Science Policy

Primary Science is a core subject in the National Curriculum. Primary science encompasses physical, chemical and biological aspects of our world, as well as the ability to work scientifically and investigate different concepts.

Subject vision statement

Why do we teach what we teach? (Our intent)

The principle of our science teaching is to enable pupils to have first-hand learning experiences, observe phenomena and to make sense of their world. At Oak Green we want pupils to be eager scientists, develop their natural curiosity and be ready to ask questions to further their knowledge and skills. We aim to provide pupils with a knowledge and skills-based curriculum that also gives them real world uses of science. Our curriculum aims to encourage pupils to use the knowledge they learn in Science, and apply it to investigations and enquiries in physics, chemistry and biology. We believe that it is vitally important that children develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage.

How do we teach it? (Our implementation)

At Oak Green we follow the science programme of study from the National Curriculum, using PLAN guidance. The programme of study describes a sequence of knowledge and concepts to develop a deep understanding of science. Pupils have weekly lessons in science throughout Key Stage 1 and 2 and in Early Years, science is taught through 'Understanding of the World' in their continuous provision. We want our pupils to acquire and then secure knowledge and transferable skills that are progressively embedded from the very beginning of their learning journey to transitioning to life beyond Oak Green. To ensure we develop the children's knowledge and understanding we make the teaching of science as practical and hands on as possible to ensure a sense of enjoyment. Sometimes we do this through whole-class and small group teaching, while at other times we engage the pupils in an enquiry-based activity. We encourage our pupils to ask, as well as answer, scientific questions through collecting, analysing and presenting data and the use of concept cartoons and Explorify resources. As well as the necessary knowledge and concepts it is important that children understand the methods and processes of science. 'Working scientifically' focuses on the key features of scientific enquiry this includes:

- observing over time
- pattern seeking
- identifying
- classifying and grouping
- comparative and fair testing (controlled investigations)
- researching using secondary sources.

Through the vocabulary progression of skills for each topic, specific scientific vocabulary is introduced to pupils, which is regularly referenced back to. Pupils are exposed to high quality texts which supports their learning of science. Outdoor learning is carefully planned for throughout the year along with taking part in 'Outdoor Learning Day'.

What is the difference that this makes? (Our impact)

At Oak Green pupils enjoy science because it taps into their natural curiosity, inquisitiveness and provides opportunities for awe and wonder. They develop a keen interest in the world around them and ask deep and well considered questions. The pupils can re-call the rich and memorable learning experiences that they have been provided with and have a wide science vocabulary. They are able to make thoughtful predictions about the answers to their questions and can test ideas and draw conclusions from their results through planned investigations. They show confidence in understanding scientific concepts, recognising science enquiry and

understanding how science is relevant to our world. The progression throughout the year groups allows the children to progress year on year and at a pace appropriate to the leaner. We nurture learners' roots to support growth and take pride in their achievements both personally and across the curriculum. We aspire for our learners to have the determination and perseverance to achieve their full potential

Teaching and Learning (including planning)

Early Years Foundation Stage
The EYFS provides activities and experiences for children in seven important and inter-connected areas of learning and development. The specific area 'Understanding the World' particularly involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment. This is implemented through planned, purposeful play and through a mix of adult-led and child-initiated activity offering the three characteristics of effective teaching and learning: playing and exploring; active learning; creating and thinking critically.

Key Stages 1 and 2
Programmes of Study for science are set out in the National Curriculum and Oak Green School progression of skills. The NC Programmes of Study for KS1 and KS2 describe a sequence of knowledge and concepts:

- Working Scientifically
- Use of Everyday Materials
- Animals including Humans
- Plants
- Living Things and Their Habitats
- Light
- Forces and Magnets
- Rocks
- Sound
- Electricity
- States of Matter
- Forces
- Properties and Changes of Materials
- Earth and Space
- Evolution and Inheritance

(See Oak Green Schools science and working scientifically curriculum maps.)

It is important that pupils make progress and develop a secure understanding of each key unit of knowledge and concepts in order to progress to the next stage. Our science is taught as a discrete subject, however there are at times links within the wider school curriculum. Our curriculum is mapped out to match the Cornerstones curriculum where possible. We use different contexts to maximise pupils' engagement and motivation. Best use is made of the school environment, curricular links, hooks and stimuli, including visits, visitors, trips, events and display of vocabulary and information to promote science.

