



Science – Progression of Key Concepts and National Curriculum Theme coverage



An Daras Trust
Supporting Children's Growing Capabilities

Over-arching Aims of the Science Curriculum

Our 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.

Year	1	2	3	4	5	6
Scientific knowledge and conceptual understanding	<p>The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.</p> <p>Spoken language The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.</p>					
Working Scientifically	<p>Working Scientifically at KS1 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:</p>		<p>Working Scientifically in Lower Key Stage 2: During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p>		<p>Working Scientifically in Upper Key Stage 2: During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills</p>	

	<ul style="list-style-type: none"> • 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 <p>gathering and recording data to help in answering questions.</p>	<ul style="list-style-type: none"> • 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 <p>using straightforward scientific evidence to answer questions or to support their findings.</p>	<p>through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> • 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 <p>identifying scientific evidence that has been used to support or refute ideas or arguments.</p>			
All encompassing Concepts	Similarities and differences Diversity Man-made/natural	Similarities and differences Diversity Innovation Environment	Similarities and differences Diversity Innovation Environment	Similarities and differences Diversity Innovation	Similarities and differences Diversity Innovation	Similarities and differences Diversity Innovation Technological Developments

				Technological development	Technological Developments Exploration Environment Climate Extinction Endangered Sustainability	Exploration Environment Climate Extinction Endangered Legacy Sustainability
Theme Specific Concepts	Plants Animals including Humans Seasonal Changes Everyday Materials	Plants Animals including Humans Living things and their habitats Everyday Materials	Plants Animals including Humans Rocks Forces and Magnets Light	Animals including Humans States of matter Electricity Sound	Animals including Humans Living things and their habitats Properties and changes of materials Forces Earth and Space	Animals including Humans Living things and their habitats Evolution and inheritance Electricity Sound
NC Knowledge	Plants identify and name a variety of common wild and garden plants, including deciduous and evergreen trees , identify and describe the basic structure of a variety of common flowering plants, including trees.	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.	Plants identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is			

			transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			
	<p>Animals incl humans identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores Science – key stages 1 and 2 8 Statutory requirements describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</p>	<p>Animals incl humans notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p>	<p>Animals incl humans identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>	<p>Animals incl humans describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	<p>Animals incl humans Pupils should be taught to: describe the changes as humans develop to old age.</p>	<p>Animals incl humans Pupils should be taught to: 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>identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>					
	<p>Seasonal Changes observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies.</p>	<p>Living things and 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,</p>			<p>Living things and their habitats describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals.</p>	<p>Living things and their habitats describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics.</p> <p>Evolution and Inheritance recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit</p>

		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.				their environment in different ways and that adaptation may lead to evolution.
	<p>Everyday materials distinguish between an object and the material from which it is made identify and name a variety of /3everyday 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.</p>	<p>Everyday materials identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing,</p>	<p>Rocks compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter.</p>	<p>States of matter compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and</p>	<p>Properties and changes of materials compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through</p>	

		bending, twisting and stretching.		associate the rate of evaporation with temperature.	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.	
			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	Electricity identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers	Forces explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identify the effects of air resistance, water resistance and friction,	Electricity associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of

			<p>magnets attract or repel each other and attract some materials and not others</p> <p>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> <p>describe magnets as having two poles</p> <p>predict whether two magnets will attract or repel each other, depending on which poles are facing.</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>	<p>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>	<p>buzzers and the on/off position of switches</p> <p>use recognised symbols when representing a simple circuit in a diagram.</p>
			<p>Light</p> <p>recognise that they need light in order to see things and that dark is the absence of light</p> <p>notice that light is reflected from surfaces</p> <p>recognise that light from the sun can be dangerous and that</p>	<p>Sound</p> <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</p>	<p>Earth and Space</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>Light</p> <p>recognise that light appears to travel in straight line</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>

			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.	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.	use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Links to other subjects	History Geography DT	History Geography DT	History Geography DT PE	History Geography DT Art Music	History Geography DT PSHE Music Art	History Geography DT PSHE PE Art
Links to capabilities						
Links to literacy texts						
Enrichment opportunities	Seasonal Cooking		Cornish Mine	Cooking Viking Feast Eden Project	Camping trip – nutritional feast	Electrical Toy making/show

Year group specific skills progression, s-plans, theme concepts and vocabulary mats should be used in planning to teach these themes and create knowledge organisers and quizzes.