# St Georges C of E Primary School

## Science - Intent, Implementation and Impact 2021 – 2022

### Research

The Primary Science Teaching Trust (PSTT)
The Teacher Assessment in Primary Science (TAPS) project
STA – 'Key stage 2 Science sampling 2018 methodology note and outcomes', July 2019
The Nuffield Foundation - 'Developing policy, principles and practice in primary school science assessment', report from a working group led by Professor Wynne Harlen July 2012
Maintaining curiosity – A survey into Science education in schools Ref. 130135 Ofsted, November 2013
Intention and substance: further findings on primary school science from phase 3 of Ofsted's curriculum research. Ref. 190002 February 2019

### Intent

At St George's C of E Primary School, we continue to recognise Science as a core subject in the National curriculum alongside English and Maths. Opportunities to experience and explore Scientific phenomena begin in our Early Years curriculum and follow with full coverage of the statutory Programme of study for Science from Year 1 through to Year 6.

Developing and maintaining children's natural curiosity about the world around them is our fundamental aim and this underpins the design and delivery of our Science curriculum. Understanding the big ideas of Science is also at the core of our Science curriculum, ensuring that we prepare children well, not only for the next stage in their education but also to become active, ethical globally aware citizens. We continually strive to personalise our science curriculum to ensure that it best meets the needs of our unique cohort of children, set within the locality and community that we serve.

Our curriculum is planned carefully for full coverage of the statutory concepts and to ensure pupils learn sequentially, building on prior knowledge. Through our curriculum, we place great importance on developing children's ability to work scientifically (Sc1) as well as fully meeting the requirements for developing children's scientific knowledge and understanding (Sc2, 3 and 4).

## Implementation

At St George's, within our Early Years Foundation Stage, pupils experience Science using all of their senses daily. Exploration across the three disciplines of biology, chemistry and physics is provided through a cross curricular approach. Learning may be specifically planned with a Scientific objective (s) or may be spontaneous as a result of a range of stimuli which could include;

- the world
- pupils experience around them such as the weather,
- materials in our inside and outside classroom environments,
- stories
- children's experiences and interests from outside school which spark discussion or exploration
- topical news stories in the media

Learning about and through Science in the Early Years allows children to begin to make sense of the world around them, building on what they already know. Early Science links to all other EYFS areas of learning such as developing communication and language skills, mathematical skills and building vocabulary. In terms of children's personal and social development, Science provides opportunities to encourage children's appreciation of variety within our world and to begin to understand that others may view aspects of our lives differently.

From Years 1 – 6 our Science curriculum is planned and delivered to ensure full coverage of the National Curriculum. Teachers plan co-operatively to ensure that coverage is complete and without gaps. This also ensures that teachers are aware of topics that have gone before and how objectives build on prior knowledge and build in challenge and depth. This is particularly important in St George's given the way our year groups are combined into classes in responses to annual fluctuations in pupil numbers. Our planning also takes account of the statutory requirement for specific knowledge and skills to be learned within the three phases of Key stage 1, Lower Key stage 2 and Upper Key stage 2.

As a core subject, Science is timetabled to ensure that sufficient time is allocated to deliver all of the required objectives, allowing the necessary time for children to grasp and embed them. Where necessary teachers break down larger more challenging concepts into smaller components and may teach these over more than one lesson. In line with best practice, we do allow lessons to expand into the day(s) following a specific lesson if this is appropriate to help pupils complete tasks or fully embed their learning.

We aim to utilise regular opportunities to develop pupil's Scientific learning through cross curricular links with other subjects, particularly the other core subjects. We recognise the wealth of opportunities to accelerate and deepen children's learning when explicit connections are made between literacy and / or maths and Science. Development of pupil's critical thinking skills, reasoning skills, questioning skills, acquisition of tier 1 vocabulary and competence with use of tier 2 vocabulary, ability to organise ideas logically, propose a sequence of investigation, to articulate and justify ideas, listen to the opposing views of others and accept or unpick them appropriately are just some of the vital transferable skills which Science develops alongside the other core subjects.

Our Science objectives are mostly delivered as standalone topics to ensure that coverage is fully met. However, in some cases cross curricular half termly topics have Science as their leading overarching subject. In these cases, the objectives are met with enhanced opportunities to link learning with other foundation subjects.

Developing children's social, moral spiritual and cultural awareness is a core aim of our curriculum and we embed opportunities to do this through our Science curriculum. Wherever possible we make links with children's own lives and make use of opportunities to develop children's awareness of their own responsibilities towards our global environment and towards each other as future citizens. We encourage pupils to understand that they are already making valid contributions to society and not to think that Science applies to someone else or may only apply to them in the future.

We embrace opportunities to work scientifically outdoors when possible and plan trips to support our Science curriculum. Wherever possible we will make links to our local environment and its rich local historical links and diverse habitats.

