'Together we grow'

Emmaville Primary School

Science Policy

Science Co-ordinator: Kit Saddington

Rationale

Science is an important core subject in our school as it provides the foundations for understanding the world. Through building key knowledge, concepts and skills, pupils should be encouraged to develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to explain what is occurring through conceptual models and practical activities that progressively build a deep understanding of the science curriculum and 'Working Scientifically'.

Through the teaching of science we aim to encourage our children to develop inquisitive and enquiring minds through the use of scientific investigations. We want the children to understand how science has changed our lives and is vital to the world's future prosperity. We aim to develop 'Science Capital' within the school – the measure of the school's engagement with science; how much we value it and how much it connects to our lives. This in turn supports our 'STEM Capital', and how our children will engage with, and aspire to careers within, Science, Technology, Engineering and Maths as they grow older. This, of course, directly helps to build our 'Cultural Capital', giving our children the greatest possible knowledge, experiences and aspirations within the world around them.

Children will study a number of different scientific topics; science will often take them outdoors into the local environment where they will be able to develop and practice investigational and observational skills. They will record and interpret findings and form and test hypotheses. Emmaville's Science Curriculum is built on National Curriculum coverage, and throughout their time at our school, pupils will acquire knowledge and understanding of the world around them.

Aims and Objectives - Intent

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

- develop scientific knowledge and conceptual understanding of science
- 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

At Emmaville Primary School, our aim is to enthuse, develop and challenge pupils through an engaging and progressively structured science curriculum and teaching approaches where pupils:

- Develop lively and enquiring minds through their ability to question and argue rationally and to apply themselves to tasks
- Attain competency and confidence in science that will enable them to contribute to our local and global communities
- Acquire the knowledge and skills relevant to subsequent stages in their education, adult life and employment

Approaches to learning - Implementation

At Emmaville, teachers provide balance in teaching approaches, and the planned sequence of work throughout the school encourages pupils to use prior knowledge when approaching new work. The National Curriculum for Science is used as a framework for science content, skills and pupil expectations at our school. To support our key principles, we will deliver this curriculum through:

- A skills-focussed approach to teaching that ensures an appropriate and flexible challenge within the classroom. This approach is called '**dual objective planning**' in which the key scientific skills are taught alongside the contextual content of lessons. The Science National Curriculum states that "*Working and thinking scientifically … must always be taught through the substantive science content*". This is supported by the explicit use of dual objective planning.
- Conceptual threads called 'science models' that link topics and support progressively deeper learning. There are four science models that span the curriculum: Energy Transfer, Force Arrows, Particles and 'Big Picture' models (Advanced Organisers)
- Five key science skills that support both knowledge / conceptual development and Working Scientifically to match pupil performance to national Key Stage expectations -
    - Explaining Science (the language, information and key scientific models used to explain ideas and thinking in science)
    - Classification (the sorting, grouping and categorising of the world around us, in order to make links in our scientific thinking)
    - Designing experiments (the skills needed in order to make predictions, select equipment and design suitable ways to test our ideas)
    - Data, Table & Graphs (making sense of our observations through organising data in tables and graphs)
    - Making Conclusions (the ability to see patterns and use them to describe and explain what have observed, and suggest ways to improve)

(See Appendices 1-4)

The children will be able to work independently, in mixed ability pairs, and in groups, allowing all children access to the curriculum. A variety of teaching methods best suited to activities and interests of the pupils will be used, including teacher demonstrations, whole-class/group/paired discussions, role-play activities, video clips and animations, focused investigations and experiments, close observations and many practical experiences.

- **At Foundation Stage**, children engage in active learning experiences to ensure that they develop skills and knowledge that will later be useful in the study of Science.
- **At Key Stage 1**, pupils observe, explore and ask questions about living things, materials and physical phenomena. They begin to work together to collect evidence to help them answer questions and to link this to simple scientific ideas. They begin to evaluate evidence and consider whether tests or comparisons are fair. They use reference materials to find out more about scientific ideas. They share ideas and communicate them using scientific language, drawings, charts and tables with the help of ICT if it is appropriate.
- **At Key Stage 2**, pupils learn about a wider range of living things, materials and physical phenomena. They make links between ideas and explain things using simple models and theories. They apply their knowledge and understanding of scientific ideas to familiar phenomena, everyday things and their personal health. They think about the effects of scientific and technological developments on the environment and in other contexts. They carry out more systematic investigations, working on their own and with others. They use a range of reference sources in their work. They talk about their work and its significance, using a wide range of scientific language, conventional diagrams, charts, graphs and ICT to communicate their ideas.

Science Across the Curriculum

- English – the skill of Explaining Science links very closely to English curriculum: speaking and listening to learn, discuss and explain; reading scientific information and vocabulary; writing coherently and with confidence to describe, predict and explain
- Mathematics – observations within science lessons often result in the collection of data, and the formulation of graphs and charts
- Computing – data logging and graphing programmes are used from the creation of simple pictograms to more complex scatter graphs. In upper KS2, knowledge of circuits and control is extended with the use of Raspberry Pi units
- Foundation subjects – History is integral to understanding how our scientific perception has changed in many topics, including Forces, Micro-organisms and the Solar System. It also underpins the work done by pioneering scientists, such as Isaac Newton and Jane Goodall. Geography is supported by science in many ways too – the water cycle, rocks and soil, comparing habitats in different locations, etc. Art has links via the exploration of light, colour and shadows, while

Technology draws from scientific understanding of electricity and materials, and Music has close links to our understanding of sound.

Assessment - Impact

Science assessment is on-going and formative. It happens in the classroom as part of the normal teaching process. It informs lesson pitch, differentiated intervention and future planning. The key document to support this process is the Science Assessment Boards which provide criteria matched to year group expectation (see Appendices 1-4).

Topic based oral/activity/classwork/homework are used to inform on science knowledge and areas of individual/group misconception. Marking should comply with the school policy and should include:

- 'short-term' topic-specific comments to correct misconceptions/errors and to drive progress within that topic. Work should then show short-term improved knowledge and accuracy within that topic.
- 'long-term' skill-specific comments to match work to skill criteria (see Assessment Board) and to drive progress between topics. Work should then show improved skill/model development, matched to expectations, over time. Progress will be recorded using '*Science Rockets*' (see Appendix 5).

The Role of the Co-ordinator

- To take the lead in curriculum development in consultation with the headteacher, staff and governors;
- To monitor the teaching of Science in the school, ensuring that there is sufficient coverage and progress in the subject;
- To lead curriculum meetings;
- To attend Science network meetings and relevant courses, including links with cluster schools, to improve science provision;
- To support staff by providing information, training and advice;
- To ensure that there are appropriate resources to support the Science curriculum.

Date policy produced: December 2019

Review Date: December 2021