



ST. JOSEPH'S CATHOLIC PRIMARY SCHOOL ALDERSHOT A VOLUNTARY ACADEMY IN THE DIOCESE OF PORTSMOUTH POLICY FOR SCIENCE (September 2019 - 2022)

The school aims to provide for the spiritual welfare, academic progress, physical development, aesthetic awareness and pastoral care of every child, within a secure, stable and stimulating atmosphere conducive to effective learning that reflects St Joseph's strong Catholic ethos.

Teaching and Learning at St Joseph's

Structure and the belief that all children can achieve is key to all learning at St Joseph's. In all subjects, **recalling pre-knowledge and skills** is fundamental to our rationale for all curriculum areas. This means that essential linked knowledge/ skills are **revised** and links made with children's current learning in all subjects. Key concepts/ end points for each topic are highlighted and **over-learning** of these areas occurs through **repetition, modelling and scaffolding of learning**. Through our subject-specific Schemes of Work, we make sure that learning for all is progressive and sequential. In addition, reading and vocabulary are emphasised in all subjects. Thus, key concepts become embedded in the **long-term memory**.

Vision Statement

As a Catholic family we welcome all and value Christ in everyone, whilst seeking the highest possible achievements.

As such, we plan and resource pupils' learning, in line with the school curriculum policy. The School's Vision and Mission Statements underpin all aspects of our planning, our chosen pedagogy and our delivery to enable all pupils to make good and sustained progress in science. We believe that all have the ability to achieve their best and our curriculum and varied choice of pedagogy enables all children to do this. This includes those with special educational needs and disability and those identified as most able.

Intent of the Science Curriculum

The science curriculum is designed by the curriculum co-ordinator, management team and governors to allow pupils to transfer key knowledge to their long-term memory. The school aims in science are not only to ingrain knowledge, understanding and the skills of scientific enquiry but to develop an approach that will enhance curiosity, confidence and enjoyment of the subject. The Scheme of Work ensures breadth, balance, continuity and progression hand-on experiences. This results in building new skills and knowledge based upon what has been taught before, allowing all pupils to **work towards clearly defined end points**.

We develop children's experiences and understanding of science and ignite their curiosity about the world through the specific disciplines of biology, chemistry and physics through encompassing

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memorable learning opportunities for example, science themed days, visiting Winchester Science Centre and science club. The school provides a coherently planned curriculum, sequenced towards cumulatively sufficient knowledge, skills and cultural capital through informative teaching and learning activities and enhancement experiences.

We therefore intend that all pupils will:

- Develop an understanding of the nature, process and method of science by embedding working scientifically throughout the science curriculum.
- Know there are five strands of scientific enquiry that are used to answer scientific questions (observations overtime, classifying and grouping, pattern seeking, comparative and fair testing and researching using secondary resources.
- Explore learning through their senses by providing hands-on learning that is safe and adequately resourced.
- Develop scientific knowledge and conceptual understanding through the disciplines of biology, chemistry and physics.
- Recognise that knowledge is not isolated from information, with firm links to science embedded throughout the wider curriculum.
- Focus, build-upon and learn key vocabulary to develop understanding of concepts and scientific knowledge.
- Read a variety of different books to promote over-learning and the development of pre-skills.
- Build in memorable experiences to promote deep learning such as science days.
- Develop an understanding of ethics within science to build on in further stages of education.

We use a range of **pedagogical practices** in the teaching of science to ensure that we are successful with our Intent. This can range from small group tasks, individual tasks, whole class tasks. We focus a lot on teacher modelling, expert questioning, giving children memorable experiences and over-learning to ensure that key knowledge is transferred to children's **long-term memory**.

Implementation of Science Curriculum

Subject Leadership:

Science has a **progressive and sequential Scheme of Work** which has been written by the subject leader/ specialist teacher to meet the needs of all pupils at St Joseph's.

