

Woolenwick Junior School

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Aims and objectives

Science is a core subject in the National Curriculum (2014). Through science children develop an understanding of natural phenomena. It aims to stimulate a child's curiosity in finding out why things happen in the way they do. It teaches methods of enquiry and investigation to stimulate creative thought. Children learn to ask scientific questions and begin to appreciate the way science will affect their future on a personal, national, and global level.

The aims of science are to enable children to:

- stimulate and excite children's curiosity about phenomena and events in the world around them;
- develop an awareness of the impact of science on everyday life;
- develop children's scientific knowledge and understanding through scientific enquiry;

- ask and answer scientific questions;
- plan and carry out scientific investigations, using equipment, including computers, correctly;
- know and understand the life processes of living things;
- know and understand the physical processes of materials, electricity, light, sound and natural forces;
- know about and understand the nature of the solar system, including the earth;
- know about and understand evolution and inheritance;
- evaluate evidence and present their conclusions clearly and accurately;
- introduce and encourage the use of correct scientific vocabulary;
- develop an understanding of working safely

Teaching and learning style

We use a variety of teaching and learning styles in science lessons, based on a VAK (visual, audio and kinaesthetic) approach (see the Teaching and Learning Policy). Our principal aim is to develop children's knowledge, skills, and understanding. Sometimes we do this through whole-class teaching, while at other times we engage the children in an enquiry-based research activity.

Through open ended questioning children are encouraged to answer, and then ask scientific questions. They have the opportunity to use a variety of data, such as statistics, graphs, pictures, and photographs. They use computing in science lessons where it enhances their learning. They take part in role-play and discussions and they present reports to the rest of the class. They engage in a wide variety of problem-solving activities. Wherever possible, we involve the pupils in 'real' scientific activities, for example, researching a local environmental problem or carrying out a practical experiment and analysing the results. We recognise that there are children of widely different scientific abilities in all classes and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child.

We achieve this in a variety of ways by:

- setting common tasks which are open-ended and can have a variety of responses;
- setting tasks of increasing difficulty (we do not expect all children to complete all tasks);
- grouping children by ability in the room and setting different tasks for each ability group;
- providing resources of different complexity, matched to the ability of the child.

Science curriculum planning

The school follows the National Curriculum for science as the basis of its curriculum planning. We follow a thematic approach to learning, which encourages cross curricular links. The national scheme has been adapted to the local circumstances of the school in

that we make use of the local environment in our fieldwork and we choose a locality where the physical environment differs from that which predominates in our immediate surroundings.

We carry out our curriculum planning in science in two phases (long-term and medium-term). The long-term plan maps the scientific topics studied in each term during the year and key stage. The science co-ordinator works this out in conjunction with teaching colleagues in each year group. In some cases we combine the scientific study with work in other subject areas, at other times the children study science as a discrete subject.

Our medium-term plans, which we have based on the National Curriculum, give details of each unit of work for each term. These plans list the specific learning objectives, differentiated activities and assessment opportunities of each lesson and cross-curricular links are highlighted. The class teacher keeps these individual plans within a folder and also on the server. S/he and the science co-ordinator often discuss them on an informal basis. The science coordinator keeps and reviews these plans. In this way we ensure complete coverage of the National Curriculum without repeating topics.

We have planned the topics in science so that they build upon prior learning. We ensure that there are opportunities for children of all abilities to develop their skills, knowledge and working scientifically in each unit. We also plan progression into each topic, so that the children are increasingly challenged as they move up through the school.

The contribution of science to teaching in other curriculum areas

English

Science contributes significantly to the teaching of English in Woolenwick by actively promoting the skills of reading, writing, speaking and listening. Some of the texts that the children study during English are of a scientific nature. The children develop oral skills in science lessons through discussions and through recounting their observations of scientific experiments. They develop their writing skills through writing reports and projects and by recording information.

