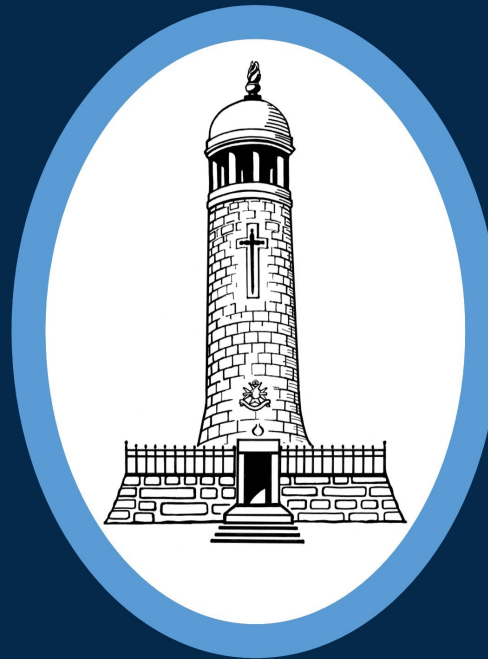


Crich Junior School



Science

Our curriculum is designed using and extending the National Curriculum and conforms to the Equality Act and SEND regulations 2014, which ensures accessibility and inclusion to all children.

At Crich Junior School, our curriculum is designed to build on children's prior learning, provide meaningful and memorable learning experiences where our children are taught to be independent, confident and resilient learners.

Our curriculum has been designed to ensure that all children leave us with a wide body of knowledge, and the skills needed to be successful, lifelong learners with a real curiosity about the world around them.

The curriculum encompasses all the planned learning that is sequenced to promote learning, personal growth and development. Whilst fully including all statutory elements of the National Curriculum, our curriculum also gives our children the chance to explore a variety of additional 'enrichment' experiences, learning and opportunities to ensure all our children thrive and find their passion.

Our children are at the heart of every aspect of our curriculum. Developing the children's ability to learn more, know more and remember more is underpinned by quality first teaching of a broad body of knowledge and vocabulary. We provide engaging opportunities where children are immersed in independent problem solving techniques. We are committed to developing the whole child. Children have a strong awareness of their local community, their role within it and the value they bring to it. Children leave our school with a sense of belonging to an inclusive tightly-knit community where they have the confidence, knowledge and skills to make decisions, self-evaluate, and feel valued.

Our curriculum is based on the following key principles:

- A clear, shared vision of the knowledge and skills our children need to take advantage of future opportunities, responsibilities and experiences of later life.
- Commitment to a rich, varied, academic, practical problem-solving curriculum experience, which is inclusive for all our children.
- A curriculum that reflects the needs of the local community context.
- Planning and sequencing. Knowledge builds on previous learning.

Our Unique Intent:

- Practical Problem Solving rich curriculum
- Bushcraft, gardening, cookery, STEM technologies, local community projects etc
- Develop self worth
- Timetable designed to enable creative curriculum.

I want to be:

**an independent
learner**

resilient

**respectful and
tolerant**

**knowledgeable
and curious**

happy

confident

a team player

creative

**healthy and
active**

**a problem
solver**

kind



Four Year Rolling Programme—Long Term Plan

1	Animals Including Humans 3,4,5,6	Materials and Properties (Y5)	Electricity 4,6	Electricity 4,6	Earth and Space (Y5)	Earth and Space (Y5)
2	Living Things and Their Habitats 4,5,6	Forces 3,5	Forces 3,5	Light 3,6	Scientists and Inventors 3,4,5,6	Sound 4
3	Animals Including Humans 3,4,5,6	Animals Including Humans	Plants 3	Electricity 4,6	Rocks 3	Evolution and Inheritance 6
4	Forces 3,5	Forces 3,5	Living Things and Their Habitats 4,5,6	Light 3,6	Scientists and Inventors 3,4,5,6	States of matter (y4)

Introduction

Science continues to change our lives in many different ways. Learning about scientific knowledge, methods, processes and applications, through a high-quality progressive science education (which is carefully planned to build - year on year - on prior knowledge) provides the foundations for understanding the world in which we live, today and in the future. Children are naturally curious and the teaching of key scientific concepts, knowledge and skills helps children to ask and answer questions and develop a sense of excitement about the world around them. We encourage our children to develop an enquiring mind and analytical thinking skills through an engaging and relevant enquiry-based curriculum. We teach children to recognise the power of rational explanation and develop inquisitiveness and curiosity about natural phenomena. The National Curriculum objectives help children to understand how science can be used to explain what is occurring, predict how things will behave and analyse causes. We understand the power of 'hands-on', practical lessons, with an emphasis on investigations which help to bring the subject to life. Through our science teaching, we want to spark a lifelong interest in the disciplines of biology, chemistry and physics, which helps more children go on to pursue a career in scientific fields.

