Science Policy

September 2023

Contents

1. **Curriculum Statement**

Intent

The 2014 national curriculum for science aims to ensure that all pupils:

- 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
- are equipped with the **scientific skills** required to understand the **uses and implications** of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this

At William Patten, we encourage children to be inquisitive throughout their time at the school and beyond. The Science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living. We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group. The key knowledge identified by each year group is informed by the national curriculum and builds towards identified phase 'end points' in accordance with NC expectations. Key skills are also mapped for each year group and are progressive throughout the school. These too ensure systematic progression to identified skills end points which are in accordance with the Working Scientifically skills expectations of the national curriculum. The curriculum is designed to ensure that children are able to acquire key scientific knowledge through practical experiences; using equipment, conducting experiments, building arguments and explaining concepts confidently. The school's approach to science takes account of the school's own context, ensuring access to people with specialist expertise and places of scientific interest as part of the school's commitment to learning outside the classroom. Cross curricular opportunities are also identified, mapped and planned to ensure contextual relevance. Children are encouraged to ask questions and be curious about their surroundings and a love of science is nurtured through a whole school ethos and a varied science curriculum.

Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all pupils are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;

- Science is taught in planned and arranged topic blocks by the class teacher, to have a project-based approach. This is a strategy to enable the achievement of a greater depth of knowledge.
- Each new unit of work begins with a recap of the previous related knowledge from previous years. This helps children to retrieve what they have learnt in the earlier sequence of the programme of study, and ensures that new knowledge is taught in the context of previous learning to promote a shift in long term memory. Key vocabulary for the new topic is also introduced as part of this 'unit introduction' and children are shown

the ‘Topic Vocabulary (TV) Mat. This provides definitions and accompanying visuals for each word to ensure accessibility to all. This approach also means that children are able to understand the new vocabulary when it is used in teaching and learning activities and apply it themselves when they approach their work.

- The KWL process is used throughout each unit of work. Once children know the new vocabulary for the unit and how it relates to previous learning, the children are asked what they already know specifically about the new topic. This provides the teacher with an insight into the children’s ‘starting points’ for the topic, to enable the use of assessment to inform planning. The children are then also asked what they would like to know and class responses are collated and used to inform the programme of study to ensure an aspect of ‘focussed interest planning’. A record of this process kept in children’s topic books. At the end of the topic, children take part in a review of what they now know. This involves writing a short summary piece of writing about what they have learnt. The teacher is then able consolidate any of the key knowledge which is identified at this part of the process as not yet being secure.
- Within all sequences of lessons, teachers plan a phase of progressive questioning which extends to and promotes the higher order thinking of all learners. Questions initially focus on the recall or retrieval of knowledge and then extend to promote application of the knowledge in a new situation to promote analytical thinking. Higher order questions focus on the children’s own work and how they might change or create an outcome and justify a choice they have made which is based on their evaluation.
- Through our planning, we involve problem solving opportunities that allow children to apply their knowledge, and find out answers for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess pupils regularly to identify those children with gaps in learning, so that all pupils keep up. Tasks are selected and designed to provide appropriate challenge to all learners, in line with the school’s commitment to inclusion.
- We build upon the knowledge and skill development of the previous years. As the children’s knowledge and understanding increases, they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.
- Working Scientifically skills are embedded into lessons to ensure that skills are systematically developed throughout the children’s school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in keeping with the topics.
- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children’s understanding of their surroundings by accessing outdoor learning and workshops with experts.
- Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.
- Regular events, such as Science Week, allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. These events often involve families and the wider community.
- At the end of each topic, key knowledge is reviewed by the children and rigorously checked by the teacher and consolidated as necessary.

Impact

The successful approach at William Patten results in a fun, engaging, high-quality science education that provides children with the foundations and knowledge for understanding the world. Our engagement with the local environment ensures that children learn through varied and first hand experiences of the world around them. Frequent, continuous and progressive learning outside the classroom is embedded throughout the science curriculum. Through various workshops, trips and interactions with experts and local charities, children have the understanding that science has changed our lives and that it is vital to the world's future prosperity. Children learn the possibilities for careers in science, as a result of our community links and connection with national agencies including the STEM association. They learn from and work with professionals, ensuring access to positive role models within the field of science from the immediate and wider local community. From this exposure to a range of different scientists from various backgrounds, all children feel they are scientists and capable of achieving. Children at William Patten overwhelmingly enjoy science and this results in motivated learners with sound scientific understanding. The school's science provision is recognised by the achievement of the nationally recognised 'Primary Science Quality Mark', which the school currently holds at silver level.

2. **Teaching and Learning**

The science curriculum is mapped to ensure alignment with the national curriculum content and programme of study. Key knowledge relates directly and builds towards the achievement of end of phase (KS1, Lower KS2 and upper KS2) 'end points', informed by the National Curriculum statements. Key skills are also mapped so that these are developed systematically and align directly to the specified working scientifically statements as outlined in the NC for each phase.

A working wall will be used to support and celebrate learning throughout each unit of work. This will also be used to support the acquisition of key knowledge and will support the accurate use of an extended specialist vocabulary.

Progressive questioning across the unit is evident on teaching slides. Questioning is informed by the Bloom's Taxonomy Teacher Toolkit, which can be found at the end of this policy (p19).

Opportunities will be sought by the school to provide the children with access to places of scientific significance and learning outside the classroom within units of work. The subject leader themselves will identify and map school trips that support each of the design and technology topics, using the School Trips Mapping document. This lists recommended trips that are appropriate to the topics of each subject that are being taught in each team. At the beginning of the year, teachers will choose one trip per half term from the list.

