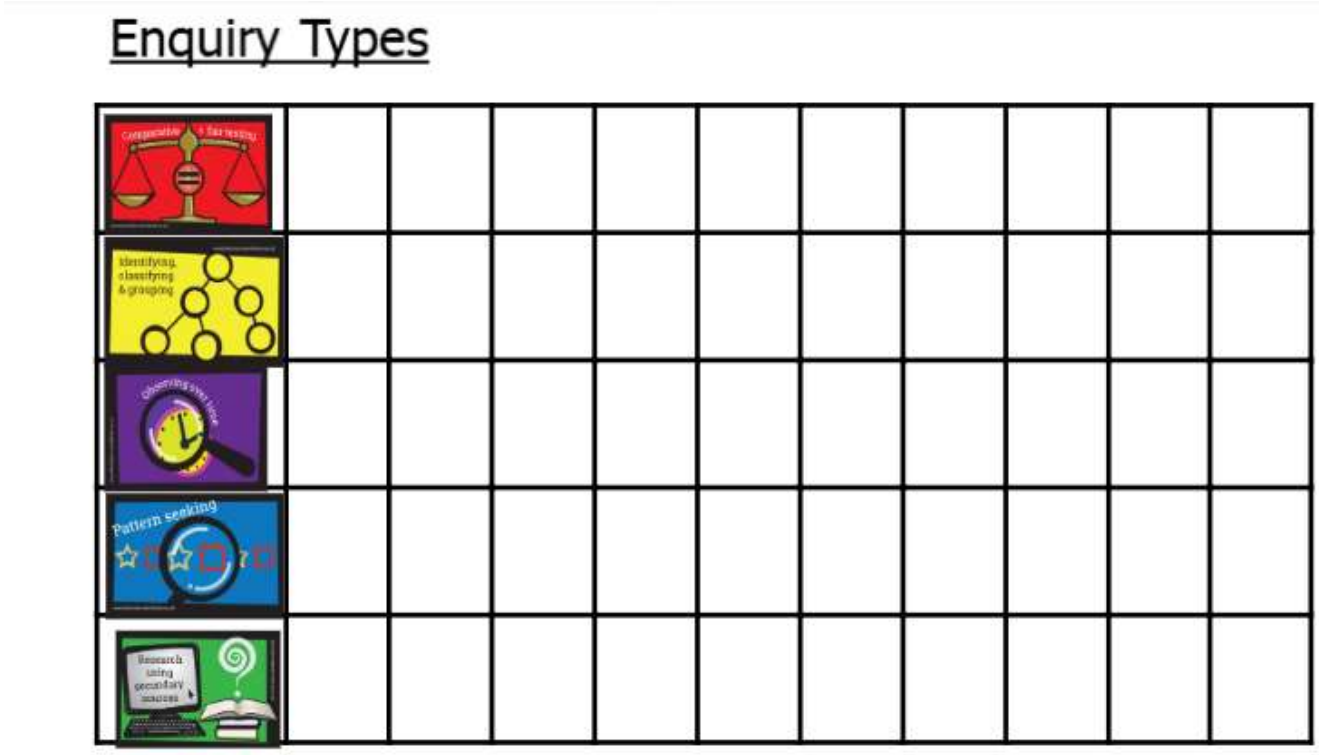
As children carry out scientific enquiry they should develop a host of skills and competencies, knowledge and understanding, bringing enormous benefits to them as **‘growing’ scientists**. Scientific enquiry increases children’s capacity to:

• Problem-solve and answer questions. Rich opportunities are provided where children explore their own ideas, develop and deepen conceptual understanding.

• Work with independence. Thinking and reasoning is nurtured alongside a host of qualities, including resilience, determination and confidence.

• ‘Be a scientist’. A necessary toolkit of practical skills is developed and added to over time.

• Communicate effectively. Technical and scientific vocabulary is learned, practised and used, as children communicate evidence in a variety of ways, often with different audiences in mind.



Appendix 3 - *A scientific classroom:*

Classroom **displays** will reflect current topics – showing examples of work done by children and supporting in the development of concepts. There may be at times interactive displays enabling children to further develop their knowledge independently or set up as continuous provision in early years. **Vocabulary** will be on display or accessible through books /knowledge organisers, words banks, enabling children to access these during discussions that may be during science lessons and other parts of the day.

Appendix 4 - Floor books

Children must develop many skills to work scientifically in the classroom: sharing ideas, making predictions, planning investigations, observing and measuring, recording results, drawing conclusions and evaluating findings. Classes may provide opportunities for enquiry through curiosity corners / cubes. To make a valid assessment of children's practical science skills, a teacher needs to draw on a body of evidence collected over time. However, some of these skills are only evident when children are talking in small groups or a class discussion, and some children do not have literacy skills to match their science skills and successfully record their ideas, predictions or findings in science. Whole class discussions and experiences can be recorded in a floorbook

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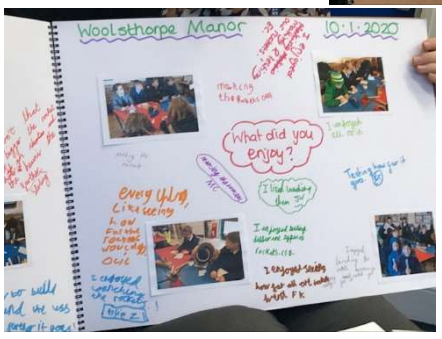

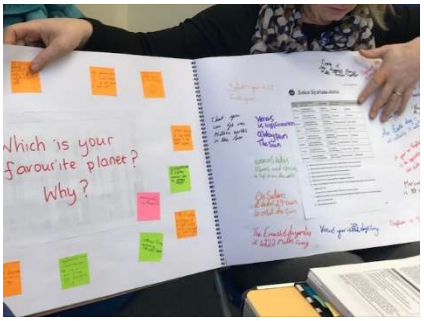

Science is a collaborative subject. Many investigations require that children work in groups in science lessons. A floor book is an possible way to record group work along with curiosity walls and Seesaw.

Using a floor book enables teachers to record oral feedback from children (as well as written work) and use this when making **formative assessments** to inform planning and **summative assessments**.

See https://pstt.org.uk/resources/curriculum-materials/floor-books for further guidance.