The national curriculum overview

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

Intent

At Crich Junior School, we aim for every child to experience the buzz and excitement of science. Our intent is to provide a high quality, planned and sequenced science education embedded with meaningful, memorable and practical learning experiences. We aim to stimulate a child's curiosity and interest in finding out why things happen in the way they do and develop an understanding of the science in the world around them. We intend to prepare our children for life in an increasingly scientific and technological world today and in the future. We aim to increase pupil's scientific knowledge and vocabulary and develop pupil's working scientifically skills. Through our science curriculum we enable pupils to build on and link prior learning with new learning.

Implementation

At Crich Junior, Science topics are taught to Y3/4 and Y5/6 in accordance with the National Curriculum.

- Every child will build upon the learning from prior year groups and lessons therefore developing depth of understanding and progression of skills.
- Teachers promote enjoyment and foster interest.
- Children explore, question, predict, plan, carry out investigations and observations as well as conclude their findings.
- Children present their findings and learning using science specific language, observations and diagrams.
- In order to support children in their ability to 'know more and remember more' there are regular opportunities to review the learning taken place in previous topics as well as previous lessons.
- At the start of each topic/lesson children will review previous learning and will have the opportunity to share what they already know about a current topic.
- Children are given a knowledge organiser at the start of each topic which details some key Science Curriculum knowledge, vocabulary, sequence of learning and prior learning. This is not used as part of an assessment, but to support children with their acquisition of knowledge and are used as a reference document.
- Teachers use assessment for learning in each lesson to ensure misconceptions are highlighted and addressed.
- Through using assessment tools, differentiation is facilitated by teachers, to ensure that each pupil can access the Science curriculum.
- End of unit quizzes, four from before, mini plenaries, specific questioning and self/peer assessment is used to inform planning, preparation, differentiation and address misconceptions within that lesson, or for the next lesson.

Cross-curricular links are planned for, with other subjects such as outdoor learning, science week/days and activity days.

Impact

Through a fun, engaging, high quality Science education, we provide children with the foundations for understanding the world. We provide children with opportunities to experience and explore outdoor learning in our school garden, as so much of the Science curriculum lends itself to outdoor learning

Through our Science teaching and learning, children should be able to recall knowledge, use scientific vocabulary and develop scientific skills. This should result in children achieving age related expectations in Science at the end of their cohort year. They will retain knowledge that is pertinent to Science with a real life context. Children will be able to question ideas and reflect on knowledge. They will be able to work collaboratively and practically to investigate and experiment. Children will be able to explain the process they have taken and be able to reason scientifically.

In science, children are monitored on a regular basis to check progress and are encouraged to take responsibility for their own learning. Children are also encouraged to make personal assessments of their own work, through evaluating tasks and identifying what they know or what they would like to know. We also look back at prior learning using questioning, knowledge organisers, four from before, post it notes, fluency sentences and quizzes. Children and adults are able to easily identify progress this way.

Assessment is an integral part of the teaching and learning process. Formative assessment is ongoing during lessons in the form of questioning, class discussions, feedback, exit reviews and mini plenaries. It is used to inform planning, to ensure understanding, to identify any gaps and to ensure progress is being made. Formative assessment grids are used to systematically assess what the children know as the topic progresses and to ensure all national curriculum objectives are achieved. An assessment book is completed by the class teacher at the end of each session to identify children who met the learning objectives and to identify any children who needed support to meet the learning objective.

