Teaching Science at Dove Bank

Subject Statement

'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. '

National Curriculum 2014

At Dove Bank we want to develop children as scientists. We do this by developing a secure grasp of specific knowledge, whilst developing specific scientific skills, which play an integral part in science lessons. We aim to provide practical activities to support the learning whenever possible. Exposure to progressively more complex vocabulary will underpin these practical opportunities, alongside a sound understanding of scientific concepts.

We raise aspiration by making science a relevant subject in the real world and ensure that it is accessible for all children, irrespective of barriers. We have a team of practitioners who have a strong knowledge of the science curriculum and model an enthusiastic approach to science. They encourage questioning wherever the opportunities arise and create an environment which nurtures enquiring minds. Asking questions and general curiosity is encouraged during, as well as beyond, science lessons. We also recognise that outside learning and trips play an important part in the development of their understanding.

Implementation

Senior leaders recognise the importance of science, and this is reflected in the high quality of training and resources provided, as well as time to develop this subject. Teachers are supported to enable them to provide high-quality lessons that involve aspirational levels of knowledge, skill and language. Science has been prioritised in staff meetings where the principles of developing specific scientific skills through both challenging and relevant activities, recording in a meaningful and effective way and building on previous knowledge underpin all Science lessons.

Science is monitored so that the quality of teaching and learning is measured effectively through half termly learning walks, pupil voice opportunities, staff questionnaires, book trawls and timely feedback to staff so that all are aware of the impact within the whole school.

Impact

Children are gaining a secure understanding of Science skills through using icons that are consistent throughout the school, they can talk about these with a greater confidence. Lessons are planned with practical opportunities in mind, linking previous knowledge, scientific skills and new concepts. Recording is varied and reflects the value of the activity that has been undertaken.

Subject Leader & Expert Teachers

Within school we have a wealth of experience in the teaching of Science. Specific details of staff are included below:

- Joanne Woodward is an experienced teacher who is a Science graduate
- Alicia Maclaren has previous experience as Science lead
- Gill Fielding has a degree in a Science-based subject
- Vicky Harley is a trained Forest-School leader.

Curriculum Organisation

Science is organised into defined units that have been specified within the National Curriculum Programmes of Study and each year group will follow this content, however, the order of units taught within each year group has been organised considering two factors;

- Linked trips and extra activities may be suitable at specific times of the year.
- Units build on previous knowledge, as defined in the document Primary Science Educational Consultancy, which advises the order of topics due to the progression of understanding of specific scientific concepts "The school's curriculum is planned and sequenced so that new knowledge and skills build on what has been taught before and towards its clearly defined end points."
- Other units, such as the seasons in EYFS and Year 1, are taught throughout the year for maximum impact and real learning opportunities. This is taken from the advice given by the 'Primary Science Education Consultancy'

Curiosity in the beginning

The culture of asking questions and recognising is as an essential scientific skill, it is fostered in Early Years, where activities are created to encourage questions and adults model these questions too.

- Asking questions should then form the basis of all science activities and be the reason to carry out science experiments, as the children move through the school. Each year group has specific vocabulary which will be introduced at the start of each topic, they will be put into context as the learning takes place. The vocabulary is provided as a visual reference, which each child has access to, either in their books or on display. Prior vocabulary is considered and reviewed as and when necessary, this is provided in the curriculum overviews, for each unit. Dove Bank knowledge organisers have been created in line with the units covered and ensure that effective links to previously taught knowledge is made, vocabulary introduced, essential facts identified and activities to do at home, suggested.

Early Language Development

Early Years and Foundation Stage provides an exciting environment where curiosity and discovery are an intrinsic part of the practical activities provided. Children are encouraged to discover things about the world through trial and error and the concept of asking questions is valued from the start. Staff will equip children with the necessary language as discussion arises, both planned and by accident. A sense of awe is created by creating specific scenarios that are often take place outside, linking the natural world with early biological concepts.

Early years best practice

Children are powerful learners and effective pedagogy is a mix of different approaches. They learn through play and discovery, by adults modelling, by observing each other and through guided learning and direct teaching. Practitioners carefully organise enabling environments for high-quality play and learning. Sometimes, they make time and space available for children to invent their own play. Sometimes, they join in to sensitively support and extend children's learning. Children in the early years also learn through group work, when practitioners guide their learning. Experiments can be adult led, encouraging questioning and developing language through observations and conversations. This will also be an important element of assessment. A well-planned learning environment, indoors and outside, is an important aspect of pedagogy.

Vocabulary

Vocabulary specific to each unit is planned carefully, with an acknowledgement of previously taught vocabulary that may need revisiting. Vocabulary will form part of classroom displays in all year groups, as well as being in books.