The subject leader/ specialist teacher is responsible for:

- The design, review and implementation of the Scheme of Work (overseen by Phase Leaders, the Headteacher and the Governors.)
- The budget in their subject they are accountable to governors in relation to this.
- Observing and giving feedback to teachers on lessons across the key stages.
- Conducting pupil interviews to gain an idea of the pupil's thoughts and feelings about the science topics they have studied and feed these into science moderation, ensuring that all children make at least good progress.
- Encouraging and maintaining links with our local secondary school and local industry to provide additional opportunity for the children.

The implementation of this science policy is the responsibility of all staff engaged in the learning and teaching of science.

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Subject Knowledge (breadth and depth of science Scheme of Work):

- The subject leaders/ specialist teacher ensures that teachers have good subject knowledge and the subject leader is appropriately trained to provide support, sharing and informing knowledge.
- The Scheme of Work provides a **focused learning environment and clear learning objectives to embed learning in the long-term memory through encompassing memorable learning experiences.**
- Our science curriculum covers the skills outlined in the National Curriculum through broad, challenging and inspiring topics. A topic-based approach is used to deliver the content within a **meaningful context and wherever possible cross-curricular links are exploited** particularly links with geography, British Values, School Values, computing, English and maths.
- **Pre-knowledge and skills are retrieved and built upon** at the beginning of each topic as outline on the Scheme of Work.
- At a classroom level, **key concepts are presented clearly so that they are embedded in the long-term memory and over-learning is prevalent**, this is also monitored by the subject leader/specialist teacher.
- Individual lessons are planned to inspire, engage and challenge pupils in response to their needs.
- Children are given a wide variety of experiences both in the classroom and out. Pupils undertake **memorable learning opportunities** by attending school visits such as The Winchester Science Museum and having visitors into school to enable the children to gain first-hand experiences to support their learning and influence further learning.
- Reading and scientific vocabulary are emphasised and taught to embed these skills in the pupils' long-term memory.
- Set books are borrowed on a termly basis from the school library to support topic work. Children are able to borrow books to enrich their learning and understanding at home as well as at school. **This develops home school links, cultural capital and reading.**
- Teachers will remind the children how their school and home environments are valuable resources. The children have the opportunity to bring in scientific resources/ artefacts from home for display and discussions.

A particular topic unit is taught each half term, on some occasions a whole term. All Key Stage 1 teachers will be responsible for the planning and teaching of the science curriculum. In Key Stage 2, a specialist science teacher will plan and teach the curriculum in the dedicated science laboratory.

In both keys stages children study science for the equivalent of 2 hours per a week. Key Stage 2 will also have topic specific homework each week to increase their subject knowledge.

At Key Stage 1: The principal focus of science teaching is to enable pupils to 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 and deepen 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 fair and 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

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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.

During Key Stage 1, pupils should be able to develop the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Mastering the skill of being able to ask simple questions and recognising that they can be answered in different ways.
- Making observations.
- Performing simple tests.
- Identifying and classifying.
- Using their observations and ideas to suggest answers to questions gathering and recording data to help in answering questions.

At Lower Key Stage 2: The principal focus of science teaching is to 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, to talk and write about what they have found out.

During years 3 and 4, pupils should be able to master the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Asking relevant questions and using different types of scientific enquiry to answer them
- Setting up simple practical enquiries, comparative and fair tests.
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings.

At Upper Key Stage 2: The principal focus of science teaching is to 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 master how these ideas help them to

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understand and predict how the world operates. They should also begin to master how scientific ideas can 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.

During years 5 and 6, pupils should be able to master the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Planning using different types of scientific enquiry to answer questions, including the mastery of controlling variables where necessary.
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Using test results to make predictions to set up further comparative and fair tests.
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments.

