



ST ANNE'S RC PRIMARY SCHOOL

Whole School Science Policy & Progression Ladder



Vision and Intent

At St Anne's Primary School, we believe that science is a vital part of every child's education. Our vision is to develop curious, questioning, and resilient learners who are equipped with the knowledge and skills to understand the world around them and contribute positively to it.

We aim to ensure that all pupils:

- Develop secure substantive knowledge across biology, chemistry, and physics
- Build disciplinary knowledge through working scientifically
- Gain an appreciation of the relevance of science in everyday life
- Develop independence, resilience, and critical thinking skills
- Are prepared for the next stage of their education

Our curriculum, supported by White Rose Science, is carefully sequenced to ensure progression, depth, and retention. It is underpinned by our whole-school values and promotes respect for the environment, sustainability, and global awareness.

Aims of the Science Curriculum

The science curriculum at St Anne's aims to:

- Provide a broad and balanced science education in line with the National Curriculum
- Develop scientific knowledge and conceptual understanding through biology, chemistry, and physics
- Ensure pupils understand the nature, processes, and methods of science
- Equip pupils with the ability to work scientifically and carry out enquiries independently
- Foster curiosity and excitement about natural phenomena
- Encourage pupils to ask questions and explore possible answers
- Develop pupils' ability to communicate ideas using scientific language

Curriculum Design and Implementation

Curriculum Structure

Science is taught weekly across Key Stage 1 and Key Stage 2, with EYFS embedding science through Understanding the World.

The curriculum is structured using **White Rose Science**, which provides:

- Small-step progression to support cognitive load
- Clear sequencing of knowledge
- Built-in retrieval opportunities

- Explicit links between prior and new learning
- Coverage of all National Curriculum objectives

Each unit identifies:

- Key knowledge (substantive knowledge)
- Key vocabulary
- Misconceptions to address
- Working scientifically opportunities

Substantive and Disciplinary Knowledge

At St Anne's, we distinguish between:

Scientific Knowledge

- Facts, concepts, and theories (e.g. forces, habitats, electricity)
- Organised into biology, chemistry, and physics strands
- Carefully sequenced to build on prior learning

Working Scientifically

- Understanding how scientific knowledge is developed
- Skills of enquiry, investigation, and analysis

- Application of knowledge through different enquiry types

Both types of knowledge are explicitly taught and revisited regularly.

Teaching and Learning Principles

Teaching at St Anne's follows key principles:

a) Small Steps and Sequencing

Learning is broken into manageable steps, ensuring pupils fully understand each concept before moving on.

b) Retrieval Practice

Regular opportunities are provided to recall prior knowledge through:

- Low-stakes quizzes
- Flashback with Friends at the start of each lesson
- AFL Questioning

c) Explicit Instruction

Teachers:

- Model scientific thinking

- Use clear explanations
- Introduce vocabulary explicitly

d) Practical Enquiry

Every unit includes opportunities for pupils to:

- Investigate
- Explore
- Apply knowledge practically

e) Questioning

Teachers use:

- Open-ended questions
- Probing questions
- Challenge questions for greater depth

Use of Scientific Vocabulary

Vocabulary is explicitly taught and revisited. Strategies include:

- Vocabulary displays

- Word banks
- Pre-teaching for SEND/EAL pupils
- Expectation of accurate use in speaking and writing

Cross-Curricular Links

Science is linked where appropriate to:

- **Mathematics** (measuring, data handling, graphs)
- **English** (reading, writing explanations, speaking and listening)
- **Geography** (environment, Earth science)
- **Design and Technology** (materials, forces)

Working Scientifically

Working scientifically is embedded across all year groups and taught progressively.

