

Science Curriculum

BIG IDEAS



INVESTIGATION

I am a scientist because I ask questions about the world around me and investigate my ideas.

This is how I increase my knowledge and understanding.

OBSERVATION

I am a scientist because I try to explain changes in the world around me carefully.

EXPLANATION

I am a scientist because I try to explain how and why things happen.



Science Curriculum

BIG IDEA	KS1	KS2
Investigation	<ul style="list-style-type: none">◇ Performing simple tests and investigations◇ Begin to understand the need for, and the importance of, a fair test◇ Begin to use prediction skills when investigating◇ Ask questions and recognise that they can be answered in different ways	<ul style="list-style-type: none">◇ Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary◇ Set up practical enquiries, comparative and fair tests◇ Using test results to make predictions to set up further comparative and fair tests◇ Asking relevant questions and using different types of scientific enquiries to answer them
Observation	<ul style="list-style-type: none">◇ Observing closely, using simple equipment◇ Identify and classify and begin to use data to record observations◇ Use observation skills and ideas to suggest answers to questions	<ul style="list-style-type: none">◇ Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs◇ Make systematic and careful observations and, where appropriate, take 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◇ Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
Explanation	<ul style="list-style-type: none">◇ Gather and recording data to help answer questions◇ Begin to explain scientific evidence	<ul style="list-style-type: none">◇ Report and present 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◇ Identify and discuss/explain scientific evidence that has been used to support or refute ideas or arguments◇ Identify differences, similarities or changes related to scientific ideas and processes using scientific evidence to answer questions or to support their findings



Science Curriculum



ORDER OF TEACHING

All the units detailed below are underpinned by the three **BIG IDEAS** in science: Investigation; Observation; Explanation.

Teachers link in the relevant skills and vocabulary, shown on the following pages, to enable children to grow and develop into confident scientists over time.

In years 1, 2 and 3, new topics are launched using key texts.

Years 1, 2 and 3 follow the National Curriculum Programmes of Study to ensure coverage throughout these year groups.

Year 1

Plants
Animals, including humans
Everyday materials
Seasonal changes

Year 2

Living things and their habitats
Plants
Animals, including humans
Use of everyday materials

Year 3

Plants
Animals, including humans
Rocks
Light
Forces and Magnets

Year 1 suggested book links

Seasonal Changes	Materials	Plants	Animals inc. Humans
Year 1 Suggested Linked Texts (Reading Across the Curriculum)			
Tree: Seasons Come, Seasons Go (Patricia Hegarty and Britta Teckentrup). One Year with Kipper (Mick Inkpen) After the Storm (Nick Butterworth)	The Great Paper Caper (Oliver Jeffers) Who Sank the Boat (Pamela Allen) The Story of Cinderella (Walt Disney)	RSPB: My First Book of Garden Birds (Mike Unwin and Sarah Whittlely) Snail Trail (Julia Donaldson & Axel Scheffler)	A Little Guide to Wild Flowers (Charlotte Voake) The Things That I LOVE about TREES (Ruth Parsons)

Year 2 suggested book links

Living Things and their Habitats	Materials	Plants	Animals inc. Humans
Year 2 Suggested Linked Texts (Reading Across the Curriculum)			
Jack and the Beanstalk (Richard Walker). Ten Seeds (Ruth Brown) A Seed is Sleepy (Ruth Parsons)	The Tin Forest (Helen Ward) Traction Man (Mini Grey) Three Little Pigs (Lesley Sims)	Handa's Surprise (Eileen Brown) Once There Were Giants (Martin Waddell & Penny Dale) Tadpole's Promise (Jeanne Willis and Tony Ross)	The Gruffalo (Julia Donaldson) Meerkat Mail (Emily Gravett) No Place Like Home (Jonathon Emmett)

