

## Year 5 – Animals, including Humans

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<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> <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>Different animals mature at different rates and live to different ages.</li> <li>Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction</li> <li>Hormones control these changes; which can be physical and/or emotional.</li> <li>Some organisms reproduce sexually where offspring inherit information from both parents.</li> <li>Some organisms reproduce asexually by making a copy of a single parent.</li> <li>Environmental change can affect how well an organism is suited to its environment.</li> <li>Different types of organisms have different lifecycles.</li> </ul>	Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty, Hormone, Physical, Emotional, Sexual, Asexual, Pollination, Dispersal, reproduction, cell, fertilisation, pollination, male, female, pregnancy, young, mammal, metamorphosis, amphibian, insect, egg, embryo, bird, plant .	
		Key Scientists	Linked Texts
		<b>David Attenborough</b> (Naturalist and Nature Documentary Broadcaster)  <b>James Brodie of Brodie</b> (Reproduction of Plants by Spores)	<i><b>The Land of Neverbelieve</b></i> (Norman Messenger)  <i><b>Mummy Laid an Egg</b></i> (Babette Cole)  <i><b>Hair in Funny Places</b></i> (Babette Cole)  <i><b>Giant</b></i> (Kate Scott)  <i><b>You're Only Old Once!</b></i> (Dr. Seuss)
Prior Learning	Key Question(s):	Future Learning	

<p>In Year 4 children should:</p> <ul style="list-style-type: none"><li>Describe the simple functions of the basic parts of the digestive system in humans.</li><li>Identify the different types of teeth in humans and their simple functions.</li><li>Construct and interpret a variety of food chains, identifying producers, predators and prey</li></ul>	<ul style="list-style-type: none"><li>What do humans look like?</li><li>Do all animal embryos look the same?</li><li>How do humans change?</li><li>Why do humans change?</li><li>What is a life cycle? What types of life cycles are there?</li><li>Are life cycles the same?</li><li>What causes puberty?</li><li>What changes do we go through during puberty?</li><li>Are there any patterns between vertebrate animals and their gestation periods?</li><li>Do plants reproduce in the same ways as us?</li><li>How do plants spread their seeds?</li></ul>	<p>In Year 6:</p> <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>			
Teaching Ideas					
Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the level of salt affect how quickly brine shrimp hatch?	Can you identify all the stages in the human life cycle?	How do brine shrimp change over their lifetime?	Is there a relationship between a mammal's size and its gestation period?	What are the differences between the life cycle of an insect and a mammal?	Do all plants and animals reproduce in the same way?
How does age affect a human's reaction time?	Compare this collection of animals based on similarities and differences in their lifecycle.	How does a bean change as it germinates?		Why do people get grey/white hair when they get older?	
Who grows the fastest, girls or boys?		How do different animal embryos change?			

## Year 5 – Earth & Space

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<ul style="list-style-type: none"> <li>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</li> <li>Describe the movement of the Moon relative to the Earth</li> <li>Describe the Sun, Earth and Moon as approximately spherical bodies</li> <li>Describe the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul>	<ul style="list-style-type: none"> <li>Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance.</li> <li>Objects with larger masses exert bigger gravitational forces.</li> <li>Objects like planets, moons and stars spin.</li> <li>Smaller mass objects like planets orbit large mass objects like stars.</li> <li>Stars produce vast amounts of heat and light.</li> <li>All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.</li> </ul>	Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, waxing, waning, crescent, gibbous. Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, planets, solar system, day, night, rotate, orbit, axis, spherical, geocentric, heliocentric.	
		Key Scientists	Linked Texts
		<b>Claudius Ptolemy and Nicolaus Copernicus</b> (Heliocentric vs Geocentric Universe)  <b>Neil Armstrong</b> (First man on the Moon)  <b>Helen Sharman</b> (First British astronaut)  <b>Tim Peake</b> (First British ESA astronaut)	<i>The Skies Above My Eyes</i> (Charlotte Guillain & Yuval Zommer)  <i>George's Secret Key to the Universe</i> (Lucy and Stephen Hawking with Christophe Galfard)  <i>The Way Back Home</i> (Oliver Jeffers)
Prior Learning	Key Question(s):	Future Learning	
In Key Stage 1 and in Year 3 children should: <ul style="list-style-type: none"> <li>Understand changes in weather patterns and seasons.</li> <li>Compare how things move on different surfaces.</li> </ul>	How does temperature/size/day length/year length change as you get closer/further to the sun? How does distance from a light source affect how much light hits an object?	In KS3 children will learn about: <ul style="list-style-type: none"> <li>Gravity force, weight = mass x gravitational field strength (g), on Earth <math>g=10 \text{ N/kg}</math>, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only)</li> </ul>	

