

Science- Whole School Overview



JUNIOR SCHOOL

Together we make a difference

In science we build upon the learning in KS1 and by the end of year 6 we aim for all pupils to have studied a broad and progressive science curriculum, which provides the foundations for understanding the world. We focus on a range of key concepts, skills, knowledge & vocabulary, which ensures pupils have the necessary understanding to embrace the KS3 curriculum. We endeavour for pupils to develop rational explanation, a sense of excitement and curiosity about natural phenomena, to understand how science can explain what is occurring, predict how things behave and analyse causes.

Year 3					
	Autumn 1	Autumn 2	Spring 2	Summer 1	
Topic	Rocks	Forces and Magnets	Animals Including Humans	Plants	Light
Scientific Knowledge and conceptual understanding	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 magnets attract or repel each 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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

		<ul style="list-style-type: none"> describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing 		life cycle of flowering plants, including pollination, seed formation and seed dispersal	
Communicating scientifically (pupils should read and spell scientific vocabulary correctly)	Use the scientific vocabulary of: Force, surface, magnet, magnetic, attract, repel, magnetic poles, North, South	Use the scientific vocabulary of: Appearance, physical, properties, hard/soft, shiny/dull, rough/smooth, absorbent/not absorbent, fossils, sedimentary, rock, soils, organic matter,	Use the scientific vocabulary of: Nutrition, nutrients, skeleton, bones, joints, skeleton, vertebrate, invertebrate, support, protection, movement	Use the scientific vocabulary of: roots, stem/trunk, leaves and flowers, air, light, water, nutrients from soil, and room to grow, pollination, seed formation and seed dispersal	Use the scientific vocabulary of: Light, see, dark, reflect, shadow, blocked, solid, artificial, light source, opaque, sunlight, dangerous, protect eyes, shape, size
Investigative Skills – Enquiry	In Year 3 all investigative skills will be modelled and supported by the teacher Set up simple practical enquiries, comparative and fair tests	Ask relevant questions and use different types of scientific enquiries to answer them identifying, classifying and grouping;	Ask relevant questions and use different types of scientific enquiries to answer them identifying, classifying and grouping;	Ask relevant questions and use different types of scientific enquiries to answer them (observation over time)	Set up simple practical enquiries, comparative and fair tests
Investigative Skills – Collecting data	Make accurate measurements using standard units, using a range of equipment, rulers	Gather, record, classify and present data in a variety of ways to help in answering questions.		Gather, record, classify and present data in a variety of ways to help in answering questions.	Make accurate measurements using standard units, using a range of equipment, rulers
Investigative Skills – Recording	Record findings using simple scientific language, drawings,	Report on findings from enquiries, including oral and written explanations, displays or presentations		Report on findings from enquiries, including oral and written explanations, displays or presentations	Record findings using simple scientific language, drawings,

	labelled diagrams, keys, bar charts and tables.	of results and conclusions		of results and conclusions	labelled diagrams, keys, bar charts and tables.
Investigative Skills – Concluding	<p>With help, Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions.</p> <p>Use straightforward, scientific evidence to answer questions or to support their findings</p> <p>With support, identify new questions arising from data, making predictions for new values within or beyond what has been collected.</p>	<p>With help, Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions.</p> <p>With help, recognise when and how secondary sources might help answer questions that cannot be answered through practical investigation.</p>		<p>With help, Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions.</p> <p>Identify differences, similarities or changes related to simple, scientific ideas and processes</p>	<p>Use results to draw simple conclusions, make predictions, suggest improvements and raise further questions.</p> <p>Use straightforward, scientific evidence to answer questions or to support their findings</p> <p>With support, identify new questions arising from data, making predictions for new values within or beyond what has been collected.</p>



Year 4

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Topic	Sound	Animals Including Humans	Electricity	Living Things and their Habitats	States of Matter
Scientific Knowledge and conceptual understanding	<ul style="list-style-type: none"> • identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear • find patterns between the pitch of 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 increase 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 • 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 • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals 	<ul style="list-style-type: none"> • 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>recognise that environments can change and that this can sometimes pose dangers to living things</p>	<ul style="list-style-type: none"> • 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 associate the rate of evaporation with temperature.

