

# Science Curriculum 2023/24 – Years 5 & 6

	Autumn 1	Autumn 2
Topic	<p><b>Evolution and Inheritance</b></p> <p>Children will explore the concept of species as a set of distinct individuals. They will learn how offspring inherit different characteristics from both of their parents, causing variation. Children will learn about the theory of evolution and natural selection, that species adapt in response to environmental conditions in order to survive, and as a result, living things have changed over millions of years. Children will understand that we are continuing to learn about what life was like in the past due to the work of scientists and also from fossils.</p>	<p><b>Electricity</b></p> <p>Children will learn to recognise and use symbols to draw a simple circuit as a diagram. They will learn that components function differently depending on the voltage, and they will systemically measure the effects of changing one component at a time, looking at the effects of changes on the brightness of a bulb, the loudness of a buzzer, positions of switches etc. Children will be reminded of the dangers of electricity and will be taught necessary precautions of how to stay safe.</p>
Knowledge	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Know that living things have changed over time, and that fossils (studied by palaeontologists) provide information about living things that inhabited the Earth millions of years ago.</li> <li>Know that living things produce offspring of the same kind and pass on characteristics, but normally offspring vary and are not identical to their parents, for instance, different breeds of dog.</li> <li>Know that species adapt over time to suit their environment in order for the species to survive, known as Natural selection (a scientific theory used by biologists, such as Charles Darwin and Alfred Wallace).</li> <li>Know how Dr Konstantina Drosou's work on Ancient Egyptian DNA helps to uncover what life was like in the past.</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>Know how to raise questions about local animals and how they are adapted to their environment</li> <li>Know how to compare how some living things are adapted to survive in extreme conditions, for example, cactuses, polar bears and camels.</li> <li>Know how to identify scientific evidence that has been used to support or refute ideas or arguments, in relation to The Theory of Evolution</li> <li>Know how to record data and results of increasing complexity, using tables and bar graphs</li> </ul>	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Know that electricity is a type of energy that builds up in one place (static), or flows from one place to another (current electricity).</li> <li>Know of and use recognised symbols when representing a simple circuit in a diagram.</li> <li>Know how to construct a simple series circuit to answer questions about what happens when different components are added, for example: switches, bulbs, buzzers and motors.</li> <li>Know that the brightness of a bulb or the volume of a buzzer is associated with the number and voltage of cells used in a circuit.</li> <li>Know that the brightness of a bulb, the loudness of buzzers, positions of switches and the length of wires cause variation in how components function.</li> <li>Know the necessary precautions for working safely with electricity (for example: no trailing cables, don't overload sockets and avoid contact with power lines) and the need for fuses.</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>Know how to systemically identify the effect of changing one component at a time in a simple series circuit, deciding on what components to change and which to keep the same.</li> <li>Know how to report and present findings from enquiries, including conclusions, causal relationships, in oral and written forms such as presentations.</li> <li>Know how to use findings to make appropriate, linked predictions and ask further questions.</li> </ul>
Vocab	<p>evolution, natural selection, adaptation, inheritance, genes, DNA, palaeontologist, species, reproduction, offspring, characteristics, appearance, variation</p>	<p>simple series circuit, components, static, current, voltage, fuses, filament, resistance (<i>Note: cells and batteries are used interchangeably</i>)</p>



