

Year 5 - Animals, including humans

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National Curriculum Objectives		Sticky Knowledge		Vocabulary
<ul style="list-style-type: none"> Describe the changes as humans develop to old age. Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird. Know the differences between different life cycles. Know the process of reproduction in plants. Know the process of reproduction in animals. 		<ul style="list-style-type: none"> Different animals mature at different rates and live to different ages. Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction Hormones control these changes; which can be physical and/or emotional. Some organisms reproduce sexually where offspring inherit information from both parents. Some organisms reproduce asexually by making a copy of a single parent. Environmental change can affect how well an organism is suited to its environment. Different types of organisms have different lifecycles. 		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
		David Attenborough (Naturalist and Nature Documentary Broadcaster)		<i>The Land of Neverbelieve</i> (Norman Messenger) <i>Mummy Laid an Egg</i> (Babette Cole) <i>Hair in Funny Places</i> (Babette Cole)
		James Brodie of Brodie (Reproduction of Plants by Spores)		<i>Giant</i> (Kate Scott) <i>You're Only Old Once!</i> (Dr. Seuss)
Prior Learning		Common misconceptions		Future Learning
In Year 4 children should: □ <ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey 		Some children may think: <ul style="list-style-type: none"> A baby grows in a mother's tummy A baby is "made". 		In Year 6: □ <ul style="list-style-type: none"> 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. Describe the ways in which nutrients and water are transported within animals, including humans.
Teaching Ideas				
Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
How does the level of salt affect how quickly brine shrimp hatch? What could we measure to show how humans develop TAPS Who grows the fastest, girls or boys?	Can you identify all the stages in the human life cycle? Compare this collection of animals based on similarities and differences in their lifecycle.	How do brine shrimp change over their lifetime? How does a bean change as it germinates? How do different animal embryos change?	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? Why do people get grey/white hair when they get older?

Year 5 - Forces

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National Curriculum Objectives		Sticky Knowledge		Vocabulary
<ul style="list-style-type: none"> 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. Identify the effects of air resistance, water resistance and friction, which act between moving surfaces. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 		<ul style="list-style-type: none"> Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. Friction is a force against motion caused by two surfaces rubbing against each other. Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move 		Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys, force, push, pull, opposing, streamline, brake, mechanism, lever, cog, machine, pulley.
				Key Scientists
		Galileo Galilei (Gravity and Acceleration) Isaac Newton (Gravitation) Archimedes of Syracuse (Levers) John Walker (The Match)		The Enormous Turnip (Katie Daynes) Leonardo's Dream (Hans de Beer) The Aerodynamics of Biscuits (Clare Helen Welsh)
Prior Learning		Common misconceptions		Future Learning
In Year 3 children should: <ul style="list-style-type: none"> Compare how things move on different surfaces. Know how a simple pulley works and use making lifting an object simpler Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract and repel each other and attract some materials and not others. 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. Describe magnets as having two poles. Predict whether two magnets with attract or repel each other, depending on which poles are facing. 		Some children may think: <ul style="list-style-type: none"> The heavier the object the faster it falls, because it has more gravity acting on it Forces always act in pairs which are equal and opposite Smooth surfaces have no friction Objects always travel better on smooth surfaces A moving object has a force which is pushing it forwards and it stops when the pushing force wears out A non-moving object has no forces acting on it Heavy objects sink and light objects float 		In KS3 children will learn about: <ul style="list-style-type: none"> opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) change depending on direction of force and its size.
Teaching Ideas				
Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
How does the angle of launch affect how far a paper rocket will go? How does the surface area of an object affect the time it takes to sink? TAPS	Can you label and name all the forces acting on the objects in each of these situations?	How long does a pendulum swing for before it stops?	Do all objects fall through water in the same way? How does surface area of parachute affect the time it takes to fall? TAPS	How do submarines sink if they are full of air?

Year 5 - Earth and Space

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National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none"> Describe the movement of the Earth, and other planets, relative to the Sun in the solar system Describe the movement of the Moon relative to the Earth Describe the Sun, Earth and Moon as approximately spherical bodies Describe the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. 		<ul style="list-style-type: none"> 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. Objects with larger masses exert bigger gravitational forces. Objects like planets, moons and stars spin. Smaller mass objects like planets orbit large mass objects like stars. Stars produce vast amounts of heat and light. All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars. 		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
				Claudius Ptolemy and Nicolaus Copernicus (Heliocentric vs Geocentric Universe) Neil Armstrong (First man on the Moon) Helen Sharman (First British astronaut) Tim Peake (First British ESA astronaut)	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)</i>
Prior Learning		Common misconceptions		Future Learning	
In Key Stage 1 and in Year 3 children should: <ul style="list-style-type: none"> Understand changes in weather patterns and seasons. Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing 		Some children may think: <ul style="list-style-type: none"> The Earth is flat The Sun is a planet The Sun rotates around the Earth The Sun moves across the sky during the day The Sun rises in the morning and sets in the evening The Moon appears only at night Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth. 		In KS3 children will learn about: <ul style="list-style-type: none"> Gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) Our Sun as a star, other stars in our galaxy, other galaxies 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 	
Teaching Ideas					
Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	
How does the length of daylight hours change in each season? Compare diff crater sizes TAPS	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?	What unusual objects did Jocelyn Bell Burnell discover? How do astronomers know what stars are made of? How have our ideas about the solar system changed over time?	

