

Science KS2 Curriculum Subject Skills Progression

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.

NCSF INTENT

Nurture – All children experience a broad and rich science curriculum, including visits and external speakers. By nurturing their enquiring minds, we encourage questioning and appreciation of natural phenomena. Our hope is that building science capital will have a positive effect on our children's lives as a tool for social justice, to help improve their life chances.

Cherish – Due to our geographical surroundings the children have opportunities to learn, play and explore our outside grounds, developing admiration and reverence for the world around them. Children are encouraged to show responsibility towards the environment on a local and global scale. During their school career children learn that resources are to be protected and respected by all who use them.

Shine – Through various competitions and challenges children have the opportunity to shine individually or as part of a group. We inspire the children to have confidence to utilise their science knowledge and skills, to ask and answer their own questions about the world around them.

Flourish – As teachers we motivate all children to flourish as scientists and global citizens. We inspire children to be ambitious and confident about science. Our close relationship with local secondary schools and outreach activities enhances the transition from our small village schools, enabling all pupils to flourish.

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Skill	Year 3	Year 4	Year 5	Year 6	End of Key Stage expectations	Vocabulary
Working Scientifically						
Question	I know how to ask relevant scientific questions.	I know how to ask relevant scientific questions.			LKS2: asking relevant questions and using different types of scientific enquiries to answer them. using straightforward scientific evidence to answer questions or to support their findings. UKS2: planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	questions relevant enquire
Observing	I know how to use observations and knowledge to answer scientific questions. I make careful and accurate observations including the use of standard units.	I know how to use observations and knowledge to answer scientific questions. I make careful and accurate observations including the use of standard units.	<i>I know how to relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.</i>	<i>I know how to relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.</i>	LKS2: making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment,	observe accurate standard units

					including thermometers and data loggers identifying differences, similarities or changes related to simple scientific ideas and processes UKS2: identifying scientific evidence that has been used to support or refute ideas or arguments	
Testing	I know how to set up a simple enquiry to explore a scientific question. I know how to set up a test to compare two things. I know how to set up a fair test and explain why it is fair.	I know how to set up a simple enquiry to explore a scientific question. I know how to set up a test to compare two things. I know how to set up a fair test and explain why it is fair.	I know how to plan different types of scientific enquiry. I know how to control variables in an enquiry. I use the outcome of test results to make predictions and set up a further comparative and fair tests.	I know how to plan different types of scientific enquiry. I know how to control variables in an enquiry. I use the outcome of test results to make predictions and set up a further comparative and fair tests.	LKS2: setting up simple practical enquiries, comparative and fair tests UKS2: using test results to make predictions to set up further comparative and fair tests	explore test enquire compare variable outcome results predict explain fair comparative
Measuring	I know how to use equipment including thermometers and data loggers to	I know how to use equipment including thermometers and data loggers to	I measure accurately and precisely using a range of equipment.	I measure accurately and precisely using a range of equipment.	LKS2: making systematic and careful observations and, where appropriate,	measure accurate thermometer data data logger

	make measurements.	make measurements.			taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers UKS2: taking measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	precise equipment
Classifying	I classify data in different ways to answer scientific questions.	I classify data in different ways to answer scientific questions.	I know how to record data and results using classification keys.	I know how to record data and results using classification keys.	LKS2: gathering, recording, classifying and presenting data in a variety of ways to help in answering questions UKS2: recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter	classify sort data classification keys

					graphs, bar and line graphs	
Recording	I gather and record data in different ways to answer scientific questions.	I gather and record data in different ways to answer scientific questions.	I know how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	I know how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	LKS2: recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables UKS2: recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	gather record results scientific diagram label tables graphs scatter, bar and line
Reporting	I present data in different ways to answer scientific questions.	I present data in different ways to answer scientific questions.	I report findings from enquiries in a range of different ways. I know how to explain a conclusion from an enquiry. I explain casual relationships in an enquiry.	I report findings from enquiries in a range of different ways. I know how to explain a conclusion from an enquiry. I explain casual relationships in an enquiry.	LKS2: reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions,	present report findings conclusion enquiries casual relationships

					<p>make predictions for new values, suggest improvements and raise further questions</p> <p>UKS2: 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</p>	
Scientific vocabulary			I read, spell and pronounce scientific vocabulary accurately.	I read, spell and pronounce scientific vocabulary accurately.	UKS2: Pupils should read, spell and pronounce scientific vocabulary correctly.	
Knowledge						
Biology						
Plants	<p>I know the function of different parts of flowering plants and trees.</p> <p>I know what different plants need to help them survive.</p>				<p>Pupils should be taught to:</p> <p>Y3 identify and describe the functions of different parts of flowering plants:</p>	<p>stem, stigma, sepal petal, leaf stamen, root, pollen tube, anther, filament, ovule, style ovary, lifecycle Air, Light, Water, Nutrients, Soil,</p>

