

St Edward's Primary School a Catholic Voluntary Academy

Science Policy

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Our Mission Statement



...we should love people not only with words and talk, but by our actions and true caring.
1 John 3:18

Our Vision Statement

We are guided by our Mission Statement and we aim to:

- develop and care for the **whole child** through our teaching and sharing of the Catholic faith.
- show our love of God in the way we care and value each other and ourselves.
- aspire and equip children with those skills necessary to become contributing members of society and responsible adults.
- recognise and encourage all pupils' individual gifts and talents.
- provide an excellent quality of education striving to achieve the very highest standards for all pupils and, at the same time, develop lively critical minds.
- develop each pupil's appreciation of education as a lifelong and enjoyable process.
- work in partnership with the Parish and families, local schools and community groups recognising that only by working together can the school make its contribution towards the development of committed Christians and active members of the Church.

Science National Curriculum 2014

"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."

Introduction:

At St. Edward's Primary School we believe that teaching and learning in Science should stimulate and excite children's curiosity about the world around them. It provides first hand experiences and support for children to develop enquiring minds, learning how to question and discuss science through collaboration. Starting from the views already held, children are given the opportunity to have their views challenged, to change their views and ultimately improve their understanding. A planned range of practical experiences set in meaningful contexts helps to develop a range of investigative skills and allows children to take risks and learn from their mistakes, developing them into independent learners.

Science Mission Statement

In planning each National Curriculum subject our mission is to recognise each child's entitlement to appropriate learning opportunities, purposeful assessment and record-keeping. Accordingly, there is a comprehensive long term plan for Science and for its assessment and recording.

In the teaching of Science we recognise particular opportunities for

- (a) Studying a body of knowledge which is essential to our understanding and care of the world around us
- (b) Developing practical skills of finding reliable answers to questions we may ask about the world around.
- (c) Evaluating our own roles in God's world so that we can learn to enrich and be enriched by other people, other organisations, other institutions and other places.

Rationale

Science in this school is about developing an understanding of making sense of our environment, primarily through experience, exploration and interaction with scientific phenomena.

The purpose of gaining this understanding is to enable pupils to take responsibility for their role in the maintenance of a healthy life and the creation of a safe environment; not only for the benefit of themselves, but also for fellow human beings, animals and plants in our world.

Children gain scientific understanding from the moment they begin to interact with their world. In the early developmental stages of movement, hearing, watching and playing, children begin to establish rules about how things in their environment react and behave. From this they develop their judgements about safety and risk; about their ability to explore, to create, to invent and to enjoy.

Scientific learning in the primary school extends and enhances this natural curiosity by providing children with the opportunity to apply and further develop the skills that they have already mastered. When pupils learn Science they are obtaining a set of skills and a body of knowledge that will be required for the essential routines of life; for work, pleasure and for the creativity in their future.

Therefore, at St. Edward's Primary School, Science is viewed as an integral and essential component of the whole curriculum.

Aims and Objectives

The teaching of Science is planned to help develop the key scientific skills of:

- Asking questions
- Hypothesising and predicting
- Planning and carrying out a range of investigations
- Using equipment correctly
- Observing and measuring
- Recording data
- Presenting results in a variety of ways, including the use of computing (ICT)
- Comparing and evaluating results, looking for patterns
- Drawing conclusions

Science is a core subject in the National Curriculum. The fundamental skills, knowledge and concepts of the subjects are currently set out in "Science in the National Curriculum" where they are categorised into four attainment targets.

Scientific knowledge and conceptual understanding

Biology

Chemistry

Physics

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.

Reception classes are taught the required science elements of the foundation stage document through cross curricular themes.

In line with the New Curriculum, science teaching across the school will change in terms of topics taught and expected skills to be mastered at each stage.

