



Science Policy Villiers Primary School

**S.Phillips
September 2019**

At Villiers Primary School, our inclusive Science curriculum encourages all our children to have an inquisitive nature throughout their time at Villiers and beyond. Our intention is for all children to develop a passion for Science and we encourage all children to fulfil their potentials. We aim to prepare our pupils for life in an increasingly scientific and technological world. We intend learning in science to be through systematic investigations of the physical, chemical and biological aspects of their lives that rely mainly on first hand experiences, leading to them being equipped to answer scientific questions about the world around them. It is our intention that, through investigative science, pupils at Villiers Primary School will continue to deepen their respect for the natural world and increase their care and appreciation of it.

We aim to:

- Develop pupils' enjoyment and interest in science.
- Develop an appreciation of its contribution to all aspects of everyday life.
- Use a planned range of investigations and practical activities to give pupils a greater understanding of the concepts and knowledge of science.
- Encourage children to be curious about science and our natural world.
- Develop pupils' basic practical skills and their ability to make accurate and appropriate measurements.
- Introduce pupils to a wide range of scientific vocabulary and encourage them to use this in daily life.
- Extend the learning environment for our pupils via environmental areas and the locality.
- Develop pupils' use of computing skills in their science studies.
- Promote a 'healthy lifestyle' in our pupils.

Children leave Villiers equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. Our children have the necessary understanding of different types of science enquiries that help them to answer scientific questions about the world around them. Our naturally curious children leave Villiers with confidence in working scientifically and are eager and ready to develop this in key stage 3 and 4.

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 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.
- To be able to learn independently and collaboratively.

Science MTPs		
Year 1	Plants Animals, including humans Everyday materials Seasonal changes	6 weeks 6 weeks 12 weeks 12 weeks
Year 2	Living things and their habitats Plants Animals, including humans Uses of everyday materials	12 weeks 6 weeks 6 weeks 12 weeks
Year 3	Plants Animals, including humans Rocks Light Forces and magnets	6 weeks 6 weeks 12 weeks 6 weeks 6 weeks
Year 4	Living things and their habitats Animals, including humans States of matter Sound Electricity	6 weeks 6 weeks 12 weeks 6 weeks 6 weeks
Year 5	Living things and their habitats Animals, including humans Properties and changes of materials Earth and space Forces	6 weeks 6 weeks 12 weeks 6 weeks 6 weeks
Year 6	Living things and their habitats Animals, including humans Evolution and inheritance Light Electricity	6 weeks 6 weeks 6 weeks 6 weeks 6 weeks

Foundation Stage Curriculum

Activities are planned in Nursery and reception classes for pupils to be able to:

30-50 months

Comment and asks questions about aspects of their familiar world, such as the place where they live of 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 their environment.

40-60 Months

To be able to look closely at similarities, differences and patterns of change.

ELGs

Know about similarities, differences in relation to places, objects, materials and living things.

Talk about the features of their own immediate environment and how environment might vary from one another.

Make observations of animals and plants and explain why some things occur and talk about changes.

Exceeding pupils

Children know that the environment and living things are influenced by human activity. They can describe some actions which people in their own community do that help to maintain the area they live in. They know the properties of some materials and can suggest some of the purposes they are used for. They are familiar with basic scientific concepts, such as floating, sinking, experimentation.

Year 1 Curriculum

Working Scientifically

To ask simple questions and recognise that they can be answered in different ways.

To observe closely, using equipment.

To perform simple tests.

To identify and classify.

To gather and record data to help in answering questions.

Plants

To identify and name a variety of common wild and garden plants, including deciduous.

To identify and describe the basic structure of a variety of common flowering plants, including trees.

Seasonal Changes

To observe changes across the four seasons.

To observe and describe the weather associated with the seasons and how day length varies

Animals, including humans

To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.

To identify and name a variety of common animals that are carnivores, herbivores and omnivores.

To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds, mammals, including pets)

To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Everyday Materials

To distinguish between an object and the material from which it is made.

To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.

To describe the simple physical properties of a variety of everyday materials.

To compare and group together a variety of everyday materials based on their simple physical properties.

Year 2 Curriculum

Working Scientifically

To ask simple questions and recognise that they can be answered in different ways.

To observe closely, using simple equipment.

To perform simple tests.

To identify and classify.

To use observations and ideas to suggest answers to questions.

To gather and record data to help in answering questions.

