

Year 6 – Animals, including Humans

| National Curriculum Objectives   | Sticky Knowledge   | Vocabulary   |   |
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| <ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</li> <li>Describe the ways in which nutrients and water are transported within animals, including humans.</li> </ul> | <ul style="list-style-type: none"> <li>The heart pumps blood around the body.</li> <li>Oxygen is breathed into the lungs where it is absorbed by the blood.</li> <li>Muscles need oxygen to release energy from food to do work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood.)</li> </ul> | Oxygenated, Deoxygenated, Valve, Exercise, Respiration Circulatory system, heart, lungs, blood vessels, blood, artery, vein, pulmonary, alveoli, capillary, digestive, transport, gas exchange, villi, nutrients, water, oxygen, alcohol, drugs, tobacco.  |   |
|  |  | Key Scientists   | Linked Texts  |
|  |  | <p><b>Justus von Liebig</b><br/>(Theories of Nutrition and Metabolism)</p> <p><b>Sir Richard Doll</b><br/>(Linking Smoking and Health Problems)</p> <p><b>Leonardo Da Vinci</b><br/>(Anatomy)</p>  | <p><i><b>Pig-Heart Boy</b></i><br/>(Malorie Blackman)</p> <p><i><b>Skellig</b></i><br/>(David Almond)</p> <p><i><b>A Heart Pumping Adventure</b></i><br/>(Heather Manley)</p> |
| <p align="center">Prior Learning</p>   | <p align="center">Key Question(s):</p>   | <p align="center">Future Learning</p>  |   |
| <p>In Year 5 children should:</p> <ul style="list-style-type: none"> <li>Describe the changes as humans develop to old age.</li> <li>Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird.</li> <li>Know the differences between different life cycles.</li> </ul>  | <ul style="list-style-type: none"> <li>Why do we need oxygen?</li> <li>How do we breathe?</li> <li>Do fish and plants breathe?</li> <li>Do all living things need oxygen?</li> <li>How does the size of a person's lungs affect their lung capacity?</li> </ul>  | <p>In Key Stage 3 children will learn about:</p> <ul style="list-style-type: none"> <li>the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</li> <li>the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)</li> <li>calculations of energy requirements in a healthy daily diet</li> </ul> |   |

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| <ul style="list-style-type: none"> <li>Know the process of reproduction in plants.</li> <li>Know the process of reproduction in animals.</li> </ul> | <ul style="list-style-type: none"> <li>Are there ways to increase/decrease our lung capacity? Is lung capacity fixed?</li> <li>Why do we have blood?</li> <li>How does our heart work?</li> <li>How does size of muscle affect our pulse rate?</li> <li>How does exercise effect our pulse rate?</li> <li>How might the circulatory system of an elephant, a hummingbird, or a polar bear differ?</li> <li>Is the air you breathe out, the same as that you breathe in?</li> </ul> | <ul style="list-style-type: none"> <li>the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</li> <li>the structure and functions of the gas exchange system in humans, including adaptations to function</li> <li>the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.</li> </ul> |
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**Teaching Ideas**

| <u>Comparative tests</u>   | <u>Identify &amp; Classify</u>  | <u>Observation over time</u>   | <u>Pattern Seeking</u>   | <u>Research</u>   | <u>BIG Question – Assessment Opportunity</u>   |
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| <p><b>How does the length of time we exercise for affect our heart rate?</b></p> <p><b>Can exercising regularly affect your lung capacity?</b></p> <p><b>Which type of exercise has the greatest effect on our heart rate?</b></p> | <p>Which organs of the body make up the circulation system, and where are they found?</p> | <p>How does my heart rate change over the day?</p> <p>How much exercise do I do in a week?</p> | <p>Is there a pattern between what we eat for breakfast and how fast we can run?</p> | <p>How have our ideas about disease and medicine changed over time?</p> | <p>How do our choices affect how our bodies work?</p> <p>Why does my heart beat?</p> |

