

Science Policy



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‘Love, Laugh, Learn’

Respect, Resourcefulness, Resilience, Reciprocity, Reflectiveness

At Wrockwardine Wood Infant School and Oakengates Nursery Federation we believe that the study of Science is about developing an understanding and making sense of the world around us, through the specific disciplines of biology, chemistry and physics. It enables children to stimulate their curiosity primarily through first hand experiences, interaction with scientific phenomenon and developing scientific language to find out about people, places, technology and the environment. Children are encouraged to understand how Science can be used to explain what is happening, predict how things will behave and then analyse the cause.

AIMS:

The aims of teaching Science in our school are to:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- Equip children with the scientific knowledge required to understand its uses and implications for today and for the future.
- Develop children’s understanding of the nature, processes and methods of Science through different types of scientific enquiries to answer questions about the world around them.
- Arouse children’s curiosity and a sense of wonder about the world around them through an enthusiastic approach to the teaching of Science.
- Provide children with opportunities to address any misconceptions through further investigation, observation and research.
- Develop children’s use of common language and accurate use of appropriate scientific terminology to communicate understanding and discuss Science.
- Encourage children to ask questions about why things happen and how things work.
- Develop children’s investigative skills through observing, measuring, predicting, experimenting, interpreting, explaining and evaluating.
- Provide opportunities for cross curricular links with other subjects, in particular mathematics and ICT.

TEACHING AND LEARNING

We use a variety of teaching and learning approaches in our Science lessons:

- Elicit children’s existing ideas and understanding using a ‘Knowledge Harvest’, discussions and practical activities.
- Whole class teaching
- Modelled and intermediate investigations
- Small group and partner work
- Opportunities to answer questions using different types of scientific enquiry methods (e.g. observations over time, fair test, pattern seeking, research)

- Practical and hands on investigations and enquires.
- Use of resources to make observations and recordings, such as rulers, stop watches, tape measurers, measuring jugs.
- Use of IT such as ipads, digital microscopes, visualisers, light boxes, cameras.
- Educational visits, local walks
- Forest schools sessions
- Communicating findings in different ways e.g. tables, charts, Venn diagrams, posters
- Links to other areas of curriculum e.g. literacy – factual poster

OUR SCIENCE CURRICULUM

Early Years Foundation Stage (EYFS)

In the Early Years Foundation Stage Science is taught through 'Understanding the World' as part of the Early Years Foundation Stage curriculum.

Understanding the World

The area of learning 'Understanding the World' consists of:

- People and communities
- The world
- Technology

At this phase children are:

- Developing the crucial knowledge, skills and understanding that help them make sense of the world;
- Involved in activities based on first-hand experiences that encourage exploration, observation, problem solving, prediction, critical thinking decision-making and discussion;
- Experiencing a wide range of activities, indoors and outdoors, including adult-focused, child-initiated and independent play;
- Stimulated, interested and curious;
- Observed by adults so that children's fascinations are fostered and learning is built upon. Observations inform formative and summative assessments and are used to inform planning of future learning.

Key Stage 1

In Key Stage 1 Science is taught through the National Curriculum. The Key Stage 1 programmes of study for Science are set out year-by-year for Years 1 and 2. They consist of the strands 'working scientifically' and subject knowledge/content.

The programmes of study for Science describe a sequence of knowledge and concepts. We believe it is vitally important that children secure understanding of each key block of knowledge and concepts in order to progress to the next stage.

At this phase children are:

- Learning through a scientific process, skill-based approach; Undertaking practical enquiries;
- Working collaboratively and independently;
- Developing high quality, purposeful talk for Science;

- Recording findings in a variety of stimulating and purposeful ways; Building upon prior Science learning, both skill and knowledge based;
- Beginning to think about the positive and negative effects of scientific and technological developments on the environment and in other contexts;
- Evaluating their own Science learning;
- Using IT to support and extend their learning in Science; Making links across subjects;
- Experiencing a variety of teaching styles and strategies that promote positive Science learning;
- Learning that Science promotes the concept of positive citizenship;
- Learning through Science, to raise social and moral questions, to understand differences between people and to have respect for others including those with disabilities.

Working Scientifically

'Working scientifically' specifies the understanding of the nature, processes and methods of Science for each year group. It is delivered through the content of biology, chemistry and physics. In Year 1 and Year 2, 'working scientifically' includes:

- Asking simple questions
- Observing closely using simple equipment
- Performing simple tests
- Identifying and classifying
- Gathering and recording data

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

Year 1

- Plants
- Animals including humans
- Everyday materials
- Seasonal changes

Year 2

- Living things and their habitats
- Plants
- Animals, including humans
- Uses of everyday materials

PLANNING SCIENCE

Effective learning builds on and extends what children know and can already do. Our planning is informed by observations we have made of the children, discussions and evidence of prior learning in order to understand and consider their current interests, experiences, development and learning needs.

There are three stages of planning the curriculum:

PLANNING EARLY YEARS FOUNDATION STAGE

Long Term Planning

In Nursery and Reception the curriculum is organized through agreed termly themes over the period of the academic year. The EYFS development matters and the schools EYFS planning matrix is used as guidance.