Teachers, in collaboration with SLT, subject and phase leaders, will ensure that there is diversity in the subjects that children are accessing school trips in. The category that each trip falls under is also mapped and considered at planning stage to ensure a broad and balanced enrichment offer.

School Trip Categories							
Natural World – parks, woodland	Places of Worship	Architecture and Heritage - Historic sites and contemporary buildings	Artistic - Theatres, galleries and creative settings	Science and Discovery	Adventure Activity and Leisure Centres	Zoos and Aquaria	Regional/ national Museums

Children from reception to Y6 have the option of accessing school trip locations via the London underground as well as local bus routes.

The school will also seek to provide access to people with specialist design and technology skills from the local and wider community to enrich the Design and Technology curriculum.

Vision and Principles

To ensure a common ethos in the teaching and learning of science, staff and children were involved in the creation of the William Patten Science Vision and Principles:

Vision:
At William Patten, children are empowered through scientific exploration that sparks curiosity and encourages engagement with and understanding of the world.

Principles:

- **Science is exciting when** we carry out practical investigations that are hands-on and have the wow-factor!
- **Science is rewarding when** we have opportunities to make mistakes, discuss them and learn from them.
- **Science is meaningful when** our experiments and learning link to real world problems, ideas and situations.
- **Science is interesting when** we build on our knowledge and explore links to different subjects.
- **Science is engaging when** we ask open-ended questions and work scientifically in a team to discover the answers.
- **Science is inspiring when** we learn about famous or local scientists and careers in STEM.
- **Science is fun when** we have special visitors or events, including going on trips and learning outside the classroom.

Figure 1: Science Vision and Principles Poster –

William Patten Primary School

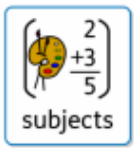
Science Principles

At William Patten, children are empowered through scientific exploration that sparks curiosity and encourages engagement with and understanding of the world.

Science is exciting when we carry out practical investigations that are hands-on and have the wow-factor!

Science is rewarding when we have opportunities to make mistakes, discuss them and learn from them.

Science is meaningful when our experiments and learning link to real world problems, ideas and situations.



Science is interesting when we build on our knowledge and explore links to different subjects.

Science is engaging when we ask open-ended questions and work scientifically in a team to discover the answers.

Science is inspiring when we learn about famous or local scientists and careers in STEM.

Science is fun when we have special visitors or events, including going on trips and learning outside the classroom.

These posters are on display on the working wall in classrooms and are referred to throughout the coverage of each science topic.

To ensure excellence across the school in the teaching and learning of science:

- Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom.
- Teachers ask a range of questions which enable all children to take part, listening carefully to answers and taking learning forward, using open and closed questions and allowing children time to think.
- Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge.
- Teachers use precise questioning in class to test conceptual knowledge and skills, and assess pupils regularly to identify those children with gaps in learning, so that all pupils keep up.
- New vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
- Working Scientifically skills are embedded into lessons and these focus on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils are given the opportunity to seek answers to questions through collecting, analysing and presenting data.
- The key knowledge for each topic and across each year group is mapped across the school and checked at the end of each science topic.
- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding.
- Teachers find opportunities to develop children's understanding through learning outside the classroom.
- Science lessons provide a quality and variety of subject specific language to enable the development of children's confident and accurate use of scientific vocabulary and their ability to articulate scientific concepts clearly and precisely. Children are encouraged and assisted in making their thinking clear, both to themselves and others, and teachers ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

3. **Assessment**

Children's existing knowledge of the topic and the key related knowledge from previous year groups, is checked at the beginning of each unit as part of the KWL process. The learning intention (LI) for each lesson is shared with the children, in the form of a 'Can I…?' question at the beginning of each lesson – this is stated at the beginning of lesson slides.

Children's knowledge and skills are continually assessed and developed by the teacher during lesson, in accordance with the lesson's success criteria. At the end of each lesson, children review their work (recorded or otherwise) according to the success criteria. The review process will usually take place through discussion, and children can interact during the process, for example, with thumbs up or down. Critical discussion, including that which generated by the teacher's progressive questioning also enables ongoing assessments.

Ongoing assessment also includes:

- Observing children at work, individually, in pairs, in a group, and in classes.
- Questioning, talking and listening to children
- Considering work/materials / investigations produced by children together with discussion about this with them.

Lessons are planned to ensure that key knowledge is developed over time, over the course of each science block and in the correct sequence. At the end of a topic, children will complete a short summary piece of writing that conveys what they have learnt throughout the topic. This writing can be prompted by visual cues and key words that focus on the key knowledge that children are summarising in their writing. This end of unit written summary will be scaffolded where appropriate, according to age and individual needs, so that task is achievable. Teachers will then tick each fact/knowledge statement that is included in this piece of writing.

There is a strong focus on developing the quality, presentation and content of children's written work across all subjects. The standard of children's writing is expected to be the same high standard across all subjects – teachers marking will address inaccuracies (such as, for example, inconsistencies in the use of capital letters and punctuation). It will also prompt when handwriting and grammar needs improvement, indicating an identified target and providing a suitable model where appropriate.

The majority of marking takes the form of highlighting. If a sentence or word is highlighted, it indicates a successful feature of the child's work. For example, this could indicate:

- evidence that the skills/knowledge for the lesson have been applied;
- use of key vocabulary or generally ambitious vocabulary;
- good use of grammar (conjunctions to elaborate on a point), or any other literacy focus such as the use of capital letters, age appropriate punctuation etc to promote literacy lessons beyond English lessons;
- and/or any aspect of the child's work which is in line with the pedagogy of science.

Although there will not always be a recorded outcome in children's books, task will be planned that provide plenty of opportunity for children to demonstrate the application of the key knowledge and skills for the lesson.

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge.

