



## Science Policy

### Contents:

1. Science curriculum statement
2. Teaching and Learning
3. Statutory requirements
4. Assessment
5. Planning and Resources
6. Organisation
7. Equal opportunities
8. Inclusion
9. The role of the subject leader
10. Parental involvement

## 1. SCIENCE CURRICULUM STATEMENT

### Intent

The 2014 National Curriculum for Science aims to ensure that all children:

- 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 Stanion CofE Primary School, through science we encourage children to develop the knowledge and skills that pupils need to be inquisitive throughout their time at the school and beyond. The Science curriculum fosters a healthy curiosity and enthusiasm in children about our universe and promotes respect for the living and non-living. We also aim develop resilience through practical explorations.

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 and vocabulary that has been identified within each unit and across each year group, as well as the application of scientific skills. Our aim is for pupils to be articulate in the use of scientific vocabulary.

We ensure that the Working Scientifically skills are built-on and developed throughout pupil's time at the school, so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently, and continue to ask questions and be curious about their surroundings.

### Implementation

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

- Science will be taught in planned 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. 'Hamilton Trust' with support from the A.S.E. Planning

Matrices will be used to inform planning and assessment. In the EYFS the A.S.E. Plan Matrices for the EYFS will be used to support the teaching of science.

- Science will be taught in line with our 'Principles of Science Teaching' (agreed by the staff) and the 'Student Principles of Science' (agreed by the pupils).
- Through our planning, we include problem solving opportunities that allow children to find out 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. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning.
- The children's achievements are tracked using 'Hamilton Trust' and Tapestry. The staff have targets in their assessment and planning folders to record the children's learning and to advise their next steps.
- We build upon the learning and skill development of the previous years with the support of progression documents. As the children's knowledge and understanding increases, and 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 these skills are being 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.
- The Key Stage 1 and 2 classes have a 'Science Working Wall' where vocabulary relating to their current topic is displayed along with examples of the children's work. Children are encouraged to add their own questions and findings to the walls.
- The class displays also include a 'sticky knowledge' star which highlights knowledge which needs to be retained and retrieved after a topic has been completed.
- 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.
- Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum (Covid guidelines permitting). These are purposeful and link with the knowledge being taught in class.
- Regular events, such as Science Week or project days allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills.

## Impact

The successful approach at Stanion Cof E Primary School 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. Children at Stanion Cof E Primary School enjoy science (this has been found out through the use of pupil surveys) and this results in motivated learners with sound scientific understanding.

## **2. TEACHING AND LEARNING**

Staff and children were involved in the development of the Stanion C of E Primary School Science Principles.

### **STANION PRIMARY SCHOOL'S PRINCIPLES FOR SCIENCE TEACHING**

- Children are given the opportunity to think for themselves; asking questions and finding the answers, and taking risks.
- Children are excited about what they are doing.
- Children are talking about their science to each other and their parents.
- Children are engaged in discussion and investigating, making predictions based on their scientific knowledge and understanding.
- Children have access to resources that are engaging and allow them to think creatively.
- Children are using cross-curricular skills eg measuring, recording, ICT skills.
- Teachers feel confident about their teaching and subject knowledge, and they are prepared to take risks.
- Teachers are using the outdoor environment and local surroundings to motivate the children and create 'awe and wonder'.
- Monitoring of the children's work shows evidence of improvements in teaching and learning.
- Classroom displays are interactive, supportive and show evidence of investigations.
- Visits and visitors to the school inspire the children and teachers.

### **STANION PRIMARY SCHOOL STUDENT'S PRINCIPLES FOR SCIENCE TEACHING**

#### **Science should:**

- Give us opportunities to think and predict.
- Be fun and exciting.
- Give us opportunities to talk about science in groups and whole class.
- Allow us to take part in investigations and make predictions.

- Use skills from other subjects eg measuring, recording, ICT skills.
- Use the outdoor environment and local surroundings.
- Have targets in books.
- Be displayed in interactive and supportive displays that show evidence of investigations.
- Include visits and visitors to school.

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

- 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 achieve their potential.
- New vocabulary (displayed on each class' science working wall) 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 to ensure these skills are being developed throughout the children's school career. 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 by accessing outdoor learning.

