

Tregoze Primary School

Science Subject Policy

The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them
William Lawrence Bragg, Nobel Prize-winning Physicist

I am among those who think that science has great beauty. A scientist in his laboratory is not only a technician: he is also a child placed before natural phenomena which impress him like a fairy tale.

Marie Curie, two-time Nobel Prize winner for Chemistry and Physics

Rationale:

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

The national curriculum for science aims to ensure that all pupils:

- develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics
- develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

Science Curriculum

Key stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, 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 secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must **always** be taught through and clearly related to the teaching of substantive science content in the programme of study.

Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower key stage 2 – years 3-4

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask 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, including 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. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

‘Working scientifically’ is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Upper key stage 2 – years 5-6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should 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, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. 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, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Teaching and Learning

At Tregoze Primary School we follow the ‘Mastery Learning Model’ when we teach Science. This involves spending greater time securing the National Curriculum objectives. Previously, when children were moved through the different Science skills too quickly, it resulted in them having gaps in their knowledge because the concept they had just learnt was either too big or learnt too quickly. As a primary school, it is our duty to ensure that children have an absolutely solid, concrete understanding of Science skills as well as encouraging them to embrace challenge.

Our intention is take learning at a measured pace. This will better ensure no child is left behind as well as providing deeper and richer experiences for children who are grasping ideas quickly. The children are only taught the content from their year group and not going beyond this. Simply going beyond the requirements of their age group does not guarantee they have fully understood something – just that they have heard it.

In essence, this means working towards:

- **Teach less, learn more** – focussed content, evidencing learning and progress;
- **No child being left behind** – the majority of children are enabled to keep up every day;
- **Space and time** – to experience and apply, with all children entitled to additional support to ensure they do not fall behind or to be challenged in their learning and go deeper with their understanding;
- **Understanding real life applications** – wherever possible for learning to be relevant and not abstract, to teach with a clear purpose.

Effective learning in Science will occur as a result of creative, challenging and inclusive teaching that supports the learning needs of all individuals in the class. A variety of different techniques will be used to record their learning such as- big floor books, videos, voice recordings, photos, sticky note observations, animation, PowerPoint presentations All lessons will open with a warm up activity and with a science jigsaw focus piece (see *Science Assessment*). Science learning walls are displayed in all classrooms which will include a class jigsaw with age related objectives for working scientifically, key vocabulary, success criteria and examples of the learning to help support the children with their independent learning.

Planning by the class teacher will address the fact that children respond most effectively to those activities that appeal to their preferred learning style(s). Class teachers facilitate ICT opportunities only where it is deemed that value will be added to teaching and learning. Practical investigations, fieldwork, school trips, drama, Socratic debates and puppets are common features of teacher's planning that focus on challenging children's scientific knowledge and understanding, whilst at the same time developing crucial Speaking/Listening and social skills. Science, as with most Curriculum subjects at Tregoe Primary School, is delivered in the context of 'Cross-curriculum' where links to other subjects are forged to support the child's wider perspective of learning and thus of science as a whole.

Science Assessment

An inclusive Curriculum should not rest on a child's ability to convey their Knowledge and Understanding of Science in written form. Subsequently, class teachers deploy a variety of assessment strategies to ascertain children's skills, development and knowledge and understanding. These range from: oral assessments/conversations to dramas, teacher observations and pupil self assessment. Teachers planning will ensure sufficient opportunities are provided to assess (and re-assess, if required) a child's progression within the subject. A clear progression of investigative skills ensures that children develop their ability to question, predict, observe, fair test, measure, record, analyse, evaluate and conclude in a variety of contexts. Excel sheets are used to track progress of the age related objectives for each child and are updated termly. If the objective is met, this is highlighted in green.

Each term there is a focus working scientifically jigsaw piece. Once this is met it is joined to the class jigsaw. The aim is that by the end of the term the class jigsaw will be completed. Attainment is tracked by individual working scientifically jigsaw pieces, which enables them to take ownership of their own progression in skills and knowledge and understanding. Data will be updated termly using the Excel tracking sheets and teachers will be responsible for analyzing progress in relation to groups and age related expectations.

