



## Science – Progression in Knowledge, Scientific Enquiry and Vocabulary

Year Six	Autumn One Physics	Autumn Two Physics	Spring One Biology	Spring Two Biology	Summer One Biology	Summer Two Biology
	Light – crime lab investigations	Electric celebrations	Living things and their habitats Classification connoisseurs	Evolution and inheritance Game of survival	The art of being human	The science of sport
Key prior knowledge	Year 3	Year 4	Year 2	New Unit	Year 4	All
<b>Unit Objectives</b>	<p><b>Content</b></p> <ul style="list-style-type: none"> <li>i) recognise that light appears to travel in straight lines</li> <li>ii) 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</li> <li>iii) 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</li> <li>iv) use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</li> </ul>	<p><b>Content</b></p> <ul style="list-style-type: none"> <li>i. associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li> <li>ii. 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</li> <li>iii. use recognised symbols when representing a simple circuit in a diagram</li> </ul>	<p><b>Content</b></p> <ul style="list-style-type: none"> <li>i. 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</li> <li>ii. give reasons for classifying plants and animals based on specific characteristics</li> </ul>	<p><b>Content</b></p> <ul style="list-style-type: none"> <li>i. recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li> <li>ii. recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</li> <li>iii. identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</li> </ul>	<p><b>Content</b></p> <ul style="list-style-type: none"> <li>i. identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</li> <li>ii. recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</li> <li>iii. describe the ways in which nutrients and water are transported within animals, including humans</li> </ul>	<p><b>Content</b></p> <p><b>Living Things and their Habitats</b></p> <ul style="list-style-type: none"> <li>i. 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</li> </ul> <p><b>Properties of Materials</b></p> <ul style="list-style-type: none"> <li>i. compare and group together everyday materials on the basis of their properties</li> <li>ii. give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> </ul> <p><b>Forces</b></p> <ul style="list-style-type: none"> <li>i. explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>ii. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>iii. recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</li> </ul> <p><b>Animals including Humans</b></p>



						<p>i. recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>ii. recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p><b>Electricity</b></p> <p>i. associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>ii. 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</p> <p>iii. use recognised symbols when representing a simple circuit in a diagram</p>
<b>Key enquiries</b>	<p>Session 1 <b>Light specialists required</b></p> <p>Session 2 <b>Light travels in straight lines</b></p> <p>Session 3 <b>Up periscope</b></p> <p>Session 4 <b>Shadow giants</b></p> <p>Session 5 <b>It's a rainbow world</b></p> <p>Session 6 <b>A trick of the colourful light filters</b></p>	<p>Session 1: <b>Electrical festive challenge</b></p> <p>Session 2: <b>Playing with electricity</b></p> <p>Session 3: <b>Designs, ideas and circuit diagrams</b></p> <p>Session 4: <b>Create a dimmer switch</b></p> <p>Session 5: <b>Create festive lights prototype</b></p> <p>Session 6: <b>Entering the Dragons' Den</b></p>	<p>Session 1 <b>Finding Linnaeus</b></p> <p>Session 2 <b>Odd one out</b></p> <p>Session 3 <b>The Sweetness of Classification</b></p> <p>Session 4 <b>Classification in your back yard</b></p> <p>Session 5 <b>Quirky creatures</b></p> <p>Session 6 <b>New creature features</b></p>	<p>Session 1 <b>Inheritance detective</b></p> <p>Session 2 <b>Mutations and adaptations</b></p> <p>Session 3 <b>Extreme survival</b></p> <p>Session 4 <b>Meet the evolutionary pioneers</b></p> <p>Session 5 <b>Evolutionary trees and fossils</b></p> <p>Session 6 <b>The tale of the giraffe's neck</b></p>	<p>Session 1 <b>Blood Composition &amp; Function</b></p> <p>Session 2 <b>The Heart</b></p> <p>Session 3 <b>Nutrient Detective</b></p> <p>Session 4 <b>The Circulatory System</b></p> <p>Session 5 <b>A Healthy Body: Diet, Exercise &amp; Lifestyle</b></p> <p>Session 6 <b>A Healthy Body: Drugs and Alcohol</b></p>	<p>Session 1 <b>Tantalising Turf (classification)</b></p> <p>Session 2 <b>Sports Kit &amp; Equipment Enquiry (materials)</b></p> <p>Session 3 <b>Harnessing Sports Forces (air resistance &amp; friction)</b></p> <p>Session 4 <b>Human Body and Sports (exercise, nutrition &amp; injury)</b></p> <p>Session 5 <b>Sports Talent (inheritance)</b></p> <p>Session 6 <b>Lighting up Sports Stadiums (electricity)</b></p>
<b>Sticky Knowledge</b>	<p>Know that light appears to travel in straight lines.</p> <p>Understand that we see things because our eyes receive light.</p>	<p>Know that batteries are a store of energy and that this energy pushes electricity around the circuit. When the battery's energy is gone it stops pushing.</p>	<p>Know that classification across all living things is based upon observable characteristics, with organisms in the same group sharing a common set of</p>	<p>Know that offspring are of the same kind as their parents but normally vary from them and from each other;</p> <p>Know that individuals in a population show variation that</p>	<p>Know that animals have a circulatory system with many important functions including supplying all parts of the body with oxygen and nutrients</p>	<p>See previous units</p>