Skills Progression

Lower KS2 National Curriculum Strands					
Lower KS2 Working Scientifically <ul style="list-style-type: none"> 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. 	Year 3				
	Biology		Chemistry	Physics	
	Animals, including Humans	Plants	Rocks	Forces	Light
	Year 4				
Biology		Chemistry	Physics		
Animals, including Humans	All Living things and their habitats	States of Matter	Electricity	Sound	

Upper KS2 National Curriculum Strands					
Upper KS2 Working Scientifically <ul style="list-style-type: none"> 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. 	Year 5				
	Biology		Chemistry	Physics	
	Animals, including Humans	All Living things and their habitats	Properties and Changes in Materials	Forces	Earth in Space
	Year 6				
Biology		Physics			
Animals, including Humans: Circulatory System	All Living things and their habitats	Evolution and Inheritance	Electricity (Circuits)	Light	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals Including Humans	<p>Pupils should be taught to:</p> <p>identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals;</p> <p>identify and name a variety of common animals that are carnivores, herbivores and omnivores;</p> <p>describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets);</p> <p>identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p>Pupils should be taught to:</p> <p>notice that animals, including humans, have offspring which grow into adults;</p> <p>find out about and describe the basic needs of animals, including humans, for survival (water, food and air);</p> <p>describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p>	<p>Pupils should be taught to:</p> <p>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;</p> <p>identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>	<p>Pupils should be taught to:</p> <p>describe the simple functions of the basic parts of the digestive system in humans;</p> <p>identify the different types of teeth in humans and their simple functions;</p> <p>construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	<p>Pupils should be taught to:</p> <p>describe the changes as humans develop to old age.</p>	<p>Pupils should be taught to:</p> <p>identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood;</p> <p>recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function;</p> <p>describe the ways in which nutrients and water are transported within animals, including humans.</p>
Vocabulary Progression	<p><u>Names of animal groups:</u> fish, amphibians, reptiles, birds, mammals.</p> <p><u>Animal diets:</u> carnivore, herbivore, omnivore.</p> <p><u>Human and animal body parts:</u> e.g. body, head, neck, arms, elbows, legs, knees, face, ears, eyes, nose, hair, mouth, teeth, hands, feet, tail, wings, feathers, fur, beak, fins, gills.</p> <p><u>Human senses:</u> sight, hearing, touch, smell, taste.</p> <p><u>Exploring senses:</u> loud, quiet, soft, rough.</p> <p><u>Other:</u> human, animal, pet.</p>	<p><u>Being born and growing:</u> Young, offspring, live young, grow, develop, change, hatch, lay, fly, crawl, talk.</p> <p><u>Young and adult names:</u> e.g. lamb and sheep, kitten and cat, duckling and duck.</p> <p><u>Life cycle stages:</u> e.g. baby, toddler, child, teenager, adult; frogspawn, tadpole, froglet, frog.</p> <p><u>Survival and staying healthy:</u> basic needs, survive, food, air, exercise, diet, nutrition, healthy, balanced diet, hygiene, germs.</p> <p><u>Food groups:</u> fruit and vegetables, proteins, dairy and alternatives, carbohydrates, oil and spreads, fat, salt, sugar.</p> <p>Previously introduced vocabulary: water.</p>	<p><u>Food groups and nutrients:</u> fibre, fats (saturated and unsaturated), vitamins, minerals.</p> <p><u>Skeletons and muscles:</u> skeleton, muscles, tendons, joints, protection, support, organs, voluntary muscles, involuntary muscles, biceps, triceps, contract, relax, bone, cartilage, shell, vertebrate, invertebrate, endoskeleton, exoskeleton, hydrostatic skeleton.</p> <p><u>Names of human bones:</u> e.g. skull, spine, backbone, vertebral column, ribcage, pelvis, clavicle, scapula, humerus, ulna, pelvis, radius, femur, tibia, fibula.</p> <p>Other: energy.</p> <p>Previously introduced vocabulary: movement.</p>	<p><u>Digestive system:</u> digest, digestion, tongue, teeth, saliva, salivary glands, oesophagus, stomach, liver, pancreas, gall bladder, small intestine, duodenum, large intestine, rectum, anus, faeces, organ.</p> <p><u>Types of teeth and dental care:</u> molar, premolar, incisor, canine, wisdom teeth, tooth decay, plaque, enamel, baby (milk) teeth.</p> <p><u>Food chains and animal diets:</u> decomposer, food web.</p> <p>Previously introduced vocabulary: producer, consumer, prey, predator, excretion, habitat.</p>	<p><u>Process of reproduction:</u> gestation, asexual reproduction, sexual reproduction, sperm, egg, cells, clone.</p> <p><u>Changes and life cycle:</u> embryo, foetus, uterus, prenatal, adolescence, puberty, menstruation, adulthood, menopause, life expectancy, old age, hormones, sweat.</p> <p><u>Changing body parts:</u> e.g. breasts, penis, larynx, ovaries, genitalia, pubic hair.</p> <p>Previously introduced vocabulary: reproduction, reproduce, types of animals and animal groups, fertilisation.</p>	<p><u>Circulatory system:</u> circulation, heart, pulse, heartbeat, heart rate, lungs, breathing, blood vessels, blood, pump, transported, oxygenated blood, deoxygenated blood, oxygen, arteries, veins, capillaries, chambers, plasma, platelets, white blood cells, red blood cells.</p> <p><u>Lifestyle:</u> drug, alcohol, smoking, disease, calorie, energy input, energy output.</p> <p><u>Other:</u> water transportation, nutrient transportation, waste products.</p> <p>Previously introduced vocabulary: carbon dioxide.</p>

