At St Mary's we champion every child to be the **best that they can be.** Our knowledge-led curriculum therefore endeavours to develop our children's **character**, **core skills**, **creativity** and sense of **community**.
Supported by our school's vision, ethos and position as a junior school, we believe that our specialist knowledge of the Key Stage 2 age range ensures **improving outcomes, opportunities and experiences for all our children.** To achieve this, we are aspirational for our pupils, instilling high expectations, the passion, perseverance and stamina to succeed

Science Policy

Ely St Mary's CofE Junior School

Written/reviewed by:	Emma Briggs	**Date:**	December 2021
Next review due by:	December 2026		

1. Introduction

St Mary's Science curriculum aims to equip children with the foundations for understanding the world through a scientific lens. Pupils will be taught units of work that cover and go beyond the requirements of the National Curriculum in the specific disciplines of biology, chemistry and physics. Pupils will encounter people who have made significant contributions to the field of science over time, understanding that science has been a quest for understanding for many years, and will continue to be so in the future. Pupils will build a body of key foundational science knowledge as they work through the curriculum, asking questions and developing a sense of curiosity about the world around us.

Following our Science curriculum will give children an introduction to fascinating content such as the inner workings of the human body, animals and the environments they live in, plants and their features, forces in nature, what lies beyond the visible and what lies beyond the planet we live on. Over time the childrens' knowledge will deepen moving from recognising and naming parts of the human body to understanding how our muscles work, how our blood moves around our body and how our nervous system helps us to interact with the world. Pupils will be encouraged to use the knowledge they learn in Science and apply it to investigations that test a theory or set out to answer a question.

Importantly, substantive scientific knowledge is taught first, before pupils are asked to undertake enquiry. This helps them to fully understand the elements of the enquiry first, and to make informed observations about the processes they see. Gathering information, recording data, graphing data and interpreting findings are all essential skills that pupils will apply to new contexts as they work through the curriculum. Enquiries include observing over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing and researching using secondary sources. Scientific enquiries provide children with a wealth of opportunities, but first and foremost they will help to deepen understanding of the nature, processes and methods of science as a discipline and how it differs from other subjects they are studying. Pupils will gain an understanding of the purpose and uses of science both today and in the future.

1.1 Aims & Objectives

Our Science curriculum builds knowledge incrementally. Pupils have multiple opportunities to secure and build on their knowledge and understanding as subject content is revisited at points throughout the curriculum. This helps children to master the knowledge and concepts whilst building up an extended specialist vocabulary. This incremental approach helps teachers to identify knowledge gaps and look back at previous content if they need to close gaps in knowledge or understanding.

Our curriculum enables children to understand the important role that Science plays in the sustainability of life on earth. We want children following this curriculum to be equipped to go forth into their secondary education with curiosity, passion and a desire for discovery.

At St Mary's the aims and objectives of teaching science ensure that all children:

• develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics

• develop an 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.

2. Procedures and practice

2.1 Teaching & Planning:

Science is a subject based around practical investigation and therefore teachers employ a range of teaching methods including exposition, explanation, demonstration, discussion, and practical activity, investigations, testing and problem-solving. Children will have the opportunity to work individually, in pairs, in groups, or as a whole class. Where possible, visits to centres of scientific interest are arranged, and visiting speakers and workshops are invited to school.

We recognise that in all classes children have a wide range of scientific abilities, and the methods used will be matched to the concepts being taught, with consideration to the age and needs of the children.

Staff plan science lessons with support from the Primary Knowledge Curriculum material and lesson design (see below). Typically a lesson design will include the following elements:

- Retrieval opportunities
- Explicit vocabulary teaching
- Teacher input
- Talk task/think task
- Activity
- Plenary/ Review.

2.2 Organisation:

Science is taught as a discrete subject and is delivered in a variety of ways across the school - sometimes in blocks of taught time (projects) but more often as a weekly session to enable knowledge to be revisited over time. Science teaching might be based in the classroom, the Café, or the STEM Hub.

2.3 Resources:

Science resources are kept in the server room in labelled boxes for each unit. Resources will be regularly reviewed in the light of curriculum developments and updated when necessary. To facilitate the teaching of Science, we also have a STEM Hub or the Café to make cross curricular links with D&T and Computing, for example.

Teachers have been provided with Primary Knowledge Curriculum Science planning which can be found on staff share in Year group specific files. This planning includes knowledge organisers (including specific scientific vocabulary), lesson plans and curriculum overviews to assist the sequential teaching of scientific knowledge, vocabulary and concepts. The planning can be used creatively and adapted to teachers' own classrooms and cohorts. The PKC also provides CPD opportunities.

The school has a rich source of scientific expertise – with its proximity to Cambridge University – and has access to many unique educational resources. Parents are invited to share expertise when possible, especially during Science weeks.

2.4 Health and Safety:

We enable all pupils to have access to the full range of activities involved in learning science. Where children are to participate in activities outside the classroom, we carry out a risk assessment prior to the activity, to ensure that the activity is safe and appropriate for all pupils.

2.5 Equal opportunities:

Every child has the right to access the full Science curriculum regardless of gender, race, and ability.