In EYFS, we assess the children's Understanding of the World according to the Development Matters statements.

4. **Planning and Resources**

Each lesson in topic block is planned according to a specific knowledge statement, according to each subject's knowledge and skills progression map. Skills that are relevant to that lesson are also planned for and evident in the slides for that lesson.

Lesson slides are designed to be accessible to all children, as well as to avoid cognitive overload. Lesson slides are used by the teacher to support the teaching, as well as to convey key information and instruction to the children.

Teachers devise lesson slides according to what is stated on the progression map for science according to the term and year group. The school has a format for lesson slides to support planning processes and to ensure consistency. Planning is a collaborative process and each class teacher plans with their year group partner. Teachers use the Associate of Science Education's 'Planning Matrices' to inform lesson content, specialist vocabulary and key knowledge and to ensure an appropriate emphasis on skills through practical experiences and approaches. Teachers also have access to the Department for Education Science Scheme of Work and the Kent Scheme of work to inform their planning and lesson design. Hamilton Trust resources are also available for adaptation and the school utilises the support and resources from the National Stem Centre. Sourced resources for lesson slides might include imagery and ideas from slides from other schemes. However, these are not used in their entirety, to ensure a structured and consistent approach that is in line with the school's bespoke curriculum mapping.

The teacher's role is not to facilitate the information on the slides, but to use them to support their teaching and to convey key information and instruction in a way that is visually accessible to all learners. Not all lessons will be planned to have a written outcome, but the lesson slides of lessons without a recorded outcome will indicate the key knowledge and skills covered and how these were taught, including what the children did.

The key vocabulary for each topic is mapped and shared with the children, with reference to the 'Topic Vocabulary (TV) Mat that each year group has created. This provides a graphic organiser of the key vocabulary, the previous related knowledge and the current key knowledge of the topic. A laminated copy of the graphic organiser will be available on children's tables as a point of reference for children throughout the duration of each topic. One side of this 'Topic Vocabulary Mat' states the key vocabulary with picture cues, and the other provides definitions for key vocabulary, as well as further key information. Responses to the 'What I'd like to know?' phase of the topic introduction, also enable and inform focussed interest planning which takes account of children's interests (as well as their starting points as informed by the 'What do I know already?' phase).

Key knowledge and skills, in line with the National Curriculum are mapped on the whole school 'Science Knowledge and Skills Progression Map' and this shows the key knowledge and skills of each unit and how they build through the school. The school's own context is also considered and opportunities for learning outside the classroom, including the use of specific school resources (such as the edible classroom and rooftop garden) and relevant educational visits, are included on the map and are planned by teachers. Cross curricular links are also mapped to further support the contextual relevance of the science curriculum.

High-quality science resources to support the teaching of all units and topics from EYFS to Y6, are used consistently and maintained by the subject leader. These are kept in a central store and are labelled and easily accessible to all staff. As well as these, the EYFS classes have a range of resources for easy access to children during exploration. The library contains a rich and varied supply of science topic books to support children's individual research and all classes have access to these during their weekly allocated library slot.

5. **Organisation**

Within the academic year, children study science in blocks, as outlined in the overall curriculum framework overview. This allows children to enhance their scientific knowledge and develop working scientifically skills through focused daily learning, throughout the duration of each block. This model also promotes the achievement of a greater depth of understanding by the end of a unit.

6. **EYFS**

Science in the EYFS is informed by and aligned to the following related early learning goals:

Personal, Social and Emotional Development

ELG: Speaking

- Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate.

ELG: Managing Self

- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.

Understanding the World

ELG: People, Culture and Communities

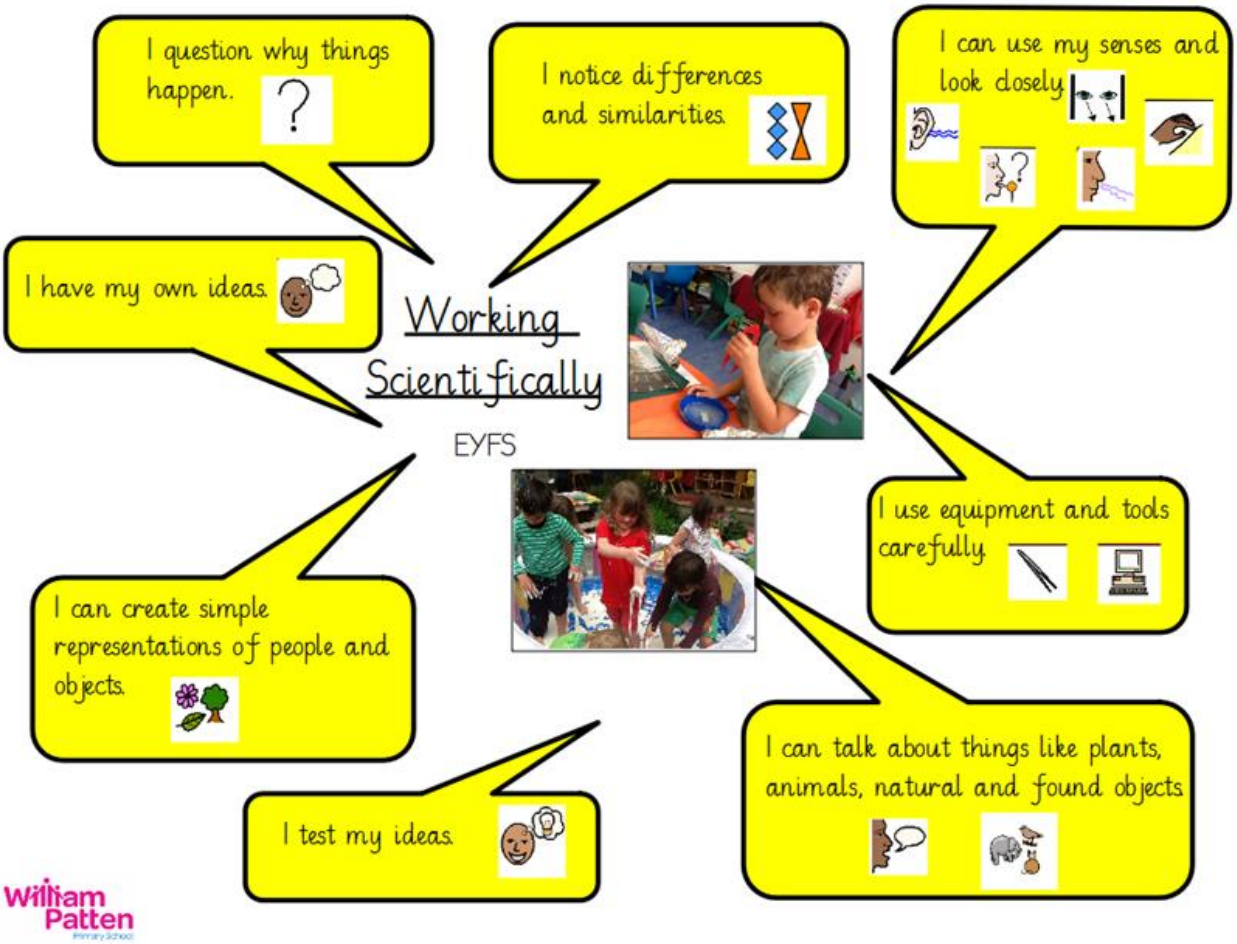
- Describe the immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps

ELG: The Natural World

- Explore the natural world around them, making observations and drawing pictures of animals and plants
- 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.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

The teaching of science in EYFS is in accordance with the EYFS national framework. Children are guided to make sense of their physical world and community through

opportunities to explore, observe and find out about people, places, technology and the environment. They are assessed according to the Development Matters attainment targets.



7. **KS1 and KS2**

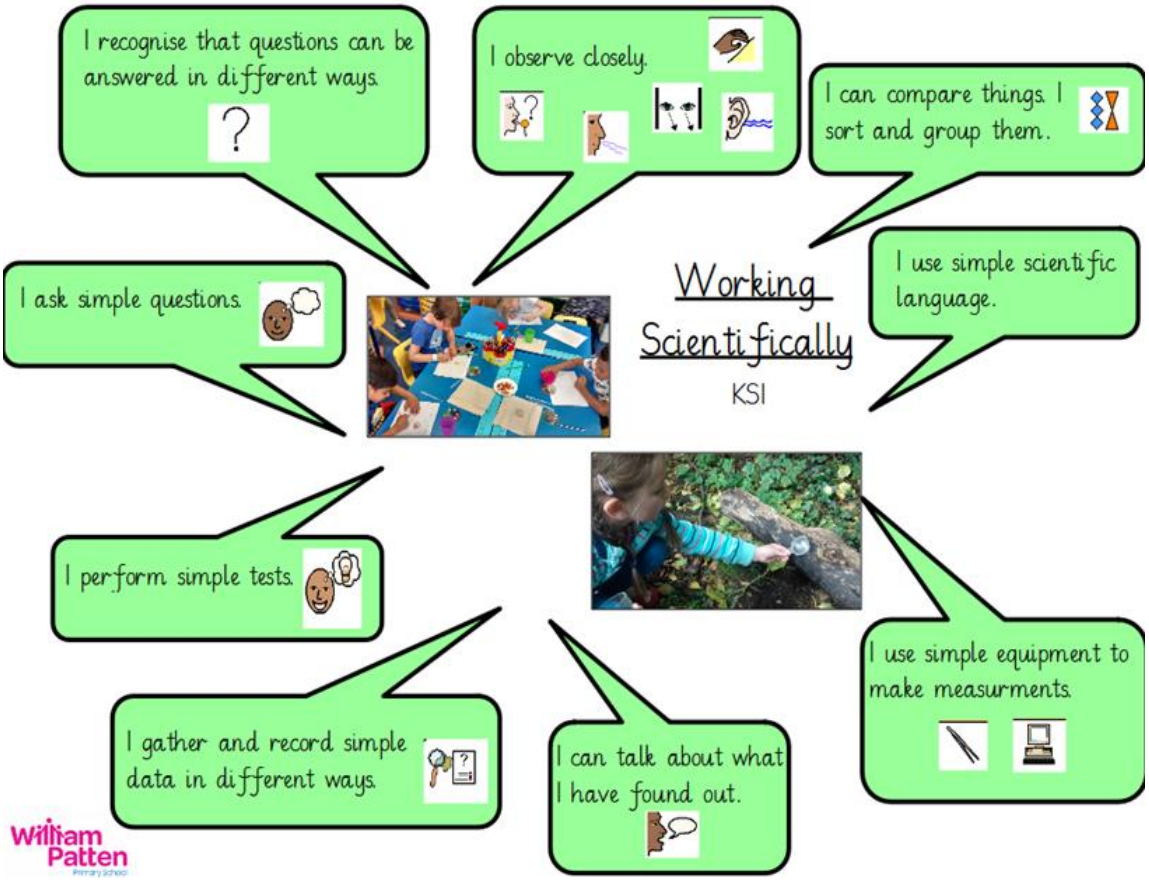
Key stage one:

