



ST. MARY'S CE PRIMARY SCHOOL, PUTNEY

Vision: Delivering excellence, allowing all to flourish

Mission: Creating a culture of wonder, guided by faith

Values: Endurance, Compassion, Thankfulness

SCIENCE CURRICULUM OVERVIEW

SUBJECT LEADER: Mark Lett

OUR SCIENCE CURRICULUM

Vision: Delivering excellence, allowing all to flourish

Mission: Creating a culture of wonder, guided by faith

Values: Endurance, Compassion, Thankfulness

Through Science at St Mary's, we aim to kindle the children's curiosity in the world around us, encourage inquisitiveness and promote critical and creative thinking. Our ambition is for children to develop their scientific knowledge, skills and conceptual understanding through a broad and engaging curriculum. As children progress through the years, they will develop their understanding of the nature, processes and methods of science through different types of science enquiries and use this knowledge to help them to answer scientific questions about the world around them. In an increasingly scientific and technological world, our goal is to equip children with the scientific knowledge and skills required to understand the uses and implications of science now and in the future.

We hope children are able to develop high levels of knowledge and skills in a variety of ways - this includes both learning theoretical knowledge and practical investigations. Knowledge and skills learned one year are built upon in the following years allowing children to deepen their knowledge and understanding of how the world works and what that means in practice.



"I like finding out about how and why things work. I've got lots of questions about how and why things work and I enjoy finding them out in Science experiments and activities." James Y5

"We learnt how to test if things are waterproof. We had to predict and then check it...we had to test it to see if we were correct. Then we had to write it down so we could remember it." George Y1

"I liked learning about static electricity. We put the balloon on our hair and it went up. Static electricity is friction." Euan Y3



"We went to Battersea Power Station. I like going on trips and I like Science. I learnt how electricity gets from the power station to the houses." Rupert Y3

"When we go on trips we learn so much...like when we went to the Science Museum and Cadbury's wold. When you come back you know way more!" Grace Y5



Year 1-2

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y1 - Y2)

National Curriculum - Key Stage 1

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.

WORKING SCIENTIFICALLY

WALT: ask questions and know they can be answered in different ways.

WALT: look closely, using equipment.

WALT: watch closely using equipment.

WALT: carry out tests.

WALT: name and group (see each area).

WALT: use my observations and ideas to suggest answers to questions.

WALT: use my observations and ideas to suggest answers to questions.

WALT: collect and record data to help answer questions.

Year 1

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y1)

National Curriculum - Year 1

PLANTS

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- identify and describe the basic structure of a variety of common flowering plants, including trees

ANIMALS INCLUDING HUMANS

- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- identify and name a variety of common animals that are carnivores, herbivores and omnivores
- describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)
- 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

- distinguish between an object and the material from which it is made
- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- describe the simple physical properties of a variety of everyday materials
- compare and group together a variety of everyday materials on the basis of their simple physical properties

SEASONAL CHANGES

- observe changes across the 4 seasons
- observe and describe weather associated with the seasons and how day length varies

Year 1

PLANTS

- WALT: name a range of common plants
- WALT: name a range of common tree
- WALT: recognise deciduous and evergreen trees and explain their similarities and differences
- WALT: name and describe the different parts of a flowering plant
- WALT: name and describe the different parts of a tree

EXTENTION

- WALT: explain the functions of the different parts of a tree and flowering plant
- WALT: name plants and trees from different habitats

ANIMALS INCLUDING HUMANS

- WALT: recognise and name a variety of animals
- WALT: recognise and name a variety of common animals that are carnivores, herbivores and omnivores
- WALT: describe and compare the structure of a variety of common animals
- WALT: name the basic parts of the human body
- WALT: name, draw and label the parts of the human body
- WALT: name the senses
- WALT: say which part of the body is to do with each sense

EVERYDAY MATERIALS

- WALT: say the difference between an object and the material from which it is made
- WALT: name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- WALT: understand that material have different properties
- WALT: describe some everyday materials
- WALT: group materials based on what they are like

SEASONAL CHANGES

- WALT: name and order the four seasons.
- WALT: recognise the difference between the four seasons
- WALT: observe and describe weather during each seasons
- WALT: observe and describe how day length changes with the seasons.

Year 2

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y2)

National Curriculum - Year 2

PLANTS

- observe and describe how seeds and bulbs grow into mature plants
- find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

ANIMALS INCLUDING HUMANS

- notice that animals, including humans, have offspring which grow into adults
- find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
- describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

EVERYDAY MATERIALS

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

LIVING THINGS AND THEIR HABITATS

- explore and compare the differences between things that are living, dead, and things that have never been alive
- 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 plants, and how they depend on each other
- identify and name a variety of plants and animals in their habitats, including microhabitats
- describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.

