Science Long Term Plan

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.

<u>KS1</u>

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. 'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower KS2

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Upper KS2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

			Year 1					Year 2		
	Seasonal changes	Animals, including humans	Everyday materials	Plants	RSE (See Relationships Education)	Living things & their habitats	RSE (See Relationships Education)	Uses of everyday materials	Animals, including humans	Plants
Working Scientifically										
Ask simple questions and recognising that they can be answered in different ways										
Observe closely, using simple equipment										
Perform simple tests										
Identify and classify										
Use their observations and ideas to suggest answers to questions										
Gather and recording data to help in answering questions.										
Plants										
Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees				x						

					I		
Identify and describe the basic structure of a variety of common flowering plants, including trees			x				
Observe and describe how seeds and bulbs grow into mature plants							x
Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.							x
Animals, including humans							
Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals	x						
Identify and name a variety of common animals that are carnivores, herbivores and omnivores	x						
Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)	x						
Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	x						
Notice that animals, including humans, have offspring which grow into adults						x	
Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)						x	
Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene						x	
Everyday materials							
Distinguish between an object and the material from which it is made		x					

Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock		x				
Describe the simple physical properties of a variety of everyday materials		x				
Compare and group together a variety of everyday materials on the basis of their simple physical properties		x				
Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses					x	
Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.					x	
Seasonal changes						
Observe changes across the four seasons	x					
Observe and describe weather associated with the seasons and how day length varies	x					
Living things & their habitats						
Explore and compare the differences between things that are living, dead, and things that have never been alive				x		
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				x		
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			x		
and name different sources of food					

			Y	ear 3					Yea	r 4		
	Light	Forces & magnets	Plants	Animals, including humans	Rocks & Soils	RSE (See Relationships Education)	RSE (See Relationships Education)	States of Matter	Electricity	Sound	Animals, including humans	Living things & their habitats
Working scientifically												
Ask relevant questions and using different types of scientific enquiries to answer them												
Set up simple practical enquiries, comparative and fair tests												
Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers												
Gather, record, classify & present data in a variety of ways to help in answering questions												
Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables												
Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions												
Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions												
Identify differences, similarities or changes related to simple scientific ideas and processes												
Use straightforward scientific evidence to answer questions or to support their findings												
Plants												
Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers			x									

	r							
Explore the requirements of plants for life								
and growth (air, light, water, nutrients from		x						
soil, and room to grow) and how they vary								
from plant to plant								
Investigate the way in which water is								
transported within plants		x						
Explore the part that flowers play in the life								
cycle of flowering plants, including		, v						
pollination, seed formation and seed		х						
dispersal								
Living things in their habitats								
	,							
Recognise that living things can be grouped								
in a variety of ways								х
Explore and use classification keys to help								
group, identify and name a variety of living								
things in their local and wider environment								x
Recognise that environments can change								
and that this can sometimes pose dangers								x
to living things								Â
Animals, including humans								
Identify that animals, including humans,								
need the right types and amount of								
nutrition, and that they cannot make their			x					
own food; they get nutrition from what they								
eat								
Identify that humans and some other								
animals have skeletons and muscles for			x					
support, protection and movement								
describe the simple functions of the basic								
parts of the digestive system in humans								
							x	
Identify the different types of teeth in								
humans and their simple functions							x	
Construct and interpret a variety of food								
chains, identifying producers, predators and							x	
prey.								

Rocks							
Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties			x				
Describe in simple terms how fossils are formed when things that have lived are trapped within rock			x				
Recognise that soils are made from rocks and organic matter			х				
States of matter							
Compare and group materials together, according to whether they are solids, liquids or gases					x		
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)					x		
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature					x		
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 an opaque object							
Find patterns in the way that the size of shadows change							
Sound							
Identify how sounds are made, associating						x	

some of them with something vibrating							
Recognise that vibrations from sounds travel							
through a medium to the ear						Х	
Find patterns between the pitch of a sound							
and features of the object that produced it						х	
Find patterns between the volume of a							
sound and the strength of the vibrations							
that produced it						Х	
Recognise that sounds get fainter as the						v	
distance from the sound source increases						х	
Electricity		•					
Identify common appliances that run on							
electricity					х		
Construct a simple series electrical circuit,							
identifying and naming its basic parts,							
including cells, wires, bulbs, switches and					х		
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					х		
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					Х		
Recognise some common conductors and							
insulators, and associate metals with being					х		
good conductors							
Forces & magnets							
compare how things move on different							
surfaces							
	х						
Notice that some forces need contact							
between two objects, but magnetic forces							
can act at a distance	х						
Observe how magnets attract or repel each	x						
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	x					
Describe magnets as having two poles	x					
Predict whether two magnets will attract or repel each other, depending on which poles are facing	x					

		Year 5							Ye	ar 6		
	Forces	Properties & changes of materials	Earth & Space	Living things & their habitats	Animals, including humans	RSE (See Relationships Education)	Light	Living things & their habitats	Electricity	Evolution & inheritance	Animals, including humans	RSE (See Relationships Education)
Working scientifically												
Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary												
Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate												
Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs												
Use test results to make predictions to set up further comparative and fair tests												
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 scientific evidence that has been used to support or refute ideas or arguments												
Living things & their habitats												
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird				x								
Describe the life process of reproduction in some plants and animals				x								
Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including								x				

micro-organisms, plants and animals								
Give reasons for classifying plants and animals based on specific characteristics.					х			
Animals, including humans								
Describe the changes as humans develop to old age			x					
Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood							х	
Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function							х	
Describe the ways in which nutrients and water are transported within animals, including humans							х	
Properties & 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	x							
Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution	x							
Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating	x							
Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic	x							
Demonstrate that dissolving, mixing and changes of state are reversible changes	х							
Explain that some changes result in the formation of new materials, and that this	х							

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smaller force to have a greater effect											
Light											
Recognise that light appears to travel in straight lines						x					
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						x					
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						x					
Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them						x					
Electricity											
Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit								x			
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								x			
Use recognised symbols when representing a simple circuit in a diagram								x			