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. At William Patten, children are encouraged to be curious and ask questions about what they notice. Their understanding of scientific ideas is supported through the use of different types of scientific enquiry so that children can answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. Children are supported to begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways, including wider school forums such as science week. Most of the learning about science is done through first-hand practical experiences, and children are also to begin to use appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the National Curriculum programme of study, but is **always** taught through and clearly related to the teaching of substantive science content in the programme of study. The knowledge and skills progression maps outline how

the specific skills of each unit progressively build between years and towards the overarching ‘end point statements’. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Opportunities are provided for the children to read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

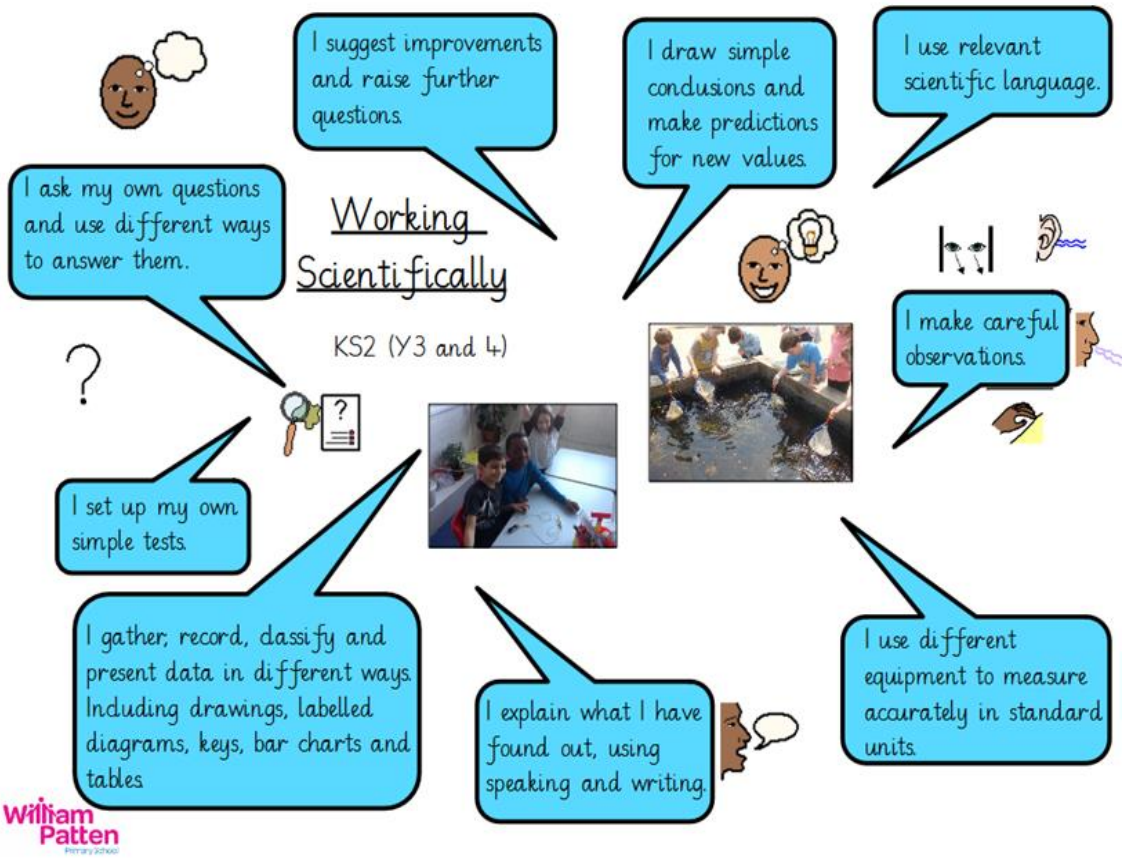


Lower Key Stage two:

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. Children are encouraged and supported to ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

As in KS1, ‘Working scientifically’ is described separately in the National Curriculum programme of study, but is **always** taught through and clearly related to the teaching of substantive science content in the programme of study. The knowledge and skills progression maps outline how the specific skills of each unit progressively build between years and towards the overarching ‘end point statements’. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Opportunities are provided for the children to read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

