Science at Rokeby Primary School

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1. Subject statement

Intent

At Rokeby, we believe that science helps to provoke children's natural interest and curiosity about the world in which they live. Our children are encouraged to explore and investigate through rich and varied opportunities so that they can develop a greater understanding of the world in which they live in and, through studying scientists and inventors, they can understand that science has changed our lives and is crucial to the world's future prosperity.

We want our children to become naturally inquisitive scientists and to understand what it means to be a scientist. We want them to develop scientific knowledge and conceptual understanding so that they know that:

- A scientist is someone with good biological knowledge who can name, describe, group and compare a variety of plants and animals, talking about the needs, habitats and life cycles of living things.
- A scientist is someone who can name, describe, group and compare rocks and soils and talk about how fossils are formed.
- A scientist is someone who can name, describe, group and compare materials, talking about suitability and uses of materials and changes of state.
- A scientist is someone who can talk about and understand physical phenomena such as weather, seasons, light, dark, sound, forces, electricity, Earth and space.

We want our children to develop their understanding of processes, methods and different types of enquiry so that they know that:

- A scientist is someone who can use their scientific skills and knowledge to ask questions, make observations, experiment, classify, apply their observations and ideas and record their findings.

We want our children to be able to build up a specialist scientific vocabulary so that they can use technical terminology with understanding and accuracy. We want to use discussion to probe children's understanding and to clarify any misconceptions.

In our children, we want to cultivate a life-long fascination about the world; to promote the children's interest & understanding of diverse animals, plants, materials, physical phenomena and natural and human environments. Our science curriculum is underpinned by both The National Curriculum 2014 and The Rainbow Continuum.

Implementation

Science is taught in blocks throughout the year. The science topic is sometimes based around the class text. When this is possible, it ensures that the children are fully immersed in their learning and can transfer their scientific knowledge to a range of curriculum areas.

Cross curricular outcomes in science are sometimes specifically planned for, with strong links between science and morning literacy lessons clearly identified and utilised. There are also strong links to enable children to apply their mathematical knowledge to their understanding of science so that they can collect, present and analyse data confidently and accurately. The programmes of study for Animals Including Humans and Living Things contain strong links to our All About Me programme.

Our National Curriculum provision for science is clearly mapped out for each group so that progression and development of skills and knowledge is key. We promote our children's language and vocabulary by frequent questioning, use of their Foundation Subject Dictionary and through the use of displays.

All KS1 and KS2 class teachers identify which children are WTS, EXS and GDS in the areas of science and edit and adapt planning and future lessons in reflection of this.

Opportunities for children to develop their scientific knowledge and skills through practical and first hand learning are key to the implementation of the science curriculum. At Rokeby we provide an after school science club. We invite in visitors and, whenever possible, we make use of links with local secondary schools to enable children to make visits to other settings that will allow them to access more specialised equipment and to take part in stimulating experiments.

Our PTA supports the development of the science curriculum by providing engaging experiences such as a mobile planetarium.

Pupil voice discussions, conducted by our science leader, enable us to take account of children's ideas and suggestions about what they enjoy doing and finding out and it can lead to new extra-curricular activities. At Rokeby the children take part in a range of stimulating activities and investigations as part of British Science Week.

Impact

2. Assessment

Assessment for learning:
Teachers use skills of questioning and evidence from prior learning to establish what children already know. This can involve dialogue with colleagues or information from other settings as part of transition.
Teachers use observations of children, questioning and marking to inform next steps planning for science. They may edit and adapt their planning and future lessons in reflection of their findings.

Assessment of Learning:
All KS1 and KS2 class teachers identify which children are WTS, EXS and GDS in the areas of science. Half termly assessments are shared with the science subject leader and kept in a section of the Science subject leader file so that the subject leader has knowledge of these assessments when carrying out lesson observations, learning walks or book trawls. This enables the Science subject leader to look at specific ability groups if desired such as progress of children working below expected levels or progress and attainment of children working above year group expectations.

3. Planning and Resources

Teachers use the science half termly overviews as the basis for their planning. These overviews specify WALTs linked to both The National Curriculum 2014 and The Rainbow Continuum for years 1 to 6. The WALTs cover aspects of scientific knowledge to be taught and relevant aspects of working scientifically so that children are learning to develop their enquiry skills, methods and processes as they expand their knowledge.
The half termly WALTs for EYFS are linked to guidance in Development Matters and work towards children achieving the Early Learning Goal in The World aspect of Understanding the World at the end of Reception.
There is a central bank of resources for Science which all teachers can access to support their teaching.

4. Teaching and Learning in the Early Years Foundation Stage (EYFS)

Some EYFS outcomes in the areas of Health and Self Care and Exploring and Using Media and Materials are prerequisite skills for science in the national curriculum. For example, children observing the effect of physical activity on their bodies (Health & Self Care 30-50 months), eating a healthy range of foodstuffs, understanding a need for variety in food (H & SC 40-60 months) and showing some understanding that good practices with regard to exercise, eating, sleeping and hygiene can contribute to good health (H & SC 40-60 months) all support later learning in the Animals including Humans aspect of National Curriculum Science. In the same way, so does the Early Learning Goal that children "know the importance for good health of physical exercise and a healthy diet and talk about ways to keep healthy and safe."