In addition, Science provides the opportunity for children to develop the following cross-curricular skills:

- Communication in a variety of contexts through promoting the skills of reading, writing, speaking and listening. (research skills)
- Application of number through the use of weights and measures, handling data, estimating and predicting
- Use of ICT to measure, record, present and interpret Data where appropriate, use of the internet and CD Rom
- Working cooperatively with others
- Problem solving
- Independent individual thinking as they follow a line of enquiry

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

(National Curriculum 2014)

Organisation and Planning

- Science should always be planned in a structured, sequenced and progressive way.
- That the plan for Science, agreed by all the teaching staff, is adhered to throughout the whole school, ensuring optimum continuity and progression for each child in the school.
- Teachers will need to have knowledge of what skills and key ideas the children have previously covered, and what skills and key ideas they will be working on next.
- Teachers need to plan which particular activities will best suit the development of these skills and key ideas.
- Teachers need to plan which materials and equipment is required to carry out these activities.
- Teaching methods and approaches should be varied so as to offer a range of experiences in the work covered in Science.
- The children should have the opportunity to work in a variety of groupings i.e. whole class, large and small groups and individually.
- The classroom should be organised for particular activities in a way to maximise safety, i.e. when using heat.
- The time allocation in Key Stages 1 and 2 for Science, is approximately two and a half hours per week, at least half of this being practical work.
- Science will be taught through a whole school plan to ensure continuity, progression, differentiation and all parts of the Programme of Study are covered.

Foundation Stage

In the Early Years Foundation Stage science is covered in the 'Knowledge and Understanding' section. This strand is concerned with equipping the children with the necessary skills to make sense of the world around them. This is provided through the context of exploration and investigation.

- Access to a range of developmentally appropriate practical activities based on first hand exploratory experiences. For example, a nature walk, magnifiers to explore natural objects, manipulating wet/dry sand etc;
- Enthusiastic and meaningful interaction with adults, who provide opportunities to develop communication skills, use correct scientific language and carefully framed open-ended questioning techniques to develop thinking skills;
- Exploration of both indoor and outdoor environments linking all areas of learning;
- Recognition and extension of their existing knowledge and understanding gained from their home setting.

Key Stage 1 (From Science National Curriculum 2014)

- Pupils should 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.
- They share ideas and communicate them using scientific language, drawings, charts and tables with the help of ICT if it is appropriate.
- 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 (From Science National Curriculum 2014)

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

Upper Key Stage 2 (From National Curriculum 2014)

- 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.
- Pupils should read, spell and pronounce scientific vocabulary correctly

Objectives

For good Science learning to take place, evidence of the following should be found in our classrooms:

- An active learning environment
- Children working from first-hand experience
- Children encouraged asking question. Children actively involved in exploration and investigation
- Children working co-operatively
- Children discussing with each other and adults
- Children devising and conduction their own investigations
- Children choosing their own materials and equipment
- Children recording their findings in a variety of ways
- Children drawing conclusions from their findings
- Children showing enjoyment in the activities they are undertaking

Teaching and Learning Strategies

A variety of teaching styles will be used to teach Science.

The main focus will be on providing practical and investigative activities for pupils that enable them to develop their knowledge, understanding and skills through first hand experience.

Teachers should ensure that all children have equal opportunities for:

- First hand observation and exploration.
- Systematic investigation and problem solving.
- Discussion between pupils and between teacher and pupils.
- Developing skills.
- Working safely and appreciating need for safe practices.
- Using secondary sources.
- Using information technology.
- Considering the place of Science in everyday life with particular emphasis on how Science affects themselves and the environment.
- Developing an appreciation of the nature of scientific ideas.

Differentiation

In order to meet the needs of each child in Science, it is essential to identify previous experiences and understanding. This will help to inform the subsequent planning of appropriate activities for all children. Every child should have the opportunity of working within each area of Science.

Science often allows children the opportunity to reveal abilities of thought and insight, attitudes and commitment which non-practical work denies. It would be wrong to assume that high and low abilities in Science have the definition as they do in other subjects.

