

**St Andrew's C of E
Primary School**
Ready, Respectful, Safe



Science Policy

With faith, hope and love we can achieve greater things.

September 2021-September 2023

Introduction

This policy outlines how science is taught and learnt in our school. At St Andrew's Primary School, "Children become scientists through the teaching of procedural knowledge as well as scientific facts and theories. It is a highly practical subject and engages the children in activities and investigations that builds on their science footprint and skills, enabling them to understand the world around them whilst capturing their awe and wonder in how things work. It introduces them to the possibilities science opens up to them for their future making links with other STEM subjects. Inspiration is taken from famous past and present scientists and links are made with how their work has shaped the world we live in." (Intent Statement)

Science teaches an understanding of natural phenomena. It aims to stimulate and excite our pupils' curiosity, through a child centered active learning experience, in finding out "why" and "how" things happen in the way they do. It teaches methods of enquiry and investigation to stimulate creative thought. Children learn to ask scientific questions and to think critically in order to solve problems. Children will begin to appreciate the way science will affect their future on a personal, national, and global level.

At St Andrew's we believe all children have the potential to progress scientifically. We know that they arrive with different levels of English language and Science Capital therefore aim to provide appropriate experiences and support to enable them to develop scientifically. Science in the classroom starts from the children's understanding (KWI) and is firmly based on any first hand experiences they have.

This policy outlines the guiding principles by which this school will implement Science in line with the National Curriculum 2014 and the Early Years Foundation Stage Curriculum. The National Curriculum for science aims to ensure that all pupils:

- develop **scientific knowledge and conceptual understanding** through the scientific 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 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

These aims define our science curriculum. As part of the long term plan in KS1 & 2 science topics are allocated to each year group to ensure that children cover and in some cases revise many aspects of science as they progress through the school. In EYFS Science is covered through the Early Learning Goal "Understanding the World".

This policy has been adopted by the staff of St Andrew's CE Primary School. It is reviewed biannually.

Aims and Objectives

"Tell me and I will forget,
Show me and I may remember,
Involve me and I will understand." Aristotle

At St Andrew's we implement our science curriculum through providing quality first teaching and learning. We aim for all children at St Andrew's Primary school to:

- Learn to love science and have an appreciation for and a curiosity and developing understanding about the world in which we live.
- To have the self-confidence to engage in scientific thinking.
- To encourage scientific questioning, curiosity and creative thought
- Access the programmes of study in ways that are imaginative, purposeful, controlled, disciplined and enjoyable.
- Develop the scientific skills of questioning, predicting, investigating in various forms, recording, accurate measuring and observation, interpreting results, reasoning and evaluating in order to draw evidence based conclusions.
- Learn about and develop their knowledge and understanding of topics in the scientific disciplines of Biology, Chemistry and Physics
- Be able to select and use appropriate equipment safely and correctly.
- Develop the children's ability to communicate their ideas and findings.
- Use correct scientific language when talking about and recording their work.
- Work independently and co-operatively through paired/group work so developing skills of discussion and co-operation.
- To be resilient learners and scientists
- Foster an understanding and an appreciation of the way in which scientific understanding can be applied practically and has enabled technological advances

We know Science is successful and has had impact when our children overwhelmingly enjoy science resulting in motivated learners who display high levels of curiosity. All children feel they are scientists and capable of achieving. Children apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions. Subsequently they acquire good scientific understanding. Children also have the understanding that science has changed our lives and our world and how it has the capacity to continue to do so. (Impact Statement)

The Science Curriculum & Expectations

Foundation Stage

In our foundation stage, we foster a hands on approach to promote curiosity and to develop children's scientific skills. We endeavour to do this by providing a range of opportunities for children to engage with. Children are encouraged to:

- Make careful observations
- Describe
- Identify/Name
- Investigate/Explore
- Compare
- Question/Discuss

Through a range of stimulating, practical activities, children learn the skills needed to start developing their own scientific understanding of the world in which they live. Our foundation stage team carefully plan inspiring opportunities for children to develop their scientific vocabulary and understanding.

Science in the Foundation Stage is taught through the objectives set out in Development Matters and the ELGs (Early Learning Goals) particularly the specific area of "The World."

