



SCIENCE POLICY 2024-25

School Vision

“Springfield is a caring, supportive, and innovative school where everyone is recognised and appreciated as an individual. The golden thread running through our vision is the mental health and wellbeing of our school community. By creating a safe, supportive, and relational environment for all, we enable our children to be ambitious and to reach their full potential, so that they can take their place in their community and in the wider world.”

Rationale

At Springfield CPS we appreciate and acknowledge how science impacts every aspect of daily life and believe that without science humankind would not have made progress throughout history. As one of the core subjects taught at primary level, we give the teaching and learning of science the prominence it deserves.

Learning science is concerned with increasing children’s knowledge of our world, and with developing skills associated with science as a process of enquiry. Our science curriculum develops the natural curiosity of each of our children no matter their demographic and encourages them to have respect for living organisms, whilst instilling in them the importance of caring for the natural environment.

At Springfield we believe that Science can stimulate and excite our children’s curiosity about phenomena and events in the world around them. It can also satisfy their curiosity with knowledge as it links direct practical experiences with ideas, so it can then engage children at many levels.

Aims of our Science Curriculum

- Engage children as learners at many levels through linking scientific concepts and idea with practical experience so that they develop deep understanding.
- Ensure that the children get a balance of ‘substantive’ knowledge- which is knowledge of the products of science, such as models, laws and theories- and ‘disciplinary knowledge’, which is knowledge of the practices of science.
- Enable children to learn to question and discuss scientific issues that may affect their own lives using PSTT’s Bright Ideas approach and through exposure to Big Questions.
- Enable children to develop, model, and evaluate explanations through scientific methods of collecting evidence.
- Develop attitudes of curiosity, originality, co-operation, perseverance, open mindedness, self-criticism, responsibility, and independence in thinking.
- Enable children to communicate their scientific predictions and discoveries effectively and confidently through providing them with them opportunities to observe, describe, illustrate, predict, evaluate, and interpret, using appropriate scientific vocabulary.
- Develop children’s understanding of the effects of their actions on the environment.
- Provide opportunities for our children to learn about the significance of science to society and to their own lives. This will involve learning about the work of scientists, and the contributions that scientists have or are making.
- Enable children to learn about the continuing importance of science in solving global challenges such as climate change, food availability and access to water.

- Showing children how major scientific ideas contribute to technological change and how these impact on improving the quality of our everyday lives.
- Helping children recognise the cultural significance of science and trace its development.
- Providing children with ongoing knowledge of a range of diverse and valuable careers within science as a means of encouraging children into more science-based fields later in life.

In addition, the intent behind science is to contribute towards the cultural capital for the children in terms of the knowledge and skills they need to be successful learners and in wider life. Cultural capital in science has been identified in terms of the knowledge useful to their lives. We are aware that powerful knowledge will put our children at an advantage.

The powerful knowledge we teach in science is as follows:

- **Scientific literacy:** a child's knowledge and understanding about science and how science works. This also includes their confidence in feeling that they know about science.
- **Science-related attitudes:** values and dispositions: this refers to the extent to which a child sees science as relevant to everyday life (for instance, the view that science is 'everywhere')
- **Scientific vocabulary**
- **Knowledge about the transferability of science:** understanding the utility and broad application of science qualifications, knowledge and skills used in science (e.g., that these can lead to a wide range of jobs beyond, not just in, science fields).
- **Science media consumption:** the extent to which a child, for example, watches science-related television, reads science-related books, magazines and engages with science-related internet content.
- **Participation in out-of-school science learning contexts:** how often a child participates in informal science learning contexts, such as science museums, science clubs, fairs, etc.
- **Family science skills, knowledge, and qualifications:** the extent to which a child's family have science-related skills, qualifications, jobs and interests.
- **Knowing people in science-related roles:** the people a child knows (in a meaningful way) in their family, friends, peer, and community circles who work in science-related roles.
- **Talking about science in everyday life:** how often a child talks about science out of school with key people in their lives (e.g., friends, siblings, parents, neighbours, community members) and the extent to which a child is encouraged to continue with science by key people in their lives.

Our science curriculum follows the Pzazz scheme and is also supplemented by resources from the Primary Science Teaching Trust. This scheme considers and implements findings published in the publication '*Intention and substance: further findings on primary school science from phase 3 of Ofsted's curriculum research*' (2019).

Implementation of Policy

We have used the best research to create a well sequenced and progressive curriculum map containing the key concepts children need to be procedurally fluent in to work and think like professional scientists.