### **Scientific knowledge and conceptual understanding**

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Children's starting points are identified at the beginning of each science topic and the children are able to convey and record what they know already. At the end of the topic, children's knowledge is checked in line with the key knowledge identified prior to the teaching block. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary and teachers ensure that this is developed within each lesson and throughout each science topic. The science curriculum ensures that pupils are provided with regular opportunities to apply their mathematical knowledge to their understanding of science,

including collecting, presenting and analysing data. Pupils are encouraged to use their literacy skills when they are recording information or writing up experiments.

### **The nature, processes and methods of science**

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group and this is embedded within lessons and focuses 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 opportunity to seek answers to questions through collecting, analysing and presenting data.

### **Spoken language**

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. At Stanion Primary 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.

## **3. STATUTORY REQUIREMENTS**

Statutory requirements for the teaching and learning of science are laid out in the National Curriculum Science Document (2014) and in the Understanding of the World section of the Statutory Framework for the Early Years Foundation Stage (2012).

In the Foundation Stage (Reception) children are given opportunities to:

- Comment and ask questions about aspects of their familiar world, such as the place where they live or the natural world.
- Talk about some of the things they have observed such as plants, animals, natural and found objects.
- Talk about why things happen and how things work.
- Develop an understanding of growth, decay and changes over time.
- Show care and concern for living things and the environment.
- Look closely at similarities, difference, patterns and change.
- Know about similarities and differences in relation to places, objects, materials and living things.
- Talk about the features of their own environment and how environments might vary from one another.
- Make observations of animals and plants and explain why some things occur, and talk about changes.

In Key Stage 1 and 2 the 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 an 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 knowledge required to understand the **uses and implications of science**, today and for the future.

During years 1 and 2 pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the program of study content:

- Asking questions and recognising that they can be answered in different ways.
- Observing closely, using simple equipment.
- Performing simple tests.
- Identifying and classifying.
- Using their observations and ideas to suggest answers to questions.
- Gathering and recording data to help in answering questions.

During years 3 and 4 pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the program of study content:

- Asking relevant questions and using different types of scientific enquiries to answer them.
- Setting up simple practical enquiries, comparative and fair tests.
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers.
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Identifying differences, similarities or changes related to simple scientific ideas and processes.
- Using straightforward scientific evidence to answer questions or to support their findings.

During years 5 and 6 pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the program of study content:

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate.
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Using test results to make predictions to set up further comparative and fair tests.

- Reporting and representing findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.
- Identifying scientific evidence that has been used to support or refute ideas or arguments.

#### **4. ASSESSMENT**

Children's progress is continually monitored throughout their time at Stanion Primary School (in line with the school's Assessment Policy) and is used to inform future teaching and learning. 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. Pupil's achievements are tracked using Hamilton Trust Tracking documents. These documents are then used to inform the teacher's next steps and planning.

Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the success criteria. Children are guided towards achievement of the main objective through the use of process based 'success criteria', provided by and explained by the teacher. Children will have these to refer to in the lesson, where they will be evident in their books and used to identify areas of difficulty by children and teachers when reviewing and assessing work. Pupils are expected to assess their own work using *www* (what went well) and *ebi* (even better if), as well as using the traffic light system evident throughout the school in all subjects.

In EYFS, we assess the children's Understanding of the World (The Natural World) according to the EYFS Profile 2021 and some aspects of Expressive Arts Design (Creating with materials) and Personal, Social and Emotional Development (Managing self) are also science based. The Characteristics of Effective Learning are also taken into consideration when making observations of science activities. The children's achievements are recorded using 'Tapestry', the online learning journal.

#### **5. PLANNING AND RESOURCES**

The key knowledge and skills of each science topic is also informed by the use of Hamilton Trust resources and supported by the Association of Science Education's 'Planning Matrices'.

Further evidence of 'good science' taking place in classrooms includes:

- An active learning environment, showcasing the Stanion Primary Science Principles, and relevant vocabulary on the working walls during science topic coverage.
- Children being encouraged to ask and answer questions and discuss their work and ideas.

- Children devising and conducting their own investigations within the context of the relevant curriculum content, as well as being given opportunities to develop their working scientifically skills.
- Children recording their findings in a variety of ways.
- Children showing enjoyment in the activities they are undertaking.
- The cross curricular teaching of science.

