St. Andrew's C of E (VA) Primary School

Science Curriculum Statement

"I have come that they may have life, and have it to the full. John 10:10"

Science Intent:

Through the teaching of Science, St Andrew's CE Primary School intends to:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- 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.
- Equip children with the scientific knowledge required to understand the uses and implications of science, today and for the future.
- Recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena.
- Understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.
- Share ideas and work in teams to help the more disadvantaged children enhance their vocabulary, discussion and collaborative skills. Give opinions, make predictions and carry out investigations.
- Open up an arena for children to discuss their wider knowledge though their interests outside school, helping improve their self-esteem.

Science brings people together through collaboration, investigation, and discussion.

Science Implementation:

The National Curriculum programmes of study will be taught as a sequence of knowledge, concepts and skills. Priority will be given to making sure children develop a secure understanding of each key block of knowledge and concepts in order to progress to the next stage.

Children will be asked to create a concept map at the beginning of each new unit, using all the associated topic vocabulary. This will also be repeated at the end of the unit to show the progression made. Relationships between the vocabulary should be shown. This vocabulary will be explained at frequent points during the unit and be on display for the children to observe and discuss.

Links are made to previous and future learning on teachers' flip charts. References to past topic vocabulary will be made.

Regular 'low stakes' testing takes place. This will ensure that children are able to describe associated processes and key characteristics in common language and be familiar with, and use, technical terminology accurately and precisely. At the start of each new lesson, the children will be asked to complete a few (typically 3) review questions from the previous lesson. An end of unit topic test is often used to assess overall understanding.

We aim to pre-teach vocabulary to SEN children and target WTS children to have group support to achieve ARE. Children working towards ARE at the end of each academic year will be targeted for support by the next teacher.

Children will apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data.

‘Working Scientifically’ specifies the understanding of the nature, processes and methods of science for each year group. It **WILL NOT** be taught as a separate strand but together with key topic knowledge and concepts. At least 1 WS investigation will take place every half term.

These types of scientific enquiry will include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Each teacher will assess the key skills achieved during the course of the year by recording who is either below or exceeding expectations. Children not at the expected standard will be targeted the following term or by the next teacher.

Spoken language /Oracy

The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. Pupils will be assisted in making their thinking clear, both to themselves and others, and teachers will ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.
Where possible teachers will be encouraged to include oracy opportunities to help embed scientific understanding. Sentence stems will be used to start scientific discussions.

Working Scientifically progression throughout the school

Foundation Stage Science Progression Map

3 to 4 Years (taken from Development Matters July 2021)	**Use all their senses in hands on exploration of natural materials (UW)** *Provide interesting natural environments for children to explore freely outdoors.* **Explore collections of materials with similar and/or different properties. (UW)** **Make collections of natural materials to investigate and talk about. Suggestions: contrasting pieces of bark, different types of leaves and seeds, different types of rocks, different shells and pebbles from the beach* **Talk about what they see, using a wide vocabulary. (UW)** **Provide equipment to support these investigations. Suggestions: magnifying glasses or a tablet with a magnifying app. Encourage children to talk about what they see. Model observational and investigational skills. Ask out loud: “I wonder if...?” Plan and introduce new vocabulary, encouraging children to use it to discuss their findings and ideas.*
Children in Foundation	**Explore the natural world around them. (UW)** Provide children with frequent opportunities for outdoor play and exploration. Encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences. Create opportunities to discuss how we care for the natural world around us. Offer opportunities to sing songs and join in with rhymes and poems about the natural world. After close observation, draw pictures of the natural world, including animals and plants. Observe and interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object and a boat floating on water. **Describe what they see, hear and feel whilst outside. (UW)** Encourage focused observation of the natural world. Listen to children describing and commenting on things they have seen whilst outside, including plants and animals. Encourage positive interaction with the outside world, offering children a chance to take supported risks, appropriate to themselves and the environment within which they are in.

