



Science Intent

Our vision

Our inclusive school is a place of creative learning where all talents are developed, celebrated and enjoyed. We nurture all to be curious, passionate and resilient lifelong learners. As a community, we listen to, forgive and love one another so all can be confident in who they are.

Inspired by Jesus we walk beside each individual in our family by understanding and responding to their unique needs. We have hope in all our children that they grow to be open, compassionate people of the world who stand up for what is right.

Compassion Friendship Forgiveness Resilience Hope



Science Curriculum

At Charing we believe that Science is a body of knowledge built up through experimental testing of ideas. The principal objectives of the teaching of science at Charing are to stimulate pupil's curiosity in finding out why things happen and to develop interest and enjoyment in science. Our children learn to ask scientific questions that relate to the world they live in. They are encouraged to plan, implement, conclude and evaluate scientific investigations. The teaching of science at Charing enables pupils to communicate scientific ideas effectively through the use of relevant scientific language and develop children's ideas and ways of working, that enable them to make sense of the world in which they live.

The Science curriculum followed at Charing is made up of 28 units of study, each clearly indicating progression in key scientific knowledge and concepts. Each of the 28 units of study indicate the aspects of knowledge to be developed as the children progress through Key Stage 1 and 2. As a school we use Kent Primary Science Scheme of Work to support our Science planning.

Progression Narrative

Pupils begin their science learning journey in Reception where guided exploratory play is key to developing enquiring minds. Working scientifically skills are embedded throughout the curriculum to enable our pupils to understand the value of science in context.

Science knowledge at Charing is built on through our primary school as topics are revisited throughout a child's primary school life. Pupils learn about natural phenomena and the world around them. Some topics covered and revisited are: Animals including Humans, Living Things and their Habitats, Plants, Materials, Forces and Electricity. We follow the National Curriculum as a basis and the Kent Primary Science scheme of work.

Every year we will take part in a Science week which sparks children's enthusiasm for the subject even further through workshops, assemblies and a range of science enquiries in lessons.

The Pathway we use at Charing helps meet the requirements of the intent, implementation and impact framework.

Intent. They help assure curriculum breadth, coverage, content and a structure that enables clear progression in knowledge and skills. (Ofsted Handbook, 157: "It is clear what end points the curriculum is building towards, and what pupils will need to be able to know and do at those end points ... The school's curriculum is planned and sequenced so that new knowledge and skills build on what has been taught before, and towards those defined end points.")

Implementation. The teaching activities in the Kent Primary Science Scheme of Work will help assure lively, effective and appropriate learning based on the structured Pathways. At the start of each topic teachers take time to find out what our children already understand and want to find out. Through teacher modelling and planned questioning, we want our children to wonder about and be amazed and surprised by the world around them. Key scientific language is modelled throughout lessons enabling our children to be familiar with and use vocabulary accurately. Teachers are also encouraged to plan in trips and visitors to enhance our children's learning experience. We aspire to promote children's independence and for all children to take responsibility in their own learning.

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Impact. The Kent Primary Science Scheme of work assessment frameworks will help demonstrate that teaching has resulted in clear and appropriate outcomes.

The science topics that need to be covered at Charing in Key Stage 1 and 2 can be seen below.

However, at Charing and in September 2021, these topics will not be able to be followed exactly in this order. This is because we currently have 4 classes in Key Stage 1 and Key Stage 2, not 6, so the topics need to be mapped out carefully for classes with mix year groups in. It is planned for topics missed in 2021-2022 due to mixed classes will be covered in 2022-23. Also, due to Covid-19 topics missed due to school closure have been factored into future planning. The topics covered by each year group and their progression can be seen in the 'Class overview 2021-2022' table below.

Topics and progression of scientific knowledge

Topics	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Identify and describe basic structure	Conditions for growth Sequence of growth	Conditions for growth Functions of parts Life cycle			
Living things and habitats		Habitats and simple food chains		Grouping and classifying, human influence	Life cycles Reproduction	Classifying plants and animals
Animals including humans	Identify and name animals. Label parts of human body	Life cycle and basic needs food water, air	Nutrition. Skeletons for movement and protection	Digestion, food chains	Human life cycle and changes	Circulation and health
Evolution and inheritance						Variation, adaptation, evolution
Rocks			Properties of rock and fossils			
Materials and properties	Name and simple properties	Materials and their uses		Solids liquids gases, heating cooling condensing evaporating	Materials, solids liquids gases and separation, reversible, irreversible changes	
States of matter				Gas, solid, liquid. Heating and cooling, evaporation and condensation	Properties of materials including magnets and separation, Reversible irreversible changes	
Seasonal changes	4 seasons					
Light			Light sources. Changing the size and			Light travels in straight lines. Shadows,

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			forming best shadows. Reflection.			reflection and how we see
Electricity				Simple circuits, conductors and insulators		Symbolic representation of components. Changing circuits
Sound				Vibration, pitch and volume		
Earth and space					Earth, sun, moon, day, night and year	
Forces and magnets			Properties of magnets and magnetic force		Air/water resistance, gravity, force of gravity on the earth	