Science pedagogy is based on the development of these key scientific concepts:

- **Conceptual understanding**
- **Processes**
- **Skills of enquiry**
- **Scientific attitudes**

At Springfield CPS, working scientifically is about developing and evaluating explanations through experimental evidence and modelling. This is an ignition to critical and creative thought. Through science, children understand how major scientific ideas contribute to technological change - impacting on industry, business and medicine and improving the quality of life. Children recognise the cultural significance of science and trace its world-wide development. They learn to question and discuss science-based issues that may affect their own lives, the direction of society and the future of the world.

Using the requirements of the Science National Curriculum as our guide, our science lessons offer opportunities for children to:

- Develop scientific knowledge and conceptual understanding of the disciplines of Physics, Chemistry and Biology.
- Formulate their own questions about the natural world.
- Foster the confidence to 'be wrong' when it comes to making predictions and postulating their own theories.
- Promote an awareness of the importance of teamwork in scientific experimentation.
- Practically investigate their questions using various methods of enquiry.
- Gain competence in the science skills of planning scientific investigations, gathering and analysing data and critical evaluation of investigations across the disciplines.
- Use a range of methods to gather data from investigations and secondary sources including I.C.T., drawings, diagrams, videos and photographs.
- Present data in a variety of appropriate methods including tables, bar charts, line graphs, pictograms and pie charts.
- Produce comprehensive science reports that demonstrate their proficiency in the scientific method.
- Demonstrate care for the safety of all individuals in lessons by developing knowledge of the hazards of the materials and equipment they handle, along with mitigating these hazards.
- Develop an enthusiasm and enjoyment of scientific learning and discovery.

Early Years Foundation Stage

At Springfield children in EYFS will be introduced to science through the Early Years Foundation Stage (EYFS) Curriculum Guidance. The Early Learning Goals (ELGs) for 'Natural World' forms the foundation for later work in science.

Wherever possible the children are provided with activities based on firsthand experience that encourage exploration, observation, problem solving, prediction, critical thinking, decision making and discussion. We provide an environment with a wide range of indoor and outdoor experiences that stimulate their interest and curiosity.

At Springfield children are provided with a broad range of opportunities and experiences in science, enabling them to work towards their Early Learning Goals.

At Springfield children develop their understanding of the world around them daily, using their senses to explore and learn about objects and materials. Children are given holistic learning experiences, incorporating elements of science in their everyday activities.

KS1

At Springfield children observe, explore and ask questions about living things, materials and physical phenomena. They begin to work together to collect evidence to help them answer questions and to link this to simple scientific ideas. They begin to evaluate evidence and consider whether tests or comparisons are preparing for the future in a caring environment.

At Springfield children make use reference materials including ICT to find out more about scientific ideas. They share ideas and communicate them using scientific language, drawings, charts and tables with the help of ICT where appropriate.

The KS1 curriculum follows the National Curriculum, ensuring all areas of the Programme of Study are covered across both Years 1 and 2. Children further develop their understanding of the world around them which they have gained in the Foundation Stage. Children are able to observe, explore and ask questions about living things, materials and physical phenomena.

Children begin to work collaboratively with others, enabling them to develop their scientific knowledge and understanding and to link scientific concepts. Children communicate ideas orally using taught scientific language and begin to develop written methods for communicating their ideas (to include drawings, diagrams, use of ICT, tables and charts).

KS2

At Springfield children learn about a wider range of living things, materials and physical phenomena. They make links between ideas and explain things using simple models and theories. They apply their knowledge and understanding of scientific ideas to familiar phenomena, everyday things and their personal health. They think about the effects of scientific and technological developments on the environment and in other contexts. They carry out more systematic investigations, working on their own and with others. They use a range of reference sources including ICT in their work. They talk about their work and its significances, using a wide range of scientific language, conventional diagrams, charts, graphs and ICT to communicate their ideas.

At Springfield the KS2 curriculum follows the National Curriculum, ensuring all areas of the Programme of Study are covered across Years 3, 4, 5 and 6. Children learn, explore and ask questions about a wider range of living things, materials and physical phenomena. Children think about the impact of scientific developments and technologies on themselves and the world around them.

At Springfield children are encouraged to develop an independent approach to their science learning, through asking questions, suggesting improvements to their work and supporting each other towards achieving a heightened understanding of scientific concepts.

Working Scientifically is promoted across KS2 with children being given the opportunity to plan, do and review. Children are encouraged to develop their own methods for presenting their ideas (to include drawings, diagrams, use of ICT, tables and charts).

Progression

In line with the findings of the *Ofsted Primary Science Review (2020)* knowledge is carefully sequenced to reveal the interplay between substantive and disciplinary knowledge. This ensures that pupils not only know 'the science' but they also know the evidence for it and can use this knowledge to work scientifically. Our substantive knowledge within the Science Whole School Progression map is organised according to the 3 subject disciplines: Biology, Chemistry and Physics.