Learning objectives, activities and adult support will be adapted to meet the needs of all pupils including those with SEND and higher attaining children. See both our SEND policy and our Most Able Policy.

Pupil Premium funding can also be allocated to facilitate disadvantaged pupils in accessing extracurricular opportunities and in subsidising enrichment trips, visits and experiences relating to Science or, more broadly, STEM.

Support staff work under the direction of the teacher to support pupils during Science lessons. Questioning and feedback promotes a depth of reflection and understanding, scaffolds and models. Where appropriate, support staff may also facilitate the recording of learning to ensure learning across the broader curriculum is not limited by literacy difficulties, for example.

2.6 Assessment:

Assessment is based on a combination of teacher assessment, formal statutory assessment and pupil self-evaluation. Feedback is offered verbally and through live marking and feedback. During a unit, teachers will document pupils' strengths and next steps to be addressed through further teacher input – see the school's Feedback Policy.

Annually, staff will use their termly assessment to record individual attainment levels on Pupil Asset. As our Science curriculum follows a progressive model, pupils who successfully learn about the intended learning goals within their year group curriculum would be considered as working at the age related standard. Both lesson observations, dialogue and summative unit-based feedback will inform staff's annual judgements as well as teacher comments in children's end of year reports to parents.

Our highest attainers in Science are recorded as 'exceeding' on Pupil Asset. Exceptionally able learners within STEM may display a selection of the following characteristics:

• Rapid and sound memorisation of mathematical material, learning and understanding mathematical ideas quickly;
• Make connections between the concepts they have learned;
• Reason logically: can verify, justify and prove, working systematically and accurately: able to communicate their reasoning and justify their methods. They are adept at posing their own questions and pursuing lines of enquiry;
• Demonstrate curiosity and enthusiasm for mathematical problems, taking a creative approach and are more analytical: being able to think flexibly, adapting problem-solving approaches. They sustain

their concentration throughout longer tasks and persist in seeking solutions and enjoy working at increased depth;
• Design and construct products with a high level of precision and quality;
• Be open to making changes throughout processes to make the best possible product;
• Have a precise awareness of what tools and materials are required in order to achieve the desired outcomes;
• Use a variety of programming languages, including the use of sequence, selection, repetition and variables;
• Use interactive approaches, running and debugging programs and showing tenacity in solving problems;
• Quick, confident, efficient take up of new computing applications;
• Exploring and developing skills and experience independently;
• Intrigued rather than frustrated by problems;

2.7 Monitoring and Evaluation:

The implementation of this policy will be monitored by the subject lead for Science and Heads of Phase/Year. At present, a portfolio is being produced by the subject leader to identify examples of effective science practice via pupil voice and work sampling.

The quality of Science will also be evaluated through lesson drop ins, pupil voice and work sampling.

The linked Science school governor will support the monitoring of this subject area at least annually (e.g. via our Governor Day).

3. Contribution of Science to other subjects in the curriculum

3.1English

Science lessons promote key English skills of reading and writing both naturally and explicitly. Students are encouraged to use technical scientific vocabulary and to spell such vocabulary correctly often using a word bank. Children are also encouraged to explain scientific processes and ideas. They are also encouraged to make predictions, investigate, record data accurately and finally conclude.

3.2 STEAM

Recognising the ability of the arts to expand the limits of STEM education and application, pupils will have the opportunity to achieve a Crest Award, SuperStar or Discovery Award, which will offer and inspire further opportunities for pupils to collaborate, apply and blend STEM-based knowledge, ideas and skills with Science.

3.3Humanities

Science lessons encourage pupils to be critical and reflective thinkers. As in History, Science develops an understanding of change and evolution overtime. The idea of natural change over time complements the running theme of legacy within the History curriculum we teach. Likewise, Science is also closely linked with geographical studies, examples including rocks, soils and the environment we live in. More broadly, it too draws links the overarching aims of our Geography curriculum, which supports pupils to not only know about the world and our place in it, but also our impact on it. Science makes strong links with PE, especially key units such as the circulatory system and nutrition.

3.4PSHE

Where possible, Science activities are used to encourage pupils to recognise and value their own and other people's understanding. Students are also encouraged in Science to respect the views of others and to work in teams alongside each other. Science can teach children the value of mutually respectful relationships as well as the art of teamwork and listening.

Science is closely linked to RSE as we study reproduction in animals including humans.

We also study such healthy eating, smoking's effects on the body and drug identification, which all make close links with our PSHE curriculum.

Through both Science and PSHE, pupils are encouraged to manage their environment to ensure the health and safety of themselves and others, to develop their sense of responsibility in following safe procedures and understand both the importance of personal hygiene and how to work hygienically.

4. Concluding notes

4.1 Consultation

This policy and Science curriculum was written by Emma Briggs, Rachel Clarke deputy headteacher and leader for DT education, in consultation with:

- Teaching staff & LGB representatives
- Governors

4.2 Monitoring and review

This policy will be monitored and reviewed by the subject leader responsible for Science

4.3 Links to other policies

- Full Science Coverage Map and Progression of Skills can be found on the Ely St Mary's Science page of our website https://www.elystmarys.org.uk/web/science/503317
- SEND Policy
- Pupil Premium Strategy
- Most Able Policy
- Feedback policy