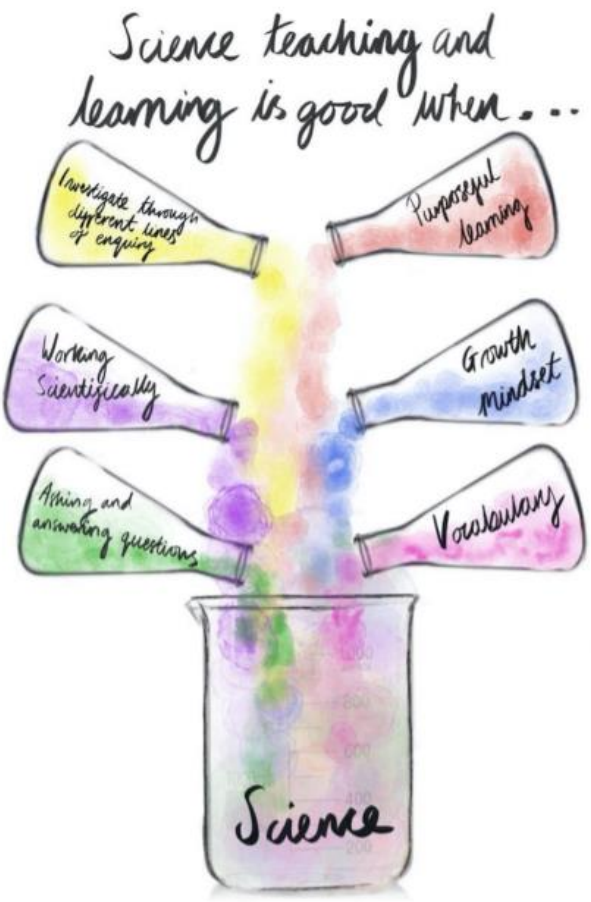
Principles of Science at Holy Cross Catholic Primary School-



At Holy Cross Catholic Primary School, we believe that Science teaching and learning is important to help the children understand the world around us, ask questions and promote investigation and exploration. Good science offers children the chance to learn new vocabulary, develop systematic learning, be inquisitive and promote resilience. Science is taught well through hands on practical learning and discussion where children are able to learn from mistakes. Our aim is to develop independent and confident learners, using their prior knowledge and growth mindset.

Our children have a natural curiosity about their world and the enthusiasm to want to make sense of it, they are fascinated by new discoveries and technologies and are becoming increasingly aware of the impact of science on their own health and well-being in addition to the health of society and of the environment. Science is an important part of our heritage and we use scientific skills and applications every day in many aspects. We aim to ensure our children are aware of the importance of science and how important it is in our lives and our futures as individuals and as a society. We capitalise on this by using first-hand experiences so that our children come face to face with phenomena and learn directly about the ways things are, and why they behave as they do.

Following on from this, children use secondary sources (books, videos, and visits) to reinforce and broaden their knowledge.

Our children are involved in a wide range of activities that are practical, relevant, co-operative and stimulating. We aim to give children an understanding of the scientific concepts - not just facts, and an understanding of scientific processes. This includes the development of a range of skills which include asking questions, discussing, predicting, planning investigations, fair testing, methods of recording, how to interpret findings and evaluating them. In addition we aim to foster social awareness and responsibility, self-reliance, independent and reflective thinking. Our aim is to allow them to develop and apply key skills which will remain with them throughout their lives in order for them to become creative, inventive and enterprising adults.

The aims of learning in science at Holy Cross Catholic Primary School are-

- To encourage and develop a curiosity, fascination and understanding of their environment and their place in the living, material and physical world
- To demonstrate a secure knowledge and understanding of the big ideas and concepts of science
- To provide science education which will be challenging to all pupils and ensure equality of opportunity
- To develop the attitudes of curiosity, open-mindedness, perseverance, tolerance, co-operation, responsibility, critical awareness and originality
- To develop skills for learning, life and work
- To develop skills of working scientifically and investigation using practical techniques
- To develop skills in the accurate use of scientific language and terminology, enabling pupils to become effective communicators
- To recognise the role of creativity and inventiveness in the development and application of science
- To apply health and safety measures and take necessary actions to control risk and hazards
- To encourage awareness of science and scientific advances outside the classroom
- To recognise the impact the sciences make on our lives, the lives of others, the environment and on society
- To develop an understanding of the Earth's resources and the need for responsible use of them
- To express opinions and make decisions on social, moral, ethical, economic and environmental issues based upon sound understanding
- To develop as scientifically literate citizens with a lifelong interest in science
- To establish the foundation for life-long learning and for future careers in science and technology

