THE ST. MARY'S PARTNERSHIP

Science Curriculum Guide

The Quality of Education Subject Pathway

ST MARY'S CE PRIMARY SCHOOL

Nurture • Grow • Achieve
MASON MOOR PRIMARY SCHOOL

VALENTINE PRIMARY SCHOOL

Bitterne CE Primary

SCIENCE CURRICULUM

Intent

Across our partnership, we believe that Science has never been a more important curriculum subject than it is right now. From the effects of climate change, and scientists working to limit Earth's rising temperature, to understanding adaptation and global warming's impact on the world's flora and fauna. Science is evolving and our children need to be at pace with it.

The planning, amended from Lion Pathways, maps all objectives from the National Curriculum to ensure that progression is clear from EYFS to Year 6. Planning identifies the key knowledge and skills pupils need to truly work scientifically.

Our curriculum is ambitious and exciting enabling pupils to understand the material world around them.

Working Scientifically

Rather than teaching component units in a linear way, our curriculum builds disciplinary knowledge over time to enable pupils to develop skills and understanding as they progress through the curriculum.

Scientific enquiry is more than practical experiments or collecting data. It is about enabling pupils to grapple with research and presenting pupils with new ideas and concepts so that they can extract meaning.

Planning

Throughout our lesson plans and connected lesson visuals, pupils are presented with layered content that builds understanding over time. We know that pupils presented with disconnected information in lessons cannot build fluency or apply the knowledge and skills in meaningful contexts.

The potential for pupils developing misconceptions in Science study is greater because of the deep subject knowledge presented. Knowing this, our lessons are planned to ensure that pupils continually revisit concepts – enabling teachers to quickly address emerging gaps in knowledge or skills.

Each lesson begins habitually with a reminder of key content over the sequence of lessons. Sometimes the lesson opening could be prompting prior learning from a previous year where a topic has been studied before – e.g. gauging pupils' understanding of plants from Year 1 into Year 2.

A proportion of time in each lesson is specifically planned to provide pupils with time to practise or implement their new learning.

Implementation

"The science of today is the technology of tomorrow"

Edward Teller

Experiential learning

Our curriculum is designed to ensure that pupils' knowledge and skills build towards a composite outcome that celebrates their newly acquired learning.

For example: Pupils in KS2 learning about the eye and light will have the opportunity to make and build a spectroscope at the end of the component unit. This ability to showcase their learning is crucial for our children as it helps to solidify the substantive concepts taught.

Celebration of Learning

At the end of each term, pupils are set home learning to create a piece of work to exhibit at a Great Exhibition. Each of our school halls are transformed into an exhibition venue where parents and carers are invited to see the product of learning.

Pupils may choose any subject and any component learnt within that term and a prize is awarded for the best showcase piece.

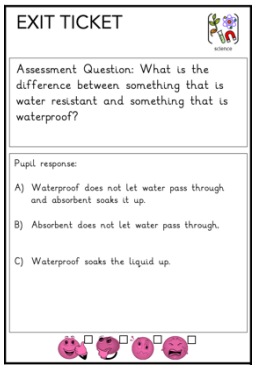
The aim of the exhibition is to support parents and carers in their understanding of our ambitious curriculum. Further, it enables pupils of all abilities to showcase their newly acquired knowledge in a format that best suits their own learning style.

The exhibition provides pupils with a platform to talk about and articulate their learning in Science.

For families at our school, it provides a home learning activity spanning four to five weeks where pupils and parents can work together to produce an exhibit – bringing the classroom and home closer.

Assessing pupil progress in Science

Teachers continually employ formative assessment to understand how pupils are knowing more and remembering more.