Mathematics

Science contributes to the teaching of mathematics in a number of ways. The children use weights and measures and learn to use and apply number through, for instance, data handling. Through working on investigations they learn to estimate and predict. They develop the skills of accurate observation and recording of events. They use numbers in many of their answers and conclusions. They are encouraged to make a conjecture and then, through investigations, convince the teacher through discussions and recorded evidence.

Computing

Children use computing in science lessons where appropriate. They use it to support their work in science by learning how to find, select, and analyse information on the Internet. Children may use computing to record, present and interpret data and to review, modify and evaluate their work and improve its presentation. The children use a variety of technology to assist their enquiry, including data loggers to accurately record sound levels and iPads to record investigations.

Personal, Social and Health Education (PSHE).

Science makes a significant contribution to the teaching of personal, social and health education. This is mainly in two areas. Firstly, the subject matter lends itself to raising matters of citizenship and social welfare. For example, children study how to maintain a healthy diet and healthy body. Secondly, children benefit from the nature of the subject in that it gives them opportunities to take part in debates and discussions. They are encouraged to reflect on matters of concern to them, such as environmental issues or their future paths.

Spiritual, Moral, Social and Cultural Development (SMSC)

Science teaching offers children many opportunities to examine some of the fundamental questions in life, for example, the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the teaching of science, children have the opportunity to discuss, for example, the effects of smoking and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

History

Children learn about significant scientists from the past who have transformed, through their scientific work, something around them. We learn about male and female scientists who come from all around the world. This gives all children an understanding of ambition and aspiration.

Teaching science to children with Special Educational Needs and Disabilities (SEND)

We teach science to all children, whatever their ability. Science forms part of the school curriculum policy to provide a broad and balanced education for all children. We provide learning opportunities that are matched to the needs of children with SEND. Our work

in science takes into account the targets set in the children's individual Passport for Learning.

Assessment and Recording

We assess children's work in science using Assessment for Learning (AFL) as we observe them during lessons. On completion of a piece of work, the teacher marks the work and comments as necessary, as per our marking policy. At the beginning of a unit the children complete a pre-assessment and at the end a post-assessment. At the end of a unit of work s/he makes a summary judgement about the work of each pupil in relation to the Herts for Learning, science assessment criteria. Children are assessed based on a 'phases' system.

Phase A relates to the typical expectations of children working in KS1 (Years 1 and 2).

Phase B relates to the typical expectations of children working in Lower KS2 (Years 3 and 4).

Phase C relates to the typical expectations of children working in Upper KS (Years 5 and 6).

It should be noted that some children may be working within a phase below their chronological age. This is due to the higher expectations of the new National Curriculum.

We also use APP (Assessing Pupils' Progress). We APP a selection of abilities and gender children, a maximum of 8, to then assist us determine which phase the children are in.

The teacher records the attainment grades. We use these grades as the basis for assessing the progress of each child and we pass this information on to the next teacher at the end of the year. We share assessment information with parents. At the end of Key Stage 2 parents receive a levelled assessment of their child in science.

Safety

all investigations are carried out in accordance with national safety guidelines published in the ASE 'Be Safe' publication. Safety issues are recorded on medium term plans and teachers notify the science co-ordinator if there are any amendments or concerns. In addition to this, advice is available from CLEAPSS.

Resources

We have sufficient resources for all science teaching units in the school. We keep these in a central store where there is a box of equipment for each unit of work. Data loggers and iPads are stored in the computing suite. The library contains a good supply of science topic books to support children's individual research.

Monitoring and review

It is the responsibility of the science co-ordinator to monitor the standards of children's work and the quality of teaching in science. The science co-ordinator is also responsible for supporting colleagues in the teaching of science, for being informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school. The science coordinator gives the headteacher an annual summary report in which s/he evaluates strengths and weaknesses in the subject and indicates areas for further improvement. The science co-ordinator has specially-allocated time for fulfilling the vital task of reviewing samples of children's work and visiting classes to observe teaching in the subject and ensuring that progress is being made.