The outcome in Exploring and Using Media and Materials at 30-50 months "begin to be interested in and describe the texture of materials" prepares the children for future learning in the national curriculum area of Everyday Materials. The outcome "explores and learns how sounds can be changed" (EMM 30-50 months) prepares children for later national curriculum study of Sound. There are also cross curricular links here because many of the Phase 1 Letters and Sounds activities that our Nursery children take part in will pave the way for later learning about Sound.

Outcomes at 30-50 and 40-60 months from the World aspect of Understanding the World and the Early Learning Goal teach skills and knowledge that all feed into national curriculum science.

At Rokeby, EYFS children are given opportunities to examine and explore creatures, people, plants and objects, to observe and manipulate materials and to talk about similarities, differences and change.

Some of these activities are adult led and can involve whole class, group or one to one work. For example, supporting children to take part in planting activities or taking them on seasonal walks around the environment to help develop their understanding of growth and change; adults supporting children to investigate and describe changes to solids and liquids through directed cooking activities such as melting chocolate to make Easter nests; or adults assisting children to learn about their senses by asking questions and encouraging children to describe, touch, smell and taste a range of Harvest fruit and vegetables.

Some EYFS scientific learning arises incidentally such as unplanned interactions that occur when a child discovers a bug whilst playing outdoors or notices a spider's web. Other opportunities for learning arise out of children's interests such as the child who is fascinated about dinosaurs or space.

Some activities are available as part of the continuous provision; for example, providing opportunities and resources to enable children to explore the concepts of floating and sinking whilst at the water play area or putting out wet and dry sand to allow children to investigate texture as part of their play.

Whilst engaged in their play, children are encouraged to be curious and to ask questions about how and why things happen. Adults question the children about how things work and assess how well children in our Nursery and Reception classes are able to use early scientific skills such as exploring, observing, thinking, making decisions and talking about the world around them.

Visitors and visits are planned into the children's experiences. For example visits from a mother and her baby or visitors bringing in their young pets help our EYFS children to begin to understand about life cycles.

5. Teaching and Learning- Key Stage One and Key Stage Two

Our science curriculum for key stages 1 and 2 is underpinned by both The National Curriculum 2014 and The Rainbow Continuum. Science is taught in blocks throughout the year in accordance with the half termly overviews. The half termly science topic is sometimes based around the class text. Opportunities for children to develop their scientific knowledge and skills through practical and first hand learning are key to the implementation of the KS1 and KS2 science curriculum. Lessons generally take place weekly although there may be occasions where additional science sessions are taught such as during British Science Week.

6. Gifted and Talented Pupils

Teachers might use a range of strategies to extend learning for gifted and talented children in the area of science. These can include:

- Using open ended questioning to probe their higher level thinking skills
- Using higher order vocabulary and teaching advanced scientific vocabulary to G & T children
- Building on the child's prior knowledge and enthusiasm which may be in a particular area of science
- Offering enrichment activities or more complex hypotheses for these children to probe
- Fostering independent thinking by asking them to plan, carry out and analyse their own investigations
- Working with a buddy from another year group
- Providing challenges and activities that are differentiated from other learners. This differentiation might be by task, outcome or level of support offered.
- Streamlining work that gifted and talented children can master at a faster pace than their peers
- Raising expectations by consistently requiring G & T children to analyse, cite evidence and evaluate
- Offering extended activities or a series of projects to be carried out over time
- Increasing the use of abstract ideas to allow opportunities for gifted and talented children to extend their knowledge and understanding of scientific rules, principles and relationships
- Offering open ended tasks to develop G & T children's creative and critical thinking skills
- Using ICT to allow gifted and talented children scope to carry out independent research
- Offering real world contexts for problem solving
- Expecting G & T children to draw their own conclusions, identify patterns and make generalisations
- Encouraging gifted and talented children to engage in wider opportunities such as attending the after school science club run by students at Rugby School

7. The Role of the Subject Leader

As Science subject leader, the role includes:

- Writing action plans for development of science across the school
- Attending Science Subject Leader conferences and feeding back to staff
- Attending other science focused relevant CPD and updating staff on new ideas or initiatives
- Organising a science display in the hall to showcase progression of science skills from EYFS to Year 6
- Organising and promoting British Science Week across school
- Holding pupil voice discussions to gather children's understanding and views about science
- Collating, considering and responding to the children's ideas as a result of these discussions
- Sending out staff questionnaires to ascertain staff strengths in the teaching of science and to support staff who may indicate that they would like further help
- Auditing, organising and purchasing resources
- Attending STEM meetings as part of the MAT
- Carrying out learning walks or lesson observations to see science practice across school
- Offering advice to colleagues in response to observations
- Keeping colleagues up to date with resources and science activities available including useful websites
- Writing and reviewing the school science provision map and vocabulary progression grid
- Looking at children's books, learning journals and classroom displays to see evidence of science learning
- Looking at and supporting teacher's planning and assessment for science

8. Parents/ Carers

Parents and carers are involved in their child's learning by:

- Sharing half termly curriculum overviews with families so that they are aware of what is being taught as part of National Curriculum Science in years 1-6 or Understanding the World activities in EYFS
- Using home learning activities to consolidate learning that has taken place or to research new topics
- Inviting families into school and Nursery to take part in shared learning activities
- Reporting annually to parents on their children's progress and achievement
- Working closely with Rokeby PTA to provide additional opportunities for the children including educational visits or experiences such as a visiting planetarium