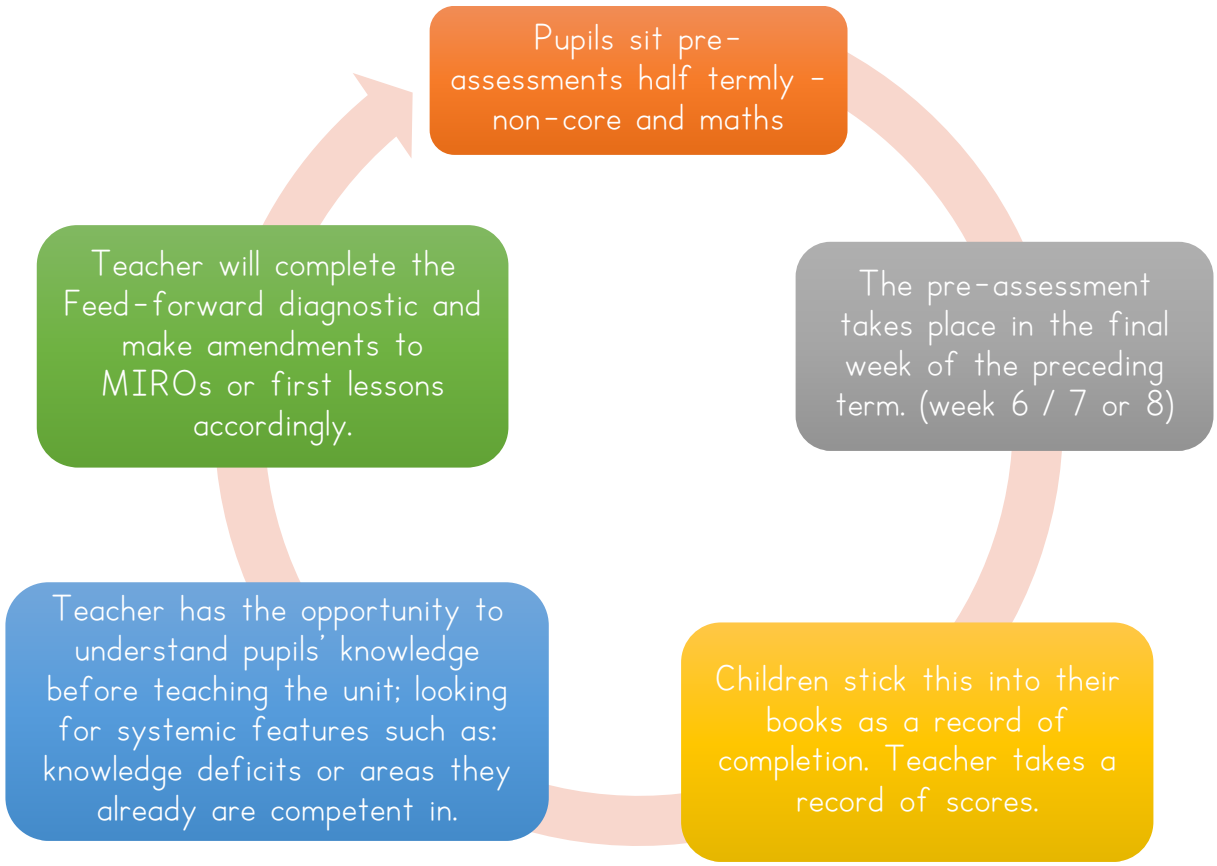


Each lesson, across the curriculum, begins with re-capping of the previous component lesson. Quick fire questions are answered verbally, in books or in groups. Exit tickets measure incremental knowledge progression – alerting teachers to misconceptions or wider gaps in prior knowledge.

Quizzes, delivered through IT and plenary activities, further demonstrate the knowledge pupils' have acquired. This example of low-stakes testing supports teachers in making balanced decisions on when to recap and repeat knowledge to ensure that is fully embedded.

The Lion Pathways provide a composite assessment task at the end of each component unit. This combines pupil self-assessment with teacher assessment indicating how well pupils have progressed in the component unit.

Interweaving knowledge concepts to commit to long-term memory



The purpose of checking prior assessment:

- To understand the knowledge-base (over time) of children before they are taught a unit of work.
- To ensure that misconceptions can be addressed ahead of delivery – which supports pupils to build new knowledge on firm foundations.
- To enable you to consider what is the MOST important content to teach/impart in the unit and which sections may need a lighter-touch.