	Name and describe some plants and animals children are likely to see, encouraging children to recognise familiar plants and animals whilst outside. opportunities to work together to develop and realise creative ideas.
Early Learning Goals	**Explore the natural world around them, making observations and drawing pictures of animals and plants. (NW)** **Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. (NW)** **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. (NW)**

Year 1 / 2		
Asking questions, predicting, planning and doing	**Observing, measuring and recording.**	**Interpreting, explaining and communicating**
● Ask questions. ● Participate in discussions about how to find answers. ● With help, suggest what might happen. ● Ask relevant questions. ● Offer suggestions about how to find answers. ● Perform simple tests. ● Work safely with other people.	● Use all 5 senses to make observations. ● Follow instructions about how to use simple equipment. ● Take non-standard measurements. ● Make close observations. ● With guidance, record observations (complete a table).	● With support, recognize cause and effect in simple situations. ● Describe to others what they did and what they observed. ● Talk about what they have done or observed. ● Use what they have found to suggest answers to the question. ● Make simple comparisons. ● Communicate findings in a simple way. ● With help, decide how to sort and group.

Year 3 / 4		
Asking questions, predicting, planning and doing	**Observing, measuring and recording.**	**Interpreting, explaining and communicating**
● Ask relevant questions. ● Recognise that questions can be answered using different types of scientific enquiries. ● Make simple predictions. ● Notice if they are working safely. ● Recognise whether or not a test if fair.	● Make careful observations. ● Use a range of equipment provided. ● Take accurate measurements using standard units. ● Record observations in simple tables. ● Present observations using simple pictograms, Venn	● With help, decide how to sort and group. ● Draw conclusions by linking observations to their question and scientific knowledge. ● Suggest how to sort and group objects or materials. ● Explain what happened and whether.

• Suggest ideas or make predictions that can be tested. • Suggest different types of enquiry to answer questions. • Set up a fair test.	diagrams, bar charts or labelled diagrams. • Make systematic and careful observations. • Use a range of equipment provided. • Record observations and take accurate measurements.	• Identify similarities and differences between findings. • Make choices on how to sort and group. • Use graphs and tables to interpret patterns in data.

Year 5 / 6		
Asking questions, predicting, planning and doing	**Observing, measuring and recording.**	**Interpreting, explaining and communicating**
• Make predictions based on scientific knowledge. • Plan different types of scientific enquiry to answer questions. • Explain whether or not a test is fair. • Identify risks and decide how to work safely. • Suggest what evidence should be collected. • Begin to select measuring instruments independently. • Explain whether or not a test is fair by controlling variables. • Decide independently what evidence should be collected. • Select measuring instruments independently.	• Make decisions on how to present findings. • Use precision when taking accurate measurements, taking repeat readings where necessary. • Present results in tables, diagrams or graphs appropriate to the findings.	• Use graphs and tables to interpret patterns in data. • Link the outcome of the investigation to the original predictions. • Use scientific knowledge to explain what happened and why. • Use evidence collected to disprove or support their original predictions. • Link the outcome of the investigation to the original predictions. • Use scientific knowledge to explain relationships in the data. • Identify problems with their work; begin to suggest improvements. • Use results to make predictions for and set up further tests.

<u>Links with other areas of learning:</u>

Science will be linked to other curriculum areas wherever possible. Some examples are highlighted below.

Maths

- Data handling: tables, graphs, analysing data, taking accurate measurements.

English

- Practise of predicting, summarising/concluding and evaluating. Science texts used in guiding reading, with opportunities for cross curricular writing.

DT

- Building structures linked to materials, alternative energy sources (mini wind turbine), and a model of the solar system.

Art

- Parts of a plant, making accurate botanical illustrations to support topic knowledge, investigative diagrams.

Dance/Drama

- Acting out scientific mechanisms (seed dispersal) and scientific processes (liquids, solids, gases).

Science Impact:

This will be determined by the following:

Monitoring of:

Increased understanding and interest from all teachers.
Purposeful learning-walls, making vocabulary explicit.
Inspiring and interactive teaching. Use of effective flip charts/ resourcing.

Assessing of:

Children's knowledge of key facts through low-stakes testing and end of unit assessments.
Children's knowledge of common and technical vocabulary (and key facts) through discussions.
Achievement of Working Scientifically objectives.
Pupils' interest through the pupil questionnaires.
Progression shown from the initial concept map to the final one at the end of the unit.

Positive impact should be evident through:

Improved presentation and quality of science learning shown in workbooks.
Clear inter-disciplinary links in English books.
Excitement, discussions and purposeful work heard and seen through the school.
Engagement and enthusiasm of children during science lessons and science week activities. (Annual lesson observations and pupil interviews).