<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>Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing</li> </ul>	<p>Does having more moons result in more light hitting a planet? How could you test this?</p> <p>How does speed/size of a meteorite affect the size of the moon crater formed?</p> <p>If the moon became heavier as a result of meteorite collisions what would happen to its position relative to Earth?</p> <p>If the mass of the Earth is 80x that of the moon, why is the gravity at the Earth's surface only 6x greater than at the surface of the moon?</p> <p>Why do we have day/night/months/years/seasons?</p> <p>Why does day length change?</p> <p>Why does shadow size change over the course of a day?</p>	<ul style="list-style-type: none"> <li>Our Sun as a star, other stars in our galaxy, other galaxies</li> <li>The seasons and the Earth's tilt, day length at different times of year, in different hemispheres the light year as a unit of astronomical distance</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>
How does the length of daylight hours change in each season?	How could you organise all the objects in the solar system into groups?	Can you observe and identify all the phases in the cycle of the Moon?	Is there a pattern between the size of a planet and the time it takes to travel around the Sun?	<p>What unusual objects did Jocelyn Bell Burnell discover?</p> <p>How do astronomers know what stars are made of?</p> <p>How have our ideas about the solar system changed over time?</p>	Sun, Earth & Moon: What is moving and how do we know?

## Year 5 – (ENERGY) Sound

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<ul style="list-style-type: none"> <li>Know how sound is made associating some of them with vibrating.</li> <li>Know what happens to a sound as it travels from its source to our ears.</li> <li>Know the correlation between the volume of a sound and the strength of the vibrations that produced it.</li> <li>Know how sound travels from a source to our ears.</li> <li>Know the correlation between pitch and the object producing a sound.</li> </ul>	<ul style="list-style-type: none"> <li>Sound travels from its source in all directions and we hear it when it travels to our ears.</li> <li>Sound travel can be blocked.</li> <li>Sound spreads out as it travels.</li> <li>Changing the shape, size and material of an object will change the sound it produces.</li> <li>Sound is produced when an object vibrates.</li> <li>Sound moves through all materials by making them vibrate.</li> <li>Changing the way an object vibrates changes the sound it produces.</li> <li>Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds.</li> <li>Faster vibrations (higher frequencies) produce higher pitched sounds</li> </ul>	Amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave.	
		Key Scientists	Linked Texts
		<p><b>Aristotle</b> (Sound Waves)</p> <p><b>Galileo Galilei</b> (Frequency and Pitch of Sound Waves)</p> <p><b>Alexander Graham Bell</b> (Invented the Telephone)</p>	<p><i>Horrid Henry Rocks</i> (Francesca Simon)</p> <p><i>Moonbird</i> (Joyce Dunbar)</p> <p><i>The Pied Piper of Hamelin</i> (Natalia Vasquez)</p>
Prior Learning	Key Question(s):	Future Learning	
<p>In KS1 children:</p> <ul style="list-style-type: none"> <li>May have some understanding that objects make different sounds.</li> <li>Some understanding that they use their ears to hear sounds.</li> <li>Know about their different senses.</li> </ul>	<ul style="list-style-type: none"> <li>How can you change the volume of a sound?</li> <li>How does the size of an ear trumpet affect the volume of sound detected?</li> <li>How does the type of material affect how well it blocks a sound?</li> <li>How does thickness of material affect how well it blocks a sound?</li> <li>Which materials vibrate better and produce louder sounds? Can we identify any patterns?</li> </ul>	<p>In KS3 children will learn about:</p> <ul style="list-style-type: none"> <li>frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound</li> <li>sound needs a medium to travel, the speed of sound in air, in water, in solids</li> <li>sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal</li> <li>auditory range of humans and animals.</li> </ul>	

- Which materials make the best string telephone components? (tin cans, paper cups, plastic cups, wire, cable, string, plastic or elastic — predict and test)
- How does length of the tube (when making a straw oboe) affect the pitch and volume?
- Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water?

### Teaching Ideas

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<p>How does the volume of a drum change as you move further away from it?</p> <p>How does the length of a guitar string/tuning fork affect the pitch of the sound?</p> <p>Are two ears better than one?</p>	Which material is best to use for muffling sound in ear defenders?	When is our classroom the quietest?	Is there a link between how loud it is in school and the time of day? If there is a pattern, is it the same in every area of the school?	Do all animals have the same hearing range?	How can we make different sounds?

