



Science Policy

Our Vision

We want Virginia Primary School to be a community of happy, confident, motivated lifelong learners. We want our pupils to be successful citizens who value themselves and each other. Therefore, we are continually striving to ensure that we nurture, challenge and enable each and every one to be the very best they can be in all areas of school life.

Rights Respecting School

We are a Right Respecting School and this policy supports the following articles from the United Nations on the Convention on the Rights of a Child:

- Article 13: freedom of expression
- Article 14: freedom of thought, belief and religion
- Article 23: pupils with a disability
- Article 28: right to an education
- Article 29: goals of education

Approved by:		Date:	
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Vision

We want our pupils to explore the world around them with curiosity and excitement, asking questions and making predictions about how things work and why things happen. We want to ensure that they understand the importance of the natural and physical world and develop a respect for all living things. We want our pupils to understand the key scientific concepts, facts and processes appropriate for their stage of learning, and be able to build on this knowledge through practical enquiry and scientific investigation. We want them to be able to analyse and explain their findings using scientific language and vocabulary with confidence. We also want them to appreciate the role that science has played in shaping the way we live today, and the valuable contributions made by a diverse range of people, cultures and communities.

Aims

To ensure this vision is met, we aim to deliver a science curriculum that:

- Stimulates and excites curiosity about the world around us
- Develops a solid understanding of core concepts and scientific knowledge
- Builds confidence in using scientific knowledge to answer questions
- Offers hands-on practical experiences and activities that develop specific scientific skills
- Ensures that all pupils make progress in their scientific understanding and skills
- Places science in a real-world, diverse and cross-curricular context

INTENT – WHAT WE WANT TO TEACH

Curriculum Content

Early Years Framework

Pupils in the EYFS follow the EFYS Framework where Scientific knowledge and skills are covered in the Understanding the World area of learning. Some aspects of the Communication and Language, Literacy and Mathematics areas of learning will also support learning in this area.

We ensure that relevant learning in the EYFS is taken into account as pupils move into Year 1.

National Curriculum

In Key stage 1 and 2 we follow the National Curriculum for Science 2014 and ensure that all statutory requirements are met at each Phase/Key Stage and in each year group.

Knowledge and Understanding

The Science National Curriculum contains a range of concepts, knowledge and understanding across the three areas of science: Life and Living Things (Biology); The Physical World (Physics) and Materials and Their Properties (Chemistry). We build learning around these strands across all year groups to ensure progression.

We use the **ASE PLAN Knowledge Grids** to focus on the specific knowledge and skills that need to be learned in each Science Unit. This ensures that pupils are taught the correct science content at the right stage of their school journey.

Scientific Skills

We ensure that pupils learn scientific skills as part of scientific investigations and practical activities. These skills are always linked to specific knowledge and concepts.