At Oak Green we carry out a key scientist / inventor study for each unit from year 1 to year 6, this is to provide our children with further real-life links and to promote positive role models. Children should:

- Develop a knowledge and appreciation of the contribution made by famous scientists to our knowledge of the world including scientists from different cultures.
- Be able to relate their scientific studies to applications and effects within the real world.

'Working Scientifically' specifies the understanding of the nature, processes and methods of science for each phase KS1, LKS2 and UKS2. It is not taught as a separate strand but embedded within the content of biology, chemistry and physics, focusing on key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions and take part in science enquiries and investigations.

These should include:

- observing over time
- pattern seeking
- identifying, classifying and grouping
- comparative and fair testing (controlled investigations)
- researching using secondary sources.

Pupils should seek answers to questions through collecting, analysing and presenting data.

Children are assisted in making their thinking clear, both to themselves and others. Teachers ensure that pupils build secure foundations by using discussion to probe and remedy misconceptions. Pupils should be able to describe processes and key characteristics in common language, and should also be familiar with, and use, technical terminology accurately and precisely by building up a specific science vocabulary. They should apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. A balance of practical activities with recording in a variety of ways, including written, is planned for by teachers. This will emphasise practical, investigative and problem-solving activity wherever possible and activities to develop observation, thinking, hypothesising, predicting, questioning, experimenting, problem solving and recording and analysing. Children should:

- Develop a strong sense of enquiry and feel confident in questioning and challenging concepts, making suggestions and investigating their beliefs and understanding.
- Be able to make informed choices when selecting equipment for a range of practical activities.
- Understand and justify the need for a fair test and apply this to their practical investigations.
- Be able to make and take accurate measurements and observational notes and record these clearly in a range of forms.
- Be confident in explaining results, including anomalies, and analyse why these results occurred with increasing detail and scientific based justifications.
- Show a strong ability to discuss their thoughts and ideas.
- Be able to make links between different scientific concepts

Key Stage 1 Content

Science teaching in key stage 1 is for pupils to experience and observe events, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using books and the internet

Key Stage 2 Content

Science teaching in Lower Key Stage 2 enables pupils to broaden their scientific view of the world around them. They do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments. Lower Key Stage 2 pupils should develop the asking of their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them. Pupils begin observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.

Science teaching in Upper Key Stage 2 enables pupils to develop a deeper understanding of a wide range of scientific ideas. They do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At Upper Key Stage 2, pupils encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry.

Planning

At Oak Green we do not follow a brought in scheme of work for science. Teachers are to use the Oak Green long-term plan/ overview to create medium term plans for each science topic. This ensures statutory content and skills are covered. The teaching of science should be varied, exciting and challenging, using strategies appropriate to the concept or skills being taught. Planning should include adaptations to meet the needs of the children in each class. Staff must be alert to expectations for health and safety considerations in science (see appendix - Science Safety Guidelines). Planning is completed on the agreed planning format. Documents to show the expectations for each topic

- Science long term plan
- Progression of skills inc key vocabulary and scientist / inventor study
- Science overview - year 1 to year 6
- Science reading spine
- Science prior knowledge

Documents that can support teachers with their planning

- OGDEN TRUST - Big questions
- Outdoor learning in the National Curriculum and outdoor learning additional opportunities
- PLAN – examples of work / knowledge matrices
- ASE – Assessment, planning PowerPoints

Learning is evidenced through children's individual science book and the whole class science book, although the individual science book is the main place for children to complete their learning.

Lesson starters

All lessons must start with a starter activity to encourage the children to use their science knowledge, skills and vocabulary orally, including looking and building on previous knowledge. Science starters are to be taken from:

- Explorify
- Concept Cartoons

Children are to be given time to think, discuss with a talking partner and then to share their thoughts and ideas with the rest of the class. During the whole class discussion allows other children to agree or challenge views in a safe environment.

These are to be evidenced twice a half term in the whole class science book.

Outdoor learning

We provide opportunities for regular outdoor learning to take place through the school from EYFS to year 6.

Forest School

More information on Forest Schools can be found in the Forest School Handbook.

Resources

Resources are stored in the Daffodil room and organised into labelled trays and boxes. Resources are monitored by the science lead. Teachers should check available resources prior to start of new topics and approach Science Leader if required resources do not appear to be available.

- Useful websites are incorporated into lessons through the use of the Interactive Whiteboard, Chromebooks and I:pads available.
- Non-fiction and fiction books that link to the science are available in the school library and classrooms. Fiction books can be found in the 'reading spine'.
- The subject leader must be informed of any changes regarding science resources i.e. missing or broken resources and/or when new or replacement resources are required.