Living things and their habitats

To explore and compare the differences between things that are living, dead and things that have never been alive.

To identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plant, and how they depend on each other.

To identify and name a variety of plants and animals in their habitats, including micro-habitats.

To describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and name different sources of food.

Plants

To observe and describe how seeds and bulbs grow into mature plants.

To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Animals, including humans

To notice that animals, including humans, have offspring which grown into adults.

To find out about and describe the basic needs of animals, including humans for survival (water, food and air)

To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Uses of everyday materials

To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.

To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Year 3

Working Scientifically

To ask relevant questions and using different types of scientific enquiries to answer them.

To set up simple practical enquiries, comparative and fair tests.

To make systematic and careful observations and, where appropriate taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

To gather, record, classify and present data in a variety of ways to help in answering questions.

To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

To report on findings from enquiries, including oral and written explanations, displays or presentations and raise further questions.

To identify differences, similarities or changes related to simple scientific ideas and processes.

To use straightforward scientific evidence to answer questions or to support their findings.

Animals, including humans

To identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food, they get nutrition from what they eat.

To identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Rocks

To compare and group together kinds of rocks on the basis of their appearance and simple physical properties.

To describe in simple terms how fossils are formed when things that have lived are trapped within rock.

Light

To notice that light is reflected from surfaces.

To recognise that light from the sun can be dangerous and that there are ways to protect our eyes.

To recognise that shadows are formed when the light from a light source is blocked by a solid object.

To find patterns in the way that the size of shadows change.

Forces and magnets

To compare how things move on different surfaces.

To notice that some forces need contact between two objects, but magnetic forces can act at a distance.

To observe how magnets attract or repel each other and attract some materials and not others.

To compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.

To describe magnets as having two poles.

To predict whether two magnets will attract or repel each other, depending on which poles are facing.

Year 4 curriculum

Working Scientifically

To ask relevant questions and using different types of scientific enquiries to answer them.

To set up simple practical enquiries, comparative and fair tests.

To make systematic and careful observations and, where appropriate taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

To gather, record, classify and present data in a variety of ways to help in answering questions.

To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

To report on findings from enquires, including oral and written explanations, displays or presentations and raise further questions.

To identify differences, similarities or changes related to simple scientific ideas and processes.

To use straightforward scientific evidence to answer questions or to support their findings

Living things and their habitats

To recognise that living things can be grouped in a variety of ways.

To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.

To recognise that environments can change and that this can sometimes pose dangers to living things.

Animals, including humans

To describe the similar functions of the basic parts of the digestive system in humans.

To identify the different types of teeth in humans and their simple functions.

To construct and interpret a variety of food chains, identifying producers, predators and prey.

States of matter

To compare and group materials together, according to whether they are a solid, liquids or gas.

To observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees or Celsius.

To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Year 5

Working scientifically

To plan different types of scientific enquires to answer questions, including recognising and controlling variables where necessary.

To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate.

To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

To use test results to make predictions to set up further comparative and fair tests.

To report and present findings from enquires, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

To identify scientific evidence that has been used to support or refuse ideas or arguments.

Forces

To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.

To identify the effect of air resistance, water resistance and friction that act between moving surfaces.

To recognise that some mechanisms, including leavers, pulleys and gears, allow a smaller force to have a greater effect.

Living things and their habitats

To describe the differences in life cycles of a mammal, an amphibian, an insect and a bird.

To describe the life process of reproduction in some plants and animals.

Properties and changes of materials

To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity and response to magnets.

To know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

To use knowledge of solids, liquids and gases, to describe how mixtures might be separated, including through filtering, sieving and evaporating.

To give reasons based on evidence

Earth and Space

To describe the movement of the Earth, and other planets, relative to the sun in the solar system.

To describe the movement of the moon relative to the Earth.

To describe the Sun, Earth and Moon as approximately spherical bodies.

To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Animals including humans

To describe the changes as humans develop to old age.

Year 6

Working scientifically

To plan different types of scientific enquires to answer questions, including recognising and controlling variables where necessary.

To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate.

To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

To use test results to make predictions to set up further comparative and fair tests.

To report and present findings from enquires, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

To identify scientific evidence that has been used to support or refuse ideas or arguments.

Living things and their habitats.

To describe how living things are classified into broad groups according to common observations characteristics and based on similarities and differences, including micro-organisms plants and animals.

To give reasons for classifying plants and animals based on specific characteristics.