In Nursery pupils explore natural materials indoors and outdoors and explore and respond to different natural phenomena. They explore the properties of materials. In Reception they build on the work done in Nursery and begin to explore how things work and explore forces. Pupils in Reception will also, plant seeds and care for them as part of understanding lifecycles which feeds into an understanding of respect for the natural environment and all living things. All of the above is done with a strong use of all the senses. Where appropriate, much of this learning is done in Forest School. Here we aim to give everybody the opportunity to develop an inquisitive and positive relationship with the natural world, while having fun and enjoying themselves. Sessions are planned weekly so that different activities are available for the children to take part in.

It is intended by the end of the Foundation Stage children will have achieved a GLD in the area "Understanding the World" with particular reference to the area of learning "The Natural World"

KS1

In KS1, pupils will explore, observe and ask questions about living things, materials and the world around them. They begin to work together to collect evidence to help them answer questions, find patterns, classify and group objects, research using a variety of sources and carry out fair testing. They use reference materials 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 if it is appropriate.

Children in KS1 will continue to work practically with engaging, real-life opportunities to explore science. Pupils will continue to develop their understanding of the world around us through a variety of inspiring, scientific challenges and investigations.

KS2

At KS2 pupils 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.

Pupils in KS2 will develop their scientific vocabulary and understanding further by engaging in increasingly more challenging and thought provoking enquiries. Pupils will carry out a range of scientific investigations including observations over time, pattern seeking, classifying, grouping and researching using other sources (including computing resources). Children learn to plan their investigations with increasing independence.

By the end of each Key Stage it is intended pupils will be working at the Expected Standard outlined in the current Teacher Assessment Frameworks.

At the end of each other Year Group it is intended pupils will meet the Age Related Expectations for that year group.

Teaching & Learning

Organisation

At St Andrew's Primary School we use a variety of teaching and learning styles in science lessons. We aim to develop children's knowledge, skills, and understanding. We do this through whole-class teaching, while at other times we engage the children in an enquiry-based research activity. During lessons we encourage the children to ask, as well as answer, scientific questions. They have the opportunity to use a variety of data, such as statistics, graphs, pictures, and photographs. Where possible they use ICT in science lessons where it enhances their learning. They take part in discussions and they present reports to the rest of the class. They engage in a wide variety of problem-solving activities. Wherever possible, we involve the pupils in 'real' scientific activities, for example, researching a local environmental problem or carrying out a practical experiment and analysing the results. We recognise that there are children with widely different Scientific Capital and abilities in all classes and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways by:

- Setting common tasks which are open-ended and can have a variety of responses
- Setting tasks of increasing difficulty (we do not expect all children to complete all tasks)
- Using the metals system (as in other subjects in school) to provide challenge and support.
- Providing resources of different complexity, to support and challenge the different abilities of the child
- Using classroom assistants to support the work of individual children or groups of children

It is the teacher's responsibility to select the most effective approach for a lesson. There must be a balance between teacher demonstration, guided practical tasks and investigations; and use of first and second hand sources.

Children record work in specific science books and in Class Science Floor Books.

Homework is not specifically given but at times teachers may choose to offer an "at home" task to support classroom science. This may include finding answers to questions posed in school, research using books/Internet, interviewing friends and family or collecting things linked to the topic.

Science is either taught weekly or blocked to aid continuity.

In all Key Stages classes are taught in single age year groups and the schemes of work stand alone from other subjects of the curriculum (although links can and should be made).

Planning

Science is a core subject in the National Curriculum, and we use MTPs which have been given a creative title as a basis for implementing the statutory requirements. We plan science in two time frames (long-term, and medium/short term).

Our long term planning has been drawn up as well as possible to match the way children progress from one idea to the next. (See Appendix 1 for long term science map.)

MTPs have been written including elements from Collins Snap Science Scheme of Work, Hamilton Trust resources, the expertise of our Science Co-ordinator (LA Lead Teacher for Science) and encompassing tried and tested best practice from our teachers. Each MTP identifies a Key investigation to plan for in each topic and lays out the Working Scientifically strands to be taught in the unit. They are working documents and the development and adaptation of the contents is encouraged. A range of resources are used to go beyond and around this guidance and where appropriate a creative approach to the teaching of science is adopted, maximising the opportunities for practical work and a variety of ways of recording work.