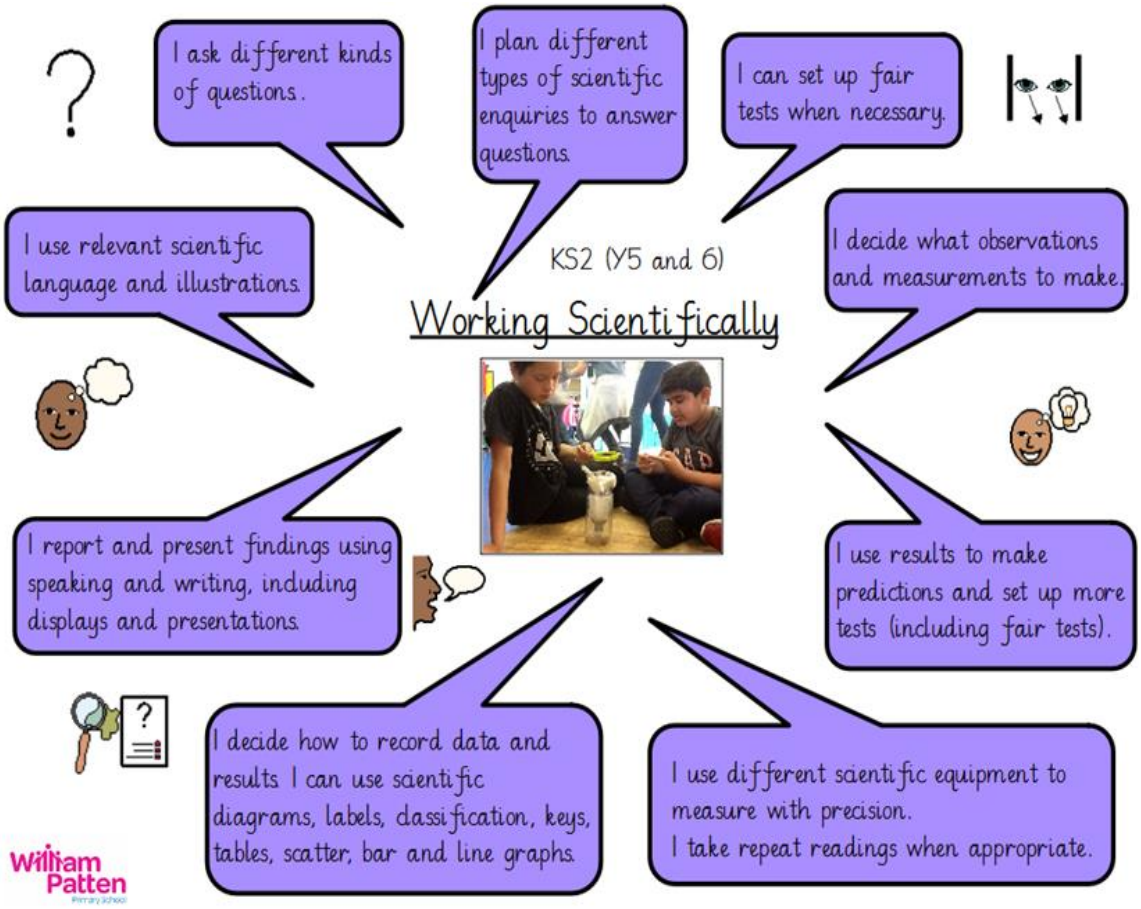


Upper Key Stage Two:

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. At William Patten, children do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. Children are also supported to begin to recognise that scientific ideas change and develop over time. The school curriculum provides opportunities for children to select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Children learn to draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Opportunities are provided for the children to read, spell and pronounce scientific vocabulary correctly.



Children will copy the LI from the board as the title for their recorded outcome. This will be underlined with a ruler. The LI and short date will be provided on a sticker to children who are not yet able to write this independently in KS1 and to identified individual children with SEND and children who are working below the age expectation. Generally, children will write the the short date themselves and this will be underlined with a ruler.

Children' s work in books will mostly be their own recorded writing. Pages of scaffolded work will only be stuck into children's books when this is absolutely necessary.
In some instances, children might stick a diagram or visual into their books that they will label or respond to into their books, rather than completing the entirety of an outcome on a separate sheet which is then stuck in.
In science, it might be appropriate for children to record a planning or investigative process directly onto a provided format. However, the majority of children will record their work directly onto the pages of their book, using the layout provided as a point of reference. This will enable greater ownership and pride in recorded outcomes.

During design and technology lessons, a 'Features of a Science Lesson' poster is clearly displayed on the wall. This has been explained to children, so they know what is in place to help them learn according to the pedagogy of the subject.

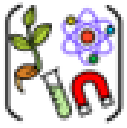
Features of a Science Lesson

1. LEARNING INITENTION

My teacher shares the LI with the class as a question – 'Can I…?'

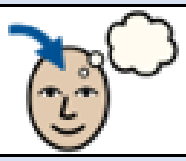
2. WORKING SCIENTIFICALLY

My teacher highlights which scientific skills we will be focusing on during the lesson. These are called 'working scientifically' statements. They are all on display in my Classroom.



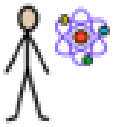
3. RECAP

We recap what we know from the previous lesson or in previous year groups if we are at the start of our topic. We think about any misconceptions we might have.



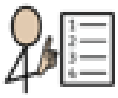
4. TEACHING

This might include -

A practical activity with the wow-factor to hook me in. 	Focused skills teaching (learning how to do one of the 'working scientifically' skills). 	Learning about new key knowledge related to the LI. 	Finding out about famous or local scientists or people who work in STEM. 

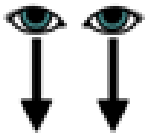
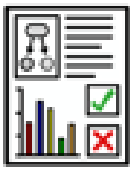
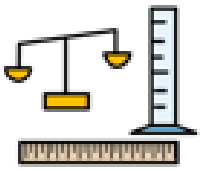
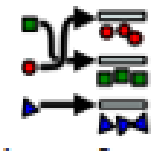
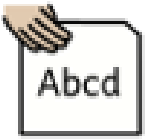
5. SUCCESS CRITERIA

The success criteria will then tell me how I can complete the task today!



6. INDEPENDENT WORK

My independent work might include one or more of the following 'working scientifically' skills -

Observing closely 	Asking scientific questions 	Performing simple tests (KS1) or setting up fair tests (KS2) 	Gathering, recording and interpreting data 	Using equipment to make measurements 
Sorting and classifying 	Presenting results and data (KS2) 	Discussing and exploring ideas and key knowledge 	Using scientific language 	Making predictions (KS2) 

7. REVIEW

We can use the success criteria to help us decide if we have met the learning intention.

At William Patten Primary school, we are committed to providing a teaching environment which ensures all children are provided with the same learning opportunities regardless of social class, gender, culture, race, special educational need or disability. Teachers use a range of strategies to ensure inclusion and also to maintain a positive ethos where children demonstrate positive attitudes towards others.