Science Laboratory: The vast majority of science resources are kept in the purpose built science laboratory. This includes all equipment for key stage 2 and whole school equipment, including microscopes. Resources used as part of the key stage 1 scheme of work may be booked out in advance, or used within the laboratory as part of a rolling programme of access. The subject leader/ specialist teacher is responsible for the ordering of resources in consultation with the Headteacher. Resources will be allocated annually in accordance with the School Improvement Plan and be linked to achieving set objectives.

Equitable Delivery

- Science is taught through a variety of individual, group and whole class activities.
- Active participation is encouraged through questioning and answering, investigations, experiments and through analysing and interpreting evidence.
- Children are encouraged to read a variety of sources e.g. library books, newspaper articles etc..
- Children are encouraged to communicate their findings in a variety of ways e.g. written or verbal reports, use of graphs and pictures, displays and drama.
- The subject leader/ specialist teacher is accountable for their own annual budget to purchase a variety of resources, training and school visits/visitors to improve outcomes for pupils.
- Enrichment days are organised in relation to particular topics covered across the key stages such as science themed days, school trips and science club.

Assessment

- It will comply with the school's assessment policy. Science will be assessed through summative and formative methods at the end topic. The class teacher will assess the child's achievement against the overall main learning outcome and end points and comment in the

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pupil's book. The teacher will assess every child as working below, developing, working securely, working above or at mastery level. This description indicates the child's performance against the learning expectations being recorded.

- Each child will be given the opportunity to appraise his / her work and progress through discussion with the teacher, either individually, or in small groups in the context of a practical task being investigated.
- Collect examples of children's work for evidence of progress throughout the school year.

Impact of Science Curriculum

- Our thorough tracking and assessment system enables teachers to check children's progress in relation to the curriculum and provide targeted intervention if needed.
- Science is monitored by the subject leader and phase leaders in all year groups after each topic, through work scrutiny, learning walks, review of assessment, pupil interviews and lesson observation to discuss learning and look at the impact. This is reported to the Headteacher and appropriate changes made.
- At St Joseph's, pupils achieve highly across the curriculum in English and Maths, the sciences, humanities, art, language and physical education and the use of transferrable skills is promoted.
- Pupils use the knowledge and skills learnt to meet the challenges of the next part of their educational journey and to do so with confidence and concentration.
- Our emphasis on scientific enquiry will give children the skillset necessary to build upon in the next step of their education.
- Our hands-on approach will foster curiosity, confidence and enjoyment of the subject which could translate into greater number choosing to pursue the subject as a career.
- Our focus on science capital and wider enrichment opportunities improves engagement and therefore cognisance and recollection.

Health and Safety

- All out of school activities comply with the guidelines in the school health and safety and educational visit guidelines.
- When engaged in field work and visits children are expected to behave in a considerate responsible manner showing respect for other people and the environment.
- The safe use of equipment is promoted at all times.
- Any animal, including insects, being used for study should be treated with respect and returned as soon as the activity is complete.
- Any experiment or investigation involving an element of risk will be subject to a risk assessment to minimise and potentially eliminate the concern.
- For science guidance related to science work refer to the 'Hampshire science policy on science safety'

Equal Opportunities

In the study of science, equal emphasis is given to both male and female roles within a community. The children focus on real-life experiences to avoid stereotyping and misconceptions.

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Pupils with special educational needs and disability (SEND) are given support with reading and writing in the classroom and work is differentiated appropriately with a varied choice of pedagogy enabling all children to achieve their full potential.

The principles and practice of diversity and race equality are integrated into the teaching and learning of science. Attainment and progress data will be monitored and supportive action will be taken to improve any underachievement due to racial bias and that assessments are free of any cultural bias.

Background Documentation

This document is a statement of the aims and strategies for teaching and learning science in St. Joseph's Catholic School Aldershot. It was developed by Mrs Caroline Keogh in consultation with the Staff, Headteacher and Directors/Governors.

DATE OF APPROVAL:
September 2019

DATE OF REVIEW:
September 2022

Signed: Mrs D. McNeill
Headteacher

Dr Campbell McCafferty CBE
Chairman of Governors/Directors