We have sufficient science resources to aid and support the teaching of all units and topics taught, from EYFS to Y6. We keep these in a central store, where they will be labelled and easily accessible to all staff. EYFS have a range of resources kept in classes, for simple access for children during exploration. The library contains a good supply of science topic books to support children’s individual research. Each class also has a bank of story books and non-fiction books based on their science topics.

## 6. ORGANISATION

Science is taught in topic blocks organised by the class teacher. In KS1 and KS2 science is organised into a two year rolling program.

### Year A (2022 – 2023)

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS	Ourselves Our senses Autumn	Light and Dark Materials Winter	Winter , Snow, Ice and Dark nights Food and cooking	Spring What makes it move?	Recycling Animal lifecycles	Summer Growing plants
Year 1/2	Animals including humans <b>Amazing Me!</b>	Animals including humans <b>Wild and wonderful creatures</b>	Seasonal changes <b>Wild weather</b>	Everyday materials <b>Brilliant builders Choosing the best materials</b>	Plants <b>Growing things</b>	Animal life cycles <b>Food chains</b>
Year 3/4	Forces and Magnets <b>Magnetic fun and games</b>	Animals including humans – food chains <b>Fit for success</b>	Rocks and soils <b>This planet rocks</b>	Light <b>Shining the light</b>	Plants <b>Greatly green growers</b>	Plants <b>A feast of fruits and seeds</b>
Year 5/6	Properties and changes of materials <b>Special effects materials</b>	Properties and changes of materials <b>Materials consultants</b>	Earth and space <b>Space</b>	Evolution and inheritance <b>Survival of the fittest</b>	Living things and their habitats <b>Illustrating lifecycles</b>	Reproduction <b>The human species</b>

## Year B (2023 – 2024)

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS	Ourselves Our senses Autumn	Light and Dark Materials Winter	Winter , Snow, Ice and Dark nights Food and cooking	Spring What makes it move?	Recycling Animal lifecycles	Summer Growing plants
Year 1/2	Animals including humans <b>People and their pets</b>	Seasonal changes <b>Weather art</b>	Materials <b>Brilliant builders Comparing materials</b>	Use of everyday materials <b>Exploring changes</b>	Plants <b>Art and nature</b>	Habitats <b>Habitats and homes</b>
Year 3/4	Sound <b>Sounds spectacular</b>	Electricity <b>Electric personalities</b>	States of matter <b>What's the matter?</b>	Living things and their habitats <b>A world of living things</b>	Living things and their habitats <b>Habitat helpers</b>	Animals including humans <b>The circle of life</b>
Year 5/6	Electricity <b>Electric art</b>	Forces <b>Welcome to Forceland</b>	Living things and their habitats <b>The classification code</b>	Health <b>Medical manoeuvres</b>	Light <b>Theatre lighting technicians</b>	Revision block <b>Sensational science</b>

The Foundation Stage deliver science content through the 'Understanding of the World' strand of the EYFS curriculum. This involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment. They are assessed according to the EYFS Profile 2021.

### YEAR 1

- **Plants:** naming common plants and describing their basic structure.
- **Animals including humans:** identify and name common animals, fish, reptiles, birds and mammals, and whether they are omnivores, herbivores or carnivores
- **Everyday materials:** identify and name everyday materials, including wood, plastic, glass, metal, water and rocks and describe their features.
- **Seasonal changes:** observe the changes in the four seasons and the weather associated with them.

### YEAR 2

- **Living things and their habitats:** compare the differences between things that are living, dead, and things that have never been alive, and identify the habitats they are suited to.
- **Plants:** describe how seeds and bulbs grow and find the conditions they need to stay healthy.

- **Animals including humans:** notice that offspring grow into adults and have basic needs.
- **Uses of everyday materials:** identify and compare everyday materials and their uses, and how they may be changed by squashing, bending, twisting and stretching.

## LOWER KEY STAGE 2

Working scientifically must **always** be taught through, and clearly related to, substantive science content in the program of study.

## YEAR 3

- **Plants:** identify the functions of the different parts of the plant and their requirements for life and growth.
- **Animals including humans:** identify that animals and humans need the right sort of nutrition and that humans have skeletons and muscles.
- **Rocks:** compare different kinds of rocks on the basis of appearance and physical properties, and how fossils are formed.
- **Light:** recognise that dark is the absence of light, and light can be reflected from surfaces; recognise its dangers and know how shadows are formed.
- **Forces and magnets:** compare how things move on different surfaces; observe how magnets can attract or repel each other and that different materials are attracted to magnets.