9. **Inclusion**

- Topic vocabulary is explained to the children from the onset of the topic, with accompanying definitions and visual cues, to ensure that all children develop and are able to use a range of vocabulary according to the project.
- Within each topic, teachers use 'word aware' to help children from identified vulnerable groups who would benefit. In Science, the word chosen for this is generally a technical term that is not a high frequency word.
- Key knowledge for all children is also provided on the TV (knowledge) mat, which is available for all children top refer to throughout the study in their books. Further use of assistive technology is also considered where appropriate for individual learners; this might include the use of widget to support instructions for construction, or the use of an electronic devise to support research.
- QR codes, photographs and print outs/screen shots of tasks completed on a computer or app can be used to evidence a learning process where the child has not produced a recorded outcome.
- Each class also has a working wall, which evolves with the topic. Teachers use this to reinforce the key knowledge and skills.
- Teaching assistants are expected to provide written feedback alongside the outcome or success criteria of the children they have supported as part of the monitoring and assessment of progress in the subject.

Science teaching considers the needs of different individuals and groups for learners and tasks are designed and adapted as appropriate to ensure an appropriate level of challenge. Supporting adults are also deployed effectively to ensure focussed support where this is necessary.

Teachers use a range of inclusion strategies, including paired work, open questions and direct, differentiated questioning and the activation of prior knowledge and contextual learning. This supports the inclusion and motivation of all learners ensuring that optimum progress is made throughout each part of the lesson.

10. **Role of the Subject Leader**

Regular opportunities will be provided throughout the year for moderation of children's achievement, according to the programme of study for their year group. The subject leader will use the outcomes of this process to support further development in science, as well as the findings from regular book looks (where teachers across year groups will view outcomes of work in each subject). The book look process itself will provide an opportunity to recognise, celebrate and disseminate good practice, and inform judgements as to the progress being made towards identified whole school and subject priorities.
In-house moderation and Book looks will be scheduled to take place within teachers' directed time.

The subject leader~~'s responsibilities are~~ will:

- Ensure the high profile of the subject and provide a strategic lead and direction for science in the school.
- Maintain and ensure use of the central supply of science resources, in accordance with those specific to each year group and topic.
- Support colleagues in their teaching of science and support the CPD of others.
- Ensure progression of the key knowledge and skills identified within each unit and that these are integral to the programme of study and secure at the end of each age phase.
- Monitor planning and oversee the teaching of science.
- Lead further improvement in and development of the subject as informed by effective subject overview.
- Ensure that the science curriculum enables the progress and raises the attainment of all pupils, including those who are disadvantaged or have low attainment.
- Ensure that the science curriculum takes account of the school's context, promotes children's pride in the local area and provides access to positive role models from the immediate and wider local area to enhance the science curriculum.
- Ensure that approaches are informed by and in line with current identified good practice and pedagogy; to attend regular opportunities for CPD, including borough forums and PSQM sessions (to maintain the school's achievement of the PSQM) and disseminate findings.
- Establish and maintain existing links with external agencies and individuals with specialist expertise to enrich teaching and learning in science.
- Organise an annual whole-school science week, in accordance with the national theme, ensuring a focus on practical and investigative activities.

The subject leader has specially-allocated time for fulfilling the task of reviewing samples of children's work, training, liaising with other subject leaders from other schools and organising science week.

11. **Parents**

Parental input is highly valued and parents are regularly invited and welcomed into school to share their own expertise with the children. Enquiries from parents and members of the school community with specialist expertise and knowledge are also encouraged. The school will actively seek to establish collaboration with parents and carers who are able to support the teaching and learning of science at William Patten.

The support that parents and carers provide in supporting their children at home with topic-based homework is also recognised and valued. When these are set, Science homework tasks will be well communicated and have a clear purpose and will often provide children with the means to consolidate or extend their classroom work.

Specific opportunities for parents to take part in science activities at the school, including science week, will be communicated. Special events will also be organised to involve families in scientific activities.

This policy will be reviewed annually by the Governing body.

Policy Agreed: **September 2023**
Policy Review Date: **September 2024**

LOW LEVEL THINKING SKILLS ← → HIGH LEVEL THINKING SKILLS

Knowledge

Recall /regurgitate facts without understanding. Exhibits previously learned material by recalling facts, terms, basic concepts and answers.

Key words:

Choose, Copy, Define, Duplicate, Find, How, Identify, Label, List, Listen, Locate, Match, Memorise, Name, Observe, Omit, Quote, Read, Recall, Recite, Recognise, Record, Relate, Remember, Repeat, Reproduce, Retell, Select, Show, Spell, State, Tell, Trace, What, When, Where, Which, Who, Why, Write

Actions:

Describing, Finding, Identifying, Listing, Locating, Naming, Recognising, Retrieving

Outcomes:

Definition, Fact, Label, List, Quiz, Reproduction, Test, Workbook, Worksheet

Questions:

Can you list three ...?
Can you recall ...?
Can you select ...?
How did _____ happen?
How is ...?
How would you describe ...?
How would you explain ...?
How would you show ...?
What is ...?
When did ...?
When did _____ happen?
Where is . . . ?
Which one ...?
Who was ...?
Who were the main . . . ?
Why did ...?

Comprehension

To show understanding finding information from the text. Demonstrating basic understanding of facts and ideas.

Key words:

Ask, Cite, Classify, Compare, Contrast, Demonstrate, Discuss, Estimate, Explain, Express, Extend, Generalise, Give examples, Illustrate, illustrate, Indicate, Infer, Interpret, Match, Observe, Outline, Predict, Purpose, Relate, Rephrase, Report, Restate, Review, Show, Summarise, Translate

Actions:

Classifying, Comparing, Exemplifying, Explaining, Inferring, Interpreting, Paraphrasing, Summarising

Outcomes:

Collection, Examples, Explanation, Label, List, Outline, Quiz, Show and tell, Summary

Questions:

Can you explain what is happening . . . what is meant . . .?
How would you classify the type of ...?
How would you compare ...?contrast ...?
How would you rephrase the meaning ...?
How would you summarise ...?
What can you say about ...?
What facts or ideas show ...?
What is the main idea of ...?
Which is the best answer ...?
Which statements support ...?
Will you state or interpret in your own words ...?