PLANTS	ANIMALS INCLUDING HUMANS	USES OF EVERYDAY MATERIALS
<ul style="list-style-type: none"> WALT: explain how seeds and bulbs grow into plants. WALT: describe how plants need water, light and a suitable temperature to grow and stay healthy. 	<ul style="list-style-type: none"> WALT: explain that animals, including humans, have babies which grow into adults WALT: explain the needs of animals, including humans, for survival WALT: explain the importance of exercise WALT: explain the importance of eating healthily WALT: explain the importance of keeping clean 	<ul style="list-style-type: none"> WALT: say why we (I) would choose a material for a particular job WALT: explain how objects made from some materials can be changed
LIVING THINGS AND THEIR HABITATS		
<ul style="list-style-type: none"> WALT: explain the difference between things that are living, dead, and things that have never been alive WALT: explain that most living things live in habitats which suit them and depend on each other WALT: name some plants and animals in their habitats, including micro-habitats WALT: I can explain how animals get their food from plants and other animals using a simple food chain 		

Year 3-4

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y3 - Y4)

National Curriculum - Lower Key Stage 2

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

WORKING SCIENTIFICALLY

- WALT: ask questions and use different types of scientific enquiries to answer them.
- WALT: set up simple practical enquiries, comparative and fair tests.
- WALT: make observations
- WALT: take measurements using standard units (Using a range of equipment, including thermometers and data loggers.)
- WALT: gather, record, classify and present data in a variety of ways to help with answering questions.
- WALT: record findings using simple scientific language.

Year 3

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y3)

National Curriculum - Year 3

PLANTS

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

ANIMALS INCLUDING HUMANS

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

FORCES AND MAGNETS

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- 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
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

LIGHT

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change.

ROCKS

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.

PLANTS	ANIMALS INCLUDING HUMANS	FORCES AND MAGNETS
<ul style="list-style-type: none">▪ WALT: explain what different parts of flowering plants do.▪ WALT: explore the requirements of plants for life and growth and how they vary from plant to plant.▪ WALT: investigate the way in which water is transported within plants.▪ WALT: explore the part that flowers play in the life cycle of flowering plants (Including pollination, seed formation and seed dispersal.)	<ul style="list-style-type: none">• WALT: explain why humans have skeletons and muscles.• WALT: explain why some other animals have skeletons and muscles.• WALT: identify that animals, including humans, need the right types and amount of nutrition.• WALT: understand that animals, including humans cannot make their own food; they get nutrition from what they eat.	<ul style="list-style-type: none">▪ WALT: compare how things move on different surfaces.▪ WALT: see that some forces need contact between two objects but magnetic forces can act at a distance.▪ WALT: compare and group some materials on the basis of whether or not they are attracted to a magnet, and identify some magnetic materials.▪ WALT: I can observe how magnets attract or repel each other and attract some materials and not others.▪ WALT: describe magnets as having two poles.▪ WALT: predict whether two magnets will attract or repel each other, depending on which poles are facing.

LIGHT

- WALT: I can show that light is reflected from surfaces.
- WALT: I can explain that I need light in order to see things and that dark is the absence of light.
- WALT: explain that light from the sun can be dangerous and that there are ways to protect eyes.
- WALT: I can show how shadows are formed when the light from a light source is blocked by a solid object.
- WALT: show that there are patterns in the way that the size of shadows change.

ROCKS

- WALT: explain that soils are made from rocks and organic matter.
- WALT: describe simply how fossils are formed when things that have lived are trapped within rock.
- WALT: examine and do practical experiments on various types of rocks in order to group them on the basis of their appearance and simple physical properties.
- WALT: understand the role of archaeologists in helping us understand the past
- WALT: answer questions using a variety of sources
- WALT: use various sources to find clues about a period in history
- WALT: research a specific event from the past using a variety of sources
- WALT: use research skills to write about historical time periods
- WALT: use research skills to compare different periods of history

Year 4

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y4)

National Curriculum - Year 4

LIVING THINGS AND THEIR HABITATS

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things.

ANIMALS INCLUDING HUMANS

- describe the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions
- construct and interpret a variety of food chains, identifying producers, predators and prey.

STATES OF MATTER

- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

SOUND

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it

- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases.

ELECTRICITY

- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors.

LIVING THINGS AND THEIR HABITATS	ANIMALS INCLUDING HUMANS	STATES OF MATTER
<ul style="list-style-type: none"> • WALT: show that living things can be grouped together in various ways. • WALT: explore and use classification keys to help group, identify and name a variety of living things. • WALT: explain that environments can change and that this sometimes means that living things are put in danger. 	<p>WALT: explain some parts of the digestive system in humans.</p> <p>WALT: explain the different types of teeth in humans and what they do.</p> <p>WALT: describe and explain a variety of food chains, naming producers, predators and prey</p>	<ul style="list-style-type: none"> • WALT: group materials together, according to whether they are solids, liquids or gases, including tricky ones like gels, foams, mists and pastes. • WALT: demonstrate and explain that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). • WALT: correctly talk about the part played by evaporation and condensation in the

water cycle, and can show a link between the rate of evaporation and temperature. (Y5)

SOUND

- WALT: explain how sounds are made and show that some of them are linked to vibrations. (Y5)
- WALT: explain that vibrations from sounds travel through a medium to the ear. (Y5)
- WALT: find patterns between the pitch of a sound and features of the object that produced it. (Y5)
- WALT: show that there is a pattern between the volume of a sound and the strength of the vibrations that produced it. (Y5)
- WALT: show that sounds get fainter as the distance from the sound source increases.