Year 3 suggested book links and famous scientists

Light	Forces & Magnets	Rocks	Plants	Animals inc. Humans
Year 3 Suggested Linked Texts (Reading Across the Curriculum)				
The Owl Who Was Afraid of the Dark (Jill Tomlinson). The Dark (Lemony Snicket) The Firework Maker's Daughter (Phillip Pullman)	The Iron Man (Ted Hughes) Mrs Armitage: Queen of the Road (Quentin Blake) Mr Archimedes' Bath (Pamela Allen)	The Pebble in my Pocket (Meredith Hopper) Stone Girl, Bone Girl (Laurence Anholt) The Street Beneath my Feet (Charlotte Guillain & Yuval Zommer)	The Story of Frog Belly Rat Bone (Timothy Basil Ering) The Hidden Forest (Jeanne Baker) George & Flora's Secret Garden (Jo Elworthy)	Funny Bones (Janet & Allan Ahlberg) I will never not ever eat a tomato (Lauren Child) Goldilocks and the Three Bears (Samantha Berger)
Famous Scientists				
James Clerk Maxwell (Visible and Invisible Waves of Light)	William Gilbert (Theories on Magnetism) Andre Marie Ampere (Founder of Electro Magnetism)	Mary Anning (Discovery of Fossils) Inge Lehmann (Earth's Mantle)	Jan Ingenhousz (Photosynthesis) Joseph Banks (Botanist)	Adelle Davis (20th Century Nutritionist) Marie Curie (Radiation / X-Rays)

Years 4, 5 and 6 use a 3 year rolling programme to ensure coverage of the science curriculum.

	Autumn Term	Spring Term	Summer Term
Year A	Electricity	Animals and Humans	Earth and Space
Suggested Link Texts:	Until I met Dudley—Roger McGough Oscar and the Bird: A book about Electricity—Geoff Waring Electrical Wizard: How Nikola Tesla lit up the world—Elizabeth Rusch	Human Body Odyssey—Werner Holzwarth Crocodiles don't brush their teeth—Colin Fancy Wolves—Emily Gravett	The Skies above my Eyes—George's Secret Key to the Universe The Way Back Home—Oliver Jeffers Meanwhile Back on Earth—Oliver Jeffers
Scientists:	William Gilbert Nikola Tesla Alessandra Volta	Ivan Pavlov Joseph Lister	Claudius Ptolemy and Nicolaus Copernicus
Year B	Light	Habitats and Living Things	States of Matter Properties and Changes of Material
Suggested Link Texts:			
Scientists:	Thomas Edison Joseph Swan Isaac Newton	David Attenborough Joseph Banks Jacques Cousteau Karl Linnaeus	Anders Celcius Daniel Fahrenheit
Year C	Sound	Evolution & Inheritance	Forces
Suggested Link Texts:	Moonbird—Joyce Dunbar	Our Family Tree: An Evolution Story—Lisa Westberg Peters The Story of Life: Evolution—Ruth Symons & Kate Scott	
Scientists:	Aristotle, Galileo Alexander Graham Bell	Charles Darwin Jane Goodhall	Isaac Newton Galileo Archimedes



Science Curriculum Skills and Vocabulary Progression

KEY STAGE 1 Working Scientifically						
Year 1	Asks a few simple questions about what they notice.	Observes things closely.	Performs a simple test.	Identifies things in the natural and humanly-constructed world.	Uses one or two basic observations and ideas to suggest an answer to a question.	Gathers and records some simple data.
Vocab	Plants	Animals including Humans		Materials	Seasonal Changes	
Fish, Amphibians Reptiles, Birds Mammals, Carnivores Herbivores, Omnivores, Flexible, hard, soft, absorbs, season, Autumn, Winter, Spring, Summer	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		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	Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies.	
Working Scientifically						
Year 2	Asks a range of simple questions about what they notice.	Observes things closely using simple equipment.	Performs a range of simple tests.	Identifies and classifies things in the natural and humanly-constructed world.	Uses a range of observations and ideas to suggest answers to questions.	Gathers and records data to help in answering questions.
Vocab	Plants	Animals including Humans		All living things and their habitats	Uses of everyday materials	
Habitat, Dead, Alive Food chain, Predator Prey, Source Light, Air, Water Warmth Offspring Hygiene States, Shapes Suitability	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	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		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 micro-habitats 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.	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.	



Science Curriculum

Skills and Vocabulary Progression

Working Scientifically						
Year 3	Asks questions about what they notice.	Observes things closely using simple equipment.	Sets up simple practical enquiries and tests.	Identifies differences, similarities or changes relating to things in the natural and humanly-constructed world.	Uses test results to draw simple conclusions and make simple predictions.	Gathers, records and classifies data to help in answering questions.
Vocab	Plants	Animals including Humans	Rocks	Light	Forces and Magnets	
<p><i>Roots, stem, trunk, leaves, flowers, air, light, water, nutrients, transported, life cycle, pollination, seed dispersal, nutrition, skeleton, muscles, protection, fossils, trapped, organic, absence, reflected, surfaces, opaque, transparent, translucent, magnetic, forces, push, pull, attraction, attract, repel, poles</i></p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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 a solid object Find patterns in the way that the size of shadows change.</p>	<p>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 describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing. 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</p>	