At Springfield as children move from Early Years to KS1 and up to KS2, science teaching and effective assessment allows opportunities for them to progress in a range of ways.

- We have used the best research to create a well sequenced and progressive curriculum map containing the key concepts children need to be procedurally fluent in to work and think like professional scientists.

We ensure progression in the following key concepts:

- Conceptual understanding
 - Processes
 - Skills of enquiry
 - Scientific attitudes
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- From using everyday language to increasingly precise use of technical, scientific vocabulary, notation and symbols.
 - From personal scientific knowledge in a few areas to understanding in a wider range of areas and knowing how these links together.
 - From describing events and phenomena to explaining events and phenomena.
 - From explaining phenomena in terms of their own ideas, to explaining phenomena in terms of scientifically accepted ideas or models.
 - From participating in adult lead practical, scientific investigations to developing and undertaking their own scientific investigations, independently.
 - From unstructured exploration to more systematic investigation of a question or questions developed independently.
 - From using simple drawings, diagrams and charts to represent and communicate scientific information, to using more conventional diagrams and graphs.

Working scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- 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

During years 3 and 4, pupils should be taught to use 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 enquiries 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

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

- planning different types of scientific enquiries to answer questions, including recognising and 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 a 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

Health and Safety

At Springfield all children are made explicitly aware of the relevance of health and safety issues when undertaking scientific work. This is specifically highlighted when they are asked to undertake scientific investigations, with additional adults being used effectively to assist with the safe running of all science lessons.

Resources

At Springfield each topic covered within the school science curriculum has its own resource box in the science stock cupboard. There is also generic science equipment within this storage area. Equipment will be updated as required, within the allocated science budget.

ICT

At Springfield children will be given opportunities to apply and develop their ICT capability throughout their science lessons, through the use of science/ICT software.

Monitoring

At Springfield monitoring of the standards of children's' work and of the quality of teaching in science is the responsibility of the science coordinator to ensure continuity and progression throughout the school. The role of science coordinator also involves being informed about current developments in the subject and providing a strategic lead and direction for the subject in school. An annual summary of science is made in which strengths and weaknesses in the subject are evaluated, and an action plan to address any issues arising is formulated for the forthcoming year.

Equal Opportunities

At Springfield we believe that every individual within the school has the opportunity to achieve their full potential has the same chance and equal access to all areas of the curriculum.

In science this means that all children will have the opportunity:

- To develop the process of systematic enquiry.
- To relate their understanding of science to everyday life and in environmental contexts
- To communicate using appropriate vocabulary and present scientific information in a number of ways
- To explore aspects of health and safety when working with living things and materials
- To carry out experimental and investigate science.
- To develop and apply their ICT capability in their study of science Staff members make every effort to use stimuli that reflect the cultural diversity of our school and to draw on children own experiences.

At Springfield we aim to create a "rich scientific enquiring environment during lessons.

Assessment

At Springfield a range of assessment techniques will be used depending on the nature of the lesson, knowledge acquired, or the process skills used.

At the start of a new topic, all staff will activate prior knowledge through conducting a pre-assessment to gather information about children's knowledge before teaching for a new topic commences. Additionally, this will also help identify if any misconceptions exist. At the end of the topic, children will add to the pre-assessment to demonstrate progress.

At the end of each topic, the working scientifically skills will be tested in years 1-6 through a TAPS assessment.

The Role of the Science Subject Leader

At Springfield the Science subject leader will:

- Ensure the development of a progressive curriculum map, monitor its implementation and impact.
- Promote the integration of science within appropriate teaching and learning activities.
- Manage the provision and deployment of resources and give guidance on classroom organisation support.
- Inspire colleagues to deliver high quality teaching and learning opportunities.
- Lead INSET within the school and investigate suitable courses elsewhere.
- Act as a contact point between the school and support agencies, including the LA.
- Analyse data to identify strengths and weaknesses in outcomes, planning for improvement accordingly.
- Write, monitor, and evaluate an action plan for Science for the School Improvement Plan
- Lead the evaluation and review of the school's Science policy.
- Bid for and manage the budget for this curriculum area.
- Monitor and review the science provision within the school.

Disability Equality Impact Assessment

This policy has been written with reference to and in consideration of the school's Disability Equality Scheme. Assessment will include consideration of issues identified by the involvement of disabled children, staff and parents and any information the school holds on disabled children, staff and parents.

Any questions or concerns regarding this policy should be made to Miss L Whiteside- Subject Lead

Autumn 2024

Reviewed Annually