# Science Curriculum 2023/24 – Years 5 & 6

	Spring 1	Spring 2
Topic	<p><b>Light</b></p> <p>Children will revisit light work from year 3 and be clear about light sources and objects that reflect light. They will learn how light travels and how we see things. They will learn the function of the pupil in our eye, and they will observe how it changes size in relation to how much light is present. Children will understand that shadows have the same shape as objects that cast them, in relation to the idea that light travels in straight lines. They will also learn about Newton's discovery, that light does not reveal colour, but is responsible for producing colour by refracting white light.</p>	<p><b>Living Things in Their Habitat</b></p> <p>Children will build on their learning from year 4 by looking at the classification system in more detail. They will learn how to classify plants, animals and microorganisms into broad groups, and they will be introduced to the idea that broad groupings can also be sub-divided. Through direct observation, where possible, they should classify plants and animals. They should discuss reasons why living things are placed in one group and not another. Pupils will find out about the work of scientists such as Carl Linnaeus and Jackie Litzgus.</p>
Knowledge	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Know that light travels in straight lines (until it hits an object that bends it).</li> <li>Know that objects are seen because they give out or reflect light.</li> <li>Know that we see things because light travels in straight lines from light sources to our eyes or from light sources to objects and then to our eyes and then to our brain.</li> <li>Know that the pupil controls the amount of light that enters our eyes and that it changes size according to how much light is present; it is smaller in bright light and becomes larger when there is less light.</li> <li>Know that shadows have the same shape as objects that cast them, using the idea that light travels in straight lines.</li> <li>Know that Isaac Newton came up with the Theory of Light and Colour and learn about the important work of Patricia Bath, an eye doctor.</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>Know how to use results to draw conclusions about how light travels.</li> <li>Know how to use scientific evidence to answer questions about how objects are seen.</li> <li>Know how to use scientific evidence to support findings about the shape of shadows.</li> <li>Know how to present observations using labelled diagrams.</li> </ul>	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Know that vertebrates are classified into broad groups including: fish, amphibians, reptiles, birds and mammals, according to common observable characteristics and based on similarities and differences, and discuss reasons why they are placed in one group and not another.</li> <li>Know that invertebrates are classified into broad groups including: insects, spiders, snails and worms, according to common observable characteristics and based on similarities and differences, and discuss reasons why they are placed in one group and not another.</li> <li>Know that plants are classified in to broad groups including: plants that produce seeds and do not produce seeds; flowering and non-flowering; trees including conifers; shrubs; mosses; and grasses, according to common observable characteristics and based on similarities and differences, and discuss reasons why they are placed in one group and not another.</li> <li>Know that microorganisms are classified into broad groups including: bacteria, fungi and viruses; and also, that some are helpful whilst others are harmful.</li> <li>Know about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification; and Jackie Litzgus, a herpetologist, who studies reptiles and amphibians.</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>Know how to make direct observations to identify animals and plants in their immediate environment.</li> <li>Know how to use keys and charts to classify unfamiliar plants and animals, based on specific characteristics.</li> </ul>
Vocabulary	light source, light wave, straight lines, pupil, reflect, shadow, prism, spectrum	micro-organism, fungi, bacteria, virus, vertebrate, invertebrate, reptile, amphibian, mammal, fish, bird, exoskeleton, insects, spiders, snails worms, moss, fern, conifers, shrubs flowering, non-flowering, seeds



# Science Curriculum 2023/24 – Years 5 & 6

	Summer 1	Summer 2
Topic	<p><b>Animals Including Humans</b></p> <p>Pupils build on their learning from years 3 and 4 about the main parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Children will explore the position, size and shape of the heart, and they will watch a demonstration of a heart being dissected. They will understand that the main blood vessels take blood in and out of the heart. They will learn about blood and that it carries oxygen around the body to every part that needs to function. Children will explore the work of a cardiologist and the importance of this line of work.</p>	<p><b>Animals Including Humans</b></p> <p>Learning is continued across the term. Pupils will learn how to keep their bodies healthy, by eating a balanced diet and exercising regularly, and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. They will carry out an investigate how too much sugar in our diet may increase the risk of a heart attack. Pupils will explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health, and they will learn that Alexander Fleming was the founder of penicillin and of the impacts that this discovery has had.</p>
Knowledge	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Know about the position, size and shape of the heart, what it is made of and of its function, that is pumps blood and oxygen around the body.</li> <li>Know what blood is made up of and of its function, that is transports materials around the body and protects it against disease.</li> <li>Know that the heart, lungs, arteries, veins and blood are the main parts of the human circulatory system.</li> <li>Know the function of blood vessels, that arteries carry oxygen around the body and veins carry waste out of the lungs.</li> <li>Know the ways in which nutrients and water are transported within animals, including mammals, fish and insects.</li> <li>Know about the work of Dr Yaso Emmanuel (a cardiologist) and understand the impacts of her work.</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>Know how to present knowledge in a variety of ways, including labelled diagrams, written descriptions and verbal presentations.</li> </ul>	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Know that our diet impacts on the way our bodies function.</li> <li>Know that we can keep our bodies healthy by exercising regularly and investigate how exercise impacts on the way our bodies function.</li> <li>Know that lifestyle can impact on the way our bodies function, including the amount of sleep we have.</li> <li>Know that drugs impact on the way our bodies function, both positively and negatively.</li> <li>Know that Alexander Fleming was the founder of penicillin and understand the impacts of this discovery.</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>Know and explain when to take repeat measurements in order to conduct a fair test.</li> <li>Know how to take accurate measurements, including using pulse meters and stop watches.</li> <li>Know how to gather, record and present data of how our heart rate changes over time in tables and line graphs.</li> <li>Know how to use scientific evidence to answer questions about the relationship between diet, exercise, drugs, lifestyle and health.</li> </ul>
Vocab	circulatory system, heart, muscles, lungs, blood, oxygen, waste, blood cells, blood vessels, arteries, veins, organs, nutrients, cardiologist	balanced diet, carbohydrates, protein, dairy, fruit & vegetables, fats, sugar, nutrients, obesity, hydration, exercise, pulse, fitness, nicotine