	Year 1	Year 2	Year 3			
Plants	<p>Pupils should be taught to:</p> <p>identify and name a variety of common wild and garden plants, including deciduous and evergreen trees;</p> <p>identify and describe the basic structure of a variety of common flowering plants, including trees.</p>	<p>Pupils should be taught to:</p> <p>observe and describe how seeds and bulbs grow into mature plants;</p> <p>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>	<p>Pupils should be taught to:</p> <p>identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers;</p> <p>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;</p> <p>investigate the way in which water is transported within plants;</p> <p>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed disper-</p>			
Vocabulary Progression	<p><u>Names of common plants:</u> wild plant, garden plant, evergreen tree, deciduous tree, common flowering plant, weed, grass.</p> <p><u>Name some features of plants:</u> e.g. flower, vegetable, fruit, berry, leaf/leaves, blossom, petal, stem, trunk, branch, root, seed, bulb, soil.</p> <p><u>Name some common types of plant</u> e.g. sunflower, daffodil.</p>	<p><u>Growth of plants:</u> germination, shoot, seed dispersal, grow, food store, life cycle, die, wilt, seedling, sapling.</p> <p><u>Needs of plants:</u> sunlight, nutrition, light, healthy, space, air.</p> <p><u>Name different types of plant:</u> e.g. bean plant, cactus.</p> <p><u>Names of different habitats:</u> e.g. rainforest, desert.</p> <p>Previously introduced vocabulary: water, temperature, warm, hot, cold, habitat.</p>	<p><u>Water transportation:</u> transport, evaporation, evaporate, nutrients, absorb, anchor.</p> <p><u>Life cycle of flowering plants:</u> pollination (insect/wind), pollen, nectar, pollinator, seed formation, seed dispersal (animal/wind/water), reproduce, fertilisation, fertilise, stamen, anther, filament, carpel (pistil), stigma, style, ovary, ovule, sepal, carbon dioxide.</p> <p>Previously introduced vocabulary: life cycle.</p>			

