



ROKEBY PRIMARY SCHOOL

PART OF STOWE VALLEY MULTI ACADEMY TRUST

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

Pupil Voice discussions have demonstrated that our Science curriculum is having a positive impact on pupil's attitudes to Science, their knowledge and their understanding:

- Many children are now confidently using the words experimenting & testing in relation to science
- Many children can now mention specific things that they have learnt about including animals, plants, light/dark, electricity and space
- Many children associate science with "learning new things"
- Children are now using specific scientific language such as circuit, shadow & root
- Children can now speak about topical science issues such as vaccines
- Overwhelmingly, children are speaking enthusiastically about enjoying carrying out practical investigations and experiments
- Children can now speak about what a scientist is and their answers commonly relate to testing, experimenting and finding things out (including cures, inventions and discoveries)

New initiatives that have been introduced such as the Science display board have helped to raise the profile of Science amongst children and staff.

Participation in British Science Week has provided additional stimulating opportunities and experiences of Science across the school and helped to promote further enjoyment of the subject.

The introduction of an after school Science Club run by specialist staff from the community ignited children's interest and enthusiasm for science prior to Covid restrictions. We hope to reinstate this soon.

The introduction of vocabulary folders has ensured that children are being taught scientific vocabulary across key stages 1 and 2 linked to the half termly objectives and are having opportunities to demonstrate that they understand what these terms mean.

The impact of the Science subject leader receiving regular communication with the regional mentor for the Primary Science Teaching Trust has been that she is able to pass on updated information to staff in school about initiatives in science, new resources, competitions, funding and CPD opportunities that all support curriculum enrichment in the teaching of Science at Rokeby.

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 WILFs 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 our Rokeby EYFS Curriculum and work towards children achieving the Early Learning Goal in The Natural 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 Managing Self and Creating With Materials are prerequisite skills for science in the national curriculum. For example, children managing their own basic hygiene and understanding the importance of healthy food choices (Personal, Social and Emotional Development, Managing Self, Early Learning Goal) support later learning in the Animals including Humans aspect of National Curriculum Science.

The outcome in Creating With Materials "Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function" prepares the children for future learning in the national curriculum area of Everyday Materials.

Outcomes from The Natural World aspect of Understanding the World 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. Spiritual, Moral, Social and Cultural Development

As part of implementing our Rokeby Science curriculum, we also incorporate opportunities, where possible, to further the Spiritual, Moral, Social and Cultural Development of our children. This may include:

Spiritual

- Helping children to appreciate the awe and wonder of the natural world
- Helping children to marvel at the scale of living things from a tiny insect to the tallest tree
- Helping children to marvel at how animals and plants are adapted to suit their environment, such as the wonder of camouflage
- Drawing children's attention to the complexity of living things, such as the intricacy of a spider's web
- Encouraging children to notice the beauty of natural phenomena such as rainbows, waterfalls, crystals and mountains
- Teaching children about the diversity of our planet, such as contrasting environments from tropical rainforests to deserts and polar landscapes

Moral

- Holding discussions to help children to ask questions about the effects of human activity on our planet such as deforestation, pollution, global warming, using chemicals on the land and endangered species
- Helping children to understand the importance for our planet of waste reduction and recycling

Social

- Providing opportunities for children to take part in paired and group practical investigations
- Encouraging children to share their ideas and their observations
- Teaching children to listen to and appreciate different viewpoints
- Supporting children to debate scientific questions and problems
- Helping children to understand the positive effect that science can have on human lives, such as the discovery of medicines and vaccines
- Helping children to notice the effect that the weather has on human lives
- Helping children to recognise the impact of diet, drugs, exercise and lifestyle on the way the human body functions

Cultural

- Helping children to learn about the work of scientists from different cultures and ways of life such as Louis Pasteur, Marie Curie, Anders Celsius, Jane Goodall, Thomas Edison and Mae Jemison

8. 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

9. 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 The Natural 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

10. Safeguarding

Integral to our Science curriculum at Rokeby, we place high value on the importance of teaching children strategies to keep themselves physically, mentally and emotionally safe.