Year 1 PLANTS	National Curriculum Knowledge	National Curriculum Working Scientifically KS1
<ul style="list-style-type: none"> • Identify & name a variety of common wild & garden plants, including deciduous & evergreen trees. • Identify & describe the basic structure of a variety of common flowering plants, including trees. 	<ul style="list-style-type: none"> • ask simple questions & recognizing that they can be answered in different ways • observe closely, using simple equipment • perform simple tests • identify & describe • use their observations & ideas to suggest answers to questions • gather & record data to help in answering questions 	<p>Prior learning</p> <ul style="list-style-type: none"> • Plant seeds & care for growing plants. (Nursery – Plants) • Understand the key features of the life cycle of a plant & an animal • Begin to understand the need to respect & care for the natural environment. (Nursery – Plants) • Explore the natural world around them. (Reception – Living Things) • Recognise some environments that are different to the one in which they live (e.g. their habitats) <p>Future learning</p>
Year 2 USES OF EVERYDAY MATERIALS	National Curriculum Knowledge	National Curriculum Working Scientifically KS1
<p>WHAT PUPILS NEED TO KNOW: Show understanding of</p> <p>Key learning</p> <ul style="list-style-type: none"> • Growing locally, there will be a vast array of plants which all have different parts. • During autumn & winter, many plants die back. • During spring & summer, many plants grow again during spring. <p>Key vocabulary</p> <ul style="list-style-type: none"> • Leaf, stalk, stem, root, • Bud, flower, blossom, petal, • Fruit, berry, seed, • Trunk, branch, bark, • Names of trees • Names of garden & wild flowering plants in the local area <p>WHAT PUPILS NEED TO BE ABLE TO DO: Apply knowledge</p> <p>Activities</p> <ul style="list-style-type: none"> • Make close observations of leaves, seeds, flowers etc. • Compare two leaves, seeds, flowers etc. • Classify leaves, seeds, flowers etc. using a range of criteria • Identify plants by matching them to named images • Make observations of how plants change over a period of 10 days • When further asked, spot plants that are the same as those <p>Non-Statutory Guidance from National Curriculum</p> <p>Pupils might work scientifically by: observing closely, perhaps diagrams showing the parts of different plants including trees. P contrast what they have found out about different plants.</p>	<ul style="list-style-type: none"> • Identify & compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper & cardboard for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting & stretching. <p>Prior learning</p> <ul style="list-style-type: none"> • Compare between an object & the material from which it is made. (Y1 - Everyday materials) • Identify & name a variety of everyday materials, including wood, plastic, glass, metal, water, & rock. (Y1 - Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) • Compare & group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) <p>WHAT PUPILS NEED TO KNOW: Show understanding of a concept using scientific vocabulary correctly</p> <p>Key learning</p> <ul style="list-style-type: none"> • All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic, because it is transparent allowing you to see the drink inside & waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests & classifying activities. A material can be suitable for different purposes & an object can be made of different materials. • Objects made of some materials can be changed in shape by bending, stretching, squashing & twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness. <p>Key vocabulary</p> <ul style="list-style-type: none"> • Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard • Properties of materials – as for Year 1 (blue, orange, transparent & translucent, reflective, non-reflective, flexible, rigid) • Shape, push/squash, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching <p>WHAT PUPILS NEED TO BE ABLE TO DO: Apply knowledge in familiar related contexts, including a range of enquiries</p> <p>Activities</p> <ul style="list-style-type: none"> • Classify materials. • Make suggestions about alternative materials for a purpose that are both suitable & unsuitable • Test the properties of materials for particular uses e.g., compare the stretchiness of fabrics to select the most appropriate for Elastigirl's costume, test materials for waterproofness to select the most appropriate for a rain hat. <p>Non-Statutory Guidance from National Curriculum</p> <p>Pupils might work scientifically by: comparing the uses of everyday materials in & around the school with materials found in other places (at home, in the gym, in stores, (rhymes & songs); observing closely, identifying & classifying the uses of different materials, & recording their observations.</p>	<ul style="list-style-type: none"> • asking simple questions & recognizing that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying & classifying • using their observations & ideas to suggest answers to questions • gathering & recording data to help in answering questions <p>Possible evidence</p> <ul style="list-style-type: none"> • Can name an object, say what material it is made from, identify its properties & make a link between the properties & a particular use • Can label a picture or diagram of an object made from different materials • For a given object can identify what properties a suitable material needs to have • Whilst changing the shape of an object can describe the action used • Can use the words flexible and/or stretchy to describe materials that can be changed in shape & stiff and/or rigid for those that cannot • Can recognise that a material may come in different forms which have different properties <p>Common misconceptions - some children may think...</p> <ul style="list-style-type: none"> • only fabrics are materials • only building materials are materials • only writing materials are materials • the word rock describes an object rather than a material • solid is another word for hard <p>Possible evidence</p> <ul style="list-style-type: none"> • Can sort materials using a range of properties • Can explain using the key properties why a material is suitable or not suitable for a purpose • Can begin to choose an appropriate method for testing a material for a particular property • Can use their test evidence to select appropriate material for a purpose e.g. which material is the best for a rain hat?

