Science Curriculum Overview

PERRAN-AR-WORTHAL CP SCHOOL

Every Moment Matters

Purpose of study

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

Scientific knowledge and conceptual understanding

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.

The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

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.

KS1:

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.

LKS2:

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.

UKS2:

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 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.

Year 1	Autumn 1		Spring 1		Summer 1		
	Seasonal changes (biology)	Name the seasons	Animals inc humans (biology)	zoology	Plant (biology)	Soil	
		changes		My pets		Leaf	
		Hot and cold		Classifying animals		flower	
		How trees change		Animal diet		Plant pots	
		Weather around the world		Animal teeth		greenhouses	
		Day length		The human body		seeds	
	What is it like in each season?		Do all animals have the same parts?		What ways can I identify a plant?		
	Autumn 2		Spring 2		Summer 2		
	Everyday materials (chemistry)	Properties of materials	Animals inc humans (biology)	senses	Plants (biology)	Bulbs	
		Types of materials		taste		Nature walk	
		Objects and materials		sight		Identifying leaves	
		stretchy		hearing		deciduous	
		bouncy		touch		evergreen	
		comparisons		smell		Plant parts	
	What are the things I use made from?		Do all animals have the same parts?		What ways can I identify a plant?		
Year 2	Autumn 1		Spring 1		Summer 1		
	Animals inc humans (Biology)	Human lifecycle	Uses of everyday materials (chemistry)	Changing materials	Living things and their habitats (biology)	Dead or alive	
		Animal lifecycle		Testing playdough		MRS. GREN	
		Insect lifecycle		Making an object		Sensitive plants	
		Gestation of animals		Material strength		habitats	
		Age and height		eggsperiment		adaption	
		Animal survival		Compare paper and cardboard		Animal food	
	How do humans stay healthy?		Why do we make things out of certain material?		What features do animals have that allow them to thrive in their environment?		
	Autumn 2		Spring 2		Summer 2		
	Animals inc humans (biology)	Pet care	Uses of everyday materials (chemistry)	Engineering research	Plants (biology)	Conditions for germination	
		Animal needs		Ship building		Bulb and seed growth	
		Food		Egg and salt		Plant growth facts	
		Exercise		Float or sink		Observation over time	
		hygiene		Siege engine		Water, light, temp experiment	
		Bird feeders		catapult			
	How do humans stay healthy?		Why do we make things out of certain material?		What things do plants need to grow?		

Year 3

Autumn 1		Spring 1		Summer 1	
Animals inc humans (biology)	skeletons	Rocks (chem)	Igneous rock formation	Light (physics)	vision
	Muscles and joints		Crystal size in igneous rocks		reflection
	Support, protection, movement		minerals		dangers
	Food types		Mineral hardness		shadows
	nutrients		fossils		Pattern seeking
	Animal diets		soil		Solid and transparent
How can animals move? What is in food?		Why are there different rocks?		What is a shadow?	
Autumn 2		**Spring 2**		**Summer 2**	
Rocks (chem)	Introduction to rocks	Forces (physics)	Movement on surfaces	Plants (biology)	Parts of a plant
	Rock characteristics		Magnetic force		Function of parts
	Classifying rocks		Attract or repel		Importance of plants
	Sedimentary rock formation		Magnetic materials		Transportation of water
	Rock porosity		poles		Lifecycle of a plant
	Metamorphic rock formation		predictions		Observation of plants
Why are there different rocks?		How do moving objects slow down?		What do different parts of a plant do?	

Year 4

Autumn 1		Spring 1		Summer 1	
Animals inc humans (biology)	Functions of different teeth	States of matter (chem)	What is a particle?	Living things and their habitats (biology)	classification
	Animal teeth		Particle diagrams		animals
	nutrition		Classification of everyday objects		mammals
	Digestive system		liquid		extinction
	nutrition		Lava lamp		Asteroid impact
	Food webs		Viscosity of liquid		habitats
What happens to food when we eat it?		What happens when we heat solids?		What happens to living things when their habitats change?	
Autumn 2		**Spring 2**		**Summer 2**	
Electricity (physics)	Common appliances	States of matter (Chem)	Gases	Sound (physics)	How sound is made
	Basic parts of circuit		Producing gas		How sound travels
	Construct simple circuit		Changing states		pitch
	Design a circuit		Chemical reactions		patterns
	conductors		research		Strength
	insulators		Water cycle		Distance
What materials conduct electricity?		What happens to a puddle after it rains?		How are sounds made?	

Year 5

Autumn 1		Spring 1		Summer 1	
Forces (physics)	gravity	Properties and changes in materials (chem)	burning	Living things and their habitats/ animals inc humans (biology)	Investigating reactions
	Gravity defying water		Reversible and irreversible		Life cycle of a chicken
	Mass and weight		Acid and alkali		Comparing lifecycles
	Galileo's ramp		dissolving		Asexual plant reproduction
	Does mass affect friction?		mixtures		Sexual plant reproduction
	research		Changes of state		Changes that occur from birth
How do machines work?		What is a mixture?		How do living things make copies of themselves?	

Autumn 2		Spring 2		Summer 2	
Forces (physics)	Air resistance	Properties and changes in materials (chem)	Filtration and sieving	Spaces (physics)	Movement of planets
	helicopters		evaporation		Earth and moon
	Water resistance		hardness		planetarium
	levels		transparency		shadows
	pulleys		magnetism		Time zones
	gears		conductors		Scientific views
How do machines work?		How do I separate a mixture into its parts?		Why does the moon appear to change shape?	

Year 6

Autumn 1		Spring 1		Summer 1	
Animals inc humans (biology)	The circulatory system	Light (physics)	Direction of travel	Evolution and inheritance (biology)	Famous scientists
	The structure of the heart		How light is seen		fossils
	Blood research		Periscope shadow puppets		Features of offspring
	Heart rate device		Reflection		Peppered moths
	Diet and lifestyle		luminous		camouflage
	Transport of nutrient and H2O		eyesight		adaptation
What affects the health of humans?		How does light travel?		What happens to species over a long time?	

Autumn 2		Spring 2		Summer 2	
Electricity (physics)	symbols	Living things and habitats (biology)	Common characteristics	Working scientifically	
	Drawing circuits		reasoning		
	Voltage of cells		kingdoms		
	Effect of number of cells		classification		
	Design a project		microorganisms		
			research		
How do humans use electricity?		How are living things grouped together?			