Key Elements:

- Asking questions
- Making predictions
- Planning enquiries

- Observing and measuring
- Recording data
- Analysing and interpreting results
- Drawing conclusions
- Evaluating

Progression of Knowledge and Investigation Skills

Year Group	Knowledge	Investigation Skills
EYFS		<ul style="list-style-type: none"> • Observe using senses • Talk about changes • Ask simple questions • Begin to record through drawings
Year One	<ul style="list-style-type: none"> • Identify and name common plants and animals • Name basic plant parts • Identify everyday materials and their properties • Recognise seasonal and weather changes 	<ul style="list-style-type: none"> • Ask simple questions • Perform simple tests • Use basic equipment (e.g. magnifying glasses) • Record using drawings and labels
Year Two	<ul style="list-style-type: none"> • Identify habitats and living things • Understand survival needs of plants and animals • Know plants need water, light, warmth • Describe uses and properties of materials 	<ul style="list-style-type: none"> • Ask questions and suggest answers • Carry out comparative tests • Measure using simple equipment • Record in tables and charts • Begin to interpret results

Year Three	<ul style="list-style-type: none"> • Understand plant functions • Know about nutrition, skeletons, muscles • Identify rock types and fossils • Understand light and shadows • Know how magnets work 	<ul style="list-style-type: none"> • Ask relevant scientific questions • Set up simple enquiries • Use standard units (cm, g, seconds) • Record data using tables and bar charts • Draw simple conclusions
Year Four	<ul style="list-style-type: none"> • Classify living things using keys • Understand food chains and digestion • Know states of matter and changes • Understand sound production • Know how electrical circuits work 	<ul style="list-style-type: none"> • Plan fair tests • Identify variables (independent, dependent, control) • Take accurate measurements • Record using a range of methods • Interpret data and identify patterns
Year Five	<ul style="list-style-type: none"> • Understand life cycles and reproduction • Describe human development • Compare and explain material properties and changes • Understand Earth's movement in space • Explain effects of forces 	<ul style="list-style-type: none"> • Plan different enquiry types independently • Control variables effectively • Use precise measuring equipment • Present data using line graphs • Explain findings using scientific reasoning
Year Six	<ul style="list-style-type: none"> • Classify organisms in detail • Understand the circulatory system • Explain evolution and inheritance 	<ul style="list-style-type: none"> • Design independent investigations • Select appropriate methods and equipment • Analyse complex data sets

	<ul style="list-style-type: none"> • Understand how light travels • Describe electrical components and circuits 	<ul style="list-style-type: none"> • Evaluate reliability and validity • Suggest improvements • Justify conclusions using evidence
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Year Group	Unit	Investigation/ Practical Enquiry	Enquiry Type
EYFS	Understanding the World	Explore floating & sinking objects	Comparative testing
	Seasons	Observe weather and seasonal changes over time	Observing over time
	Plants	Grow seeds and observe changes	Observing over time
	Materials	Sort material by properties	Identifying and classifying
Year One	Everyday Materials	Which materials are waterproof?	Comparative testing
	Animals including Humans	Identify body parts linked to senses	Identifying and classifying

	Seasonal Changes Plants	Observe changes across seasons What plants need to grow	Observing over time Observing over time
Year Two	Living Things & Habitats Plants Materials Animals Including Humans	Investigate habitats around school Do plants grow better in light or dark? Which material is strongest? How exercise changes heart rate?	Observing & classifying Comparative testing Comparative testing Pattern seeking
Year Three	Forces & Magnets Light Plants Rocks	Which surfaces create the most friction? How shadows change during the day How water moves through plants Which rocks absorb water?	Fair testing Pattern seeking Observing over time Comparative testing
Year Four	Sound Electricity States of Matter Living Things & Habitats	How does sound change over distance? What makes a complete circuit? How temperature affects evaporation	Pattern seeking Fair testing Observing over time Identifying & classifying

		Classifying animals using keys	
Year Five	<p>Forces</p> <p>Materials</p> <p>Earth & Space</p> <p>Living Things</p>	<p>Air resistance investigation (parachutes)</p> <p>Which materials dissolve in water?</p> <p>Investigate shadow length and light source distance</p> <p>Life cycle observations</p>	<p>Fair testing</p> <p>Comparative testing</p> <p>Pattern seeking</p> <p>Observing over time</p>
Year Six	<p>Electricity</p> <p>Light</p> <p>Animals Including Humans</p> <p>Living Things & Evolution</p>	<p>How number of bulbs affects brightness</p> <p>How shadows change with distance</p> <p>Heart rate investigation</p> <p>Classification using branching keys</p>	<p>Fair testing</p> <p>Pattern seeking</p> <p>Pattern seeking</p> <p>Identifying & classifying</p>

