Science - Programme of study 2021-2022

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

The national curriculum for science aims to ensure that all pupils:

* develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
* develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
* are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Science Overview 2021-2022

Cycle B

	Autumn		Spring 1	Spring 2	Summer 1	Summer 2
Reception	Seasonal Change		Materials	Growing and Animals	Contrasting Environment	Scientific Enquiry
Year 1 Year 1/2 (Year 2 – cover Year 2 objectives from NC for these topics)	Animals including Humans Seasonal Changes		Materials Year 2 (Look at Living things)		Plants	Scientific Enquiry
Year 2/3 (Year 3 – cover Year 3 objectives from NC for these topics)	Animals including Humans		Everyday Materials	Living things and their Habitat	Plants	Scientific enquiry Light (Y3 objectives)
Year 3 Year 4	Animals including Humans (Y4)	Living things (Y3 & 4)	Electricity (Y4)	States of matter (Y4)	Light (Y3)	Scientific Enquiry
Year 5 Year 5/6 Year 6	Animals including Humans (Y5)	Living Things includes plants (Y6)	Electricity (Y6)	Light (Y6)	Earth and Space (Y5)	Scientific Enquiry

Early Years Foundation Stage

Early Learning Goals

Understanding the world

* Explore the natural world around them, making observations and drawing pictures of animals and plants.

* Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.

* Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

Key Stage 1 – Working scientifically

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.

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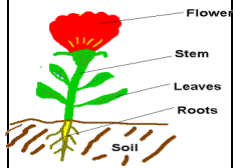
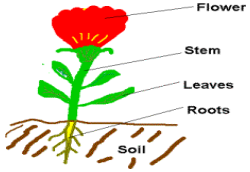
						
Reception	**Animals including Humans** Explore the natural world around them, making observations and drawing pictures of animals.	**Seasonal Changes** Understand some important processes and changes in the natural world around them, including the seasons Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;	**Materials** Changing states of matter.	Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;	Explore the natural world around them, making observations and drawing pictures of animals and plants;	* Asking simple questions * Observing closely, using simple equipment * Using their observations and ideas to suggest answers to questions * Gathering and recording data to help in answering questions.
Year 1 & Year 1/2	**Animals including Humans** * Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	**Seasonal Changes** * Observe changes across the four seasons * Observe and describe weather associated with the seasons and how day length varies.	**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	**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	**Plants** * Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	**Working Scientifically** * Asking simple questions and recognising that they can be answered in different ways * Observing closely, using simple equipment * Performing simple tests * Identifying and classifying

			* 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.	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 and describe the basic structure of a variety of common flowering plants, including trees.	* Using their observations and ideas to suggest answers to questions * Gathering and recording data to help in answering questions.
						
Year **2** **&** **2/3**	**Animals including humans** * Notice that animals, including humans, have offspring which grow into adults	**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	**Living Things and their Habitat** * 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	**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.		**Working Scientifically** * Asking simple questions and recognising that they can be answered in different ways * Observing closely, using simple equipment * Performing simple tests * Identifying and classifying

	* 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. Year 3 * 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)	* Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	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.	Year 3 * 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.	* Using their observations and ideas to suggest answers to questions * Gathering and recording data to help in answering questions.

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

Lower Key Stage Two -Working Scientifically

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.

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					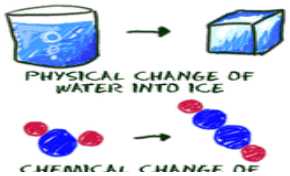	
Year 3/4 &	**Animals including humans** * Describe the simple functions of the basic parts of the	**Living Things** * Recognise that living things can be grouped in a variety of ways	**Electricity** * Identify common appliances that run on electricity	**Light** * Recognise that they need light in order to see things and	**States of matter** * Compare and group materials together, according to whether they are	**Scientific Enquiry** * Asking relevant questions and using different types of scientific

4	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.	* 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	* 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	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.	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.	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.

Upper Key Stage two - 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

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	Animals including Human	**Living things including habitats**	**Electricity**	**Light**	**Earth and Space**	**Scientific Enquiry**
Year 5 **Year 5/6** **Year 6**	* Describe the changes as humans develop to old age	* Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, 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	* 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	* 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	* 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

			buzzers and the on/off position of switches * Use recognised symbols when representing a simple circuit in a diagram.	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.	* Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	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