We do this by:

- Teaching our EYFS children about the importance of washing their hands thoroughly and often
- Teaching our Year 1 children about wearing the right clothes for the weather and seasons, applying sun cream, wearing a sun hat and drinking plenty of water during hot weather
- Teaching our Year 2 children about the basic needs of humans, the importance of exercise, eating the right amounts of different types of food and the importance of good hygiene
- Teaching our Year 3 children that animals including humans get their nutrition from what they eat and need the right types and amounts of nutrition.
- Teaching our Year 3 children to recognise that light from the sun can be dangerous and that there are ways to protect our eyes
- Teaching our Year 4 children about electrical safety and about good dental hygiene
- Teaching our Year 5 children to understand about changes to their body during adolescence and puberty
- Teaching our Year 6 children to recognise the impact of diet, drugs, exercise and lifestyle on the way our bodies function

During investigative work, we also teach children about safe use of equipment, using protective clothing such as goggles where appropriate and safe handling of objects and materials. There is a risk assessment for Science which details safety control measures that staff take when teaching a range of Science activities.

11. Children with SEND (Special Educational Needs and Disabilities) in Science

At Rokeby, staff treat all children fairly and equally, regardless of their gender, race, religion, or ability. All children matter, are made welcome and are given opportunities to achieve their best.

Rokeby has a very inclusive ethos throughout the school and Nursery and this is reflected in our Science curriculum which has ambitious aims that are accessible for all children through its carefully sequenced Science Progression Map.

When planning and teaching Science, Rokeby staff:

- Provide a positive, supportive environment where every child is included in lessons and adaptations are made, as needed, to enable children with SEND to succeed
- Consider the specific needs of pupils with SEND and use targets from their learning plans to provide the necessary means for them to fully access the learning
- Ensure that high quality teaching of Science is the starting point for all children
- Carefully select small group and 1:1 interventions so they are clearly targeted towards the needs of children with SEND and enable them to make accelerated progress
- Plan effectively and specifically for TAs so that their use impacts directly on the learning of children with SEND

As part of high quality teaching of Science, staff may use a number of the following strategies:

- Scaffolding – modelling how to conduct a practical experiment or investigation for an SEND child or group of children the first time they try an activity; providing writing frames for SEND pupils to refer to enable them to record their findings, leading onto reducing the amount of support offered on a writing frame to enable SEND pupils over time to record their own work
- Providing explicit instructions – breaking instructions down into smaller steps for SEND children who are carrying out investigations; reducing the complexity of scientific terminology or providing examples of what new scientific words mean to enable SEND children to understand words used in instructions; providing opportunities for SEND children to repeat experiments in different contexts to enable them to build and consolidate their learning over time; providing examples of what good scientific learning looks like so that SEND children have clear models of what is expected and what to aim for
- Making use of technology – providing alternative means for children to present their scientific findings such as using Talking Tins, PowerPoint presentations, video recordings or use of software such as Clicker 8 and apps to support note taking and recording of their scientific discoveries
- Choosing techniques to support children's cognitive and metacognitive understanding – teaching children mnemonics to help them to remember information, such as the names of the planets in the solar system; pre-teaching new scientific vocabulary; providing checklists of headings to include when writing up an experiment or useful equipment that children might want to use; scaffolding the thought process or using sustained sharing thinking by thinking aloud for children ("I'm wondering if this object will float or sink when I place it in the water."); providing visuals such as aided communication mats, Communicate in Print cards or picture word banks to support children with cognition, learning and communication needs; using Makaton to support pupils with SEND
- Being flexible with groupings – this might include grouping children with similar SEND needs together to provide them with the additional support that they need or pairing SEND children with good role models such as children with good scientific understanding.