Medium Term Planning

We address particular aspects of the curriculum in more detail for each term. Learning objectives, assessment opportunities, and activities and experiences for each area of learning and development are identified.

Short Term Planning

The daily planning is informed in two ways. Firstly, through ongoing observation of child initiated, adult initiated and adult directed activities both indoors and outdoors. This allows for flexibility in response to individual children's needs and interests and for revision and modification of plans.

It is informed secondly by referring to the medium term plans containing objectives and activities/experiences in the half/termly theme.

PLANNING KEY STAGE 1

Long Term Planning

The Science curriculum for key stage 1 is organised through themes. It is usual that six units are taught across the academic year (2 units per term). These units have subject specific focuses. Three units have been chosen to focus on Science in each year group (Year 1 and Year 2). Cross curricular links have also been planned so that children can apply their developing skills, knowledge and understanding across the curriculum. Teachers use the '**Engaging Science**' scheme of work, to support planning and assessment. Appropriate 'Engaging Science' topics have been linked to each curriculum theme.

Medium Term Planning

Particular aspects of the curriculum are addressed in more detail, for each term, in our medium term plans.

- Learning objectives, assessment opportunities, activities and experiences for Science are identified. The 'Engaging Science' scheme of work, adapted to meet the needs of children at our settings, is used as a guide. Each lesson within a topic is outlined in detail.

Short Term Planning

Short term planning is informed by the statutory requirements outlined in the medium term plan. Assessment for learning is also used to inform short term planning to address individual children's needs.

Weekly and daily planning consists of the following:

- Clear and concise learning intentions linked to scientific skills, knowledge and understanding.
- Clear success criteria identified.
- Differentiated tasks
- Health and safety considerations
- Key scientific vocabulary
- Cross curricular links identified, which encourage the use of IT and mathematics.
- Evaluated lessons used to inform future teaching and learning (this does not need to be in a written format)
- Progression built into lessons so that the children are challenged and supported appropriately.

Spoken language

The quality and variety of spoken language that our children hear and speak is vital in developing their use of scientific vocabulary and articulating their understanding of scientific concepts. The use of adults modelling key vocabulary, displays of specific scientific vocabulary, and word banks are provided to scaffold children's understanding and ability to communicate their findings.

ASSESSMENT

We analyse and review what we know about each child's development and learning in 'Understanding the World', (EYFS), and Science, (KS1), and make informed decisions about supporting the child's progress. This enables us to plan the next steps for individuals and groups of children by providing challenging but achievable activities and experiences to extend the children's learning.

Teachers, and other supporting adults, assess pupils Scientific capability through:

- Interactions
- questioning
- responding to childrens recorded work
- on-going observations
- discussions between staff working with groups of pupils etc

ASSESSMENT IN EARLY YEARS FOUNDATION STAGE

- Observations are recorded on ipads, which include photographic evidence and comments that gain evidence of individual children's skills, knowledge and understanding.
- Collected evidence is linked clearly to the EYFS curriculum statements, Early Learning goals and characteristics of effective learning.
- Evidence is used to inform planning and next steps in learning.
- Evidence is used to update tracking grids, highlighted to track attainment and progress and to identify next steps in learning.

- Termly learning targets are created for individual children within ‘Understanding the World’ and shared with parents.
- Parents receive an end of year report in reception to identify their attainment in the area of learning ‘Understanding the World’.
- Ongoing assessments are used to inform a termly summative assessment that is included in our data tracking system.

ASSESSMENT AT THE END OF KEY EYFS – The *Early Years Foundation Stage Profile* (EYFSP)

In the final term of the year in which the child reaches age five, and no later than 30 June in that term, the EYFS Profile is completed for each child. The Profile provides parents and carers, practitioners and teachers with a well-rounded picture of a child’s knowledge, understanding and abilities, their progress against expected levels, and their readiness for Year 1, in all areas of learning including ‘Understanding the World’.

The Profile reflects:

- on-going observation;
- all relevant records held by the setting;
- discussions with parents and carers, and any other adults whom the teacher, parent or carer judges can offer a useful contribution

In all areas of learning including ‘Understanding the World’, each child’s level of development is assessed against the early learning goals. Practitioners indicate whether children are meeting expected levels of development, or if they are exceeding expected levels, or not yet reaching expected levels (‘emerging’).

ASSESSMENT IN KEY STAGE 1

- Each topic has an assessment grid which is included in children’s Science books at the beginning of a topic and is highlighted to track individual attainment and progress in scientific skills and content.
- Teachers date when a child has met each statement.
- Statements are progressive and also link to the end of KS1 expected standard exemplification.
- Photographic evidence with group or individual comments is captured within Science books.
- Adult annotations are included to provide feedback on learning.
- Learning ladders are completed, by adults and children, to assess learning against the lesson objective/success criteria.
- Assessment grids linked to each science topic are completed each half term. Teachers make accurate assessments as to whether the children are working below, within or above age related expectations for that unit. These science topic assessment grids are used alongside working scientifically assessments to making end of year attainment judgements for individual children in science.
- Parents receive an end of year report that communicates children’s attainment in Science.