			with being good conductors		
Communicating scientifically (pupils should read and spell scientific vocabulary correctly)	Use the scientific vocabulary of: Sound Vibrate, vibration, vibrating, air, medium, ear, hear, sound, pitch – higher/lower, volume – faint/fainter/loud/louder, distance, size, shape, length	Use the scientific vocabulary of: Animals Including Humans human digestive system, digestion, mouth, tongue, saliva, oesophagus, stomach, small intestine – absorbs, water, vitamins, large intestine – compacts, colon, teeth, incisors – cutting, slicing, canines – ripping, tearing, molars – chewing, grinding, floss, brush, food chain, sun, producers, prey, predators, carnivore, herbivore, omnivore	Use the scientific vocabulary of: Electricity Appliances, electricity, electrical circuit, cell, wire, bulb, buzzer, danger, electrical safety, sign, insulators, conductors, switch, open, closed, simple series circuit,	Use the scientific vocabulary of: States of Matter Compare, group, materials, solids, liquids, gases, change state, heated, cooled, temperature, degrees Celsius (°C), evaporation, condensation, water cycle, evaporation	Living Things and their Habitats Grouping, classifying, animals vertebrate, environment, vertebrate, fish, amphibians, reptiles, birds, mammals, invertebrate, insects, flowering plants (including grasses), non-flowering (including mosses and ferns), human impact, positive - nature reserves, ecologically planned parks, garden ponds negative - population, development, litter, deforestation
Investigative Skills – Enquiry In Year 4, all investigative skills will be initially modelled and supported by the teacher with the expectation that they will become independent by	Ask relevant questions and use different types of scientific enquiries to answer them (identifying) Set up simple practical enquiries, comparative and fair tests.	Ask relevant questions and use different types of scientific enquiries to answer them (observation over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigation); and researching using secondary data)	Ask relevant questions and use different types of scientific enquiries to answer them (comparative and fair testing (controlled investigation); Set up simple practical enquiries, comparative and fair tests.	Ask relevant questions and use different types of scientific enquiries to answer them (classifying and grouping) Set up simple practical enquiries	Ask relevant questions and use different types of scientific enquiries to answer them (observation over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigation); and researching using secondary data)

the end of the year (unless otherwise stated)		Set up simple practical enquiries, comparative and fair tests.			Set up simple practical enquiries, comparative and fair tests.
Investigative Skills – Collecting data	<p>Make accurate measurements using standard units, using a range of equipment, e.g. data loggers.</p> <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p>	Gather, record, classify and present data in a variety of ways to help in answering questions.	<p>Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.</p> <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p>	Gather, record, classify and present data in a variety of ways to help in answering questions	<p>Make accurate measurements using standard units, using a range of equipment, e.g. thermometers.</p> <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p>
Investigative Skills – Recording	<p>Record findings using simple scientific language, drawings, labelled diagrams</p> <p>Report on findings from enquiries, including oral and written explanations and conclusions.</p>	<p>Record findings using simple scientific language, drawings, labelled diagrams,</p> <p>Report on findings from enquiries written explanations and conclusions.</p>	<p>Record findings using simple scientific language, drawings, labelled diagrams,</p> <p>Report on findings from enquiries including oral and written explanations and conclusions.</p>	<p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables (including basic Venn diagrams and simple tables).</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p>	<p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables (including basic Venn diagrams and simple tables).</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p>
Investigative Skills – Concluding	Use results to draw simple conclusions, make predictions, suggest	Use results to draw simple conclusions, make predictions, suggest	Use results to draw simple conclusions, make predictions, suggest improvements	Use results to draw simple conclusions, make predictions, suggest	Use results to draw simple conclusions, make predictions, suggest

	<p>improvements and raise further questions.</p>	<p>improvements and raise further questions.</p> <p>Use straightforward, scientific evidence to answer questions or to support their findings</p>	<p>and raise further questions</p> <p>Identify differences, similarities or changes related to simple, scientific ideas and processes.</p> <p>Use straightforward, scientific evidence to answer questions or to support their findings</p> <p>With support, identify new questions arising from data, making predictions for new values within or beyond what has been collected</p>	<p>improvements and raise further questions.</p> <p>Identify differences, similarities or changes related to simple, scientific ideas and processes.</p>	<p>improvements and raise further questions.</p> <p>Identify differences, similarities or changes related to simple, scientific ideas and processes.</p> <p>Use straightforward, scientific evidence to answer questions or to support their findings</p> <p>With support, identify new questions arising from data, making predictions for new values within or beyond what has been collected.</p> <p>With help, recognise when and how secondary sources might help answer questions that cannot be answered through practical investigation.</p>
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Year 5

	Autumn 1	Autumn 2	Spring 2	Summer 1	Summer 2
Topic	Earth, Moon and Space	Properties and Change of Materials	Animals Including Humans (NC Y6)	Living Things and Their Habitats	Animals Including Humans
Scientific Knowledge and conceptual understanding	<ul style="list-style-type: none"> describe the movement of the Earth, and other planets, relative to the Sun in the solar system describe the movement of the Moon relative to the Earth describe the Sun, Earth and Moon as approximately spherical bodies <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> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 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 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> describe the changes as humans develop to old age

