



Science Policy

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Signed:	Headteacher
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SCIENCE POLICY



Heygarth Primary School

'Learning and Achieving Together for Life.'

OUR VISION

At Heygarth Primary School, we strive to promote the love of learning science and for children to understand and be curious about the science within their everyday lives. Science provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. We promote the importance of a problem solving, investigative approach through regular 'hands on' experiences wherever possible. It is our intention that by the end of each Key Stage, each child will have an understanding of a variety of scientific concepts and be able to confidently discuss and transfer knowledge across subjects and in their individual lives. We aim for all children to gain independence and work scientifically during lessons as well as working collaboratively to investigate different concepts and ideas.

Through building up a body of key foundational knowledge and concepts in science, our children will be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They will be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. We know that we are doing our children a disservice if we do not both provide them with opportunities to explore scientific vocabulary and we will expect them to use the knowledge and skills to articulate their ideas in a variety of ways.

AIMS

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.

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It will not be taught as a separate strand. All ways of 'working scientifically' are clearly mapped out for progression and embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry. Pupils learn to use a variety of approaches to answer relevant scientific questions. Pupils will seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed from EYFS, Key Stage 1 and throughout Key Stage 2 in order to prepare pupils for further challenge that will be presented at Key Stages 3 and 4 in science. The types of working scientifically we include

are: Observing over time; pattern seeking; identifying, classifying and grouping; research; comparative and fair testing.

The Content of our Curriculum

Pupils at our school are taught to use a variety of approaches to answer relevant scientific questions and this is set out in a long-term plan.

EYFS

Knowledge and Understanding of the world

Key Stage 1

Year 1 Knowledge: Plants, Animals including Humans; Everyday materials and seasonal change

Working Scientifically Skills: Ask simple questions; Sorting and Classifying; Survey; Research; Pattern Seeking; Observation over time; observe closely using simple equipment;

Perform simple tests; recognise the questions can be answered in different ways.

Gathering and Recording Data: Record simple data to answer a question; make simple measurements; draw Venn diagrams and charts.

Year 2 knowledge: Living things and their habitats; plants; Animals including humans; Uses of everyday materials

Working Scientifically Skills: Survey; Identify and Classify; Comparative Test; Pattern Seeking; Observation over time and Research;

Gathering and Recording Data: Record in a tally chart; Record data in a table; Record data in a flow diagram; Record data a bar chart.

Lower Key Stage 2

Year 3: Plants; Animals including humans; Rocks; Light and Forces and magnets

Working Scientifically: Fair Test; Classification: Comparative Test; Research; Investigation over time; Modelling; Child-led Investigation

Gathering and Recording Data: Record using drawings; Record data in a table; Draw simple conclusions; Record data in a bar chart; Record data in a branching key; record in a tally chart.

Year 4: Animals including humans; Living things and their habitats; Electricity; States of Matter; Sound

Gathering and Recording data: Provide written and oral explanations; Use a data-logger or equivalent to take measurements; Use a thermometer to take measurements; record using labelled diagrams.

Working Scientifically: Identify and Classify; Problem Solving; Pattern Seeking; Research; Comparative Test; Fair Test; Explanations; Investigation over time; Child-led Investigation

Upper Key Stage 2

Year 5: Animals including Humans; Earth and Space; Living things and their habitats; Properties and Changes of Materials; Forces

Working Scientifically: Fair Test identifying variables; Identify and Classify; Evaluations; Fair Test; Pattern Seeking inquiry; Child-led Investigation

Gathering and Recording Data: Take accurate measurements using a data logger or equivalent; Make accurate measurements using a thermometer; Take repeated accurate measurements with a stopwatch; Explain the degree of trust in results to make further predictions; Record data in tables; Record data in line graphs; Communicate data using a scatter graph; Explain findings; Use scientific diagrams and labels.