Year Group	Asking Questions	Planning Investigations	Measuring & Equipment	Recording Results	Concluding
EYFS	Ask simple questions about what they notice	Explore materials and natural objects through play	Use simple tools (magnifiers, containers)	Talk about what they see and draw pictures	Describe what happened
Year 1	Ask simple scientific questions	Suggest ways to test ideas	Use simple equipment (rulers, containers)	Use tables or pictures to record results	Talk about what they found
Year 2	Ask questions that can be investigated	Begin to plan simple tests	Measure using simple equipment	Record data in charts or tables	Identify simple patterns
Year 3	Ask relevant scientific questions	Plan fair tests with support	Use measuring tools (thermometers, rulers, timers)	Record results in tables and simple graphs	Explain findings using evidence
Year 4	Identify variables to change and measure	Plan investigations with some independence	Take accurate measurements using standard units	Use tables, bar charts and diagrams	Identify patterns and explain results
Year 5	Plan investigations that control variables	Decide what data to collect	Use more precise equipment (stopwatches, data loggers)	Present data in line graphs and tables	Use evidence to support conclusions
Year 6	Plan comparative and fair tests independently	Identify variables and controls	Select appropriate equipment accurately	Record data in tables, graphs and charts	Evaluate results and reliability

Key Skills Progression:

Skill	EYFS/ Key Stage One	Lower Key Stage Two	Upper Key Stage Two
Asking Questions	Simple curiosity questions	Relevant scientific questions	Testable scientific questions
Measuring	Informal measure5s	Standard units	Accurate measurements
Recording	Drawing and simple tables	Charts and bar graphs	Line graphs and detailed tables
Interpreting	Describe what happened	Identify patterns	Use evidence and evaluate results

Progression of Scientific Thinking

Children gradually develop from:

Exploring → Questioning → Testing → Measuring → Analysing → Evaluating

Key Stage	Scientific Thinking Development
EYFS	Curiosity and exploration
KS1	Simple investigations and observations
Lower KS2	Fair tests and identifying patterns
Upper KS2	Independent investigations and evaluating evidence

Enquiry Types Progression

Pupils experience five enquiry types:

1. Observing over time
2. Pattern seeking
3. Identifying, classifying and grouping
4. Comparative and fair testing
5. Research using secondary sources

Progression:

- **KS1:** Focus on observation and classification
- **LKS2:** Introduce fair testing and pattern seeking
- **UKS2:** Select and justify enquiry types independently

Assessment

Formative Assessment

- Ongoing questioning
- Teacher observation
- Feedback during lessons
- Pupil discussions

Summative Assessment

- End-of-unit assessments (White Rose aligned)
- Knowledge quizzes

Retrieval Practice

- Weekly/regular flashback with friends to start every lesson
- Revisiting prior units

Use of Assessment

Assessment informs:

- Planning
- Intervention
- Adaptation of teaching

Inclusion and Adaptive Teaching

At St Anne's Primary School:

- All pupils access the same ambitious curriculum
- Tasks are adapted, not reduced
- Support includes:
 - Scaffolds
 - Visual aids such as widgeits
 - Adult support
 - Chunked instructions

Greater depth pupils are challenged through:

- Open-ended investigations

- Application tasks
- Leadership opportunities

Monitoring and Evaluation

The Science Leader will:

- Monitor planning and books
- Conduct lesson observations
- Analyse data
- Gather pupil voice
- Attend relevant training provided by Emmaus CAT and other relevant agencies
- Provide CPD for staff

Resources

Science resources include:

- White Rose Science materials
- Investigation equipment
- Outdoor learning spaces
- Digital tools

Resources are regularly reviewed and maintained.

Impact

By the end of Year 6, pupils will:

- Have secure knowledge across all science strands
- Be confident in working scientifically
- Use scientific vocabulary accurately
- Think critically and independently
- Be prepared for secondary education

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Science Subject Lead: Sarah Schilling