## YEAR 4

- **Living things and their habitats:** classify living things in a variety of different ways, recognise that environments can change and pose dangers to living things.
- **Animals including humans:** describe the functions of parts of the digestive system; identify different types of teeth; construct and interpret food chains.
- **States of matter:** identify solids, liquids and gases; observe how materials change when they are heated or cooled, and measure in degrees Celsius.
- **Sound:** identify how sounds are made and how they travel through a medium to the ear.
- **Electricity:** identify common appliances that can run on electricity and construct simple circuits.

## UPPER KEY STAGE 2

Working scientifically must **always** be taught through, and clearly related to, substantive science content in the program of study.

## YEAR 5

- **Living things and their habitats:** describe the differences in the lifecycles of a mammal, an amphibian, an insect and a bird; describe the life process of reproduction in some plants and animals.
- **Animals including humans:** describe the changes as humans develop to old age.
- **Properties and changes of materials:** compare everyday materials based on their properties.

- **Earth and space:** describe the movement of the earth and other planets based on their relation to the sun; use the idea of the earth's rotation to explain day and night; and the apparent movement of the sun across the sky.
- **Forces:** explain the force of gravity; identify the effects of air resistance; recognise that some mechanisms including levers, pulleys and gears allow a force to have a greater effect.

## YEAR 6

- **Living things and their habitats:** describe how living things are classified into groups according to common observable characteristics and based on similarities and differences give reasons for classifying plants and animals.
- **Animals including humans:** identify and name the parts of the human circulatory system; identify the effects of diet, exercise, drugs and lifestyle on the way their bodies function.
- **Evolution and inheritance:** recognise that living things have changed over time and that fossils provide information about living things that inhabited the earth millions of years ago; identify how plants and animals are adapted to suit their environment.
- **Light:** recognise that light travels in straight lines and that we see objects because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- **Electricity:** associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit; use recognised symbols when representing a simple circuit in a diagram.

## 7. EQUAL OPPORTUNITIES

At Stanion C Of E Primary School we have universal ambitions for every child whatever their background or circumstances. Children learn and thrive when they are healthy, safe and engaged.

In order to engage all children cultural diversity, home languages, gender and religious beliefs are all celebrated. Our curriculum includes a wide range of experiences and resources which represent the diversity and backgrounds of all our children and the wider community.

## 8. INCLUSION

We aim to provide for all children so that they achieve as highly as they can in science according to their individual abilities. We will identify which pupils or groups of pupils are under-achieving and take steps to improve their attainment. Gifted children will be identified and suitable learning challenges will be provided.

## 9. ROLE OF THE SUBJECT LEADER

The subject leader is responsible for improving the standards of teaching and learning in science through:

Strategic direction:

- Lead the development of a vision for science in the school and approaches to teaching and learning.
- Lead the writing of policies and long term plans.
- Communication beyond immediate colleagues eg. Governors, Ofsted.
- Promote values; high expectations and inclusion.

Managing change:

- Supporting colleagues; arranging CPD opportunities.
- Monitoring and evaluating progress; listening to the pupil voice; data analysis.
- Action planning – contributing to school development plans.

Management:

- Ordering and storage of resources.
- Overview of health and safety in science (BeSafe)
- Provide a framework for implementing planning and record keeping for science.

## **10. PARENTAL INVOLVEMENT**

We aim to involve parents directly in the life of the school, and thus in the development of children's skills, knowledge and understanding of science.

There are opportunities each term when parents can discuss their children's progress with their teacher. Termly curriculum letters provide information about the science topics being taught and how parents can support their children. Weekly newsletters keep the parents informed as to what the children have been learning on a weekly basis. Parents are also able to see what their children are covering at school through their access to their child's online Tapestry journal.

This policy should be read in conjunction with the following school policies:

- Assessment and record keeping
- Marking
- Special Educational needs
- ICT
- Equal opportunities
- Teaching and learning

Mrs Sarah Hankins – Science subject lead

Policy agreed by Governors on Thursday, 14<sup>th</sup> December 2023

Signed ..... Head Teacher

Signed ..... Chair of Governors