	<p>I know how water is transported within plants.</p> <p>I know the plant lifecycle, especially the importance of flowers.</p>				<p>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>	<p>Reproduction, Transportation, Dispersal, Pollination, Flower</p>
<p>Animals including humans</p>	<p>I know about the importance of a nutritious, balanced diet.</p> <p>I know how nutrients, water and oxygen are transported within animals and humans</p>	<p>I identify and name the parts of the human digestive system.</p> <p>I know the functions of the organs in the human digestive system.</p>	<p>I create a timeline to indicate stages of growth in humans.</p>	<p>I identify and name the main parts of the human circulatory system.</p> <p>I know the function of the heart and, blood vessels and blood.</p> <p>I know the impact of diet, exercise, drugs</p>	<p>Pupils should be taught to:</p> <p>Y3</p> <p>identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their</p>	<p>nutritious balanced diet</p> <p>nutrients</p> <p>water</p> <p>oxygen</p> <p>digestive system</p> <p>stomach, large intestine, small</p>

	<p>I know about the skeletal system of a human.</p> <p>I know about the muscular system of a human.</p> <p>I know about the purpose of the skeleton in humans and animals.</p>	<p>I identify and know the different types of teeth in humans.</p> <p>I know the functions of different human teeth.</p> <p>I use food chains to identify producers, predators, and prey.</p> <p>I construct food chains to identify producers, predators, and prey.</p>		<p>and lifestyle on health.</p> <p>I know the ways in which nutrients and water are transported in animals, including humans.</p>	<p>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>Y4: 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>Y5: describe the changes as humans develop to old age.</p> <p>Y6: identify and name the main parts of</p>	<p>intestine, oesophagus, heart, lungs, liver, kidney, brain, blood vessels, blood, lifestyle, diet, exercise, drugs, substance abuse, floss, mouth acids, saliva, enzymes, incisors, canines, molars, skeleton. Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty</p>
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					<p>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>Living things and their habitats</p>		<p>I group living things in different ways. I use classification keys to group, identify and name living things (for others to use). I know how changes to an environment could endanger living things.</p>	<p>I know the life cycle of different living things, e.g. mammal, amphibian, insect, bird. I know the differences between different life cycles. I know the process of reproduction in plants. I know the process of reproduction in animals.</p>	<p>I classify things into broad groups according to observable characteristics and based on similarities and differences. I know how living things have been classified. I give reasons for classifying animals and plants in a specific way.</p>	<p>Pupils should be taught to: Y4: recognise that living things can be grouped in a variety of ways; explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment;</p>	<p>Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats Mammal, Reproduction, Insect, Amphibian, Bird, Offspring Classification, Vertebrates,</p>

					<p>recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>Y5: 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>Y6: 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</p>	<p>Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, Insects</p>
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					on specific characteristics	
Evolution including inheritance				<p>I know how the Earth and living things have changed over time.</p> <p>I know how fossils can be used to find out about the past.</p> <p>I know how reproduction and offspring (recognising that offspring normally vary and are not identical to their parents).</p> <p>I know how animals and plants are adapted to suit their environment.</p> <p>I link adaptation over time to evolution.</p> <p>I know about evolution and can explain what it is.</p>	<p>Y6 Pupils should be taught to:</p> <p>recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago;</p> <p>recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents;</p> <p>identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>	<p>evolution, fossils, adaptation, reproduction, genetics</p>
Chemistry						
Rocks	I compare and group rocks based on their appearance and				Y3 Pupils should be taught to: compare and group together different	Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent,

	<p>physical properties, giving a reason. I know how fossils are formed. I know how soil is made. I know and explain the difference between sedimentary, metamorphic and igneous rock.</p>				<p>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>sedimentary, metamorphic, igneous,</p>
<p>Properties and changes of materials/ States of matter</p>		<p>I group materials based on their state of matter (solid, liquid, gas). I know how some materials can change state. I explore how materials change state. I measure the temperature at which materials change state. I know about the water cycle. I know the part played by evaporation and</p>	<p>I compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and respond to magnets). I know how a material dissolves to form a solution; explaining the process of dissolving. I know and show how to recover a</p>		<p>Pupils should be taught to: Y4: 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);</p>	<p>Hardness, Solubility, Transparency, Conductivity, Magnetic, Thermal, Filter, Solution, Evaporation, Dissolving, Mixing Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Celsius, Freezing, Heating, Water cycle, Reversible, Irreversible,</p>

