

Science Non-Negotiable Key Skills, Knowledge and Vocabulary YEAR 6

National curriculum:

Working scientifically:

During year 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.

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 microorganisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics

Animals including humans:

- 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.

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 their environment in different ways and that adaptation may lead to evolution.

Light:

- 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 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.

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 buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram.

Key Concepts:

Working Scientifically: *Use practical scientific methods, processes and skills to understand how ideas and theories are investigated and how this improves scientific knowledge and skills*

Living things and habitats: *Animals can be classified into groups dependent on their physical characteristics. Animals are affected by their habitats and this may cause them to change.*

Animals including humans: *All animals, including humans, share life processes, which allows them to adapt and grow.*

Evolution and inheritance: *Living things on Earth have changed over time, as a result of adaptation to changes within the environment and this has resulted in evolution..*

Light: *Some objects are sources of light, which we need in order to see, however the absence of light is dark.*

Electricity: *Electricity is a useful form of energy, which flows through a complete circuit to make electrical appliances function.*

Topic	Key Skills	Subject Knowledge	Key Vocabulary
Working scientifically	<ul style="list-style-type: none"> • Plan enquiries, including recognising and controlling variables where necessary • Take measurements, using a range of scientific equipment, with increasing accuracy and precision • Record data and results of increasing complexity using scientific diagrams 	<p>To know:</p> <ul style="list-style-type: none"> • What an enquiry is • What to observe and measure in a fair test • How to control variable to conduct a fair test • How to use thermometers, timing devices, data loggers • How to use a variety of classification keys 	Predict prediction aim purpose method apparatus equipment measure accurate reliable repeatable analyse diagram fair test control variable independent variable dependent variable relationship trend conclusion evaluation



	<ul style="list-style-type: none">and labels, classification keys, tables, bar and line graphs, and modelsReport findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.Present findings in written form, displays and other presentations.Use test results to make predictions to set up further comparative and fair tests.Use simple models to describe scientific ideasIdentify scientific evidence that has been used to support or refute, ideas or arguments.	<ul style="list-style-type: none">How to record and present data in a table, diagram, bar chart, line graphs and modelsHow to predictHow to report finding in written and oral formHow to use scientific language to explain and describeHow to draw a conclusion based on aimsHow to relate scientific knowledge to findingsHow to begin to question resultsHow to form a hypothesisHow to evaluate the success of an investigationHow to suggest improvements	
Living things and their habitats	<p>Investigate and classify (living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals)</p> <p>Provide reasons for choices based on evidence (why animals have been classified into different groups)</p> <p>Research and classify (animals from a range of habitats)</p>	To know: <ul style="list-style-type: none">Groups of animals (microorganisms, invertebrates, vertebrates, etc.) and their common featuresGroups of plantsThe work of Carl Linnaeus and where different animals belong in the classification systemsA range of habitats	Mammal reptile amphibians habitat micro-organism adapt adaptation characteristics classify fungi virus bacteria movement respiration reproduction growth nutrition excretion sensitivity vertebrate invertebrates species kingdoms mosses ferns woody flowering plants non-woody flowering plants
Animals including humans	Research and explain in a variety of ways (circulatory system)	To know:	Circulatory system heart blood vessel veins capillaries lungs oxygenated

	<p>Investigate and evaluate (diet, exercise, drugs and lifestyle and their effects on the body)</p>	<ul style="list-style-type: none"> the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood the impact of diet, exercise, drugs and lifestyle on the way their bodies function the ways in which nutrients and water are transported within animals, including humans. 	de-oxygenated aorta atrium dioxide	respiration arteries oxygen	pulse carbon	ventricle
Evolution and inheritance	<p>Investigate using secondary research (how fossils provide information about living things)</p> <p>Investigate using secondary research (how features are inherited but offspring are not identical to parents)</p> <p>Identify and classify (animals and plants)</p> <p>Explain and evaluate (how animals and plants are adapted to suit their environment in different ways)</p>	<p>To know:</p> <ul style="list-style-type: none"> that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents that variation in offspring over time can make animals more or less able to survive in particular environments that adaptation may lead to evolution that plants and animals adapt to suit their environment the works of: Charles Darwin, Mary Anning and Alfred Wallace. 	Natural selection fossils parent inherited characteristic characteristic environment environment	characteristics offspring inherit environmental adapt adaptation species breed	evidence	
Light	<p>Use existing knowledge to test and explain (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>Research and explain (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>To know:</p> <ul style="list-style-type: none"> that light appears to travel in straight lines light is reflected from surfaces dark is the absence of light shadows are formed when the light from a light source is blocked from a solid object because it appears to travel in a straight line shadows have the same shape as the objects that cast them light creates different phenomena (e.g. rainbows, periscopes, colour filters and refraction) 	Reflect transmit emit retina cornea	reflection opaque absorb dispersion iris refraction	shadow transparent prism optic nerve lens mirror	light ray translucent pupil image convex concave

	<p>Use existing knowledge to test and explain (the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them).</p>		
Electricity	<p>Use scientific knowledge to investigate (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 (variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches)</p> <p>Create and draw (circuits using recognised symbols)</p>	<p>To know:</p> <ul style="list-style-type: none"> • recognised symbols when representing a simple circuit in a diagram. • the number and voltage of cells affects the performance of components within a circuit 	Conductor insulator battery cell lamp switch circuit component buzzer motor voltage function brightness volume symbols wire graphite series parallel plastic metal