## Year 5 – Materials (Changes)

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<ul style="list-style-type: none"> <li>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.</li> <li>comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic.</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>Explain that some changes result in the formation of new materials, and this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda</li> </ul>	<ul style="list-style-type: none"> <li>All matter (including gas) has mass.</li> <li>Sometimes mixed substances react to make a new substance. These changes are usually irreversible.</li> <li>Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible.</li> <li>Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature)</li> <li>If it is not possible to get the material back easily it is likely that it is not there anymore and something new has been made (irreversible change)</li> </ul>	Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing Material, conductor, dissolve, insoluble, suspension, chemical, physical, irreversible, solution, reversible, separate, mixture, insulator, transparent, flexible, permeable, soluble, property, magnetic, hard.	
		Key Scientists	Linked Texts
		<p><b>Spencer Silver,</b> <b>Arthur Fry and Alan Amron</b> (Post-It Notes)</p> <p><b>Ruth Benerito</b> (Wrinkle-Free Cotton)</p>	<p><i><b>Itch</b></i> (Simon Mayo)</p> <p><i><b>Kensuke's Kingdom</b></i> (Michael Morpurgo)</p> <p><i><b>The BFG</b></i> (Roald Dahl)</p>
Prior Learning	Key Question(s):	Future Learning	
<p>In Year 4 children should:</p> <ul style="list-style-type: none"> <li>Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.</li> </ul>	<ul style="list-style-type: none"> <li>The key question we want children to interrogate is "have we made a new substance?" <ul style="list-style-type: none"> <li>Wet clay → air-dried clay → fired clay.</li> <li>Flour and water → dough → bread</li> </ul> </li> <li>Add sugar to fizzy water; it fizzes up. Has a new substance been made? (No, the gas was suspended in the water and adding sugar made it collect into larger bubbles and separate)</li> </ul>	<p>In KS3 children will learn about:</p> <ul style="list-style-type: none"> <li>the concept of a pure substance mixtures, including dissolving</li> <li>diffusion in terms of the particle model</li> <li>simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography</li> <li>the identification of pure substances</li> </ul>	

<ul style="list-style-type: none"> <li>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>	<ul style="list-style-type: none"> <li>Add baking powder to vinegar, it fizzes up. Has a new substance been made? (Yes the gas was not in the vinegar as it wasn't fizzy, so it must have been made)</li> <li>Add water to instant snow.</li> <li>Use lemon juice as an invisible ink, heating gently makes the ink visible. Is this a new substance?</li> <li>When water is added to jelly and it is set, is it a new substance.</li> <li>When materials are heated or mixed with other materials they sometimes can be made to turn into new materials. The question is how would we know if it was a new material or the same material mixed differently?</li> </ul>	
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### Teaching Ideas

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<p><b>Which material rusts fastest/slowest?</b></p> <p><b>How can we change the consistency ('jellyness') of jelly?</b></p>	<p>Can you identify and classify these reactions and changes into reversible, and irreversible?</p> <p>Can you describe their groups similarities and differences?</p>	<p>How does a nail in salt water change over time?</p>	<p>What patterns can you notice in different reactions?</p> <p>How does the amount of bicarbonate of soda, washing up liquid and vinegar affect the reaction?</p>	<p>What are smart materials and how can they help us?</p>	<p>How can we change materials reversibly and irreversibly?</p>



## Year 5 – (ENERGY) Light and Sight

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<ul style="list-style-type: none"> <li>Recognise that light appears to travel in straight lines.</li> <li>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>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>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> <li>Know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.</li> </ul>	<ul style="list-style-type: none"> <li>Animals see light sources when light travels from the source into their eyes.</li> <li>Animals see objects when light is reflected off that object and enters their eyes.</li> <li>Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light so we don't see the beam.</li> <li>Light travels in straight lines.</li> </ul>	Light source, dark, reflect, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow, block, transparent, translucent. Reflect Absorb Emitted Scattered Refraction	
		Key Scientists	Linked Texts
		<b>Thomas Young</b> (Wave Theory of Light)	<i>Letters from the Lighthouse</i> (Emma Carroll)
		<b>Ibn al-Haytham (Alhazen)</b> (Light and our Eyes)	<i>The Gruffalo's Child</i> (Julia Donaldson)
		<b>Percy Shaw</b> (The Cat's Eye)	<i>The King Who Banned the Dark</i> (Emily Haworth-Booth)
Prior Learning	Key Question(s):	Future Learning	
In Year 3 children should: <ul style="list-style-type: none"> <li>Recognise that they need light in order to see things and that dark is the absence of light.</li> <li>Notice that light is reflected from surfaces.</li> </ul>	<ul style="list-style-type: none"> <li>How does the size of an object affect the size of a shadow?</li> <li>How does the distance between the light and the object change the size of a shadow?</li> <li>How does the distance between the object and the size of the screen affect the size of a shadow?</li> </ul>	In Key Stage 3, children will learn about: <ul style="list-style-type: none"> <li>the similarities and differences between light waves and waves in matter</li> <li>light waves travelling through a vacuum; speed of light</li> <li>the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface Science</li> </ul>	