		<p>condensation in the water cycle.</p>	<p>substance from a solution. I know how some materials can be separated. I demonstrate how materials can be separated (e.g. through filtering, sieving, and evaporating). I know and can demonstrate that some changes are reversible, and some are not. I know how some changes result in the formation of a new material that is usually irreversible. I know about reversible and irreversible changes. I give evidenced reasons why materials should be used for specific purposes.</p>		<p>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature Y5: 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</p>	
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					<p>separated, including through 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.</p>	
Physics						
Light	I know what dark is (the absence of light).			I know how light travels.	Pupils should be taught to: Y3:	Light, Shadows, Mirror, Reflective, Dark, Reflection Refraction, Light,

	<p>I know that light is needed in order to see.</p> <p>I know that light is reflected from a surface.</p> <p>I know and demonstrate how a shadow is formed.</p> <p>I explore shadow size and explain the changes.</p> <p>I know the danger of direct sunlight and describe how to keep protected.</p>			<p>I know and demonstrate how we see objects.</p> <p>I know why shadows have the same shape as the object that casts them.</p> <p>I know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.</p>	<p>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.</p> <p>Y6 Pupils should be taught to:</p> <p>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</p>	<p>Spectrum, Rainbow, Colour,</p>
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					<p>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.</p>	
Forces and magnets	<p>I know about and describe how objects move on different surfaces. I know how some forces require contact and some do not, giving examples. I know about and explain how objects repel and attract in relation to objects and other magnets. I predict whether objects will be</p>		<p>I know what gravity is and its impact on our lives. I identify and know the effect of air resistance. I identify and know the effect of water resistance. I identify and know the effect of friction. I explain how levers, pulleys and gears allow a smaller force to have a greater effect.</p>		<p>Y3 compare how things move on different surfaces; notice that some forces need contact between 2 objects, but magnetic forces can act at a distance; observe how magnets attract or repel each other and attract some materials and not others;</p>	<p>Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull, Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys</p>

	<p>magnetic and carry out an enquiry to test this out. I know how magnets work. I predict whether magnets will attract or repel and give a reason.</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; describe magnets as having 2 poles; predict whether 2 magnets will attract or repel each other, depending on which poles are facing. Y5: 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, that act between moving surfaces; recognise that some mechanisms</p>	
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					including levers, pulleys and gears allow a smaller force to have a greater effect.	
Sound		<p>I know how sound is made</p> <p>I know how sound travels from a source to our ears.</p> <p>I know how sounds are made associating them with vibrating.</p> <p>I know the correlation between the volume of a sound and the vibrations that produced it.</p> <p>I know what happens to a sound as it travels away from its source.</p>			<p>Y4 Pupils should be taught to:</p> <p>identify how sounds are made, associating some of them with something vibrating; recognise that vibrations from sounds travel through a medium to the ear;</p> <p>find patterns between the pitch of a sound and features of the object that produced it;</p> <p>find patterns between the volume of a sound and the strength of the vibrations that produced it;</p> <p>recognise that sounds get fainter as the distance from</p>	<p>Volume, Vibration, Wave, Pitch, Tone, Speaker, Source</p>

					the sound source increases.	
Electricity		<p>I identify and name appliances that require electricity to function.</p> <p>I construct a series circuit.</p> <p>I identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers).</p> <p>I know how to draw a circuit diagram.</p> <p>I predict and test whether a lamp will light within a circuit.</p> <p>I know the function of a switch in a circuit.</p> <p>I know the difference between a conductor and an insulator: giving examples of each.</p>		<p>I know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer.</p> <p>I compare and give reasons for why components work and do not work in a circuit.</p> <p>I draw circuit diagrams using correct symbols.</p>	<p>Pupils should be taught to:</p> <p>Y4:</p> <p>identify common appliances that run on electricity;</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers;</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</p>	<p>Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell</p>

					<p>and insulators, and associate metals with being good conductors.</p> <p>Y6: 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.</p>	
Earth and Space			I know about and explain the movement of the Earth and other planets relative to the Sun.		Y5 Pupils should be taught to: describe the movement of the Earth and other planets relative to	Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation

			<p>I know about and explain the movement of the Moon relative to the Earth.</p> <p>I know and demonstrate how night and day are created.</p> <p>I describe the Sun, Earth and Moon (using the term spherical).</p>		<p>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>use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>	
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