Science Curriculum

Skills and Vocabulary Progression

Working Scientifically

<p>Year 4</p>	<p>Ask relevant questions about what they notice.</p>	<p>Makes systematic and careful observations using a range of equipment.</p>	<p>Sets up simple practical enquiries, comparative and fair tests.</p>	<p>Identifies differences, similarities or changes related to simple scientific ideas and processes.</p>	<p>Uses test results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p>	<p>Gathers, records and classifies data in a variety of ways to help in answering questions.</p>
<p>Vocab</p>	<p>All living things and their habitats</p>	<p>Animals, including humans</p>	<p>States of matter</p>	<p>Sound</p>	<p>Electricity</p>	
<p>Classification, keys, digestion, stomach, acid, incisor, molar, premolar, canine, food chain, producer, prey, predator, solids, liquids, gases, state, evaporation, condensation, vibration, pitch, volume, strength, appliance, circuit, cells, wires, bulbs, switches, buzzers, conductor, insulator</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>Identify common appliances that run on electricity I can 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.</p>	



Science Curriculum

Skills and Vocabulary Progression

Working Scientifically						
Year 5	Ask relevant questions about what they notice.	Makes systematic and careful observations using a range of equipment.	Uses test results to ask further questions.	Identifies differences, similarities or changes related to simple scientific ideas and processes.	Uses test results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Gathers, records and classifies data in a variety of ways to help in answering questions.
Vocab	Living things and their habitats	Animals including humans	Properties and change of materials	Earth and Space	Forces	
<i>Life cycle, amphibian, reptile, reproduction, properties, transparency, conductivity, thermal, magnetic, dissolve, solution, mixture, separated, evaporation, reversible, irreversible, axis, spherical, clockwise, anticlockwise, rotation, gravity, resistance, air resistance, water resistance, friction, mechanism, lever, pulley, gear, force</i>	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals.</p>	<p>Describe the changes as humans develop to old age.</p>	<p>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</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>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.</p>	<p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <p>Describe the movement of the Moon relative to the Earth</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p>	



Science Curriculum

Skills and Vocabulary Progression

Working Scientifically

Year 6	Ask relevant questions about what they notice.	Makes systematic and careful observations using a range of equipment.	Uses test results to set up further enquiries, comparative and fair tests.	Identifies differences, similarities or changes related to simple scientific ideas and processes.	Uses test results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Gathers, records and classifies data in a variety of ways to help in answering questions.
Vocab	Living things and their habitats	Animals, including humans	Evolution and inheritance	Light	Electricity	
<p><i>Characteristics, micro-organisms, circulatory system, blood vessels, capillaries, aorta, veins, nutrients, fossils, adaptation, environment, evolution, reflect, reflection, reflecting, sources, shadows, circuit</i></p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	



Science Curriculum

END POINTS

Progression in science happens over a period of time. Aligned to the 7 Qi (non-cognitive) skills, the statements below are intended to represent what our aspiration of a Y6 scientist will be, having had the breadth and depth of scientific learning experiences on their primary journey.

ME	WILL	WHAT IF?	WHY?
<p>I enjoy all science activities</p> <p>I understand why it is important to follow safety guidelines at all times during science investigations</p> <p>During lessons I am able to form confident opinions and hypothesis, as well as sharing ideas and skills with my peers.</p>	<p>I understand that sometimes thinking of explanations and investigations can be challenging.</p> <p>I am driven and committed to finding and exploring possible explanations and reasons</p> <p>I am driven to finding out other facts and explanations about scientific topics I have learned.</p>	<p>I feel confident asking questions related to topics that I have learned.</p> <p>I can express myself based on the scientific topics I have studied.</p> <p>I can hypothesise based on prior knowledge and think creatively</p>	<p>I am inspired by all things science related and the emotional and mindful connection it has to our everyday lives.</p> <p>By laying strong scientific foundations I am able to consider how science features and supports my academic future.</p> <p>I am able to explain my scientific findings and observations in different ways</p>
WE	WIGGLE	WOBBLE	
<p>I work collaboratively and respectfully with my peers</p>	<p>I take part in practical investigations.</p> <p>I am curious and can explore my school grounds and my world around me</p>	<p>I understand that sometimes things will not go according to plan and can use my knowledge and scientific understanding to overcome difficulties and/or explain anomalies</p>	