Planning is based around a current theme or topic with a focus on the Science Progression of Working Scientifically and Knowledge & Understanding, which will be used to ensure that planning meets the needs of the children and will challenge their skills, knowledge, understanding and any existing misconceptions: Predicting, Questioning, Researching, Sorting, Fair Testing, Measuring, Recording, and Concluding.

Standards in Science

The subject's standards are monitored closely by the subject leader. A Working Scientifically investigation is administered at the end of each unit and moderated against age related expectations. This is then collated for the teachers and the subject leader to analyse in accordance to where there are weaknesses in subject knowledge and where children sit in regards to age related. These areas of weakness can then be addressed through interventions and future planning. The subject leader will track individual or cohort progress and to ensure that challenging, differentiated, and inclusive teaching is practiced - particularly with respect to SEN, FSM, PP and previously high attainer groups. The class teacher will also use this evidence to choose the next terms class jigsaw target piece. On an annual basis, the subject leader will carry out a subject audit based on collected evidence, such as planning, teaching, children's work, learning walks through the school, Progression of Skills records, liaison with colleagues, pupil voice, feedback and impact of school visits, and discussions with parents. Using school tracking sheets, areas needing developed are identified and addressed through written or oral feedback.

The evidence collected will influence decisions made with regards to:

- ❖ Raising standards of Science (Investigative and Knowledge-based) throughout the school
- ❖ Identifying and addressing subject strengths and weaknesses
- ❖ How received training/release time has impacted upon standards OR where training/release time needs to be undertaken to raise standards
- ❖ Evaluating and revising Subject Governor's role and responsibilities
- ❖ Evaluating the impact of targets made and achieved in the SIP
- ❖ Informing future targets for the SEF
- ❖ Identify groups of children who may need targeted intervention

This process is crucial in giving the subject leader a transparent and accurate perspective of their subject within the school, and elucidates areas for further effective Subject Action Planning.

Meetings are scheduled with the school's governors to present them with a candid perspective of the findings of such an exercise. Progress is shared in terms of age related and any gaps in groups. In addition, teaching staff and teaching assistants are invited to comment on the presented findings and the subsequent targets identified by the subject leader. This will in turn feed into the next year's Action Plan aimed to raise Science standards throughout the school. The cost estimations of resources needed to achieve the targets are listed on the Action Plan beside each target, allowing the Principal to make budget allocations based on demands.

Greater Depth

Once a child has mastered a skill or knowledge and understanding then they are challenged by greater depth activities. Should the child be secure within their age related expectations then they will continue to master skills through investigations, using and applying. The subject leader will work alongside class teachers to ensure that planning remains challenging by identifying further ways to develop the mastering of the objectives.

Race

Science can be a powerful part of a school's curriculum to explore and contextualize cultural attitudes, values and beliefs. Hence, Science is used in school as a vehicle to challenge stereotypes and celebrate human and cultural diversity.

Equal Opportunities

The teaching of Science supports equal opportunities by addressing the diverse needs of the individual. This is achieved in several ways:

- ❖ Creating comfortable and effective learning environments that encourage self-discipline, independence and motivation
- ❖ Providing a variety of teaching approaches in response to the learning styles of the children
- ❖ Using appropriate assessment strategies
- ❖ Teachers having high expectations reflected in the setting of challenging (but achievable) targets for the individual.

Science Resources

It is the role of the subject leader to undertake regular audits of resources. Resources are purchased from a Subject budget held by the subject leader. They are purchased to support teaching, and thus impact on learning, in the case of a lack of sufficient resources or if a new topic area is introduced. Resource purchasing is done in collaboration with Class Teachers, Teaching Assistants and Governors.

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School: Tregoze Primary

Name of Head Teacher: Helen Tudor

Name of Governor: (Chair of Curriculum and Standards)