

Eleanor Palmer Primary School

Science Policy

Science at Eleanor Palmer

At Eleanor Palmer we believe that through the study of science, children develop a sense of the world and how it works! We believe it is a great tool of exploration and collaboration.

All year groups have specified Science learning objectives which are outlined in our Long Term Plan (see appendix). These objectives are broadly in line with the National Curriculum which states what year groups should cover. Science is taught discretely for most of the year but for one term is the driving force behind the class topic.

What principles underlie the teaching of Science at Eleanor Palmer?

Knowledge is power - Children need to develop scientific understanding by acquiring the necessary knowledge to explain what they have observed and investigated. Teachers explain what happened and why in every session and encourage children to explore this understanding by applying it in different ways or different situations. Even in younger classes our sessions are grounded in scientific fact. We take the National Curriculum statements as the minimum requirement. For example, in Year 2 the teacher will deliver beyond the required labelling parts of a plant to explore different types of root, why some are bigger than others, why plants in arid areas might have deeper roots than others or why mangroves have such unusual root systems.

Practical enquiry where possible - *"Tell me and I will forget, show me and I may remember, involve me and I will understand."* Our teachers are confident enough to give children many and regular opportunities to work scientifically. Children use and apply investigative and practical skills in almost every Science session. Although in some instances the teacher may demonstrate something, the vast majority of lessons involve children carrying out tests in pairs, threes and small groups. This hands-on experience reinforces and embeds what they have heard and seen.

Collective curiosity - children develop a sense of excitement and curiosity about natural phenomena through observing and conducting a variety of experiments e.g. witnessing the power of a chemical reaction by observing Alka Seltzer and water exploding within a canister as part of learning on 'states of matter' or mixing cornflour with water to make 'Oobleck' and exploring unusual properties of liquids.

Children suggest what they test - Achievement is high when children plan, carry out and evaluate experiments that they have, in part, suggested themselves and this is emphasised in the Ofsted document, 'A survey into science education in schools' (2010-2013). Children need to make decisions based on previously acquired knowledge.

We like our children to suggest areas they would like to learn more about or pose questions that develop an earlier test, e.g. having discussed the impact heat and air flow has on water evaporation, they suggest putting bowls of water in locations around the school, predicting what they expect might happen. Teachers set up experiments that have this scope, and allow time for pupil planning and resource gathering so these tangents can be fully explored.

We encourage questions - We love our children to ask challenging questions and will admit that we may not know the answer ourselves. We want to be part of the journey to finding out and will support learners in setting up investigations or carrying out research to help answer the questions they pose, e.g. having observed how sultanas behave in lemonade a child asks "Would dried blueberries behave the same way?" or "Do all dried fruits behave this way in fizzy drinks?"

Children should talk - We want our children to be active learners who ask questions and talk about their learning. Science lessons should generate a buzz. Children will be actively engaged in discussions about concepts, might challenge statements and verbally work through new ideas to develop understanding. Science is not about teaching from the front but about actively seeking out thoughts, opinions and misconceptions so these can be addressed and developed.

Science is fun and engaging - Although all our Science teaching is grounded in knowledge and understanding we want our children to develop a sense of awe at their world. Teachers are encouraged to plan in some 10 minute 'Wow Science' experiments. These are those experiments that can appear magical until the science behind them is explained. Why does water stay in a bucket swung around my head? How did I make an eggshell soft enough to push through the neck of a bottle?

Visits are used to develop interest - As in all areas of the curriculum we actively seek out visits to enhance learning. Children regularly go out to experience science in the 'real world'. This might be a seasonal walk to Hampstead Heath in Year 1, a visit to the Royal Institution to learn about DNA in Year 5 or a practical session at the Royal Veterinary College in Year 6. Visits are relevant and linked to classroom learning.

'Thinking Science' at Eleanor Palmer

We expect our teachers to use strategies to promote thinking in science by ensuring children use these 5 tools for scientific investigation across the year. It serves as a useful memoire when planning a year's work:

- Classifying - this involves children sorting and grouping, from identifying similarities and differences between two objects to choosing a criterion by which to sort. Classification is a useful tool with which to start many science topics
- Comparative and fair testing - this involves identifying variables that will affect outcome
- Using a survey - this involves looking for patterns in data, from the very simple to more complex involving two variables

- Problem solving - when children use their knowledge to solve a problem in context
- Observing - which involves watching something over time

Children use their observations and results to draw conclusions, make predictions and suggest ideas. They present their data in a variety of ways which help them to answer the initial question posed.