<ul style="list-style-type: none"> <li>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</li> <li>Recognise that shadows are formed when the light from a light source is blocked by a solid object.</li> <li>Find patterns in the way that the sizes of shadows change.</li> </ul>	<ul style="list-style-type: none"> <li>How would a solar eclipse be different if: <ul style="list-style-type: none"> <li>The moon was a different size?</li> <li>The earth spun faster or slower?</li> <li>The sun was larger or smaller?</li> <li>If the earth and moon were the same size but further away in the solar system?</li> </ul> </li> <li>How does the amount of aluminium foil crumpled affect how much light is scattered?</li> <li>How does the amount of polishing affect how well a piece of metal scatters light?</li> <li>How perfect are our mirrors? Do some scatter light more than others?</li> <li>What happens to light when it is shone through water? How is this affected by putting glitter, salt or talc in the water?</li> <li>How does a periscope/microscope/telescope work?</li> </ul>	<ul style="list-style-type: none"> <li>use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye</li> <li>light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras</li> <li>colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.</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>
<p>How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface?</p> <p>Which material is most reflective?</p>	Can you identify all the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together?	<p>Does the temperature of a light bulb go up the longer it is on?</p> <p>How does my shadow change over the day?</p>	Is there a pattern to how bright it is in school over the day? And, if there is a pattern, is it the same in every classroom?	<p>Why do some people need to wear glasses to see clearly?</p> <p>How do our eyes adapt to different conditions?</p>	Why does my shadow change length over the course of a day?

## Year 6 – Living Things & their Habitats

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<ul style="list-style-type: none"> <li>Classify living things into broad groups according to observable characteristics and based on similarities and differences.</li> <li>Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>	<ul style="list-style-type: none"> <li>Variation exists within a population (and between offspring of some plants) – <i>NB: this Key Idea is duplicated in Year 6 Evolution and Inheritance.</i></li> <li>Organisms best suited to their environment are more likely to survive long enough to reproduce.</li> <li>Organisms are best adapted to reproduce are more likely to do so.</li> <li>Organisms reproduce and offspring have similar characteristic patterns.</li> <li>Competition exists for resources and mates.</li> </ul>	Variation Organisms Populations. Classification Characteristics Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation. Classify, compare, bacteria, microorganism, organism, invertebrates, vertebrates, Linnaean.	
		Key Scientists	Linked Texts
		<b>Carl Linnaeus</b> (Identifying, Naming and Classifying Organisms)	<b>Beetle Boy</b> <i>(M G Leonard)</i>  <b>Insect Soup</b> <i>(Barry Louis Polisar)</i>  <b>Fur and Feathers</b> <i>(Janet Halfmann)</i>
Prior Learning	Key Question(s):	Future Learning	
In Year 4, children should: <ul style="list-style-type: none"> <li>Recognise that living things can be grouped in a variety of ways.</li> <li>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> </ul>	<ul style="list-style-type: none"> <li>Why do we need to classify living things?</li> <li>How do we classify?</li> <li>What are the difficulties with classification? (penguins, whales, platypus)</li> <li>How do animals change over time?</li> <li>Why does variation exist?</li> </ul>	In Key Stage 3 children will learn about: <ul style="list-style-type: none"> <li>the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere</li> <li>the adaptations of leaves for photosynthesis.</li> </ul>	

Recognise that environments can change and that this can sometimes pose danger to living things.	<ul style="list-style-type: none"> <li>What happens if animals of different species breed? (hybrids)</li> <li>What happens to house plants outside?</li> <li>What are microorganisms?</li> <li>How can we prevent the spread of disease?</li> <li>Why do animals and plants compete — and what for?</li> </ul>	<ul style="list-style-type: none"> <li>the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</li> <li>the importance of plant reproduction through insect pollination in human food security</li> <li>how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.</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>
<p>How does the temperature affect how much gas is produced by yeast?</p> <p>Which is the most common invertebrate on our school playing field?</p>	How would you make a classification key for vertebrates/invertebrates or microorganisms?	What happens to a piece of bread if you leave it on the windowsill for two weeks?	Do all flowers have the same number of petals?	What do different types of microorganisms do? Are they always harmful?	In what ways can we sort living things?