Living Things and Their Habitats		Year 2		Year 4	Year 5	Year 6
		<p>Pupils should be taught to:</p> <p>explore and compare the differences between things that are living, dead, and things that have never been alive;</p> <p>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;</p> <p>identify and name a variety of plants and animals in their habitats, including microhabitats;</p> <p>describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name differ-</p>		<p>Pupils should be taught to:</p> <p>recognise that living things can be grouped in a variety of ways;</p> <p>explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment;</p> <p>recognise that environments can change and that this can sometimes pose dangers to living things.</p>	<p>Pupils should be taught to:</p> <p>describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird;</p> <p>describe the life process of reproduction in some plants and animals.</p>	<p>Pupils should be taught to:</p> <p>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;</p> <p>give reasons for classifying plants and animals based on specific characteristics.</p>
Vocabulary Progression		<p><u>Living or dead:</u> living, dead, never living, not living, alive, never been alive, healthy.</p> <p><u>Habitats including microhabitats:</u> depend, shelter, safety, survive, suited, space, minibeast, air.</p> <p><u>Life processes:</u> movement, sensitivity, growth, reproduction, nutrition, excretion, respiration.</p> <p><u>Food chains:</u> food sources, food, producer, consumer, predator, prey.</p> <p><u>Names of habitats and microhabitats:</u> e.g. under leaves, woodland, rainforest, sea shore, ocean, urban, local habitat.</p> <p>Previously introduced vocabulary: senses, carnivore, herbivore, omnivore, seed, water, names of materials.</p>		<p><u>Living things:</u> organisms, specimen, species.</p> <p><u>Grouping living things:</u> classification, classification keys, classify, characteristics.</p> <p><u>Names of invertebrate animals:</u> snails and slugs, worms, spiders, insects.</p> <p><u>Invertebrate body parts:</u> e.g. wing case, abdomen, thorax, antenna, segments, mandible, proboscis, prolegs.</p> <p><u>Environmental changes:</u> environment, environmental dangers, adapt, natural changes, climate change, deforestation, pollution, urbanisation, invasive species, endangered species, extinct.</p> <p>Previously introduced vocabulary: carbon dioxide, fish, bird, mammal, amphibian, reptile, skeleton, bone, vertebrate, invertebrate, backbone, names for animal body parts, names of common plants, photosynthesis.</p>	<p><u>Reproduction:</u> asexual reproduction, sexual reproduction, gestation, metamorphosis, gametes, tuber, runners/side branches, plantlet, cuttings, embryo, adolescent, penis, vagina, egg, pregnancy, gestation.</p> <p>Previously introduced vocabulary: life cycle, pollination, offspring, fertilise, fertilisation, sepal, filament, anther, stamen, pollen, petal, stigma, style, ovary, carpel, ovule, stem, bulb, roots, mammal, adult, baby, sperm, cells, live young.</p>	<p><u>Classifying:</u> Carl Linnaeus, Linnaean system, flowering and non-flowering plants, variation.</p> <p><u>Microorganisms:</u> bacteria, single-celled, microbes, microscopic, virus, fungi, fungus, mould, antibiotic, yeast, ferment, microscope, decompose.</p>

Evolution and Inheritance						<p style="text-align: center;">Year 6</p> <p>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>
Vocabulary Progression						<p>Evolution and inheritance: evolve, adaptation, inherit, natural selection, adaptive traits, inherited traits, mutations, theory of evolution, ancestors, biological parent, chromosomes, genes, Charles Darwin.</p> <p>Other: selective breeding, artificial selection, breed, cross breeding, genetically modified food, cloning, DNA.</p> <p>Previously introduced vocabulary: classification, offspring, characteristics, habitat, environment, adapt, variations, human, fossil, suited, cells, names of different habitats, names of animals and their body parts, species, sedimentary rock, lava, igneous rock, metamorphic rock, magma, heat, fossilisation.</p>

Seasonal Changes	Year 1					
	<p>Pupils should be taught to:</p> <p>observe changes across the 4 seasons;</p> <p>observe and describe weather associated with the seasons and how day length varies.</p>					
Vocabulary Progression	<p>Seasons: spring, summer, autumn, winter, seasonal change.</p> <p>Weather: e.g. sun, rain, snow, sleet, frost, ice, fog, cloud, hot/warm, cold, storm, wind, thunder, weather forecast.</p> <p>Measuring weather: temperature, rainfall, wind direction, thermometer, rain gauge.</p> <p>Day length: night, day, daylight.</p>					