The Science Curriculum at Holy Cross Catholic Primary School-

The science curriculum at Holy Cross Catholic Primary School is designed to ensure that we are fulfilling our statutory duties as set out in the Early Learning Goals for Foundation Stage and the National Curriculum programmes of study for Key Stages 1 and 2. In addition to this, we offer a wide range of enrichment activities to ensure that our children have the opportunities to develop and apply their scientific skills meanwhile fostering a love of science. Our philosophy is that every child and young person needs to develop a secure understanding of important scientific concepts while their experience of the sciences in school must develop a lifelong interest in science and how it is relevant to our every day lives.

Since the introduction of the New National Curriculum in 2014, our science curriculum has been updated and our programme of enrichment activities has been considerably developed as a result of research evidence on learning in science and of teaching and learning in general.

The key concepts in each year group are as follows:

Year 1-Seasonal change, Everyday materials, Plants and Animals including humans
Year 2-All living things and their habitats, Uses of everyday materials, Animals including humans and Plants
Year 3-Forces and magnets, Light, Rocks, Animals including humans and Plants
Year 4-Sound, States of matter, Electricity, Animals including humans and All living things
Year 5-Animals including humans, Earth and Space, Forces, Properties and changes of materials and All living things
Year 6-All living things, Evolution and inheritance, Electricity, Light and Animals including humans

The teaching and learning experiences which we provide for our children are designed to develop their natural curiosity and their desire to create and work in practical ways. The children progressively develop their skills, knowledge, understanding and attitudes.

Teaching and learning approaches used at Holy Cross Catholic Primary School-

At Holy Cross Catholic Primary School, we believe that through high quality teaching and learning, we will develop high aspirations and transferable skills for our children using a variety of teaching and learning approaches. The science experiences and outcomes at our school are designed to stimulate the interest and motivation of children and young people and to support staff in planning challenging, engaging and enjoyable teaching and learning activities. They allow flexibility and choice for both teachers and learners to meet individual learning

needs. Through effective teaching and learning, we strive for the achievement of excellence for each individual regardless of gender, race and age. The learning opportunities for our children are tailored to individual needs, allowing each child to achieve their full potential.

The effective teaching and learning approaches that we use extends learning from the early years into primary school and beyond. As children and young people progress in their learning, teachers use a variety of opportunities for study and enrichment in local and national environments, in order to deepen their knowledge and understanding of a wide range of scientific concepts. Our teaching and learning approaches promote effective questioning and thinking as well as provide opportunities to consolidate and apply learning. Our scientific approach has a global perspective and the opportunities we provide for our children allows them to consider how science helps to solve problems in a wide range of contexts.

When teaching science, we use a wide range of approaches-

- active learning and planned, purposeful play
- development of problem solving skills and analytical thinking skills
- development of skills when working scientifically
- use of relevant contexts, relevant to our children's experiences
- effective use of technology, real materials and living things
- building on the principles of Assessment for Learning, peer and self-assessment
- collaborative learning and independent thinking based on our whole school philosophy of the Learning to Learn approach
- emphasis on our children's scientific literacy, their understanding of concepts, informed discussion and communication.

Our children are involved in a wide variety of open-ended experiences, challenges and investigations, including those related to the application of science in other areas. Our children develop skills of critical and analytical thinking and appreciate the key role of the scientific process both in generating new knowledge and in applying this to addressing the needs of society.

Development of skills at Holy Cross Catholic Primary School-

At Holy Cross Catholic Primary School, we encourage our children to develop and practise a range of inquiry and investigative skills, scientific analytical thinking skills and scientific literacy skills; they also support the development of a range of skills for life, including literacy, numeracy and ICT.

Through working scientifically and solving problems and challenges in a variety of contexts, our children:

- ask questions or hypothesise
- plan and design procedures and investigations

- select appropriate equipment and other resources
- carry out tests and experiments
- use practical analytical techniques
- observe, collect, measure and record evidence, taking account of health and safety and controlling risk and hazards
- present, analyse and interpret data to draw conclusions
- review and evaluate results to identify limitations, reliability and improvements
- present and report on findings.

