



# **St. Augustine's Catholic Primary School Hoddesdon**



## **Science Policy**

September 2024

# MISSION STATEMENT

*We come to school to live and learn happily together by loving ourselves and each other as Jesus taught us.*

Values:

We believe that the purpose of St. Augustine's Catholic Primary school is to:

- help pupils to live and learn in a Catholic Christian environment leading to acceptance and respect of others in a diverse school community and wider world.
- provide an environment in which high expectations will lead to a striving for excellence in all areas of school life.
- educate and develop each member of the school community by building on their strengths and supporting their weaknesses.
- foster purposeful relationships with those who learn in, work in and visit our school where diverse views and backgrounds are respected.

## St. Augustine's R.C. Primary School Science Policy

*The following is to provide the philosophy and framework for the teaching of science at St. Augustine's and is part of the overall curriculum policy of the school.*

*It is essential that this document should be regularly reviewed and evaluated, as necessary, in order to implement the requirements of the National Curriculum. It should be seen as part of an ongoing process rather than a final statement.*

### Contents

- Philosophy and nature of science at St. Augustine's.
- Role of the science co-ordinator
- Aims for science
- Objectives of science
- Learning
- Teaching
- Exploration of science
- Skills and Attitudes
- Role of the class teacher
- Presentation
- Assessment Recording and Reporting
- Inclusion
- Special Educational Needs
- Safety
- Resources
- Appendices

## Philosophy and nature of Science at St. Augustine's

**WHY** - **Understanding the world** - At St. Augustine's, we want children to consider reasons behind the why - empowering them to ask questions and investigate with increasing independence to find out answers.

**WHAT** - **Essential aspects of the knowledge**, methods, processes and uses of Science are taught to grow deeper scientific understanding that can be communicated clearly through explanation and discussion (using scientific vocabulary)

**HOW** - The children will grow to use scientific skills and understanding to **explain** what is occurring, **predict** how things will behave, and **analyse** causes - reflecting and giving reasons for results.

**WHO** - Science has changed our lives and is vital to the world's future prosperity. The children will develop a breadth of understanding of Science in the working world - fields of science, job roles, as well as **key scientists and scientific discoveries through history** (Racial Justice, Equality and Diversity link).

**WOW** - Science in the school will grow excitement and curiosity about natural phenomena. Lessons need to be exciting/surprising where possible and involve active investigation.

At St. Augustine's it is important that scientific knowledge, skills and understanding are seen within the Christian context of our school. This gives a particular slant to the attitudes towards ourselves, others and the environment and gives a holistic approach to Science within a Christian framework.

### Role of the Science co-ordinator

1. To keep up-to-date with developments and changes and disseminating these to staff.
2. To liaise with the class teachers and advise on all aspects of the science curriculum and to ensure that the science policy is understood.
3. To analyse results to find areas for development.
4. To draw up an action plan.
5. To review and evaluate the science policy yearly or as necessary in order to implement the National Curriculum.
6. To consult with the Head teacher and staff in ordering and updating learning materials and resources.

### Aims for Science

The aims for Science, which help deliver the wider school aims, are:

- To deliver activities that meet the requirements of the national curriculum in a way that is appropriate to the needs and interests of all pupils and which challenge them to fulfil their potential.
- To use scientific contexts to develop and consolidate the basic cross-curricular skills of Literacy, Numeracy and ICT.
- To develop children's knowledge of a range of Scientists and Inventors from a range of backgrounds.

#### **WHY**

- For pupils to apply their scientific knowledge and skills to solve problems in a wide variety of contexts.
- For pupils to develop a caring attitude to the environment and living things.

#### **WHAT**

- To develop pupils' scientific knowledge and understanding.
- To develop pupils' explanatory and communicative skills.
- For pupils to be able to work both collaboratively and independently on scientific tasks.

#### **HOW**

- To develop a positive, active attitude to scientific enquiry and an awareness of the influence of Science in everyday life.
- To develop pupils' skills in sequencing and carrying out helpful, informative investigations for a purpose.
- For pupils to develop an understanding of safe ways of working and to take increasing responsibility for managing their own investigations safely.

#### **WHO**

- To develop pupils' experience and understanding of the applications of scientific understanding and research

in the working world through history and today.

- To ensure we cover a wide range of Scientists (RJED).

WOW

- To provide appropriate and stimulating scientific experiences which encourage pupils to make sense of the world around them.

### Objectives of Science

Scientific experiences may arise from many starting points such as everyday situations, studies of the school, school grounds, the local environment and cross-curricular studies. Through exploration and practical investigation of the world in which we live, we are seeking to develop particular skills, concepts and attitudes that are appropriate to each Key Stage.