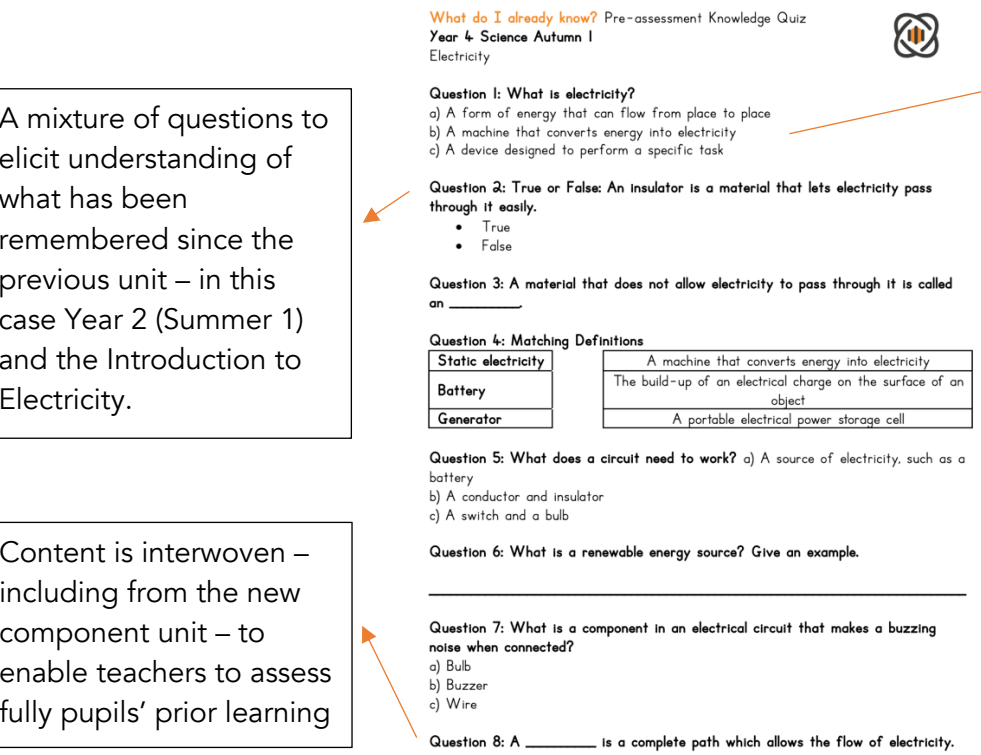
Pre-assessment knowledge quizzes – teaching to need

A mixture of questions to elicit understanding of what has been remembered since the previous unit – in this case Year 2 (Summer 1) and the Introduction to Electricity.

A clear link to vocabulary understanding that should be embedded from the child's previous study of the unit.

Multi-modal questions to enable pupils of all ability ranges to demonstrate their understanding.

Content is interwoven – including from the new component unit – to enable teachers to assess fully pupils' prior learning



What do I already know? Pre-assessment Knowledge Quiz
Year 4 Science Autumn 1
Electricity

Question 1: What is electricity?
a) A form of energy that can flow from place to place
b) A machine that converts energy into electricity
c) A device designed to perform a specific task

Question 2: True or False: An insulator is a material that lets electricity pass through it easily.
- True
- False

Question 3: A material that does not allow electricity to pass through it is called an _____.

Question 4: Matching Definitions

Static electricity	A machine that converts energy into electricity
Battery	The build-up of an electrical charge on the surface of an object
Generator	A portable electrical power storage cell

Question 5: What does a circuit need to work? a) A source of electricity, such as a battery
b) A conductor and insulator
c) A switch and a bulb

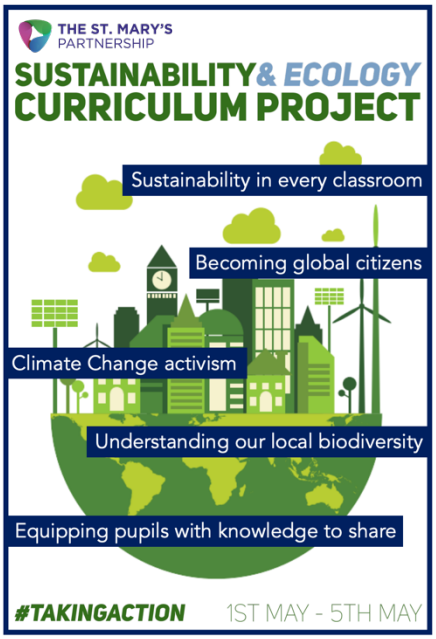
Question 6: What is a renewable energy source? Give an example.

_____

Question 7: What is a component in an electrical circuit that makes a buzzing noise when connected?
a) Bulb
b) Buzzer
c) Wire

Question 8: A _____ is a complete path which allows the flow of electricity.