We have developed consistent expectations for the delivery of Science as a subject in our school in the form of our Science Non- negotiables. These include elements such as the requirement to use a 'Knowledge Organiser' type page, in an age appropriate format at the start of each topic and some element of assessment recorded in books at the beginning and end of topics to demonstrate progress.

Expectations for vocabulary have now been agreed for each year group and tier 1 and 2 words are now taught systematically and thoroughly. In Key Stage 1 pupils are supported to use appropriate vocabulary and spell it correctly where possible. In Key Stage 2 pupils are expected to learn and use relevant vocabulary and time is invested in supporting children to learn to spell the vocabulary correctly.

Our Science curriculum strives to fulfil the requirements of Ofsted's new inspection framework, in that it planned sequentially and learning is revisited at timely intervals so that knowledge and skills become embedded in children's long term memories. All teachers use a range of activities at the start of each lesson providing our 'interleaving' element, ensuring knowledge and skills taught in previous lessons or topics are revisited. There will sometimes but not always be evidence of this in books. Interleaving activities will again vary according to the nature of the selected topic and the age and stage of the pupils. They may include activities such as quizzes, debates, discussion of news items, practical challenges, or news clips.

Impact

*'Assessment has a strong influence on curriculum and pedagogy, making it essential that there is a correspondence between what is intended to be learned and what is assessed.', Wynn Harlen*

We have devised a robust school wide system for assessment in Science in order to maximise opportunities to raise and sustain attainment for all of our pupils. Assessment in Science has the dual purpose of tracking and measuring pupil's mastery of the Working Scientifically skills (Sc1) and of their progress in their Scientific knowledge and understanding. (Sc2,3,and 4)

- For our EYFS pupils, assessment follows the same approaches of planned and chance observations and interactions with children as the other EYFS areas of learning.

For pupils within years 1 – 6 learning according to the National Curriculum, our assessment falls into three strands;

- All teachers use a 'knowledge harvest' approach at the start of or more ideally, just prior to the start of each new topic. These vary in format both for the sake of variety and to ensure they best match the nature of the topic and the age and stage of the children. These activities may take the form of a game such as subject specific Top Trumps, sorting activities, quizzes, discussions or activities to solve problems or challenges. These are sometimes carried out individually, or in pairs or within a group. Teachers use these activities to assess children's current knowledge and gaps and to identify misconceptions. They are also used to assess vocabulary use and understanding. The results are then used to direct planning to ensure that existing knowledge and skills are shored up and new learning builds from existing starting points. Individual children can also be identified and catered for, such as those who may have very high levels of knowledge or those who have gaps and need intervention before they can fully access the required objectives to follow. This is particularly important where children may have missed learning thorough illness or transfer from another school.

- Formative assessment is used during the delivery of the topic, which informs subsequent planning, ensuring it meets the children's requirements. This is usually informal through questioning, observation and discussion but can also take the form of quizzes or tests.

- Summative assessment judgements are made at the end of each topic. Teachers use teacher assessment supported by tests when they feel these are appropriate (Rising Stars). Assessment is recorded in books back at the beginning of each topic alongside the evidence of where the pupil began their learning. Progress within the topic should then be clear.

- Collected data is then recorded on our own spreadsheets, that allow analysis and comparison between groups and cohorts. We input the data formally onto the school system 3 times a year at Autumn end, Spring end and Summer end. This information is then shared and discussed at Pupil Progress meetings with senior leaders and the Science lead. This ensures that underachievement can be identified and addressed swiftly.

Performance data (NB 2018 – 2019 data is the most recent data uninterrupted by Covid disruption)

| | Our School<br>Summer end data<br>2018 - 2019 | | National data<br>Latest available data – 2018 Science sampling outcomes | | MAT data<br>2020 - 2021 | |
|---|---|---|---|---|---|---|
| | All pupils | Pupil Premium | All Pupils | Pupil Premium | All Pupils | Pupil Premium |
| EYFS pupils achieving GLD<br>EYFS pupils achieving expected in UW | 64%<br>71% | 66%<br>66% | 71%<br>84% | | | |
| % End of KS1 achieving expected. | 75% | 71% | | | | |
| % End of KS2 achieving expected | 83% | 67% | 21% | 9% | | |

Current Autumn end data following Covid catch up

Percentages of children at expected

| Year group | Whole class | Non PP | PP | Previous year comparison for expected |
|---|---|---|---|---|
| Year 1 | 93% | 100% | 86% | 47% →93% |
| Year 2 | 100% | 100% | 100% | 67% →100% |
| Year 3 | 90% | 100% | 71% | 47% →90% |
| Year 4 | 50% | 78% | 0% | 64% →50% |
| Year 5 | 67% | 88% | 25% | same |
| Year 6 | 75% | 89% | 64% | 60% →75% |

Green denotes raised attainment Red denotes reduced attainment