Forces			Year 3		Year 5	
			<p>Forces and Magnets</p> <p>Pupils should be taught to:</p> <p>compare how things move on different surfaces;</p> <p>notice that some forces need contact between 2 objects, but magnetic forces can act at a distance;</p> <p>observe how magnets attract or repel each other and attract some materials and not others;</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;</p> <p>describe magnets as having 2 poles;</p> <p>predict whether 2 magnets will attract or repel each other, depending on which poles are facing.</p>		<p>Forces</p> <p>Pupils should be taught to:</p> <p>explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object;</p> <p>identify the effects of air resistance, water resistance and friction, that act between moving surfaces;</p> <p>recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.</p>	
Vocabulary Progression			<p><u>How things move:</u> move, movement, surface, distance, strength.</p> <p><u>Types of forces:</u> push, pull, contact force, non-contact force, friction.</p> <p><u>Magnets:</u> magnetic, magnetic field, magnetic force, bar magnet, horseshoe magnet, ring magnet, magnetic poles (north pole, south pole), attract, repel, compass.</p> <p><u>Magnetic and non-magnetic materials:</u> e.g. iron, nickel, cobalt.</p> <p>Previously introduced vocabulary: metal, names of materials.</p>		<p><u>Types of forces:</u> air resistance, water resistance, buoyancy, upthrust, Earth's gravitational pull, gravity, opposing forces, driving force.</p> <p><u>Mechanisms:</u> levers, pulleys, gears/cogs.</p> <p><u>Measurements:</u> weight, mass, kilograms (kg), Newtons (N), scales, speed, fast, slow.</p> <p><u>Other:</u> streamlined, Earth.</p> <p>Previously introduced vocabulary: air, heat, moon.</p>	

Light			Year 3			Year 6
			<p>Pupils should be taught to:</p> <p>recognise that they need light in order to see things and that dark is the absence of light;</p> <p>notice that light is reflected from surfaces;</p> <p>recognise that light from the sun can be dangerous and that there are ways to protect their eyes;</p> <p>recognise that shadows are formed when the light from a light source is blocked by an opaque object;</p> <p>find patterns in the way that the size of shadows change.</p>			<p>Pupils should be taught to:</p> <p>recognise that light appears to travel in straight lines;</p> <p>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;</p> <p>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;</p> <p>use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>
Vocabulary Progression			<p>Light and seeing: dark, absence of light, light source, illuminate, visible, shadow, translucent, energy, block.</p> <p>Light sources: e.g. candle, torch, fire, lantern, lightning.</p> <p>Reflective light: reflect, reflection, surface, ray, scatter, reverse, beam, angle, mirror, moon.</p> <p>Sun safety: dangerous, glare, damage, UV light, UV rating, sunglasses, direct.</p> <p>Previously introduced vocabulary: opaque, transparent, sunlight,</p>			<p>Reflection: periscope.</p> <p>Seeing light: visible spectrum, prism.</p> <p>How light travels: light waves, wavelength, straight line, refraction.</p> <p>Previously introduced vocabulary: names and properties of materials, absorb.</p>

Sound				<p style="text-align: center;">Year 4</p> <p>Pupils should be taught to: 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 increases.</p>		
Vocabulary Progression				<p><u>Parts of the ear:</u> eardrum.</p> <p><u>Making sound:</u> vibration, vocal cords, particles.</p> <p><u>Measuring sound:</u> pitch, volume, amplitude, sound wave, quiet, loud, high, low, travel, distance.</p> <p><u>Other:</u> soundproof, absorb sound.</p>		

Earth and Space					<p style="text-align: center;">Year 5</p> <p>Pupils should be taught to:</p> <p>describe the movement of the Earth and other planets relative to 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>	
					<p><u>Solar system:</u> star, planet.</p> <p><u>Names of planets:</u> Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus.</p> <p><u>Shape:</u> spherical bodies, sphere.</p> <p><u>Movement:</u> rotate, axis, orbit, satellite.</p> <p><u>Theories:</u> geocentric model, heliocentric model, astronomer.</p> <p><u>Day length:</u> sunrise, sunset, midday, time zone.</p> <p>Previously introduced vocabulary: Sun, moon, shadow, day, night, heat, light, reflect.</p>	
Vocabulary Progression						

Electricity				<p style="text-align: center;">Year 4</p> <p>Pupils should be taught to: 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 with being good</p>		<p style="text-align: center;">Year 6</p> <p>Pupils should be taught to: 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>
	Vocabulary Progression			<p>Electricity: mains-powered, battery-powered, mains electricity, plug, appliances, devices. Circuits: circuit, simple series circuit, complete circuit, incomplete circuit. Circuit parts: bulb, cell, wire, buzzer, switch, motor, battery. Materials: electrical conductor, electrical insulator. Other: safety.</p> <p>Previously introduced vocabulary: names of materials.</p>		<p>Flow and measure of electricity: voltage, amps, resistance, electrons, volts (V), current. Circuits: symbol, circuit diagram, component, function, filament. Variations: dimmer, brighter, louder, quieter. Types of electricity: natural electricity, human-made electricity, solar panels, power station. Other: positive, negative.</p>