### Learning

Following the national curriculum for science aims, we ensure that all pupils:

1. **Develop scientific knowledge and conceptual understanding -**
  - Knowledge and concepts are sequenced and children must develop secure understanding of each key block of knowledge and concepts in order to progress successfully to the next stage.
  - Pupils can describe and explain in common language and be able to use technical terminology accurately.
  - Mathematical knowledge is applied to their understanding of Science, including collecting, presenting and analysing data.
  - Children engage and are motivated to study Science - understanding the social and economic implications.
2. **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.**
  - "Working scientifically" is taught within each topic empowering the children to focus on the key features of scientific enquiry.
  - Children learn to use a variety of approaches to answer relevant scientific questions through collecting, analysing and presenting data.
  - They learn to: observe over time; seek patterns; identify, classify and group; carry out comparative and fair tests (controlled investigations) and research using secondary sources.
3. **Children are equipped with the scientific knowledge required to understand the uses and implications of Science, today and for the future.**

### Teaching

As well as ensuring we provide high-quality presentation of scientific knowledge for the children's understanding. We give children first-hand experience of:

- Exploratory play to gain experience of a situation or article and to develop their own ideas.
- Experimentation to try out ideas and find out what happens - asking questions and finding answers.
- Investigation to test ideas or hypotheses in an increasingly systematic way.
- Focused observation to develop the ability to notice detail and changes that take place over time.
- Focused practical tasks to promote understanding of a concept or skill.
- Sorting and classifying to group things by observable characteristics.
- Discussion and debate of ideas and conclusions to consolidate understanding and develop the ability to explain clearly.
- Recording and presenting the results of their work in appropriate and varied ways linking with Mathematics and Literacy.
- Gaining respect for evidence and appreciating the views of others.
- Working collaboratively and independently.

- Using secondary sources to widen experiences, enhance understanding and provide evidence.
- Research from books and online to grow their understanding independently and in groups.
- Work is scaffolded to ensure that **all** children make progress within the unit of work and each lesson.

Teachers follow the **New National Curriculum** to help them deliver these:

- Foundation stage 'science' (understanding of the world) learning will have a strong emphasis on developing basic enquiry skills and high quality observations as set out in the Foundation stage.
- Children should enjoy a challenging Science curriculum; approximately 1 - 1 ½ hours a week will be spent on Science.
- Children **regularly take part in Scientific Enquiry activities** to explore different areas of Science.
- Careful assessment will be made to manage any risks involved in practical activities.
- Investigation skills will be developed through planned instruction of skills appropriate to the age and ability of pupils.
- Key vocabulary will be displayed pertinent to each topic and pupils will be encouraged to use the technical vocabulary in all levels of communication; (see appendix 2: technical vocabulary).
- There will be frequent opportunities for pupils to make choices and take decisions both collaboratively and independently.

### Exploration of Science

It is essential that children should be given opportunities to develop their understanding of Science through practical investigations.

These activities should:

- a) Involve children and their teachers in promoting ideas and seeking solutions.
- b) Promote first-hand explorations of objects and events.
- c) Encourage an appreciation of the need for safe and careful action.
- d) Encourage the sorting, grouping and describing of objects in their immediate environment, using their senses and noting similarities and differences.
- e) Increasingly encourage the development of non-standard (e.g. hand spans) and simple standard measuring skills.
- f) Develop an understanding of the purpose of recording results and so encourage systematic recording using appropriate methods, such as block graphs and frequency charts.
- g) Develop reporting skills, ideally by talking but by other means, as appropriate.

### Skills and Attitudes

A **SKILL** is the ability to perform a task, whether manual or mental, which in turn involves working out and building up a series of processes and actions into a co-ordinated sequence to be followed.

The scientific skills we wish to encourage in the children are:

- a) Detailed observations.
- b) Predicting, anticipating.
- c) Research, investigate or experiment.
- d) Make a fair test and know why this is important.
- e) Interpret findings, co-operate with others.
- f) Manipulation, manual dexterity and use of equipment such as microscopes and measuring equipment.
- g) Logical thought processes, reasoning, problem solving.
- h) Classification, finding similarities and patterns.
- i) Scientific language, communication of ideas verbally, mathematically and graphically.
- j) Recording - wide variety of methods.

In developing these skills, we will encourage children to work through the science process.

An **ATTITUDE** is a disposition to act in a particular way in relation to one's self or to other individuals or

groups, the attitudes we hope to foster are:

- Curiosity, a willingness to explore.
- Sensitivity to living things and the environment.
- Co-operation with others, sharing.
- Development of an enquiring mind.
- Perseverance and a willingness to tolerate uncertainty or failure.
- Open-mindedness, flexibility.
- Responsibility, safety.
- Self criticism, independence in thinking, confidence to express own ideas.

N.B. To develop these positive attitudes, the right learning environment must be created.