Class overview 2024-2025

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 1	Everyday Materials 1.4, 1.5, 1.6 SC: Autumn 1.1, 1.2	Investigation: Materials	Animals incl. Humans 1.8, 1.9, 1.11, 1.12, 1.13 SC: Winter 1.3	Investigation: Animals (Plants 1.10) SC: Spring 1.7	Plants 1.14, 1.15	Investigation: Plants SC: Summer 1.16
Year 2	Uses of everyday Materials 2.6-2.9	Investigation: Materials	Living things and their habitats 2.11-2.13	Animals incl. Humans 2.1-2.5	Plants 2.10	Investigation: Plants 2.14
Year 3	Animals including humans 3.1, 3.2, 3.3	Rocks 3.4, 3.5, 3.6, 3.7, 3.8	Forces 3.9, 3.10	Light 3.11, 3.12	Plants 3.3, 3.14, 3.15, 3.16, 3.17, 3.18	Investigation and Embedding knowledge
Year 4	Animals including humans 3.1, 3.2, 3.3	Rocks 3.4, 3.5, 3.6, 3.7, 3.8	Forces 3.9, 3.10	Light 3.11, 3.12	Plants 3.13, 3.14, 3.15, 3.16, 3.17, 3.18	Investigation and Embedding knowledge
Year 5	Living Things and their habitats 4.11, 4.12	Forces 5.1, 5.2, 5.3, 5.4, 5.5	Space 5.14, 5.15	Properties and Changes of Materials 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13	Properties and Changes of Materials 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13	Living Things and their Habitats 5.17, 5.18
						Animals Including Humans 5.16
Year 6	Properties and changes of Materials 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13	Properties and changes of Materials 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13	Animals including Humans 5.16 Electricity 6.5	Evolution and Inheritance 6.9, 6.10, 6.11	Animals including Humans 6.1, 6.2, 6.3, 6.4	Animals including Humans 6.1, 6.2, 6.3, 6.4

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What does Science education look like in the EYFS?

Science is taught in Reception class as an integral part of the topic work covered during the year. Key scientific aspects are related to the pupils' learning in accordance with the objectives set out in the Early Learning Goals (ELGs) which underpin the curriculum planning for pupils aged three to five.

What does Science Education look like in Key Stage 1?

During Year 1 and Year 2, pupils are 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.

What does Science Education look like in Key Stage 2?

In Lower Key Stage 2 (LKS2 – years 3 and 4), pupils are taught to use the following practical scientific methods, processes and skills through the teaching of the program 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.

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In Upper Key Stage 2 (UKS2 – years 5 and 6), pupils are 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 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.

Knowledge acquired in each year group

Year 1

Plants

Identify and name a variety of common wild and garden plants.

Identify and name deciduous and evergreen trees.

Identify and describe the basic structure of a variety of common flowering plants and trees (roots, stem/trunk, leaves and flowers).

Light

Identify different light sources, including the Sun, electric lights and flames.

Understand that darkness is the absence of light.

Seasonal Changes

Associate shadows with a light source being blocked by something.
Observe changes across the four seasons.

Observe and describe weather associated with the seasons and how day length varies.

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Animals and Humans

Identify and name a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates).

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 (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets).

Know how to treat animals with care and sensitivity.

Group living things according to observable similarities and differences.

Identify, name, draw and label the basic parts of the human body.

Identify which part of the body is associated with each sense.

Recognise similarities and differences between themselves and others, and to treat others with sensitivity.

Everyday Materials and their Uses

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 (e.g. Roughness, hardness, shininess, ability to float, transparency and magnetic/non-magnetic)

Compare and group together a variety of everyday materials (including glass, wood and wool) on the basis of their simple physical properties.

Year 2

Animals and Humans

Recognise that animals, including humans, have offspring which grow into adults.

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 and their uses

Identify and compare the suitability of variety of everyday materials for particular uses (including wood, metal, plastic, glass, brick, rock, paper and cardboard).

Explain 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 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.

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.

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Year 3

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.

Green Plants

Identify and describe the functions of different parts of flowering plants: roots, stem, 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 animals have skeletons and muscles for support, protection and movement.

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 a solid object.

Find patterns in the way that the size of shadows change.

Rocks and Fossils

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.

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Year 4

Digestion and Teeth	<p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions.</p>
Electricity	<p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>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.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p>
Living Things and their Habitats	<p>Recognise that living things can be grouped in a variety of ways.</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p>
Sound	<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as then distance from the sound source increases.</p>
States of Matter	<p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>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 (oC)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>

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Year 5

Earth and Space	<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.</p>
Forces	<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>Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.</p>
Plants and Animals	<p>Explain 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 from birth to old age.</p>
Properties and change of materials	<p>Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</p> <p>Understand 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>

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Year 6

Electricity	<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</p> <p>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.</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</p>
Evolution and Inheritance	<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.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>
Light	<p>Recognise that light appears to travel in straight lines.</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.</p> <p>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.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>
Plants and Animals	<p>Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood.</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</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.</p> <p>Give reasons for classifying plants and animal, based on specific characteristics.</p>