ASSESEMNT AT THE END OF KEY STAGE 1

Teacher assessments in Science, for Children in their final term of year 2, are completed using evidence from previous learning and assessments. Final judgements are based on childrens individual evidence demonstrating their undertsanding knowledge and skills against the Statutory Interim assessment framework. The results of these assessments are submitted to the Department for Education (see appendix 1)

ROLE OF SUBJECT LEADER

The subject leader monitors the standards of teaching, learning and assessment in Science through:

- Lesson observations/walks - to improve standards in Science
- Book scrutiny/look – to review previous and feedback new targets for improvement
- Monitoring Planning – to ensure statutory requirements are met, that the policy for Science is fully implemented and that children’s differing needs are being planned for.
- Working with small groups of children – to discuss learning and future targets.
- Pupil interviews, to gain pupils views of Science in our school and their thoughts on how to improve, take place and the outcomes used to support continual improvement.
- Monitoring Science planned in line with the school monitoring policy.
- Best practice for Science is identified and shared amongst practitioners.
- Samples of children’s work are collected to standardise judgements.

The Subject leader also

- Supports colleagues in their teaching, informing them about current developments in Science and providing a strategic lead and direction for this subject in school.
- Reviews and evaluates the action plan, budget and long term planning matrix.
- Liaises with staff and the head teacher for ordering and managing the supply of resources.

Computing/Technology

- Technology enhances teaching and learning in Science wherever appropriate, across all age phases.
- Children use ITT to enhance their skills in data handling (e.g. traffic survey) and in presenting written work (e.g. tables).
- Children research information through the Internet, computer programs such as ‘Espresso’, photographs, etc.
- Children use ipads to support Science such as use of sand timers, cameras, decibel readers, and monitor sound waves.

Inclusion

- At our school we teach Science to all children, whatever their ability and individual needs.
- Science is an integral part of providing a broad balanced curriculum to all children.
- Through our Science teaching we provide learning opportunities that match the needs of children with learning difficulties and we take into account the targets set for individual children in their Individual Provision Maps (IPM's).
- We meet the needs of those pupils with special educational needs, those with disabilities, those who are more able and those learning English as an additional language through differentiated activities and learning outcomes.

Health and Safety

- We enable all pupils to have access to the full range of activities involved in learning Science.
- Where children participate in activities outside the classroom, such as a visit to a farm, we carry out a risk assessment prior to the activity to ensure that the activity is safe and appropriate for all pupils.
- Planning identifies the possible health and safety issues relating to that topic/lesson.
- Our Design and Technology policy also refers to the safe use of food and utensils.
- All staff follow the Educational Visits Guidelines document.

Resources and the classroom environment

Science resources are stored in classrooms, the school library (books) and a central Science cupboard:

- Classrooms are equipped with globes, atlases, measuring equipment, digital cameras, laptops and ipads for research.
- The school library has information books and the Schools Library Service can provide topic collections upon request.
- Teachers have access to RM books, an online resource with a range of information books.
- The Science cupboard has central resources that include a box of different materials, magnifying glasses, life processes materials (e.g. bird nest), seeds for planting, mirrors, electricity equipment, batteries, torches, magnets, measuring jugs.
- The outdoor classroom is seen as an additional resource. A collection of ideas on ways our outdoor environment can enhance learning in Science has been linked to the relevant Science units and is used as an aid to planning.

Appendix 1

Interim teacher assessment frameworks at the end of Key Stage 1

Working at the expected standard

Science

Using the science framework

- The standard in this framework contains a number of 'pupil can' statements. To judge that a pupil is working at this standard in science, teachers need to have evidence which demonstrates that the pupil meets all of the 'working scientifically' statements and all of the 'science content' taught in the final year of the key stage.
- There is no requirement to have evidence from the classroom that pupils have met statements relating to science content taught before the final year of the key stage. Where possible, teachers should draw on assessments that have been made earlier in the key stage to make their judgement against this framework.
- The 'working scientifically' statements must be taught through, and clearly related to, the teaching of substantive science content in the programme of study. The 'science content' statements will be taught and assessed throughout the key stage.

Working at the expected standard

Working scientifically

The pupil can:

- ask their own questions about what they notice
- use different types of scientific enquiry to gather and record data, using simple equipment where appropriate, to answer questions including:
 - observing changes over time
 - noticing similarities, differences and patterns
 - grouping and classifying things
 - carrying out simple comparative tests
 - finding things out using secondary sources of information
- use appropriate scientific language from the national curriculum to communicate their ideas in a variety of ways, what they do and what they find out.

Science content

The pupil can:

- name and locate parts of the human body, including those related to the senses, and describe the importance of exercise, balanced diet and hygiene for humans
- describe the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults
- describe basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants
- identify whether things are alive, dead or have never lived
- describe and compare the observable features of animals from a range of groups
- group animals according to what they eat, describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships
- describe seasonal changes
- name different plants and animals and describe how they are suited to different habitats
- use their knowledge and understanding of the properties of materials, to distinguish objects from materials, identify and group everyday materials, and compare their suitability for different uses