Science skills

Specific icons are used throughout school to identify seven identified Science skills. These are introduced in the Nursery where there are three icons referred to and are built on, until all seven identified Science skills are used by Key Stage 2 children. Icons are displayed in all classrooms and linked to lessons.

Subject Specific information

Two hours per week is dedicated to the teaching of science, whether that is in one lesson or spread over several days. In the Early Years it will sometimes be part of continuous provision and may also be taught throughout the year if appropriate, for example, the seasons.

At least one trip or visit per year will be planned to specifically enhance the learning in Science. This can also be considered when attributing teaching time to this subject.

As part of our practical emphasis, children will experience real-life activities, so that Science is meaningful in the real world.

Long term plans can be found on Teams, within the Curriculum folder and each year is kept in the 'Overviews' folder. Medium term plans can be found on Teams, under the curriculum folder and in the Science folder in particular. A hard copy is available from the Science coordinator for reference. All the content is broken down into objectives that can be reasonably covered in half a term (unless it runs throughout the year, for example, seasons). There are also specific Science skills that are identified within each unit. Resources are available in the Science cupboard or can be requested via the head teacher or Science coordinator. A regular supermarket order can accommodate specific items, such as fresh food, needed for experiments.

Other resources can be requested before each term begins, through the Science coordinator, this is requested and approved by the SLT and should arrive in school before the next term starts, if ordered in good time.

Children record any work in a green exercise book. The learning objective is recorded for each session in a way that is age appropriate and the recording of Science skills may either be included in the learning objective, or using the Science sticker. Specific Science skills icons are to be displayed and referred to during Science lessons. The work that is recorded in these books is a variety of evidence of practical Science, including photos (Pic Collage), diagrams, written results or conclusions and products from an

experiment. There are a variety of ways of recording within the unit, with at least two opportunities for quality writing and children recording in their own ways seen as good practice.

Assessment

It is expected that all Science work is marked in line with the school's marking policy.

Science skills are also assessed by teachers throughout lessons and the assessment of Science skills and knowledge are recorded in the Foundation Assessment Folder, which identifies children working below and beyond, expectations.

Assessments will be sent up to the next class teacher alongside the children.

Provision is made for children who have particular needs. For example, written work is made accessible through scaffolding or adult support, children who find a practical element tricky will be supported so that they can achieve in Science without prejudice. Equipment may be modified so that experiments are accessible to all.

Science across the Curriculum

The timing of units means that there may be links with other subjects.

For example, Space in Year 5 is studied as a Science topic at the same time as it features as the non-fiction text in guided reading (Pathways). The model text in the Pathways to Write is also based on a book about Space. This enhances the opportunity to familiarise the children with a wide range of specific vocabulary.

As well as Literacy, Design and Technology also has strong links, for example, designing a streamlined boat helps children to build links with associated concepts taught during the topic on forces in Year 5.

Another example is that water cycle in Year 4 complements the Geography unit on rivers perfectly. These are just two examples.

Extra-Curricular Activities

Climate and Sustainability Ambassadors have an important and active role within school, helping to raise the profile of the school environment by promoting and supporting recycling, walking to school week and using the walking bus. They also lead initiatives during Science week such as plastic-free lunch boxes and food waste initiatives.

SMSC within Science

Spiritual	Our Science curriculum stimulates children's curiosity about the world around them. They have a sense of awe and wonder when exploring the natural world through work on seasons. Pupils can link practical experience with scientific ideas and discover how these ideas can contribute towards environmental issues such as deforestation of the rainforest and global warming.
Moral	Pupils understand that scientific knowledge is rooted in evidence. They will learn about a number of scientists who have been integral in how we see the world now, including, Darwin, Newton and Galileo. They will explore the moral implications of the use of palm oil (deforestation and endangered animals). They will look at the theory of evolution in year 6 and appreciate the socially acceptable ideas at the time, of creation stories and how this caused controversy at the time for Darwin.
Social (British Values)	Students learn that scientific knowledge requires collaboration. They can share their own opinions when discussing aspects such as healthy lifestyles. Through looking at their own environment, they can contribute in a positive way towards sustainability and understand that they all have a part to play in this. They will appreciate medical advances and the implications of this as well as
Cultural	Pupils will appreciate that science plays a part in our lives, our attitude towards diet, hygiene and drugs is based on scientific evidence. As part of this work in year 6, pupils will look at smoking and vaping, looking at the harms of this and why non-smoking zones are often in place in public places. Another aspect is hygiene, and how this is important when protecting others, especially vulnerable groups, such as babies, this includes washing hands and using tissues in KS1 and the spread of bacteria in kS2.
Well-being	Learning in Science plays an essential role in well-being on a physical level, when learning about personal hygiene, looking after teeth, bacteria and how to stay healthy. It also creates opportunities for practical work, where pupils may need to manage risk and know how to keep safe. Appreciation of innovations in Science – for example, electricity, has improved the quality of our lives.