These plans ensure an appropriate balance and distribution of work across each term without repeating topics. Each scheme of work begins and concludes with pupils completing KWI grids.

The class teacher is responsible for planning how the MTPs are developed into lesson sized Learning Journeys (STPs). Specific learning objectives (WALTs) for Working Scientifically and Knowledge and Understanding are planned for each lesson. When planning teachers should consider introductory activities, teacher input, practical tasks and a plenary. They would also benefit from when appropriate including

- Whether these objectives need to be modified for particular children or groups in the light of past learning;
- What resources are needed;
- How to divide up time during the lesson;
- How to introduce the activities;
- How to organize the activities;
- What will show what the children have learnt;
- What key vocabulary needs to be covered in the lesson;
- How to draw the lesson together, evaluate what has been learnt and point to what comes next.
- Use of WALT, WILF and WAGOLL

We have planned the topics in science so that they build upon prior learning. We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each unit and we also build progression into the Working Scientifically skills, so that the children are increasingly challenged as they move up through the school.

Assessment

At St Andrew's, assessment is ongoing and continuous and is used to inform teacher's planning. Verbal feedback is given which children can respond to in the moment. On completion each piece of work is marked and comments made when appropriate. WALTs are ticked as per the school marking policy. If required and linked to achievement against the learning objectives Gap/Challenge Tasks are set. Children self-assess their own learning using purple pen. AfL is embedded in good teaching practice in science and teachers will draw on these assessments to inform teaching sequences as well as judgements on pupil's knowledge, understanding and attainment against ARE expectations. Children's progress in scientific skills is teacher assessed through questioning and observation as part of their classroom practice.

At the end of each unit of work in KS1 & 2 teachers use children's work, their observations and professional judgement to apply a best fit statement (See end of each MTP). Teachers may choose to design and administer tests to assess pupil's knowledge and use of scientific language. Teachers inform the Science Co-Ordinator of their best fit decisions at the end of each unit. These results are entered onto DCPro termly and at the end of the academic year the results are averaged out to inform staff if pupils are working at ARE, Below or Beyond. This data is then used to target underperforming pupils for the next term/year.

Children are teacher assessed in science at the end of Key Stages 1 & 2 using the current Teacher Assessment Framework. Internal assessments and results will feed into these final assessments.

Reporting to parents

All parents receive an annual written report on which there is a summary of their child's effort attainment and progress in science over the year. A Curriculum Letter is sent to parents each term giving details of topics being covered. Parent's evenings are held each term to discuss their child's progress and any concerns. At the end of year 2 & 6 each pupil's level of achievement as assessed by the teacher is reported to parents.

Cross Curricular Links

Literacy

Science contributes significantly to the teaching of literacy in our school by actively promoting the skills of reading, writing, speaking and listening. Some of the texts that the children study in literacy lessons are of a scientific nature. The children develop speaking and listening skills in science lessons through discussions and through conducting experiments and recounting their observations of scientific investigations. They develop their writing skills through presenting predictions, observations and their conclusions and evaluations in a written format.

Numeracy

Science contributes to the teaching of numeracy in a number of ways. The children use weights and measures and learn to use and apply number. They will choose and use suitable measuring equipment for specific purposes, use standard units of measure and measure accurately. Through working on investigations they learn to estimate and predict. Pupils will develop their data handling skills by recording, tracking and reviewing their findings over a period of time. They use numbers in many of their answers and conclusions.

Computing

Children use ICT in science lessons where appropriate. The children have access to the internet via the laptops and iPads to research information about the science topics. They have access to word processing, spreadsheet and database packages enabling them to present results and findings in a variety of ways. Each classroom is fitted with an interactive whiteboard enabling the teacher to use video clips, simulations and virtual experiments to enrich lessons. A set of data loggers is centrally stored to enhance their skills in data handling as they are required to record their results and observe change over time.

PSHE

Science makes a significant contribution to the teaching of personal, social, and health education.

Firstly, the subject matter lends itself to raising matters of health and social welfare. For example, children study what makes a healthy diet and how exercise impacts on health. They also consider the way people recycle material and how environments are changed for better or worse.

