Ottery St Mary Primary School

Science Curriculum Overview

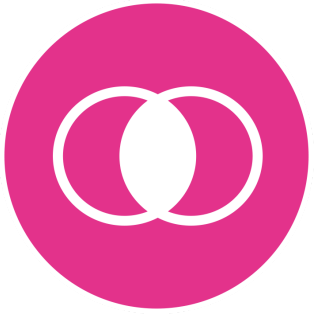
Pupils at Ottery St Mary Primary School will:

- Be curious about the world around them and ask questions about the way things work,
- Understand the key principles of scientific enquiry and apply these skills in their approach to investigations,
- Ask scientific questions about the things they observe and think of ways to find the answer,
- Understand how to use a range of equipment to set up and measure scientific enquiry,
- Take an interest in key scientists from throughout history and their findings,
- Take an interest in future STEM careers,
- Reflect on their learning within Science.

Science Curriculum

Intent	To inspire our pupils to be curious about the world around them. Using the key principles of scientific enquiry our pupils will have a desire to find out the answers to their scientific questions. Through their experiences in science, our pupils will be interested in future STEM careers and the possibility to change the world around them through STEM.
Implementation	Science is taught weekly and covers the objectives of the national curriculum. Science is further supplemented through the annual celebration of science week across the school. Science lessons include opportunities for pupil-led investigations and practical work.

Types of scientific enquiry

Comparative / fair testing	Research / secondary sources	Observation over time	Pattern seeking	Identifying / grouping / classifying	Problem solving
					
Changing one variable to see its effect on another whilst keeping all others the same.	Using secondary sources to answer scientific questions.	Observing changes that happen over a period of time that could range from minutes to months.	Identifying patterns and looking for relationships in enquiries where variables are difficult to control.	Making observations to name, sort and identify items.	Applying prior scientific knowledge to find answers to problems.

Year 1				
Unit	**Seasonal changes**	**Everyday Materials**	**Plants**	**Animals including humans**
Term taught	**Autumn 1 and 2, Spring 1 and 2, Summer 1 and 2**	**Autumn 2**	**Spring 2**	**Summer 1**
Key knowledge (From the National Curriculum 2014)	Observe changes across the 4 seasons Observe and describe weather associated with the seasons and how day length varies	Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Distinguish between an object and the material from which it is made 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.	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	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
Working scientifically skills	Identifying and classifying Observing closely, using simple equipment Gathering and recording data to help in answering questions. Using their observations and ideas to suggest answers to questions	Identifying and classifying Observing closely, using simple equipment Gathering and recording data to help in answering questions. Using their observations and ideas to suggest answers to questions Performing simple tests	Identifying and classifying Observing closely, using simple equipment Gathering and recording data to help in answering questions. Using their observations and ideas to suggest answers to questions	Identifying and classifying Observing closely, using simple equipment Gathering and recording data to help in answering questions. Using their observations and ideas to suggest answers to questions
Types of scientific enquiry	Identifying and classifying Pattern seeking Observation over time Research Problem Solving	Identifying and classifying Pattern seeking Problem Solving	Identifying and classifying Pattern seeking Research Observation over time	Identifying and classifying Pattern Seeking Problem Solving Research
Enrichment opportunities	Visit from a meteorologist (Met Office)	3 Little Pigs	Tree hunt around the local area	Visit from an animal handler

Year 2				
Unit	**Materials**	**Animals Inc Humans**	**Plants**	**Living things and their habitats**
Term taught	**Autumn**	**Spring**	**Summer 1**	**Summer 2**
Key knowledge (From the National Curriculum 2014)	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	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	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	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
Working scientifically skills	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	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	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	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
Types of scientific enquiry	Observation over time Identifying and classifying Research Fair testing	Pattern seeking Observation over time Identifying and classifying Research	Pattern seeking Observation over time Identifying and classifying Research Fair testing	Pattern seeking Observation over time Identifying and classifying Research Fair testing
Enrichment opportunities	Materials hunt	Egg Hatch Project.	Link to Otter Nurseries	Visit to the forest school Hedgerow hunt

Year 3					
Unit	**Forces**	**Rocks**	**Light**	**Plants**	**Animals inc humans**
Term taught	**Autumn**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Key knowledge (From the National Curriculum 2014)	Compare how things move on different surfaces Notice that some forces need contact between 2 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 2 poles predict whether 2 magnets will attract or repel each other, depending on which poles are facing	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	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	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	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
Working scientifically skills	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 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.				
Types of scientific enquiry	Pattern seeking Identifying and classifying Problem Solving Fair testing	Identifying and classifying Observation over time Research	Problem solving Observation over time Identifying and classifying Fair testing	Observation over time Identifying and classifying Research Pattern seeking Problem solving	Pattern seeking Identifying and classifying Research Problem solving
Enrichment opportunities	Identifying forces in action	Jurrassic coast link	Ribbon lights, UV beads	Plant hunt	Making a skeleton