Vocabulary

We use the key vocabulary from the ASE PLAN Knowledge Grids to ensure progression Withing the three main themes across all year groups. This vocabulary is built into the more detailed medium term plans and staff will incorporate it into lesson resources and displays. For further details see the **Vocabulary Progression Grid**.

Curriculum Overview

The science objectives laid out in the statutory National Curriculum have been mapped across each year group to ensure progression within the different scientific knowledge strands

Thematic links

Some Science units are matched to other class topics and themes but only where links are strong and will enhance learning.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	SoS: Who Am I?	Hamilton	Hamilton	Hamilton	Hamilton	Hamilton
	Animals Inc Humans Y1: Human Structures Labels, Senses	Everyday Materials Y1: Object/material distinction Identify & name everyday materials	Animals Inc Humans Y1: Identify/name variety of animals Describe and compare the structure of different animals	Everyday Materials Y1: Describe properties of everyday materials & compare and group based on properties	Animals Inc Humans Y1: Identify and name variety of herbivores, carnivores, and omnivores	Plants Y1: Identify and name plants & trees Describe basic structure of common plants and trees
Seasonal Changes - link to Plants						
Year 2	Hamilton: Animals Inc Humans	SoS: Materials Monster	Hamilton Animals Inc Humans	SoS: Move it	Hamilton Living Things/Habitats	Hamilton Plants
	Animals Inc Humans Y2: Animal Growth and Life Cycles	Everyday Materials Y2: Suitability of various everyday materials for their uses	Animals Inc Humans Y2: Human basic needs, growth, healthy eating, exercise	Everyday Materials Y2: Changing shape of some materials by squashing, bending, twisting & stretching	Living Things Habitats Y2: Alive/dead/never alive Animal and plant habitats Food chains	Plants Y2: Seeds/bulbs: plant growth: plant growth needs - water/light/temp.
Year 3	SoS: Opposites Attract	SoS: Earth and Rocks	SoS: Food and Our Bodies		SoS: HDY Garden Grow?	SoS: Mirror Mirror
	Forces and Magnets Y3: Magnetism	Rocks Y3: Rocks and Fossils	Animals In Humans Y3: Nutrition, muscles, skeleton		Plants Y3: Plant Lifecycle, growth requirements, structure	Light Y3: Light, danger of sunlight, shadows, reflections
Year 4	SoS: Power it up	SoS: Teeth and Eating	SoS: Looking at States		SoS: What's That Sound?	SoS: Living things
	Electricity Y4: Electricity - Circuits appliances	Animals Inc Humans Y4: Digestion, teeth, food chains	States of Matter Y4: solid, liquid, gas, water cycle,		Sound Y4: Sound, vibration, volume, pitch	Living Things Habitats Y4: Group, classify, identify living things, local environments
Year 5	SoS: Circle of Life	SoS: Growing Up Growing Old (PHSE) SoS: Let's Get Moving	SoS: Material World		SoS: Let's Get Moving	SoS: Out of This World
	Living Things and Habitats Y5: Animal and plant life cycles	Animals Inc Humans Y5: Humans changes to old age Forces Y5: Levers gears pulleys, Friction/moving surfaces	Properties and Changes of Materials Y5: properties and everyday uses. reversible changes - mixing, dissolving, separating, new materials		Forces Y5: Gravity, Water/Air Resistance	Earth Space Y5: Sun, Earth Moon Day and Night
Year 6	SoS: Classifying Critters	SoS: We Are Evolving	SoS: Let It Shine	SoS: Electrifying	SoS Staying Alive	
	Living Things and Habitats Y6: Classification of living things	Evolution Inheritance Y6: Fossils, Inheritance, Evolution	Light Y6: Human Eye Light and Shadows	Electricity Y6: Electrical circuit components	Animals Inc Humans Y6: Human heart and circulation, exercise, diet, nutrition, health	

IMPLEMENTATION – HOW WE ARE GOING TO TEACH IT?