	Year 1	Year 2	Year 3	Year 4	Year 5	
Materials	<p>Everyday Materials</p> <p>Pupils should be taught to:</p> <p>distinguish between an object and the material from which it is made;</p> <p>identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock;</p> <p>describe the simple physical properties of a variety of everyday materials;</p> <p>compare and group together a variety of everyday materials on the basis of their simple physical properties.</p>	<p>Use of Everyday Materials</p> <p>Pupils should be taught to:</p> <p>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses;</p> <p>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p>	<p>Rocks</p> <p>Pupils should be taught to:</p> <p>compare and group together different kinds of rocks on the basis of their appearance and simple physical properties;</p> <p>describe in simple terms how fossils are formed when things that have lived are trapped within rock;</p> <p>recognise that soils are made from rocks and organic matter.</p>	<p>States of Matter</p> <p>Pupils should be taught to:</p> <p>compare and group materials together, according to whether they are solids, liquids or gases;</p> <p>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>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>Properties and Changes of Materials</p> <p>Pupils should be taught to:</p> <p>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;</p> <p>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution;</p> <p>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating;</p> <p>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic;</p> <p>demonstrate that dissolving, mixing and changes of state are reversible changes;</p> <p>explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associat-</p>	
Vocabulary Progression	<p><u>Names of materials:</u> wood, plastic, glass, metal, water, rock, paper, cardboard, rubber, fabric.</p> <p><u>Properties of materials:</u> hard, soft, shiny, dull, stretchy, rough, smooth, bendy, not bendy, transparent, opaque, waterproof, not waterproof, absorbent, not absorbent, sharp, stiff.</p> <p><u>Other:</u> object.</p>	<p><u>Changing shape:</u> squash, bend, twist, stretch.</p> <p><u>Properties of materials:</u> e.g. strong, flexible, light, hard-wearing, elastic.</p> <p><u>Other:</u> suitability, recycle, pollution.</p>	<p><u>Types of rock:</u> sedimentary rock, igneous rock, metamorphic rock.</p> <p><u>Properties of rocks:</u> permeable, semi-permeable, impermeable, durable.</p> <p><u>Names of rocks:</u> e.g. marble, chalk, granite, sandstone, slate.</p> <p><u>Formation of rocks and fossils:</u> natural, human-made, magma, lava, molten rock, sediment, erosion, fossilisation, layers, bone, fossil.</p> <p><u>Soil:</u> sandy, chalky, clay, peaty, loamy, topsoil, subsoil, bedrock, mineral, organic matter, compost.</p> <p><u>Other:</u> palaeontology.</p> <p>Previously introduced vocabulary: soil, water, air.</p>	<p><u>States of matter:</u> solids, liquids, gases, particles.</p> <p><u>State change:</u> evaporate, condense, melt, freeze, heat, cool, melting point, freezing point, boiling point, water vapour.</p> <p><u>Water cycle:</u> precipitation, evaporation, condensation, ground run-off, collection, underground water, bodies of water (sea, river, stream), water droplets, hail.</p> <p><u>Other:</u> atmosphere.</p> <p>Previously introduced vocabulary: temperature, rain, cloud, snow, wind, sun, hot, cold, absorb, carbon dioxide</p>	<p><u>Properties of materials:</u> thermal conductor/insulator, magnetism, electrical resistance, transparency.</p> <p><u>Mixtures and solutions:</u> dissolving, substance, soluble, insoluble.</p> <p><u>Changes of materials:</u> reversible change, physical change, irreversible change, chemical change, burning, new material, product.</p> <p><u>Separating:</u> sieving, filtering, magnetic attraction.</p> <p>Previously introduced vocabulary: electrical conductor/insulator, bulb, translucent.</p>	