## Year 6 – Evolution & Inheritance

| National Curriculum Objectives  | Sticky Knowledge  | Vocabulary   |  |
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| <ul style="list-style-type: none"> <li>• Know about evolution and can explain what it is.</li> <li>• Know how fossils can be used to find out about the past.</li> <li>• Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</li> <li>• Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution- 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> </ul> | <ul style="list-style-type: none"> <li>• Life cycles have evolved to help organisms survive to adulthood.</li> <li>• Over time the characteristics that are most suited to the environment become increasingly common.</li> </ul> <p><i>NB: The following could be duplicated in Year 6 Living things and their habitats.</i></p> <ul style="list-style-type: none"> <li>• Organisms best suited to their environment are more likely to survive long enough to reproduce. Organisms are best adapted to reproduce are more likely to do so.</li> <li>• Organisms reproduce and offspring have similar characteristic patterns.</li> <li>• Variation exists within a population (and between offspring of some plants)</li> <li>• Competition exists for resources and mates</li> </ul> | Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics, Variation, Inherited, Environmental, Mutation, Competition, Survival of the Fittest, Evidence,  |  |
|   |   | Key Scientists   | Linked Texts   |
|   |   | <b>Charles Darwin and Alfred Russel Wallace</b><br>(Theory of Evolution by Natural Selection)<br><br><b>Jane Goodall</b><br>(Chimpanzees)  | <b>One Smart Fish</b><br><i>(Christopher Wormell)</i><br><br><b>The Molliebird</b><br><i>(Jules Pottle)</i><br><br><b>Our Family Tree</b><br><i>(Lisa Westberg Peters)</i> |
| Prior Learning  | Key Question(s):  | Future Learning  |  |
| <p style="color: green;">From Key Stages 1 &amp; 2, children should:</p> <ul style="list-style-type: none"> <li>• Understand there is a variety of life on Earth</li> <li>• Know that some animal's differences are important to their survival</li> </ul>  | <ul style="list-style-type: none"> <li>• Why are we all different?</li> <li>• What is variation, and why is it important?</li> <li>• How did life begin on Earth?</li> <li>• How do we change?</li> <li>• What is evolution?</li> <li>• What evidence is there for evolution?</li> </ul>  | <p style="color: red;">In Key Stage 3 children will learn about:</p> <ul style="list-style-type: none"> <li>• heredity as the process by which genetic information is transmitted from one generation to the next</li> <li>• the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation</li> </ul> |  |

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| <ul style="list-style-type: none"> <li>• Know how animals and plants reproduce</li> <li>• Know how fossils form over time</li> </ul> | <ul style="list-style-type: none"> <li>• How does evolution happen?</li> <li>• What reasons do animals become extinct?</li> <li>• Polar Bears habitat is rapidly changing, what possible futures do they face and can we predict which is most likely?</li> <li>• How did Darwin come up with the theory?</li> <li>• Why was his theory not initially accepted?</li> </ul> | <ul style="list-style-type: none"> <li>• the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection</li> <li>• changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction</li> <li>• the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.</li> </ul> |
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**Teaching Ideas**

| <u>Comparative tests</u>                                       | <u>Identify &amp; Classify</u>   | <u>Observation over time</u>                                | <u>Pattern Seeking</u>  | <u>Research</u>   | <u>BIG Question – Assessment Opportunity</u>                             |
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| <p><b>What is the most common eye colour in our class?</b></p> | <p>Compare the skeletons of apes, humans, and Neanderthals – how are they similar, and how are they different?</p> <p>Can you classify these observations into evidence for the idea of evolution, and evidence against?</p> | <p>How has the skeleton of the horse changed over time?</p> | <p>Is there a pattern between the size and shape of a bird's beak and the food it will eat?</p> | <p>What happened when Charles Darwin visited the Galapagos islands?</p> <p>What ideas did American geneticist Barbara McClintock have about genes that won her a Nobel Prize?</p> | <p>What is evolution, how does it happen and how do scientists know?</p> |

## Year 6 – Electricity

| National Curriculum Objectives   | Sticky Knowledge  | Vocabulary  |   |
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| <ul style="list-style-type: none"> <li>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>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>Use recognised symbols when representing a simple circuit in a diagram.</li> </ul> | <ul style="list-style-type: none"> <li>Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.'</li> <li>The greater the current flowing through a device the harder it works.</li> <li>Current is how much electricity is flowing round a circuit.</li> <li>When current flows through wires heat is released. The greater the current, the more heat is released.</li> </ul> | Electricity, neutrons, protons, electrons, nucleus, atom, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, conductor.   |   |
|  |   | Key Scientists  | Linked Texts  |
|  |   | Alessandro Volta<br>(Electrical Battery)<br><br>Nicola Tesla<br>(Alternating Currents)  | Goodnight Mister Tom<br>(Michelle Magorian)<br><br>Blackout<br>(John Rocco)<br><br>Hitler's Canary<br>(Sandi Toksvig) |
| Prior Learning   | Key Question(s):  | Future Learning   |   |
| In Year 4, children should: <ul style="list-style-type: none"> <li>Identify common appliances that run on electricity.</li> <li>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>Identify whether or not a lamp will light in a simple series circuit, based on whether or</li> </ul>   | <ul style="list-style-type: none"> <li>Do all batteries push as hard as each other?</li> <li>What is electricity?</li> <li>How does the voltage of a battery affect how much current is pushed?</li> <li>How does the length of time I leave the current flowing for affect the brightness of the bulb?</li> <li>How does number of bulbs affect the brightness of a bulb?</li> <li>Are all types of wires as good as conducting electricity?</li> </ul>                                  | In Key Stage Three children will learn: <ul style="list-style-type: none"> <li>Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge</li> <li>Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current</li> <li>Differences in resistance between conducting and insulating components (quantitative).</li> </ul> |   |