The practicalities of science at Eleanor Palmer

- Science is taught for the equivalent of an hour weekly, either in the classroom or our award-winning Lab
- It is taught by the class teacher, or sometimes by a support teacher with specialist knowledge e.g. Susie Yaffe during discrete units;
- Cross curricular links are made where possible - for example in literacy work on explanation or in links to history and geography topics;
- Science is recorded in separate, red Science books and work, at times, is displayed and celebrated
- Science books are monitored half termly alongside other core subjects by the SLT
- Science is linked to practical experiences and enquiry whenever possible;
- Teachers use a variety of teaching methods: modelling, demonstration, use of internet links and video, experiments (both immediate and over time), research, discussion and debate;
- Topics are re-visited but expanded and developed as children move up the school;
- Relevant discussion is encouraged;
- Groups are encouraged to communicate their findings in a variety of ways such as diagrams, posters, concept cartoons, mind maps, talking partners and group scribing and
- Homework is used to support science through tasks such as finding answers to questions posed in school, research using books, Internet and interviews with friends and family.

Inclusion

We provide a variety of approaches and tasks appropriate to ability levels. These include:

- Groups are often mixed in ability to promote peer teaching;
- We specifically target and support children with learning barriers or who are having difficulty in understanding particular concepts or vocabulary;
- Teachers and TAs work with specific children to promote understanding and
- We have good quality resources, centrally stored, and provide enough so that children have access to hands on experiences.

Planning and Assessment

Teachers write detailed termly plans for science which are then discussed with the Head in the termly planning meeting. These will outline objectives and activities. Teachers are guided by the vertical science curriculum plan, which ensures that scientific knowledge and skills are built upon year on year by clearly outlining a progression of topics and objectives.

Each Science unit starts with an assessment activity to find out what children already know and understand. Planning will be adjusted or written in response to this task. 'Concept maps', brainstorming and quizzes are a great tool for assessing prior knowledge. We repeat the task at the end of the unit to see what children have learnt. We actively encourage the use of 'Concept Cartoons' (by Millgate House) to assess children's understanding of specific concepts, both to start and/or end a teaching session.

Formative assessment is carried out while a task is being completed - through discussion, specifically questioning between child and teacher. It can be carried out through observations of children working in groups or individually. Our questioning aims to help children learn by encouraging them to think critically about what they have achieved.

Parents are informed of science units and topics to be covered at the beginning of the term through the topic letter, and, for the term in which the class topic is science led, through the EP Collectible. There is an opportunity for parents to see work and discuss progress at the mid year meeting and class teachers are always willing to show and discuss science at other times. Progress in science is formally reported in the end of year school report and parents' meetings.

Monitoring

Science books are monitored at least half-termly by a member of the SLT with responsibility for Science and alongside other core subjects. Verbal feedback is given to individuals within a week of the 'book look' and general points to the staff team. Book looks focus on progress over time, marking and feedback, a consistent school approach and policy to practice. They can result in discussion about how we teach and record science and our practice is amended in the light of this.

The monitoring of science by the Governing Body is managed by subject lead, Tom Gibson. Monitoring is carried out in partnership with a member of the Governing Body, for the last eight years this has been Boris Telyatnikov. Monitoring occurs annually or as identified in the School Development Plan (SDP) and generally involves Pupil Discussion Groups with samples of children from Year 1-6 and a 'book look' to see links between policy and practice.

Feedback is written and presented to the Curriculum Committee. Reference is made to previous findings and developments so there is a record of progress over time. Records of these visits can be found in Curriculum Committee Minutes

Appendix 1 - Grid of units

Class teachers review their topic order each year but we generally keep the same topics in the same year groups to ensure that all areas are taught and that there is progression throughout the school. Many areas are revisited as outlined in the National Curriculum. Science based topics are in bold.

Year Group	Science Units
Foundation Stage	Science is taught through the area 'Knowledge and Understanding of the World'. Topics include 'Animals', 'Dinosaurs' and 'In the Air'
Year 1	Seasonal Change (To include regular Heath walk to observe seasonal change and to provide a context for plant work in particular) Plants Animals, including humans Everyday materials Light
Year 2	Animals, including humans Living things and habitats Everyday Materials Sound
Year 3	Plants (through maintaining the EP garden) Rocks Magnets
Year 4	Animals Living things and habitats - classification States of matter Light Electricity
Year 5	Animals, including humans Living things and habitats Properties and changes of materials Earth and Space
Year 6	Forces Animals, including humans Living things and habitats Evolution and inheritance