Scientists and Inventors	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> identify and name a variety of common wild and garden plants, including deciduous and evergreen trees; describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets); identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense; describe the simple physical properties of a variety of everyday materials; compare and group together a variety of everyday materials on the basis of their simple physical properties; observe and describe weather associated with the seasons and how day length varies. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> find out and describe how plants need water, light and a suitable temperature to grow and stay healthy; describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food; describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene; identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses; find out about people who have developed new materials (non-statutory). 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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; identify that humans and some other animals have skeletons and muscles for support, protection and movement; 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; notice that light is reflected from surfaces; observe how magnets attract or repel each other and attract some materials and not others. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> recognise that environments can change and that this can sometimes pose dangers to living things; identify the different types of teeth in humans and their simple functions; 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); recognise that vibrations from sounds travel through a medium to the ear; 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; recognise that a switch opens and closes a circuit and associate this with whether or not a lamp 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird; 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; use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating; describe the movement of the Earth, and other planets, relative to the Sun in the solar system; find out about the work of naturalists and animal behaviourists (non-statutory); describe how scientific ideas have changed over time (non-statutory). 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> give reasons for classifying plants and animals based on specific characteristics; 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; recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago; use recognised symbols when representing a simple circuit in a diagram.

Lower Key Stage 2 National Curriculum 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.

Upper Key Stage 2 National Curriculum 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.

Plan	LKS2	UKS2
	<p>Lower KS2 Science National Curriculum Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Children can:</p> <ul style="list-style-type: none"> a start to raise their own relevant questions about the world around them in response to a range of scientific experiences; b start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; c recognise when a fair test is necessary; d help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. 	<p>Upper KS2 Science National Curriculum Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Children can:</p> <ul style="list-style-type: none"> a with growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences; b with increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; c explore and talk about their ideas, raising different kinds of scientific questions; d ask their own questions about scientific phenomena; e select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; f make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; g plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary.

	LKS2	UKS2
Do	<p>Lower KS2 Science National Curriculum</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Children can:</p> <ul style="list-style-type: none"> a make systematic and careful observations; b observe changes over time; c use a range of equipment, including thermometers and data loggers; d ask their own questions about what they observe; e where appropriate, take accurate measurements using standard units using a range of equipment; f set up and carry out simple comparative and fair tests; g talk about criteria for grouping, sorting and classifying; h group and classify things. 	<p>Upper KS2 Science National Curriculum</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Children can:</p> <ul style="list-style-type: none"> a choose the most appropriate equipment to make measurements and explain how to use it accurately; b take measurements using a range of scientific equipment with increasing accuracy and precision; c make careful and focused observations; d know the importance of taking repeat readings and take repeat readings where appropriate; e independently group, classify and describe living things and materials; f use and develop keys and other information records to identify, classify and describe living things and materials.

	LKS2	UKS2
Record	<p>Lower KS2 Science National Curriculum</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Children can:</p> <ul style="list-style-type: none"> a collect data from their own observations and measurements; b present data in a variety of ways to help in answering questions; c use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge; d record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables. 	<p>Upper KS2 Science National Curriculum</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Children can:</p> <ul style="list-style-type: none"> a decide how to record data from a choice of familiar approaches; b record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.

	LKS2	UKS2
Review	<p>Lower KS2 Science National Curriculum</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>Children can:</p> <ul style="list-style-type: none"> a draw simple conclusions from their results; b make predictions; c suggest improvements to investigations; d raise further questions which could be investigated; e first talk about, and then go on to write about, what they have found out; f report and present their results and conclusions to others in written and oral forms with increasing confidence; g make links between their own science results and other scientific evidence; h identify similarities, differences, patterns and changes relating to simple scientific ideas and processes; i use straightforward scientific evidence to answer questions or support their findings; j recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. 	<p>Upper KS2 Science National Curriculum</p> <p>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> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Children can:</p> <ul style="list-style-type: none"> a notice patterns; b draw conclusions based in their data and observations; c use their scientific knowledge and understanding to explain their findings; d read, spell and pronounce scientific vocabulary correctly; e identify patterns that might be found in the natural environment; f look for different causal relationships in their data; g discuss the degree of trust they can have in a set of results; h independently report and present their conclusions to others in oral and written forms; i use their test results to identify when further tests and observations may be needed; j use test results to make predictions for further tests; k use primary and secondary sources evidence to justify ideas; l identify evidence that refutes or supports their ideas; m recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact; n use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas; o talk about how scientific ideas have developed over time.