Through working scientifically, the children are encouraged to use a variety of enquiry skills-

- Survey - count the number of things
- Do a test - find out what happens to something when we change something about it (KSI)
- Do a fair test - find out what happens to something when we change something whilst keeping all other things the same (KS2)
- Classifying - put things into groups
- Investigation over time - watch or measure something over time
- Secondary source - use a book or internet
- Pattern-seeking - finding out if there is a relationship between two things (KS2)

Our children develop a range of analytical thinking skills in order to make sense of scientific evidence and concepts. This includes:

- being open to new ideas and linking and applying learning
- thinking creatively, analytically and critically
- developing skills of reasoning to provide explanations and evaluations supported by evidence or justifications
- making predictions, generalisations and deductions
- drawing conclusions based on reliable scientific evidence.

Our science curriculum is designed to incorporate all of these skills at a variety of levels so that the children have the opportunity to develop and apply a wide range of skills progressively throughout their learning.

Developing the skills and attributes of scientifically literate citizens at Holy Cross Catholic Primary School-

We value the importance of developing our children as scientifically literate citizens with a lifelong interest in science by:

- developing scientific values and respect for living things and the environment
- assessing risk and benefit of science applications
- making informed personal decisions and choices
- expressing opinions and showing respect for others' views

- developing informed social, moral and ethical views of scientific, economic and environmental issues
- developing self-awareness through reflecting on the impact, significance and cultural importance of science and its applications to society
- demonstrating honesty in collecting and presenting scientific information/data and showing respect for evidence
- being able to read and understand essential points from sources of information including media reports
- discussing and debating scientific ideas and issues
- reflecting critically on information included or omitted from sources/reports including consideration of limitations of data.

Assessment of science at Holy Cross Catholic Primary School-

Assessment of science focuses on our children's knowledge and understanding of key scientific concepts in the science curriculum in addition to working scientifically skills and analytical and thinking skills.

Science is assessed in a variety of ways from three aspects; short-term, medium term and long-term. Teachers gather evidence of progress throughout lessons and learning activities and these short-term assessments are used to inform daily plans and are closely matched to the teaching objectives. Pupils at Holy Cross Catholic Primary School frequently use self and peer assessment skills which are embedded as part of science teaching and learning.

Medium term assessments, which include specific assessment tasks, are used to measure progress against scientific knowledge and understanding, working scientifically skills and analytical and thinking skills. The outcomes of these assessments inform planning for the next unit of work.

Long term assessments are carried out toward the end of the school year and are used to assess progress against school and national targets. Targets can then be set for the next school year and a summary of each child's progress made before discussing it with parents. We pass this information on to the next teacher at the end of the year, to inform future planning.

Holy Cross Catholic Primary School is a shared learning community and we encourage the children to be a part of the assessment process which may include the children generating assessment tasks as a result of their enquiries based on whole units of work. The assessments are designed to be progressive throughout the school and allow the children to demonstrate their learning and skills in increasingly complex situations.

We also value the importance of identifying how well our children can apply their skills in their learning and their daily lives and in preparing for the world of work. For example:

- How well do they contribute to investigations and experiments?

- Are they developing the capacity to engage with and complete tasks and assignments?
- To what extent do they recognise the impact the sciences make on their lives, on the lives of others, on the environment and on society?

Science and Cross Curricular Learning Opportunities at Holy Cross Catholic Primary School-

At Holy Cross Catholic Primary School, we offer learning opportunities which extend beyond the science learning within the classroom. All members of staff are involved in mapping learning experiences and enrichment opportunities which provide links between science and other areas of the curriculum. By doing this, we provide our children with opportunities to recognise the connectivity which exists across curriculum areas as a means of understanding the world around them and develop their Science Capital.

All teachers will look for opportunities both to develop and reinforce science knowledge and skills within their teaching activities and cross curricular projects and we work together to plan this which includes the development of literacy and numeracy skills, aspects of health and wellbeing and ICT.

The Senior Management Team values the importance of an appropriate balance of learning and teaching approaches, progression in skills, and effective use of cross curricular work to deepen and extend learning. In order to promote this, a regular review and action plan is in place each year to ensure the experiences we provide allow our children the best opportunities to develop in these areas.

Monitoring and Reviewing Science at Holy Cross Catholic Primary School-

Monitoring of the standards of children's learning and of the quality of teaching in science is the responsibility of the Science Subject Leader. The work of the Science Subject Leader also involves supporting colleagues in the teaching of science, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The Science Subject Leader evaluates the strengths and weaknesses in the subject annually, indicates areas for development and provides a comprehensive professional development programme for the staff. The head teacher allocates regular management time to the Science Subject Leader so that samples of children's work and skills can be evaluated, lesson observations of science teaching across the school and learning walks can be undertaken. A named member of the school's governing body is briefed to oversee the teaching of science. This governor meets biannually with the Science Subject Leader to review progress.