<p>Communicating scientifically (pupils should read, spell and pronounce scientific vocabulary correctly)</p>	<p>Use the scientific vocabulary of: Earth Moon and Space Earth, Sun, Moon, moons, planets, dwarf planets, stars, solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, rotate, day, night, orbit, axis, spherical</p>	<p>Properties and Change of Materials Properties, hardness, solubility, transparency, electrical conductor, thermal conductor, response to magnets, dissolve, solution, separate, separating, solids, liquids, gases, evaporating, reversible changes (dissolving, mixing, evaporation, filtering, sieving, melting) Irreversible changes (new material, burning, rusting), magnetism, electricity, measurements, conductivity, insulation, chemical</p>	<p>Animals including Humans Puberty, life cycle, gestation, growth, reproduce,</p>	<p>Use the scientific vocabulary of: Living Things and their Habitats life cycles, mammal, amphibian, insect, bird, life process of reproduction, plants, reproduction, plants: sexual, asexual, animals: sexual, similarities, differences</p>	<p>Animals including Humans foetus, baby, fertilisation, toddler, child, teenager, adult, old age, life expectancy, adolescence, adulthood, early adulthood, middle adulthood, late adulthood, old age</p>
<p>Investigative Skills – Enquiry</p>	<p>At Year 5, the expectation is that pupils are developing independence in selecting the most appropriate ways to answer science questions.</p> <ul style="list-style-type: none"> • use their science experiences to raise different kinds of questions within scientific topics • 	<p>plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p>			
<p>Investigative Skills – Collecting data</p>	<ul style="list-style-type: none"> • 			<ul style="list-style-type: none"> • take measurements independently, using a range of scientific equipment, with increasing accuracy 	

				and precision, taking repeat readings when appropriate	
Investigative Skills – Recording		record data and results of increasing complexity using Venn and Carroll diagrams	record data and results of increasing complexity using Diagrams	record data and results of increasing complexity using Line graphs record data and results of increasing complexity using Classification keys	record data and results of increasing complexity using Scatter graphs?
Investigative Skills – Concluding	<ul style="list-style-type: none"> identifying scientific evidence that has been used to support or refute ideas or arguments (including showing how thinking about science has changed over time). 	<ul style="list-style-type: none"> use test results to make predictions to set up further comparative and fair tests 	<ul style="list-style-type: none"> 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 		



Year 6

	Autumn 1	Autumn 2	Spring 1	Summer 1	Summer 2
Topic	Living Things and their Habitats	Evolution and Inheritance	Forces (NC Y5)	Light	Electricity
Scientific Knowledge and conceptual understanding	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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, including levers, pulleys and gears, allow a smaller force to have a greater effect. 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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

		and that adaptation may lead to evolution			
<p>Communicating scientifically (pupils should read, spell and pronounce scientific vocabulary correctly)</p>	<p>Use the scientific vocabulary of: Living Things and their Habitats Classify, compare, classification, class, order, family, genus, species, characteristics, vertebrates, invertebrates, microorganisms – bacteria/ fungi/virus, organism,</p>	<p>Use the scientific vocabulary of: Evolution and Inheritance Evolution, adaption, variation, inherited characteristics, adaptive characteristics, natural selection, inheritance, Charles Darwin, DNA, genes, parent, offspring, fossil, environment, habitat, fossilisation, plants, animals, living things</p>	<p>Use the scientific vocabulary of: Forces Gravity, air resistance, water resistance, friction, surface, force, effect, move, accelerate, decelerate, stop, brake, mechanism, pulley, gear, spring, theory of gravitation, Galileo Galilei, Isaac Newton</p>	<p>Use the scientific vocabulary of: Light Light, reflection , light source, shadows, mirrors block , opaque , translucent , transparent, object,</p>	<p>Use the scientific vocabulary of: Electricity Voltage, brightness, volume, switches, danger, series circuit, electrical safety, sign, recognised symbol, circuit diagram, switch, bulb, buzzer, motor, variation, cell, wire, bulb,</p>
<p>Investigative Skills – Enquiry</p>	<p>By Year 6, the expectation is that pupils can independently select the most appropriate ways to answer science questions.</p> <ul style="list-style-type: none"> • use their science experiences to raise different kinds of questions within scientific topics • independently plan different types of scientific enquiries to answer 	<p>By Year 6, the expectation is that pupils can independently select the most appropriate ways to answer science questions.</p> <ul style="list-style-type: none"> • use their science experiences to raise different kinds of questions within scientific topics • independently plan different types of scientific enquiries to 	<p>By Year 6, the expectation is that pupils can independently select the most appropriate ways to answer science questions.</p> <ul style="list-style-type: none"> • use their science experiences to raise different kinds of questions within scientific topics • independently plan different types of scientific enquiries to answer questions: i) comparative and fair 	<p>By Year 6, the expectation is that pupils can independently select the most appropriate ways to answer science questions.</p> <ul style="list-style-type: none"> • use their science experiences to raise different kinds of questions within scientific topics • independently plan different types of scientific enquiries to answer questions: i) 	<p>By Year 6, the expectation is that pupils can independently select the most appropriate ways to answer science questions.</p> <ul style="list-style-type: none"> • use their science experiences to raise different kinds of questions within scientific topics • independently plan different types of scientific enquiries to answer questions: i)