- a) The pupils will be enthusiastic, curious, open minded and co-operative if the teacher is.
- b) The children will show an interest in the environment if their surroundings are interesting.
- c) Learning through science will be conducted in a spirit of enquiry where ideas, however feeble, are valued, expectations are high and children have constant opportunity and encouragement to find out for themselves.

WE MUST:

- Let the children find out for themselves.
- Praise and encourage.
- Ask the right questions at the right time.
- Improve children's problem solving abilities.
- Provide opportunities for children to choose what to investigate and how to do this.

### Role of the Class Teacher

Teachers have the responsibility to design their own teaching within the overall framework of the National Curriculum, programmes of study, attainment targets and schemes of work. St. Augustine's is currently implementing the new National Curriculum in Science. They will find the following criteria useful in selecting particular learning experiences for pupils in their class:

- a) develop scientific strategies and skills.
- b) develop attitudes appropriate to working scientifically.
- c) develop basic scientific concepts.
- d) apply scientific ideas to real life problems, including those which require designed technological solutions.
- e) work co-operatively and communicate scientific ideas to others.
- f) stimulate curiosity.
- g) relate to the interests and every day experiences of the children.
- h) help children understand the world about them through their own mental and physical interaction with it.
- i) appeal to both boys and girls and those of all cultural backgrounds.
- j) discuss the ways in which scientists work.
- k) allow children the opportunity to develop their own ideas and investigations.

Teachers should also consider these strategies for gathering scientific evidence

- Maximise opportunities for enquiry work by considering different ways of presenting knowledge and understanding through your teaching approaches.
- Build opportunities into your planning both for whole investigations and elements of an investigation.
- Be clear about what is to be assessed. Ensure the activities are suitable for assessment purposes: that there is sufficient opportunity for all abilities to show what they can do; that there are opportunities for choice, decision taking, pupil interpretation.
- Limit the number of skills to be assessed.
- Link planning to gathering specific evidence as set out in the expected outcomes of a unit.
- Identify whether the evidence will be primarily written, oral or a mix of both and how your observations

will be recorded

- If there are additional adults how they can be best used to gather evidence
- Be very clear about the level and purpose of adult interventions
- Tell the children what you are going to be assessing
- Ensure pupils know the targets they are working towards

### Pedagogy

At the beginning of a new unit of work, a knowledge organiser will be stuck into the book that shows key knowledge and vocabulary. These key words will also be displayed on the Science working wall so the children and teacher can refer to these in the lesson.

**All lessons should** - Begin with a clear learning objective and differentiated success criteria (which all children have the opportunity to progress through with necessary scaffolding). Key vocabulary is displayed for the unit with definitions and images. It should be marked what is new vocabulary and what has been built on before. This vocabulary should match what is shown on the working walls and knowledge organisers. Additional key words may be added or discussed but only where explicitly taught for good purpose. There should be an image that clearly shows the meaning of the word, and where possible actions that the children have made up to demonstrate their understanding.

All lessons should offer opportunity to: retrieve key information from previous units of work/ year groups, re-cap learning that has happened before on which this lesson shall be built. This can form part of a starter, or an additional starter that hooks children/generates an emotional/global connection to root the learning and confront the WHY of the lesson.

The lesson should involve clear explicit teaching where information is given directly to the children ONLY when it cannot be found through inquiry/discussion. Questioning that allows children to find out for themselves is always preferable.

The role of the teacher is to guide the discussion through progressive questioning that allows revelation of knowledge as much as possible. Paired/group discussion allows children to generate their own ideas to discover facts and misconceptions addressed through questioning where possible. A range of AFL strategies should be used within a lesson and all children should be engaged in their learning, this could be through the use of sentence stems, you say I say, filling in the blanks and reading as a whole class, showing the answer using their hands, multiple choice questions etc.

Drawing in learning from other subjects will support this process and help the scientific learning to be rooted in the global significance. Where possible links should be made with other subjects especially Mathematics. Children should be encouraged to show their results in a variety of ways such as bar graphs, line graphs and tables.

Activities should be planned that enable the children to make discoveries for themselves, and progress through discussion into revelations and WOW moments.

All lessons should include resources, which scaffold the learning for children with additional needs - such as pictures and key vocabulary lists, memory prompts from the slides.

Lessons can be broken up into small sections of teaching and activities rather than a main input followed by activity, as it takes away the pressure of holding too many ideas at once, which is a barrier to those with memory issues.

Throughout all discussion and activities, teachers engage with the learners collectively and individually through questioning and feedback. This can be used to address misconceptions or challenge learners to think more deeply or make cross-curricular connections.

Mini-plenaries throughout the lesson and one main reflection at the end are used to consolidate the learning. Technology is used throughout to support all learners.