Year 4						
Unit	**Sound**	**Electricity**	**States of matter**	**Animals Including Humans: Digestion**	**Living things and their habitats**	**Living things and their habitats**
Term taught	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Key knowledge (From the National Curriculum 2014)	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	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	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	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	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 Construct and interpret a variety of food chains, identifying producers, predators and prey	Recognise that environments can change and that this can sometimes pose dangers to living things Recognise that living things can be grouped in a variety of ways
Working scientifically skills	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.					
Types of scientific enquiry	Pattern seeking Observation over time Research Fair testing	Pattern seeking Research Fair testing	Pattern seeking Observation over time Identifying and classifying Research Fair testing	Pattern seeking Observation over time Identifying and classifying Research Fair testing	Pattern seeking Observation over time Identifying and classifying Research Fair testing	Pattern seeking Observation over time Identifying and classifying Research Fair testing
Enrichment opportunities	Visit from a sound technician	DT project - Anderson shelter	Making ice cream	Visit from a dentist	Forest school experiences	Persuasive writing

Year 5					
Unit	**Properties of materials**	**Reversible and Irreversible change**	**Earth and space**	**Forces**	**Animals inc humans - lifecycles**
Term taught	**Autumn 1**	**Autumn 2**	**Spring**	**Summer 1**	**Summer 2**
Key knowledge (From the National Curriculum 2014)	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 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	Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution 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	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	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	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 Describe the changes as humans develop to old age
Working scientifically skills	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 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				
Types of scientific enquiry	Identifying and classifying Research Fair testing	Pattern seeking Observation over time Fair testing	Pattern seeking Observation over time Research	Pattern seeking Research Fair testing	Identifying and classifying Research Fair testing
Enrichment opportunities		Making cinder toffee	'Borrow the Moon' Loan	Boat float competition Lego pulleys	

Year 6						
Unit	Light	Cardiovascular health	Classification of living things	Electricity	Evolution / inheritance	**SRE (see PSHE)**
Term taught	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Key knowledge (From the National Curriculum 2014)	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	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	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	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	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	Know about the changes that occur during puberty Know about human reproduction in the context of the human lifecycle how a baby is made and grows To answer each other's questions about sex and relationships with confidence, where to find support and advice when they need it some myths and misconceptions about HIV, who it affects and how it is transmitted about how the risk of HIV can be reduced To know that contraception can be used to stop a baby from being conceived
Working scientifically skills	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 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					
Types of scientific enquiry	Pattern seeking Research Fair testing	Observation over time Research Fair testing	Pattern seeking Identifying and classifying Research	Pattern seeking Observation over time Fair testing	Pattern seeking Observation over time Identifying and classifying Research	NA
Enrichment opportunties		Links to PE	Microscope loan	Making an electric toy		

Science Overview	Autumn	Spring	Summer
Year 1	Seasonal changes (Autumn 1) Everyday Materials (Autumn 2)	Seasonal changes (Spring 1) Plants (Spring 2)	Animals Including Humans Seasonal Changes (Summer 2)
Year 2	Materials	Animals Including Humans - Offspring	Plants Living things and their habitats
Year 3	Forces	Rocks Light	Plants Animals including Humans
Year 4	Sound Electricity	Digestion States of Matter	Human Impact (Living things and their habitats) Food chains
Year 5	Properties of materials Reversible and Irreversible change	Earth and Space	Forces Lifecycles / Human changes (See PSHE Curriculum)
Year 6	Light Cardiovascular health	Classification of living things Electricity	Evolution / inheritance SRE (See PSHE Curriculum)

Knowledge Progression: Animals including humans
Animals Including Humans Y1
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
Animals Including Humans Y2
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
Animals Including Humans Y3
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
Animals Including Humans Y4
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
Animals Including Humans Y5
Describe the changes as humans develop to old age
Animals Including Humans Y6
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

Knowledge Progression: Electricity
Electricity Y4
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
Electricity Y6
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

Knowledge Progression: Everyday Materials
Everyday Materials Y1
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
Everyday Materials Y2
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
States of Matter Y4
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
Properties and Changes of Materials Y5
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

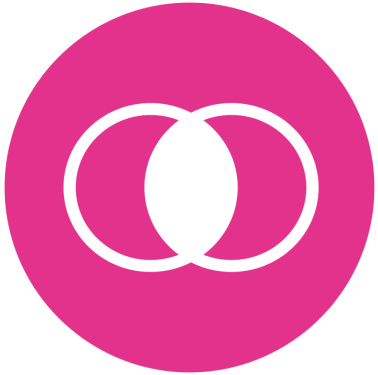
Knowledge Progression: Forces
Forces and Magnets Y3
Compare how things move on different surfaces
Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance
Observe how magnets attract or repel each other and attract some materials and not others
Compare and group 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 2 poles
Predict whether 2 magnets will attract or repel each other, depending on which poles are facing
Forces Y5
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

Knowledge Progression: Light
Light Y3
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
***Earth and Space Y5**
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
Light Y6
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

*Earth and space included due to link to light / shadow

	**Comparative / fair testing** Changing one variable to see its effect on another, whilst keeping all others the same.
	**Research** Using secondary sources of information to answer scientific questions.

	**Observation over time** Observing changes that occur over a period of time ranging from minutes to months.
	**Pattern-seeking** Identifying patterns and looking for relationships in enquiries where variables are difficult to control.

	**Identifying, grouping and classifying** Making observations to name, sort and organise items.
	**Problem-solving** Applying prior scientific knowledge to find answers to problems.