Year 6: Evolution and Inheritance; Living things and their Habitats; Animals including Humans; Light; Electricity

Working Scientifically: Identify and Classify; Comparative Test; Fair Test recognising and controlling variables; Pattern Seeking enquiry. Plan a scientific enquiry to answer a question.

Gathering and Recording Data: Take repeat measurements of data with precision using a data logger or alternative; Record data in a table; Report causal relationships; Record results in a line graph; Report the degree of trust in results; Record results in a line graph; Support or refute ideas; Recognise which secondary sources will be most useful.

Planning and Delivery

Planning in science is a process in which all teachers are involved to ensure that the school delivers full coverage of the current National Curriculum and Foundation stage. Following extensive research, carried out by the science lead, Year 1 - Year 6 have been supported to ensure that science is taught to mastery and we use a problem-solving approach in each lesson. The units set out in the long-term plan are used as a starting point to the delivery of the Science Curriculum and ensure that the programme of study at each stage of development is covered. This ensures progression between year groups, guarantees topics are revisited over time and prior learning is built upon. Teachers are expected to write lesson plans including prior learning, key vocabulary and the area of working scientifically to be covered in the lesson and modify the model to suit their own teaching and children within the class, making best use of any support staff and the resources available. Where science is not part of topics then science is taught as a stand-alone subject and should be planned in order to enrich learning experiences.

- EYFS, KS1 & KS2 teachers should be teaching science for a minimum of one hour each week or equivalent pro rata.
- Teachers should try to make cross-curricular links wherever possible.

The science curriculum is delivered through co-operative group work, individual work, and whole class teaching.

Within this structure there will be:

- Odd one out activities for discussion;
- Philosophical questions to explore;
- Whole class and group discussions and presentations;
- Demonstrations, explanations and instruction by teachers to groups, individuals and the whole class as well as child-led when possible;
- Practical activities to advance and consolidate knowledge and skills.;
- Problem solving and investigation tasks.

Technology

The role of technology in enhancing pupils' learning in Science:

Technology is used to support teaching and learning in a number of ways:

- Explore, describe and explain scientific processes;
- Defining tier three scientific vocabulary;
- Practice and consolidate understanding;
- Explore the natural world through information programs, DVDs, video clips and Internet;
- Investigating the results of changing data in graphs, tables and experiments;
- Use of computer APPS to measure and record information;
- Developing scientific vocabulary, logical thinking and investigative skills;
- Revision of information from class units;
- Measure, record and interpret data from sensors;
- Presenting evidence and results of investigations;
- Individual revision in preparation for SATs;
- Digital camera images and motion clips to record investigations and fieldwork;
- Use of Interactive Whiteboards;
- Research, presenting and completing activities using iPad or desktop computers.

Assessment and Monitoring

Teachers at Heygarth use assessment effectively to plan lessons that builds on individual pupils' prior knowledge and provide feedback that genuinely helps pupils to improve their work in science. Teachers provide feedback to all pupils in order to address misconceptions, or challenge.

Using the 'Balance' tool for assessment, teachers will make regular formative judgements, focusing on learning that has taken place and to plan next steps. Strengths and areas for development will be identified and addressed.

In EYFS, KS1 and KS2, assessment in science is ongoing and observations inform next steps planning. Evidence is collected throughout the year and it includes photographs and evidence slips or post-it notes annotations collated into a class evidence book.

Reports to parents on the attainment of their children are made verbally in the autumn and spring term and a written report is provided during the summer term. Reporting in science focusses on each child's:

- Attitude towards science;
- Progress in the ability to work scientifically, including understanding of the nature of scientific method;
- Level of scientific knowledge achieved: WTS (Working Towards Standard), EXS (Expected Standard) or GDS (Greater Depth Standard).

Monitoring

Monitoring teaching, pupil achievement and progress is essential and the outcomes of monitoring are used strategically to secure even better science.

Monitoring and data analysis includes:

- Learning walks;
- Moderating assessment;
- Observing lessons;
- Planning;
- Pupil focus groups;
- Team meetings;
- Work scrutiny;
- Other ideas.