### Each unit should -

- Begin with a knowledge organiser linked to the topic.
- Teach the vocabulary from the knowledge organiser and display this on the working wall.
- Explain what previous learning has taken place in previous years that this learning will build upon.
- Introduce a scientist (varying ethnicity, social status, ability, gender etc.)
- Root the learning in the real world - why it has mattered to humanity and what careers people do using this information.
- Enable the children to build their own curiosity, inquiry skills and make connections with other learning.
- Include a variety of work, investigations, hands on activities, cross curricular work and scientific enquiry.
- Assess learning and progress against the knowledge organiser.
- End of unit assessments should also have a section for retrieval of previous units of work.
- At the end of the unit, the children should complete the knowledge organiser assessment independently and it will enable assessment of learning in this unit (WTS, ARE or GDS). Data then should be put on AM7 at the end of each term.
- Assessment evidence will be evident in the books.

### Presentation

The way that the work is to be presented will be clearly identified in lesson plans and will relate to the ability of groups of pupils.

- Pupils will experience and be taught a variety of styles of presenting or recording their work. These will include:
  - verbal reports and discussions
  - drawings, diagrams, charts, graphs
  - artistic and dramatic presentations including role play
  - written work in a variety of styles and for different audiences
  - using a range of ICT facilities
- Pupils will be encouraged on occasions to make their own choice of appropriate presentation style.
- Work will be presented:
  - in individual exercise books or folders
  - as wall or classroom displays
  - by annotating activities or models
  - as audio-visual displays
  - through assemblies
- Teachers will set high expectations for the quality and accuracy of the work presented and encourage children to evaluate their success in achieving this.

### Assessment Recording and Reporting

- Science will be assessed in line with the school assessment policy.
- At the end of each topic, we will assess the children using the 'knowledge organiser assessment' that is in line with our Twinkl Scheme topic. Teachers will also incorporate questions from previous units of work to ensure that key information is recalled.
- Summative records will be kept of individual achievement against National Curriculum levels and unit / topic expectations. These will be updated at the end of each topic and will comment on both knowledge & Sci attainment.
- Information gained from pupil records, initial assessment tasks and discussions will be used to plan activities.
- Work will be marked regularly against lesson objectives shared with pupils. Comments will identify strengths and weaknesses and a Next step targets will be provided in every other lesson.
- Where possible children will be encouraged to review their own progress.
- At the end of each unit, children will answer questions against the knowledge organiser to show progress.

### Inclusion

This will be addressed through the school's Inclusion Policy.

Whenever possible materials and artefacts used will reflect a varied cultural dimension e.g. food, musical instruments and clothing.

### Special Educational Needs

It must be noted that whilst the majority of children will naturally gain from various teaching methods within the classroom, there is a point at which special needs of individuals must be taken into account.

They may need:

- a) A greater degree of praise and encouragement.
- b) Extended individual attention.
- c) Help with practical activities if there is poor co-ordination or other physical problems.
- d) Encouragement to communicate about the activity in hand.
- e) Extra help with recording - possibilities might be the use of a tape recorder or having their responses typed on the computer.
- f) Visuals to help with their learning.
- g) writing frames to help record information

Teachers are encouraged to consult the special needs co-ordinator and to refer to the school's policy on special educational needs.

All lessons should include the 5 A Day Principles of High Quality Teaching - Explicit Instruction, Cognitive and Metacognitive Strategies, Scaffolding, Flexible Grouping, Using Technology.

### Challenge

- All lessons should empower children to think beyond what has been taught.
- Connections with other topics and the wider world should be set-up by class teachers but formed independently by learners.
- Connections with the world around us should be facilitated to allow for discussion and reflection by learners independently.

### Safety

- The school follows the advice published in 'Be Safe' as recommended by the Local Education Authority (LEA). Teachers need to make risk assessments for situations not covered in 'Be Safe'.
- All teachers will be expected to refer to this publication when planning activities and assessing for any risk to pupils. The booklet will be kept in the staff room.
- Further free Health and Safety advice can be sought from the Consortium of Local Education Authorities for the Provision of Science Services (CLEAPSS).
- Pupils will be made aware of safety issues that arise in topics or activities and will be trained to use the appropriate equipment and carry out tasks in a safe and responsible manner.
- Pupils will be increasingly required to identify safety considerations in their planning as they progress through the school.

### Resources

- Science resources are stored in labelled boxes in the stock room.
- The resource area will regularly be checked.
- It is the class teacher's responsibility to ensure all resources are placed back into the central stores cupboard.
- Staff should check availability of resources prior to the start of a topic and any resource shortages should be notified to the subject leader.
- The school grounds, which include a wildlife and grass area, are to be used throughout the year to aid the delivery of the Life Processes and Living Things section of the National Curriculum.