Equal Opportunities and Inclusion

We ensure that all pupils have access to the science curriculum by using a range of strategies and approaches including:

- Carefully planned and targeted use of additional adult support
- Differentiated resources, including writing frames and scaffolds, where necessary
- Use of paired and group work to support pupils to reach greater depth

We ensure that learning in science and technology is inclusive and that it:

- Supports positive attitudes to scientific endeavour in different cultures
- Provides good role models and resources that emphasise equality, diversity and inclusion
- Reflects the achievements of women in STEM subjects and encourages girls to take part
- Shows how science and technology plays an important role in the developing world

Science Scheme of Work

The school Science Lead has developed a bespoke scheme of work with detailed lesson plans and resources for each year group. A science unit is taught either half termly or termly.

The scheme of work covers the statutory Science National Curriculum for all year groups and also reflects the school ethos and values.

Resources

We provide a range of appropriate practical and hands-on resources and equipment for each science unit, ensuring that there is enough to support meaningful investigations in pairs, small groups and whole class demonstrations. Equipment is checked and reviewed each year and replaces/updated if necessary.

We use several reputable third-party teaching and learning resources, lesson plans and presentations. These sources have been evaluated by the Science Lead and embedded into medium term plans to ensure teaching materials are appropriate and of consistent quality.

Health and Safety

We ensure that all investigations are safe and appropriate, using the *CLEAPPS Model Health and Safety Policy* for Science as guidance. For more details see the *Health and Safety Policy*

Cross-curricular links

Links with English

There is always a focus on **key vocabulary and scientific language**, particularly when starting a new topic, and pupils are encouraged to learn and remember these words.

Scientific writing will include description, explanation, information reports (including comparisons) and discussion. These types of writing are scaffolded using a range of writing frames, template and models until pupils are confident to use them independently. Pupils are also taught how to use evidence to formulate a conclusion as part of their scientific investigations and research.

Links with Maths

There are rich opportunities to link maths with science, particularly in the areas of data handling/statistics and measurement. Teachers plan for these links, ensuring that pupils are secure in the mathematical concepts and skills before using them in a scientific context

Use of ICT

ICT can be an invaluable tool for scientists, and there are many useful resources that will add a new dimension to many areas of science. These include:

- Data Logging equipment – for measurement and recording of light, sound and temperature levels
- Digital microscopes – the magnified image can be shown on the class whiteboard
- Digital photography – invaluable to record a science investigation and stimulate follow-up writing
- Digital video – useful for recording a process that might be hard to see in detail or that happen quickly

IMPACT – HOW WE KNOW PUPILS ARE LEARNING

Marking

We follow the general *School Marking Policy* for science

- Marking includes both content/knowledge and scientific enquiry skills
- Attention is paid to possible misconceptions and opportunities for self/adult correction identified and included in comments written in the pupil's book

Assessment

We assess pupil learning and attainment in a variety of ways

Scientific Knowledge quizzes

Cognitive Science tells us that knowledge retention can be supported by asking pupils to recall their learning sometime after the topic has been taught. To this end we use knowledge quizzes at the end of Science units, and also after some time has passed. These quizzes are delivered using Google classroom.

In KS1 the quizzes are delivered as a whole class or in small groups with an adult.

In KS2 the quizzes are delivered individually to pupils.

The quiz results can be viewed immediately, and common misconceptions or misunderstandings corrected,

Pupil Voice Interviews

The Science Lead meet with pupils from each year group twice during the school year and asked questions about their learning. Pupils are encouraged to recall information, and also to use their Science books as a reference source to trigger recall.

Class teachers are present at these meetings which provide them with a valuable insight into pupil's understanding of the science topics covered and their ability to describe, explain and reflect on their science learning. It also allows teachers to assess their use of scientific vocabulary.

Pupil Self-Assessment

There will be opportunities for pupils to reflect on their learning in discussion with the teacher and their peers, and in written self-assessment statements in their Science books.

Formative Assessment and Marking

Science is assessed at the point of learning using the school's assessment and marking procedures. See the *Assessment Policy* for more information