- Resources to support the teaching and learning of science are stored on the school system and staff have access to these. There are a large number of resources stored on the school system for staff to use to support the teaching and learning of science.
- When resources are updated or new resources are available staff are informed of these.

Children will have the opportunities to use the following resources: stopwatches, magnets, cells, wires, bulbs, switches, thermometers, sieves etc. in a range of environments: classroom, playground, field etc.

Children are briefed before using equipment to ensure correct and safe usage. When engaged in practical work, children should behave in a considerate, responsible manner, showing respect for other people and the equipment.

Assessment

All teachers' plans will include a clear Learning Objective, Success Criteria and Working Scientifically skill taken from the progression of skills.

Teacher assessments are made throughout the units of work, through discussion, observation and marking of work and this informs planning. In marking, verbal and written feedback is used. In written feedback comments are used to challenge those who have achieved the Learning Objective or to challenge children's misconceptions along with the correction of errors. For more details, refer to Feedback and Marking policy. Particular attention is paid to 'working scientifically' for accurate assessment of children's understanding.

By the end of each Key Stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant Programme of Study.

Teachers complete a best fit end point assessment for each topic. They assess children working below the expected level and working above the expected level using key knowledge and vocabulary. All children not included are working at the expected level. These will be given to the next teacher.

At the end of the year teachers will assess science as a whole and give each child an end of year level. These are recorded of Bromcom and given to the next teacher.

At the end of KS2, teacher-assessed judgements are reached, based on knowledge of how pupils have performed over time and across a range of contexts, considering strengths and weaknesses of performance. A level of attainment for the end of KS2 is determined for each child to say if they are working below the expected level or working at the expected level.

Equal opportunities/ Inclusion

This policy applies to all children regardless of their ethnicity, colour, preferred gender description, ability or disability, English language proficiency, religion, lifestyle or nationality. The accurate match of work to individual and group need is met through effective planning and delivery, based upon assessment and monitoring of progress. All children are challenged through provision, especially 'more able' pupils in science. Strategies are used accordingly, such as scaffolding learning, differentiation, e.g. variation in presentation of work or recording, targeted adult support or intervention strategies, mixed ability groups in investigative work which can be beneficial to all learners etc. Vocabulary will be reinforced for all children, in particular EAL pupils, e.g. through displays etc. We recognise the particular importance of first-hand experience for motivating children with learning difficulties.

The role of the subject leader and monitoring standards

- To support and guide the classroom practice of teachers and support staff.
- To ensure pupil entitlement to the National Curriculum
- To ensure coverage, continuity and progression in planning.

- To monitor and evaluate the effectiveness of geography teaching and learning and provide support for and development of the subject where appropriate.
- To update documentation where necessary.
- To produce action plans for the School Development Plan and manage the budget allocated effectively.
- To liaise and consult with outside agencies where appropriate.
- To prepare and lead INSET.
- To attend relevant INSET training.
- To review regularly the contribution made by geography to a meaningful curriculum.
- To conduct book scrutiny to monitor outcome and progress.
- To conduct pupil interviews.
- To assess learning environments.

To be read with (other policies):

- Curriculum Policy
- Teaching and Learning Policy

Monitoring and review

- Science lead

Appendix – (Science Safety Guidelines)

Staff and pupils should be aware of and note any potential hazards in order to minimise risks.

- Children should be given appropriate health and safety teaching and be shown how to work safely.
- Teachers should demonstrate equipment to avoid accidents or breakages.

Children must be encouraged from an early age to adopt correct and safe practice, particularly when carrying out practical activities, including:

- Risk assessments should be carried out if any hazard is anticipated.
- Working quietly and sensibly and using equipment safely and properly
- Chairs to be tidy and the environment uncluttered.
- Minimal amount of movement around the room but walking if carrying equipment
- Once practical work has begun, keeping hands away from their eyes and mouth
- Washing hands thoroughly after practical work, especially after outside work or handling animals
- Allergies noted, particularly if handling materials or food
- Hair tied back and clothing tucked in.
- Removing potential hazards from the room
- Batteries not kept in, e.g. Torches but in separate containers. Corroded batteries recycled appropriately.
- Check materials for use in the classroom are not hazardous, sharp or easily breakable.
- Use extreme caution and common sense when dealing with hot liquids (such as water for making jellies).
- Children should not be exposed to moulds or decaying materials – keep these in a tightly lidded container