Investigations allow differentiation through the way a child's knowledge and understanding is used. There will be children who are able to grasp a particular concept fairly readily, while others may struggle. To differentiate in this way, the level of knowledge in a particular aspect for each child has to be defined and then developed using investigative methods.

Recording

Children may record things that please them, information they might otherwise forget, information for future work, finished work for themselves and others. This recording may be formal or informal in exercise books/folders, or in displays. It is important that each child should see a purpose and a point to the records they make if they are not to become demotivated.

Assessment

Each science topic is assessed at the end of the unit using Formative assessments, which include statutory objectives and mastery objectives to challenge pupils. These are evident in children's books with objectives highlighted off when they have achieved it. The Formative assessments inform pupils and teachers of the coverage and progress made in the topic.

The end of each term, assessments by teachers will be made against a background of the National Curriculum Level Descriptions and the knowledge and understanding assessments made throughout the year. Each teacher should keep individual records of attainment, and this information should be passed on as the child progresses through the school.

To ensure that pupils are making the optimum progress throughout the academic year, their Science achievement levels will be monitored continually on an internal tracking grid.

Review, Evaluation and Monitoring

The Science teaching and learning will be subject to continual review, evaluation and monitoring:

The Science leader will monitor changes and the development in the subject and will disseminate such information by liaising with other members of staff as when necessary.

There will be opportunities for Key Stage teams to discuss recent Science work and present proposals for development to the Science leader,

The Science leader will keep a co-ordinator's map to keep an overview of Science teaching in the school.

The Science leader will record suggestions for staff development to support the teaching of Science.

Data will be carefully analysed to highlight any gaps in teaching and learning and scientific enquiry.

The leader will monitor the subject by studying teaching plans, talking to the children and if possible observing lessons and scrutinising work/evidence.

At certain times of the year, examples of AT1 evidence will be asked for to monitor and evaluate this across the school.

Resources

The subject leader will possess and be responsible for its own resources, which will be distributed according to curriculum requirements.

The co-ordinator will oversee the purchase and distribution of resources, and will ensure that resources for the teaching of the subject are adequate and appropriate by liaisons with individual teachers.

Parental Participation

Parents will be encouraged to support and take an interest in their child's studies. They will be kept informed as to their child's progress. Parents, when and where appropriate, will be offered opportunities to participate in science activities.

Health and Safety

The following rules should be observed.

- Children should not use glass apparatus or any sharp edged tools.
- When using electrical devices, they must be low-voltage and battery powered. On no account should children use hand –held, mains-powered equipment.
- Household chemicals should be chosen with care. Do not use anything strongly caustic or containing bleach.
- Discourage random sniffing or tasting, and that anything the children are asked to smell or taste has been carefully chosen for the activity.
- Observe hygiene rules, i.e. don't share spoons etc. and encourage hand washing.
- When using heat, the children should be highly supervised. The children should not handle matches or lighters themselves. Lighted candles should be secure and never moved.
- Classrooms should be organised to maximise safety. Long hair and loose sleeves should be secured. Any other heating should be done with hot water, i.e. from a tap or from an adult-held kettle. Under no circumstances should flammable liquids be used.
- Unknown plants, wild animals or their homes should not be touched without wearing rubber gloves.

- Children should not directly at the sun.
- Polythene bags should not be left around after using.

The children should be taught about the dangers of heat, electricity, cooking, suffocation, heights, sharp instruments, chemicals (sniffing/tasting) and why hygiene and washing hands is so important.

It is important that during the planning of scientific excursions, the safety aspect of the proposed visit is fully addressed.

Care of the Environment

The children should be taught to respect wildlife and property, not to damage habitats, not to pick wild flowers, not to remove animals from their natural habitats unless necessary and return them back to where they were found.

Teachers should help the children to recognise that no environment is totally without life and that any life, no matter how unattractive, is precious and unique. We have a responsibility to ensure its survival. This responsibility extends to all animal and plant life, to each other and ultimately to all life on our planet.