	<p>Understand that we see most objects because light from a light source travels to the object and then to our eyes, unless it is a light source in which case we see light that travels from it directly to our eyes.</p> <p>Develop a more advanced understanding about reflection and its uses:</p> <ul style="list-style-type: none"> <li>that we can use mirrors to see round corners;</li> <li>that mirrors reflect an image of any object because light bounces off a mirror in exactly the same pattern as it arrives;</li> <li>that light is reflected by different amounts depending on the roughness and colour of an object (for example, a white object reflects more light than a dark object).</li> </ul> <p>Develop a more advanced understanding about shadows:</p> <ul style="list-style-type: none"> <li>that shadows have the same shape as the objects that cast them because light travels in a straight line;</li> <li>that light passes through some material (transparent) and not others (opaque), and how this affects the ability of an object to form shadows;</li> <li>how the size of a shadow changes when the distance from the light source, or between the light source and the object, changes;</li> </ul>	<p>Know that voltage is the force that measures the push and is measured in volts.</p> <p>Know that the greater the current flowing through a device the harder it works and that current is how much electricity is flowing around a circuit.</p> <p>Understand that when current flows through wires, heat is released; the greater the current, the more heat.</p> <p>Know that the more cells, the stronger the electric current which will impact on the brightness of a bulb or volume of a buzzer.</p>	<p>characteristics that are unique to that group.</p> <p>Know that classification based on specific characteristics is done for many reasons:</p> <ul style="list-style-type: none"> <li>To help identify and organise the vast number of different living organisms</li> <li>To help understand how living organisms are related to each other and how they have changed over time</li> <li>To help scientists in their conservation efforts.</li> </ul>	<p>can lead to them being more or less successful in a given environment;</p> <p>Know that over a long timescale this may lead to evolution of a population;</p> <p>Identify how animals and plants are adapted to suit their environment in different ways;</p> <p>Know that living things have changed over time, generally very slowly over many generations;</p> <p>Know that fossils provide information about the living things that inhabited the Earth millions of years ago as well as a record of how living things have changed over time.</p>	<p>needed for energy and growth and removing waste products from these areas.</p> <p>Know that the main parts of the human circulatory system are the blood, blood vessels and the heart.</p> <p>Know that this is a closed system in which the heart pumps blood round the blood vessels to reach all parts of the body.</p> <p>Know that other animals have different types of circulatory systems, which serve similar functions to the circulatory system in humans.</p> <p>Know that we need a sensible diet and lifestyle, including plenty of exercise, to keep our bodies healthy.</p> <p>Know that some lifestyles, diets and drugs are harmful, in particular because of the effect they have on the heart and circulatory system.</p>	
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	<p>how the length and position of a shadow depends on the position of the Sun in the sky and that this will change depending on the time of the day and the time of the year. Know that when light travels through an object it can bend. This effect, known as refraction, can cause objects to appear distorted, for example, a pen at an angle in a glass of water. Refraction also explains why rainbows happen.</p>					
<b>Scientific Enquiry</b>	<p>i) planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary            ii) taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate            iii) recording results using scientific diagrams and labels, tables, scatter graphs, bar and line graphs            iv) using test results to make predictions to set up further comparative and fair tests            v) 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            vi) identifying scientific evidence that has been used to support or refute ideas or arguments</p>	<p>i. plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary            ii. take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate            iii. record results using scientific diagrams and labels            iv. use test results to make predictions to set up further comparative and fair tests            v. 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            vi. identify scientific evidence that has been used to support or refute ideas or arguments</p>	<p>i. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary            ii. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate            iii. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs            iv. using test results to make predictions to set up further comparative and fair tests            v. 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            vi. identifying scientific evidence that has been used to</p>	<p>i. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary            ii. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate            iii. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs            iv. using test results to make predictions to set up further comparative and fair tests            v. 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            vi. identifying scientific evidence that has been used to</p>	<p>i. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary            ii. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate            iii. 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            iv. identifying scientific evidence that has been used to support or refute ideas or arguments</p>	<p>i. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary            ii. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate            iii. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs            iv. using test results to make predictions to set up further comparative and fair tests            v. 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            vi. identifying scientific evidence that has been used to</p>



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<b>Vocabulary</b>	light, light source, names of light sources, dark, reflect, reflective, mirror, shadow, block, absorb, direct/ direction, transparent, opaque, translucent, straight, rainbow, colours, refraction, magnifying glass, bend	electricity, electrical circuit, complete circuit, circuit symbol, components, cell, battery, positive/negative, connect/connection, loose connection, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), voltage, current, conductor, insulator, metal/non-metal, enquiry question, investigation, findings, conductor, insulator, metal/non-metal, enquiry question, investigation, findings  terminal, short circuit, resistance	classification, kingdom, phylum, class, order, family, genus, species, Linnaeus, opinion, similarities, differences, classification key, opinion, group, observations, support, refute, branching classification key, micro-organism, organism, taxonomy	offspring, characteristics, vary/variation, inherit/inheritance, environmental variation, suited/suitable, environment, adapted/adaptation, characteristics, natural selection, evolution, fossils, theory, opinion, cladogram	blood, blood vessels, arteries, veins, capillaries, heart, pumps, oxygen, carbon dioxide, lungs, nutrients, water, circulatory system, exercise, diet, lifestyle, health  drugs, lifestyle, addiction, disease, medicine, alcohol, cigarettes, stimulant, depressant, analgesic, hallucinogen	classification, grass, angiosperm, growth, monocotyledon, key, variables, conditions for growth, conclusions  materials, properties, fair test, investigate, fitness for purpose, comparison  force, push, pull, air resistance, friction, fair test, variables  diet, exercise, muscles, heart rate, lifestyle, fitness, injury  inheritance, environmental factors, genetic, muscles, heart rate, cardiac capacity, lung capacity  circuit, voltage, cell, battery, bulb, switch, timer, bright, dim, light meter