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| <p>not the lamp is part of a complete loop with a battery.</p> <ul style="list-style-type: none"> <li>Recognise that a switch opens and closes the 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 conductors.</li> <li>Know the difference between a conductor and an insulator, giving examples of each.</li> <li>Safety when using electricity.</li> </ul> | <ul style="list-style-type: none"> <li>Why are wires insulated in plastic? Does type of material make a difference?</li> <li>Does length of wire make a difference?</li> <li>Does the type of circuit affect how the components work/long the battery lasts?</li> <li>What renewable ways can we generate electricity?</li> <li>How does current affect heat?</li> <li>What are the dangers of a short circuit?</li> </ul> | <ul style="list-style-type: none"> <li>Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects</li> <li>The idea of electric field, forces acting across the space between objects not in contact.</li> </ul> |
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### Teaching Ideas

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| <p>How does the voltage of the batteries in a circuit affect the brightness of the lamp?<br/>How does the voltage of the batteries in a circuit affect the volume of the buzzer?</p> <p>Which make of battery lasts the longest?</p> <p>Which type of fruit makes the best fruity battery?</p> | <p>How would you group electrical components and appliances based on what electricity makes them do?</p> | <p>How does brightness of bulb change as the battery runs out?</p> <p>How can we measure how quickly a battery is used up?</p> | <p>Does the temperature of a light bulb go up the longer it is on?</p> | <p>How has our understanding of electricity changed over time?</p> | <p>Can we vary the effects of electricity?</p> |

Year 6 – Force

| National Curriculum Objectives   | Sticky Knowledge   | Vocabulary  |   |
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| <ul style="list-style-type: none"> <li>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.</li> <li>Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.</li> <li>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li> </ul> | <ul style="list-style-type: none"> <li>Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way.</li> <li>Friction is a force against motion caused by two surfaces rubbing against each other.</li> <li>Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move</li> </ul> | Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys, force, push, pull, opposing, streamline, brake, mechanism, lever, cog, machine, pulley.  |   |
|  |  | Key Scientists  | Linked Texts  |
|  |  | Galileo Galilei<br>(Gravity and Acceleration)   | The Enormous Turnip<br>(Katie Daynes)               |
|  |  | Isaac Newton<br>(Gravitation)   | Leonardo’s Dream<br>(Hans de Beer)                  |
|  |  | Archimedes of Syracuse<br>(Levers)  | The Aerodynamics of Biscuits<br>(Clare Helen Welsh) |
|  |  | John Walker<br>(The Match)  |   |
| Prior Learning   | Key Question(s):   | Future Learning   |   |
| In Year 3 children should: <ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> <li>Know how a simple pulley works and use making lifting an object simpler</li> </ul>   | <ul style="list-style-type: none"> <li>What actually is a force?</li> <li>How can a force act on an object?</li> <li>How can we see forces?</li> <li>How can we measure forces?</li> <li>How does the saltiness (salinity) of water affect the water resistance?</li> </ul>  | In KS3 children will learn about: <ul style="list-style-type: none"> <li>opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface</li> <li>forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only)</li> <li>change depending on direction of force and its size.</li> </ul> |   |

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| <ul style="list-style-type: none"> <li>• Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</li> <li>• Observe how magnets attract and repel each other and attract some materials and not others.</li> <li>• 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.</li> <li>• Describe magnets as having two poles.</li> <li>• Predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul> | <ul style="list-style-type: none"> <li>• How does the length of a piece of a paper helicopter's wings affect the time it takes to fall?</li> <li>• How does changing the shape of a piece of plasticine affect water resistance?</li> <li>• How does adding holes to a parachute affect the time it takes to fall?</li> <li>• How does the amount/depth of tread affect the friction between a shoe and a surface?</li> <li>• How can we use levers to lift more?</li> <li>• What is the most effective way to move an object?</li> <li>• How do see-saws work?</li> <li>• Can you create a pulley system to lift a given load?</li> </ul> |  |
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|--|---|--|---|--|--|
| <p><b>How does the angle of launch affect how far a paper rocket will go?</b></p> <p><b>How does the surface area of an object affect the time it takes to sink?</b></p> | <p>Can you label and name all the forces acting on the objects in each of these situations?</p> | <p>How long does a pendulum swing for before it stops?</p> | <p>Do all objects fall through water in the same way?</p> <p>How does surface area of parachute affect the time it takes to fall?</p> | <p>How do submarines sink if they are full of air?</p> | <p>How and why do objects move?</p>          |