# Science Curriculum 2024/25 – Years 5 & 6

	Autumn 1 and Autumn 2
Topic	<p><b>Properties and changes of materials</b></p> <p>Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4.</p>
Knowledge	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know that everyday materials can be grouped together using properties such as: hardness, solubility, transparency, conductivity.</li> <li>• Know about solids, liquids and gases and the difference in the particles of these</li> <li>• Know that solids, liquids and gases can be separated through filtering, sieving and evaporation.</li> <li>• Know that some materials will dissolve in liquid form to form a solution.</li> <li>• Know how to recover a substance from a solution.</li> <li>• Know and identify reversible and irreversible changes.</li> <li>• Know that some changes result in the formation of new materials and that this is not usually reversible.</li> <li>• Know that some changes are difficult to transfer.</li> <li>• Know about the scientists Silver Spencer and Stephanie Kwolek and understand the impact of their work</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>• Know how to conduct a comparative and fair test.</li> <li>• Know how to record data and results of increasing complexity, using tables and bar graphs</li> <li>• Know how to observe and compare the changes that take place</li> <li>• give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> </ul>
Vocab	<p>Dissolve, soluble, solution, particles, sieving, filtering, evaporation, reversible changes, irreversible changes, separate.</p> <p>Solid, liquid, gas</p>



# Science Curriculum 2024/25 – Years 5 & 6

	Spring 1	Spring 2
Topic	<b>Earth &amp; Space</b> Children will learn about our Earth, the sun, the moon and the solar system and in particular how the relationship between them creates night and day.	<b>Living Things and their Habitats</b> Children will learn about life cycles and reproduction and they will work scientifically to observe, compare and ask questions.
Knowledge	<b>Knowledge</b> <ul style="list-style-type: none"> <li>Know how to describe the movement of the Earth and other planets relative to the sun in the solar system.</li> <li>Know how to describe the movement of the moon relative to the Earth.</li> <li>Know to describe the sun, Earth and moon as approximately spherical bodies.</li> <li>Know how to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> <li>Know how to use a model of the sun and Earth to explain day and night.</li> <li>Know that the sun is a star at the centre of our solar system and that it has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).</li> <li>Know that a moon is a celestial body that orbits a planet (Earth has 1 moon; Jupiter has 4 large moons and numerous smaller ones).</li> <li>Know that it is not safe to look directly at the sun, even when wearing dark glasses.</li> <li>Know how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.</li> </ul> <b>Skills</b> <ul style="list-style-type: none"> <li>Know how to compare the time of day at different places on the Earth through internet links and direct communication.</li> <li>Know how to create a simple model of the solar system.</li> <li>Know how to construct a simple shadow clock and sundial, calibrated to show midday and the start and end of the school day;</li> </ul>	<b>Knowledge</b> <ul style="list-style-type: none"> <li>Know how to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</li> <li>Know how to describe the life process of reproduction in some plants.</li> <li>Know how to study and raise questions about the local environment throughout the year.</li> <li>Know how to observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment.</li> <li>Know about the work of naturalists and animal behaviourists including David Attenborough and Jane Goodall.</li> <li>Know about different types of reproduction, including sexual and asexual reproduction in plants.</li> </ul> <b>Skills</b> <ul style="list-style-type: none"> <li>Know how to observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world.</li> <li>Know how to ask pertinent questions and suggest reasons for similarities and differences.</li> <li>Know how to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs.</li> <li>Know how to observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.</li> </ul>
Vocab	sun, moon, planets, stars, solar system, Earth, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, dwarf planet, asteroids, comets, day, night, orbit, rotate, tilt, axis, gravity, spherical bodies, phases of the moon	life cycle, mammal, amphibian, insect, bird, life process, reproduction, naturalist, sexual reproduction, asexual reproductions, reproduce



# Science Curriculum 2024/25 – Years 5 & 6

Summer 1 & 2	
Topic	<p><b>Forces</b></p> <p>Children will learn about and experience a range of forces. They will work scientifically by asking questions, designing and making models, carrying out fair tests, observing and recording.</p>
Knowledge	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>• Know the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>• Know that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</li> <li>• Know how to explore falling objects and raise questions about the effects of air resistance.</li> <li>• Know how to explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.</li> <li>• Know and experience forces that make things begin to move, get faster or slow down.</li> <li>• Know how to explore the effects of friction on movement and find out how it slows or stops moving objects.</li> <li>• Know how to explore the effects of levers, pulleys and simple machines on movement</li> <li>• Know how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>• To plan and carry out a fair test</li> <li>• To make sensible predictions</li> <li>• To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• To record findings using a table and graph</li> </ul>
Vocab	force, friction, gravity, gravitational pull, air resistance, water resistance, surfaces, levers, pulleys, gears, theory