	<p>questions: i) Identifying and Classifying things and ii) observing change over time</p>	<p>answer questions: i) Looking for naturally occurring patterns ii) researching from secondary sources and iii) observing change over time</p>	<p>testing, ii) naturally occurring patterns and iii) research from secondary sources</p>	<p>research from secondary sources and looking for naturally occurring patterns</p>	<p>comparative and fair testing</p>
<p>Investigative Skills – Collecting data</p>	<p>Recognise when identifying and classifying will be helpful to answer questions.</p> <p>Make careful observations.</p>	<p>Recognise when variables cannot be controlled and when pattern seeking will help to answer questions.</p> <p>Make careful observations.</p>	<p>take measurements independently, using a range of scientific equipment, with increasing accuracy and precision:</p> <p>newton meters, timers (split second), taking repeat readings and calculating the mean average</p>	<p>take measurements independently, using a range of scientific equipment, with increasing accuracy and precision:</p> <p>mirrors, protractors,</p>	<p>take measurements independently, using a range of scientific equipment, with increasing accuracy and precision:</p> <p>data loggers</p>
<p>Investigative Skills – Recording</p>	<p>record data and results of increasing complexity using classification keys, scatter graphs (e.g. for length and width of leaves) observations with labelled diagrams,</p>	<p>record data and results of increasing complexity using scientific diagrams and labels, more complex Venn and Carroll diagrams</p>	<p>record data and results of increasing complexity using scientific diagrams and labels, tables, bar and line graphs</p>	<p>record data and results of increasing complexity using scientific diagrams and labels, tables, more complex Venn diagram</p>	<p>record data and results of increasing complexity using scientific diagrams and labels, tables, Carroll diagrams, bar and line graphs</p>
<p>Investigative Skills – Concluding</p>	<p>By Year 6, the expectation is that pupils draw conclusions based on their data and observations, using evidence to justify their ideas and using their scientific knowledge to explain their findings.</p> <ul style="list-style-type: none"> • use test results to make predictions 	<p>By Year 6, the expectation is that pupils draw conclusions based on their data and observations, using evidence to justify their ideas and using their scientific knowledge to explain their findings.</p>	<p>By Year 6, the expectation is that pupils draw conclusions based on their data and observations, using evidence to justify their ideas and using their scientific knowledge to explain their findings.</p> <ul style="list-style-type: none"> • use test results to make predictions to set up further 	<p>By Year 6, the expectation is that pupils draw conclusions based on their data and observations, using evidence to justify their ideas and using their scientific knowledge to explain their findings.</p> <ul style="list-style-type: none"> • report and present findings from 	<p>By Year 6, the expectation is that pupils draw conclusions based on their data and observations, using evidence to justify their ideas and using their scientific knowledge to explain their findings.</p> <ul style="list-style-type: none"> • use test results to make predictions to set up further

	<p>to set up further comparative and fair tests</p> <ul style="list-style-type: none"> report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written form 	<ul style="list-style-type: none"> report and present findings from enquiries in oral forms such as presentations (evolution) and written form (inheritance) identifying scientific evidence that has been used to support or refute ideas or arguments (including showing how thinking about science has changed over time (Darwin). 	<p>comparative and fair tests</p> <ul style="list-style-type: none"> report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments (including showing how thinking about science has changed over time (Galileo & Newton). 	<p>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> <ul style="list-style-type: none"> identify scientific evidence that has been used to support or refute ideas or arguments (including showing how thinking about science has changed over time (Newton). 	<p>comparative and fair tests</p> <ul style="list-style-type: none"> report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral such as displays and other presentations.
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