Secondly, children benefit from the nature of the subject in that it gives them opportunities to take part in debates and discussions. Pupils are required to work with one-another to plan

and conduct research. In lessons, pupils will have many opportunities to develop their self-confidence and social skills. They will be required to reason with each other in order to make decisions about their investigations and to reach conclusions. Science promotes the British Value of Mutual Respect

HRE

The mechanics of Relationships and Sex Education is covered in PSHE and follows the school's "HRE Policy" (Health & Relationships Education). The unit of work in Y5 entitled "Growing Pains" (Animals Including Humans), is taught through the delivery of HRE. Outside speakers are brought in where necessary to add credence to some of the more sensitive matters involved.

Drugs Education

Drug types and their effects are taught in science in Year 5 and 6, with details on why they are taken and saying "No" covered in PSHE. Both these areas follow the school's "Drugs Education Policy".

Spiritual, Moral, Social and Cultural Development

Science teaching offers children many opportunities to examine some of the fundamental questions in life, for example the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of the world. Science raises many social and moral questions. Through the teaching of science, children have the opportunity to discuss, for example, the effects of smoking and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's understanding of physical and environmental factors, it promotes respect for other people.

Inclusion

At St Andrew's all children are taught science in their class groups. We aim to meet the needs of all our children by differentiation in our science planning and the use of the metals system. This will enable children with physical/learning difficulties to take an active part in science learning, including practical activities and investigations so that they can make progress. This takes the form of a variety of approaches and tasks appropriate to ability levels. These include:

- Open ended tasks to allow for differentiated outcomes;
- Groups of mixed ability to promote peer teaching;
- Ability groups with specific tasks set to meet their learning styles and needs;
- Teachers and TAs working with specific groups/individuals to promote understanding;

- EAL support for practical and written tasks;
- We have good quality resources, centrally stored, with enough to provide children with access to hands on experiences. The resources reflect diversity and are free from discrimination and stereotyping.

The school's "*Inclusion Policy*" clarifies the way we at St Andrew's strive to ensure inclusive provision for all children.

Equal Opportunities

All children matter and are given the opportunity to achieve their best.

The MTPs have been written to meet the needs of all pupils regardless of gender, ability, social and cultural background, religion or ethnic origin. Scientific knowledge needs a global perspective with opportunities to consider how science has helped solve problems in a wide range of contexts.

The school's "*Equal Opportunities Policy*" clarifies the way we at St Andrew's strive to ensure equal provision for all children.

Special Educational Needs

Pupils are supported in a number of ways depending on their difficulties. (See list above).

This is most likely to include support from a TA, appropriately differentiated tasks or access to specialized resources particularly for our EAL children. Notice will be taken of IEP's where appropriate.

The school's "*Special Educational Needs Policy*" clarifies the way we at St Andrew's strive to ensure tailored provision for SEND children.

EAL Learners

Through our science teaching we provide learning opportunities that enable all pupils to make progress. The learning needs of pupils with EAL will be met through differentiation and in class support in order to maintain their inclusion within lessons and to foster their progress.

The school's "*EAL Policy*" clarifies the way we at St Andrew's strive to ensure tailored provision for EAL children.

Gifted and Talented

More able children are challenged by being given enhancing and enriching activities enabling them to progress to a higher level of knowledge and understanding, as well as access to Gold Challenges within the metal system

The Learning Environment

At St Andrew's all of our buildings and grounds are the classroom in which children learn. Teachers are encouraged as much as possible to use the space available to them to enhance children's scientific learning and experiences. The field, playgrounds, garden, library, corridors and kitchens all have varied scope for learning

All Classrooms should have the Science Enquiry Cycle displayed enhanced by the key vocabulary linked to the current topic. This display should also be a working wall and a place to celebrate children's written recording. The class floor book should also be on display.

Resourcing

We have sufficient resources for all science teaching units in the school. We keep these in a central store in the main corridor where there are clearly labeled containers of equipment for each unit of work. The library contains a supply of science topic books and there is computer software to support children's individual research and presentation of work. A number of published materials are used to facilitate the teaching of science but as a school we realize the need for the teaching of science to be scheme assisted not scheme driven. School also has access, on request, to a further range of resources from the school's library service.

The coordinator monitors these resources and replenishes them as necessary.

Supporting the resources in school, we value human resources and offer parents/governors etc the opportunity to come into school to share their expertise. School visits to support the teaching and learning of science are also encouraged.