Beyond science – the world they will inherit



Whilst our Science Curriculum provides essential knowledge related to: biodiversity and global warming and our Geography curriculum teaches children about the environmental impact of issues such as global trade – it is important that we root this knowledge and skill development within the local context of the area they inhabit and they will one day lead.

The Sustainability & Ecology Project is a curriculum drop-down week (run annually) to inform, educate, celebrate and create action. We will use a wealth of resources including: visual, art, spoken word (including music), video, real-life speakers and visits.

The week will culminate in each child contributing to a 'bigger piece' school project – including a parent/carer event to showcase learning and a Community Day.

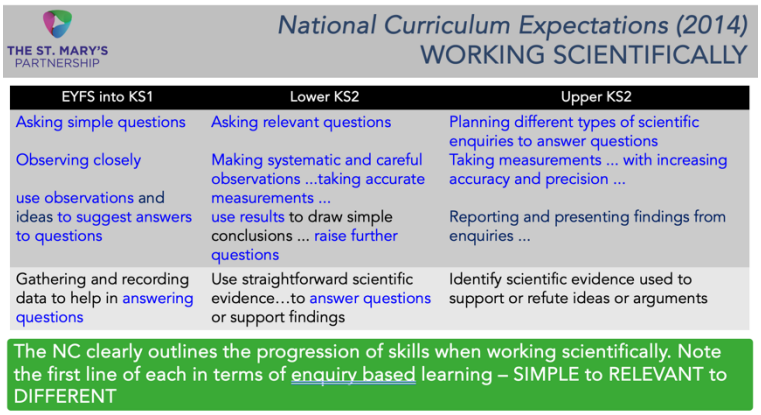
Simultaneously the project will support the retention of new knowledge in relation to: Southampton's wider sustainability goals, Our School's Climate Pledge and Ecologically-driven activities that promote sustainability at our school in the longer-term.

But it doesn't end here. Our wider reading and writing spine this year incorporates world literature linked to sustainability and climate change action. Our VR headsets enable pupils to see climate action first-hand, to visit new centres tackling sustainability and to review areas that still pose a threat to the World. We are doing our bit to create future global citizens.

Science Subject knowledge and Staff development

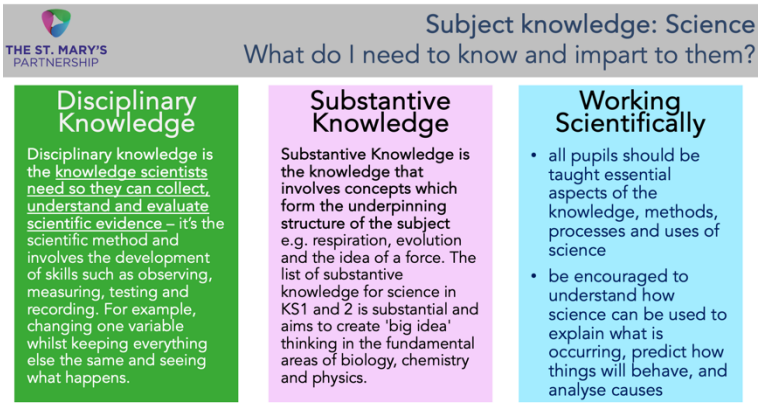
Staff development closely links to our school monitoring schedule, ensuring that cyclical support can be provided to enhance all teachers subject knowledge.

We ensure that sessions are focused purely on the subject, and we can do this easily because of the strong pedagogical model we employ across all teaching subjects in the school. This means that teachers can concentrate on developing subject expertise.



Teachers continually review the expectations set out in the National Curriculum (2014) in relation to 'working scientifically'.

This work has ensured that a progression of skills links to enquiry-based-learning and the wider aims of our Science Curriculum Pathway.



Within subject knowledge sessions, we unpick the component units and consider carefully the difference between disciplinary concepts – and related working scientifically skills - to the substantive knowledge we expect our children to know and remember over the course of study.

Finally, we sign-post teachers to innovative and relevant further curriculum reading.

Staff have the opportunity to request these texts to support study. Over the last few years, we've moved towards a 'story' approach for lower KS1 and EYFS to ensure that it matches our pedagogical model in other core subjects – like maths.

External Science Support

Through the HISP Teaching School – we utilise the CPD from the Science Learning Partnership. Our local hub is accessible to teachers who can freely connect with Secondary Science colleagues over transition units, complex science teaching components or to simply request scientific equipment to be used in Primary classrooms.