ELECTRICITY

- WALT: talk about common appliances that run on electricity.
- WALT: construct and draw with labels a simple series electrical circuit which includes cells, wires, bulbs, switches and buzzers.
- WALT: predict if a lamp will light or not in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.
- WALT: explain that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
- WALT: show that some materials are conductors, and some are insulators, and can explain that metals are good conductors.

Year 5-6

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y5-Y6)

National Curriculum - Upper Key Stage 2

WORKING SCIENTIFICALLY

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.

WORKING SCIENTIFICALLY

- WALT: plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- WALT: take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- WALT: record data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- WALT: use test results to make predictions to set up further comparative and fair tests.
- WALT: talk about and present findings from enquiries, including conclusions, causal relationships and explanations of how reliable the information is.

- WALT: identify scientific evidence that has been used to support or refute ideas or arguments.

Year 5

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y5)

National Curriculum - Year 5

LIVING THINGS AND THEIR HABITATS

- describe the differences in the life cycles 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 and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

EARTH AND SPACE

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system

- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as approximately spherical bodies
- 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 that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

LIVING THINGS AND THEIR HABITATS	ANIMALS INCLUDING HUMANS	PROPERTIES AND CHANGES OF MATERIALS
<ul style="list-style-type: none"> • WALT: describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • WALT: describe how some animals reproduce. • WALT: describe how some plants reproduce. 	<ul style="list-style-type: none"> • WALT: describe the changes as humans develop, up to old age. 	<ul style="list-style-type: none"> • WALT: compare and group together everyday materials on the basis of their properties • WALT: investigate the properties of materials • WALT: give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials • WALT: explain that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • WALT: use knowledge of solids, liquids and gases to decide how mixtures might be separated • WALT: demonstrate that dissolving, mixing and changes of state are reversible changes.

		<ul style="list-style-type: none"> WALT: explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible
EARTH AND SPACE		FORCES
<ul style="list-style-type: none"> WALT: describe the movement of the Earth, and other planets, relative to the Sun in the solar system. WALT: describe the movement of the Moon relative to the Earth. WALT: describe the Sun, Earth and Moon as approximately spherical bodies. WALT: explain day and night, and the apparent movement of the sun across the sky, using the idea of the Earth's rotation. 		<ul style="list-style-type: none"> WALT: explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. WALT: I can demonstrate the effects of air resistance, water resistance and friction, that act between moving surfaces. WALT: I can show that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Year 6

DEVELOPMENT OF KNOWLEDGE, SKILLS AND UNDERSTANDING IN SCIENCE (Y6)

National Curriculum - Year 6

LIVING THINGS AND THEIR HABITATS

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics.

ANIMALS INCLUDING HUMANS

- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.

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
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

LIGHT

- recognise that light appears to travel in straight lines
- 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

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

ELECTRICITY

- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- 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
- use recognised symbols when representing a simple circuit in a diagram.

LIVING THINGS AND THEIR HABITATS	ANIMALS INCLUDING HUMANS	EVOLUTION AND INHERITANCE
<ul style="list-style-type: none"> • WALT: give reasons for classifying plants and animals based on specific characteristics. • WALT: describe how plants, animals and micro-organisms are classified into broad groups according to common observable characteristics and based on similarities and differences. 	<ul style="list-style-type: none"> • WALT: identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • WALT: recognise the impact of diet, exercise, drugs and lifestyle on the way the body functions. • WALT: describe the ways in which nutrients and water are transported within animals, including humans. 	<ul style="list-style-type: none"> • WALT: explain that the kinds of living things that live on the earth now are different from those that inhabited the Earth millions of years ago and that fossils provide this information. • WALT: explain that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. <p>WALT: give examples of how animals and plants are adapted to suit their environment in different ways and can explain that adaptation may lead to evolution.</p>
LIGHT		ELECTRICITY
<ul style="list-style-type: none"> • WALT: show that light appears to travel in straight lines. (Y5) 		<ul style="list-style-type: none"> • WALT: show that the brightness of a lamp or the volume of a buzzer depends on the number and voltage of cells used in the circuit.

- WALT: explain that light travels in straight lines and that objects are seen because they give out or reflect light into the eye. (Y5)
- WALT: demonstrate and 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. (Y5)
- WALT: demonstrate that light travels in straight lines to show why shadows have the same shape as the objects that cast them. (Y5)

- WALT: 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.
- WALT: I can draw a diagram using recognised symbols to represent a simple circuit.
- WALT: identify which materials conduct electricity and which make good insulators