Health and Safety

We accept that we must all plan safe activities for science. We must make our children aware of the need for personal safety and the safety of others during investigations. We encourage them to reflect on safety issues themselves to reinforce teacher direction.

The LA maintains a subscription to CLEAPS school science service. This organization produces a termly newsletter, which includes a wide range of guidance about science that teachers can use for health and safety purposes. This will be available in the science resource cupboard.

Advice is also used from the ASE's publication "Be Safe," also in the Science resource cupboard

Through using the above advice and reference to the schools "Health and Safety Policy", teachers need to make their own risk assessments for their classroom practice.

Monitoring and Review

It is the responsibility of the Science Coordinator to monitor the standards of children's work and the quality of teaching in science. The science subject leader is also responsible for supporting colleagues in the teaching of science, for being informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school. The science subject leader gives the head teacher an annual development plan indicating areas for further improvement linked to the SIP...these are evaluated termly. Impact statements are written half termly describing the work of the subject leader and the impact on teaching and learning. A named member of the school's governing body is link governor for science and meets periodically with the Science Coordinator

The effectiveness of the implementation of this policy will be reported to the Governing Body.

This policy was last reviewed and revised September 2020 and approved by the Governing Body.

Signed: _____ Headteacher

Signed: _____ Chair of Governors

To be reviewed: Biannually

Date of next review: September 2023



St Andrew's C of E Primary School



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Long Term Plan

Year Group/Term	Autumn			Spring			Summer		
	Biology	Physics	Chemistry	Biology	Physics	Chemistry	Biology	Physics	Chemistry
Year 1	Marvelous Materials (Objects & Materials) Sensing Seasons 1 (Weather throughout the Year)		Sensing Seasons 2 (Weather throughout the Year)	My Family & Other Animals (Body Parts/Common Animals)		Plant Detectives (Plants & Plant Parts) Sensing Seasons 3 (Weather throughout the Year)			Sensing Seasons 4 (Weather throughout the Year)
Year 2	Mini Worlds (Living Things in their habitats/Food Chains & Habitats)		Healthy Me (Basic Needs of Animals)		Materials Monster (Comparing Materials)				The Apprentice Gardener (Growing Plants)
Year 3	Mirror Mirror (Sources of Light)		Earth Rocks (Rocks, Soils and Fossilisation)	Amazing Bodies (Animal Skeletons/Nutrition)		Opposites Attract (Simple Forces)			How does your garden grow? (Plants)
Year 4	Power it Up (Electricity)		In a State (Changes of State/Water Cycle)	Good Vibrations (Sound)		Gnashers & Nosh (Digestion and Teeth)			Human Impact (Classifying Living Things/Food Chains)
Year 5	Out of this World (Earth Sun and Moon)		Material World (Reversible and Irreversible Changes inc Mixtures and Solutions/ Classifying Materials by Properties)			Circle of Life (Life Cycles inc Reproduction)			Let's get Moving (Gravity and Forces) Growing Pains (Changes in Humans)
Year 6	Classifying Critters (Classification inc Micro Organisms)		Electrifying (Investigating Circuits)	Staying Alive (Healthy Lifestyles inc Circulatory System)		We're Evolving (Evolution and Adaptation)			Let it Shine (How we See Things/ Light) RSE

Appendix 1



St Andrew's Primary School
Science Medium Term Plans Route Planner



Each knowledge based unit of science should be planned through the following phases. Individual phases may take one or more lessons.

Phase one - An initial practical lesson, linked to the unit that inspires the children to the forthcoming topic. (WOW Start)

Phase two - What we know and what we want to know about the unit

Phase three - AFL: plan targeted teaching around the units objectives based on the children's prior knowledge

(During Phase three, ensure the children work outside at some point and also ask/answer questions about the implications/application of science...eg What would the world be like without plants? How has the discovery of other planets benefitted the world)

Phase four - If there is time left at the end of the unit use AFL to plan remaining lessons that meet the targeted needs of children Working Scientifically based on any questions raised by children during the unit.

Alternatively if children have answered many of their questions previously children may come up with their own investigations based on objects they are given or other questions that have risen in other areas of learning or day to day experiences.

Appendix 2