Application

To use in a new situation. Solving problems by applying acquired knowledge, facts, techniques and rules in a different way.

Key words:

Act, Administer, Apply, Associate, Build, Calculate, Categorise, Choose, Classify, Connect, Construct, Correlation, Demonstrate, Develop, Dramatise, Employ, Experiment with, Group, Identify, Illustrate, Interpret, Interview, Link, Make use of, Manipulate, Model, Organise, Perform, Plan, Practice, Relate, Represent, Select, Show, Simulate, Solve, Summarise, Teach, Transfer, Translate, Use

Actions:

Carrying out, Executing, Implementing, Using

Outcomes:

Demonstration, Diary, Illustrations, Interview, Journal, Performance, Presentation, Sculpture, Simulation

Questions:

How would you use...?
What examples can you find to ...?
How would you solve _____ using what you have learned ...?
How would you organise _____ to show ...?
How would you show your understanding of ...?
What approach would you use to...?
How would you apply what you learned to develop ...?
What other way would you plan to ...?
What would result if ...?
Can you make use of the facts to ...?
What elements would you choose to change ...?
What facts would you select to show ...?
What questions would you ask in an interview with ...?

Analysis

To examine in detail. Examining and breaking information into parts by identifying motives or causes; making inferences and finding evidence to support generalisations.

Key words:

Analyse, Appraise, Arrange, Assumption, Breakdown, Categorise, Cause and effect, Choose, Classify, Differences, Discover, Discriminate, Dissect, Distinction, Distinguish, Divide, Establish, Examine, Find, Focus, Function, Group, Highlight, In-depth discussion, Inference, Inspect, Investigate, Isolate, List, Motive, Omit, Order, Organise, Point out, Prioritize, Question, Rank, Reason, Relationships, Reorganise, Research, See, Select, Separate, Similar to, Simplify, Survey, Take part in, Test for, Theme, Comparing

Actions:

Attributing, Deconstructing, Integrating, Organising, Outlining, Structuring

Outcomes:

Abstract, Chart, Checklist, Database, Graph, Mobile, Report, Spread sheet, Survey

Questions:

What are the parts or features of ...?
How is _____ related to ...?
Why do you think ...?
What is the theme ...?
What motive is there ...?
Can you list the parts ...?
What inference can you make ...?
What conclusions can you draw ...?
How would you classify ...?
How would you categorise ...?
Can you identify the difference parts ...?
What evidence can you find ...?
What is the relationship between ...?
Can you make a distinction between ...?
What is the function of ...?
What ideas justify ...?

Synthesis

To change or create into something new. Compiling information together in a different way by combining elements in a new pattern or proposing alternative solutions.

Key words:

Adapt, Add to, Build, Change, Choose, Combine, Compile, Compose, Construct, Convert, Create, Delete, Design, Develop, Devise, Discover, Discuss, Elaborate, Estimate, Experiment, Extend, Formulate, Happen, Hypothesise, Imagine, Improve, Innovate, Integrate, Invent, Make up, Maximise, Minimise, Model, Modify, Original, Originate, Plan, Predict, Produce, Propose, Reframe, Revise, Rewrite, Simplify, Solve, Speculate, Substitute, Suppose, Tabulate, Test, Theorise, Think, Transform, Visualise

Actions:

Constructing, Designing, Devising, Inventing, Making, Planning, Producing

Outcomes:

Advertisement, Film, Media product, New game, Painting, Plan, Project, Song, Story

Questions:

What changes would you make to solve...?
How would you improve ...?
What would happen if...?
Can you elaborate on the reason...?
Can you propose an alternative...?
Can you invent...?
How would you adapt _____ to create a different...?
How could you change (modify) the plot (plan)...?
What could be done to minimise (maximise)...?
What way would you design...?
Suppose you could _____ what would you do...?
How would you test...?
Can you formulate a theory for...?
Can you predict the outcome if...?
How would you estimate the results for...?
What facts can you compile...?
Can you construct a model that would change...?
Can you think of an original way for the ...?

Evaluation

To justify. Presenting and defending opinions by making judgements about information, validity of ideas or quality of work based on a set of criteria.

Key words:

Agree, Appraise, Argue, Assess, Award, Bad, Choose, Compare, Conclude, Consider, Convince, Criteria, Criticise, Debate, Decide, Deduct, Defend, Determine, Disprove, Dispute, Effective, Estimate, Evaluate, Explain, Give reasons, Good, Grade, How do we know?, Importance, Infer, Influence, Interpret, Judge, Justify, Mark, Measure, Opinion, Perceive, Persuade, Prioritise, Prove, Rate, Recommend, Rule on, Select, Support, Test, Useful, Validate, Value, Why

Actions:

Attributing, Checking, Deconstructing, Integrating, Organising, Outlining, Structuring

Outcomes:

Abstract, Chart, Checklist, Database, Graph, Mobile, Report, Spread sheet, Survey

Questions:

Do you agree with the actions/outcomes...?
What is your opinion of...?
How would you prove/disprove...?
Can you assess the value/importance of...?
Would it be better if...?
Why did they (the character) choose...?
What would you recommend...?
How would you rate the...?
What would you cite to defend the actions...?
How would you evaluate ...?
How could you determine...?
What choice would you have made...?
What would you select...?
How would you prioritise...?
What judgement would you make about...?
Based on what you know, how would you explain...?
What information would you use to support the view...?
How would you justify...?
What data was used to make the conclusion...?

Bloom's Taxonomy: Teacher Planning Kit