Animals, including humans

To identify and name the main parts of the human circulatory system, and describe the function of the heart, blood vessels and blood.

To describe the ways in which nutrients and water are transported within animals including humans.

Electricity

To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.

To compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.

To use recognised symbols when representing a simple circuit in a diagram.

Evolution and inheritance

To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago

To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.

To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Light

To recognise that light appears to travel in straight lines.

To use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.

To explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.

To use the idea that light travels in straight lines to explain why shadows have the same shapes as the objects that cast them.

CURRICULUM AND SUBJECT CONTENT

The programmes of study for science are set out year-by-year for Key Stages 1 and 2 in the national curriculum. Class teachers are responsible for ensuring that all of the relevant statutory content is covered within the school year. The national curriculum gives a full breakdown of the statutory content to be taught within each unit. Non-statutory guidance is also provided which staff members are encouraged to use.

WORKING SCIENTIFICALLY WITHIN THE CURRICULUM

Class teachers must ensure that there are frequent opportunities for pupils to 'work scientifically' within the curriculum. 'Working scientifically' specifies the understanding of the nature, processes and methods of science. Pupils are required to work scientifically within all areas of the science curriculum. The following skills are statutory:

Years 1 and 2

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

- asking simple 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.

Years 3 and 4

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme 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 and data loggers
- 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 straight forward scientific evidence to answer questions or to support their findings.

Years 5 and 6

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme 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 when 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 presenting findings from enquiries, including conclusions, causal relationships and explanations of and 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.

STAFF TRAINING

The Science subject leader is responsible for ensuring that all staff are adequately trained so that they are able to deliver the curriculum effectively. This will include: organising CPD; leading staff meetings; sharing resources for planning and teaching; supporting colleagues. Regular communication with staff will be sustained and all staff can speak to the subject leader if they require any further support.

TEACHING STYLE

Science teaching should include visual, auditory and kinaesthetic elements to ensure access for children with different learning styles. All lessons have clear learning objectives, to be shared and reviewed with the pupils. Lessons will make effective links with other curriculum areas and subjects, especially English, Mathematics and Computing. 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. 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. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. Teachers should plan to allow for a wide range of scientific enquiry, including: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum - cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. Teachers should plan opportunities for outdoor learning wherever possible with each year group embarking on an external educational visit once per year which is Science based.

Recording of Learning

The children's learning will be recorded in Science books. The purpose of these books is to: record work from classroom-based tasks; write short self-reflections about their learning; record and annotate photographs of learning or specific achievements. Learning should be recorded in these on a regular basis.

Assessment

All children will take a topic test at the end of each topic taught. Staff will use this to inform their future planning and to

In each assessment point, pupils may demonstrate five levels of understanding of the content: Working below the Standard, Working Towards Standard 1, Working Towards Standard 2, Expected and

Greater Depth. Children deemed to be working below **WTS** will be assessed on the year group curriculum they are currently working on.

Working Below the Standard - *learning will be monitored by the SENCO and planning and teaching modified for the child accordingly, as they may be accessing a curriculum relating to another year group.*

WTS 1 - *understanding of basic facts and ideas relating to a concept - can tackle questions, sometimes with support. Low level cognitive demand. Involves following instructions.*

WTS 2 - *a good understanding of basic facts and ideas related to a concept. They are tackling questions independently. Good level of cognitive demand.*

EXS - *more independent application, can explain, use or summarise understanding. Higher level of cognitive demand. Involves mental processing beyond recall. Requires some degree of decision making.*

GDS - *have a full understanding and can apply independently in different contexts/ problems solve/ etc. Cognitive demands are complex and abstract. Involves problems with multi-steps or more than one possible answer. Requires justification of answers.*

These grades are based on the expectations for children in that year group. Throughout the year teachers are expected to plan for on-going creative assessment opportunities in order to judge whether the children have achieved the Key Learning and Working Scientifically expectations for their year group.

In Science we will also assess by:

- Talking to the pupils and asking questions.
- Discussing the work with the pupil.
- Looking at the work and marking against the learning objective.
- Observing the pupils carrying out practical tasks.
- Pupils self-evaluation of their work.

MARKING WORK

Please refer to the whole School Feedback and Marking Policy.

REPORTING TO PARENTS

This will be done at Parents Evenings in the autumn and spring terms and Science will be reported on specifically on the annual end of year academic report for each pupil.