Monitoring of science teaching is carried out through a program of lesson observations by the Science leader. The objective of the monitoring is to ensure science is being taught well across the school. Observations focus primarily on the effective communication of scientific knowledge and the quality of 'Working Scientifically'. Specific areas can be chosen as the focus for example: use of support staff, the use of technology, agreed in advance of the lesson. Following an observation, the class teacher receives feedback and a copy of the observation notes.

Science monitoring achieves the following:

- To gain insight into the nature of science teaching across the school;
- It gives class teachers the opportunity to review their own practice and discuss teaching science with a subject specialist;

- It gives the science leader an insight into areas of strengths, enabling good practice to be shared among colleagues;
- It allows resources to be audited and for the assessment of current and future resource requirements;
- It allows the science leader to set targets, demonstrating the school's commitment to self-evaluation and improvement of standards in science;
- It provides opportunities for bespoke support for areas of need.

Inclusion

We recognise that supporting access to science for all pupils is crucial. The range of needs include those for whom language and communication difficulties are the result of sensory or physical impairment; for some, English may be an additional language requiring additional support; pupils may have a speech and language delay, impairments or disorders, specific learning difficulties as a result of dyslexia, dyspraxia or ADHD. Other difficulties in communication/interaction may have arisen from a disrupted education through illness or early childhood trauma.

At Heygarth we ensure that we are aware of barriers to learning and we endeavour to meet the needs of all pupils in our school.

Communicating ideas and understanding:

- Consider a variety of methods for communicating ideas;
- Consider imaginative pieces of writing e.g. The journey of the sandwich;
- Adopt a multi-sensory approach;
- Try not to introduce more than one concept at a time;
- Consider how technical words are introduced;
- Use physical movement to help remember concepts;
- Enable opportunities to discuss ideas in pairs;
- Key vocabulary displayed on a working wall.

Equal Opportunities

All teaching and non-teaching staff at Heygarth Primary School are responsible for ensuring that all pupils irrespective of gender, ability, ethnicity and social circumstance, have access to the curriculum and make the greatest possible progress and achievement.

Health and Safety

The Code of Practice for Health and Safety in Primary Science is encompassed in the booklet "Be Safe!" The Science leader keeps copies of this booklet if required. All

staff are expected to be familiar with the contents and follow its guidance during planning each teaching unit. Relevant safety measures are identified in planning and additional risk assessments as required.

Staff ensure that pupils are made aware of the importance of safety rules during scientific investigations.

Under COSHH regulations (Control of Substances Hazardous to Health) no chemicals should be used until a Risk Assessment has been made.

The Local Authority subjects all mains-powered electrical equipment in school to regular safety checks.

Role of the Subject Leader

At Heygarth the science leader uses research to keep up to date with developments in pedagogy within science. This helps to ensure that there is a deep understanding of the best ways to teach science to ensure that the subject is delivered to mastery. There is an understanding of progression in terms of childhood development which helps to build upon concepts into each phase of education. The leader can identify issues in science teaching and address through appropriate CPD for all staff. The science leader has a secure knowledge of, and is able to apply and model a range of, teaching methods suitable for teaching across all phases in school.

The science leader ensures that all pupils can develop their understanding of the big ideas of science, and learn the skills needed to work like a scientist, because the science lead ensures all teachers are confident in their teaching of science and they can deliver an enquiry-rich curriculum with access to the appropriate resources.

The science leader has developed a whole school vision for science and ensures that science is valued as a core subject that builds skills across the curriculum.

Role of Governors

The role of the link governor for science is based on trust, openness and transparency. They know the school well. They will support the monitoring of science, ask questions for clarification or explanation and challenge.

Conclusion

It is the responsibility of all staff at Heygarth Primary School to share the love of learning in science and to model the curiosity in their everyday lives.

Science Policy written by: Karen Howell

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