Year 5 - Materials (mixtures & separation)

National Curriculum Objectives	Sticky Knowledge	Vocabulary														
<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. 	<ul style="list-style-type: none"> When two or more substances are mixed and remain present the mixture can be separated. Some changes can be reversed and some can't. Materials change state by heating and cooling. <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">Separating technique</th> <th style="width: 50%;">Difference in property required</th> </tr> </thead> <tbody> <tr> <td>Filtration and sieving</td> <td>A solid that does not dissolve in a liquid. Different sized solid bits</td> </tr> <tr> <td>Magnets</td> <td>Some materials magnetic others not</td> </tr> <tr> <td>Evaporation</td> <td>A solid dissolved in water and the solid has a high boiling temperature</td> </tr> <tr> <td>Floating</td> <td>Some materials float and other sink</td> </tr> </tbody> </table>	Separating technique	Difference in property required	Filtration and sieving	A solid that does not dissolve in a liquid. Different sized solid bits	Magnets	Some materials magnetic others not	Evaporation	A solid dissolved in water and the solid has a high boiling temperature	Floating	Some materials float and other sink	<p>Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection,</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr style="background-color: #ffff00;"> <th style="width: 50%;">Key Scientists</th> <th style="width: 50%;">Linked Texts</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> Spencer Silver, Arthur Fry and Alan Amron (Post-It Notes) Ruth Benerito (Wrinkle-Free Cotton) </td> <td style="vertical-align: top;"> Itch (Simon Mayo) Kensuke's Kingdom (Michael Morpurgo) The BFG (Roald Dahl) </td> </tr> </tbody> </table>	Key Scientists	Linked Texts	Spencer Silver, Arthur Fry and Alan Amron (Post-It Notes) Ruth Benerito (Wrinkle-Free Cotton)	Itch (Simon Mayo) Kensuke's Kingdom (Michael Morpurgo) The BFG (Roald Dahl)
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Prior Learning	Common misconceptions	Future Learning														
<p>In KS1 children should:</p> <ul style="list-style-type: none"> Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. 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. 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 how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 	<p>Some children may think:</p> <ul style="list-style-type: none"> Solids dissolved in liquids have vanished and so you cannot get them back 	<p>In Year 5 children will:</p> <ul style="list-style-type: none"> 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. Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. 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 														

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
Design a test to investigate factors affecting the speed at which solids dissolve in water TAPS Compare sugar cubes in water TAPS	Can you group these materials based on whether they are transparent or not?	How does a container of salt water change over time? How does a sugar cube change as it is put in a glass of water?	Do all stretchy materials stretch in the same way? How does temperature affect how much solute we can dissolve?	What are microplastics and why are they harming the planet?

Year 5 - materials (changes)

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National Curriculum Objectives		Sticky Knowledge		Vocabulary
<ul style="list-style-type: none"> 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. Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. 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 		<ul style="list-style-type: none"> All matter (including gas) has mass. Sometimes mixed substances react to make a new substance. These changes are usually irreversible. Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible. Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature) 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) 		Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing Material, conductor, dissolve, insoluble, suspension, chemical, physical, irreversible, solution, reversable, separate, mixture, insulator, transparent, flexible, permeable, soluble, property, magnetic, hard.
				Key Scientists
		Spencer Silver, Arthur Fry and Alan Amron (Post-It Notes) Ruth Benerito (Wrinkle-Free Cotton)	Itch (Simon Mayo) Kensuke's Kingdom (Michael Morpurgo) The BFG (Roald Dahl)	
Prior Learning		Common misconceptions		Future Learning
In Year 4 children should: <ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 		Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed. Some children may think: <ul style="list-style-type: none"> Thermal insulators keep cold in or out Thermal insulators warm things up Solids dissolved in liquids have vanished and so you cannot get them back Lit candles only melt, which is a reversible change 		In KS3 children will learn about: <ul style="list-style-type: none"> the concept of a pure substance mixtures, including dissolving diffusion in terms of the particle model simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography the identification of pure substances
Teaching Ideas				
Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
Compare best materials for insulation TAPS Which is the stickiest tape? TAPS Compare nappy absorbency TPS	Can you identify and classify these reactions and changes into reversible, and irreversible?	How does a nail in salt water change over time?	What patterns can you notice in different reactions? How does the amount of bicarbonate of soda, washing up liquid and vinegar affect the reaction?	What are smart materials and how can they help us?

Year 5 - Living things and their habitats

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National Curriculum Objectives		Sticky Knowledge		Vocabulary				
<ul style="list-style-type: none"> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals. 		<ul style="list-style-type: none"> Some organisms reproduce sexually where offspring inherit information from both parents. Some organisms reproduce asexually by making a copy of a single parent. Environmental change can affect how well an organism is suited to its environment. Different types of organisms have different lifecycles. 		Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings				
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Prior Learning		Common misconceptions		Future Learning				
In Year 4: <ul style="list-style-type: none"> Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Know and label the features of a river Recognise that environments can change and that this can sometimes pose danger to living things. 		Some children may think: <ul style="list-style-type: none"> All plants start out as seeds All plants have flowers Plants that grow from bulbs do not have seeds Only birds lay eggs. 		In Year 6: <ul style="list-style-type: none"> Classify living things into broad groups according to observable characteristics and based on similarities and differences. Give reasons for classifying plants and animals based on specific characteristics. Know how animals and plants are adapted to suit their environment. Know about reproduction and offspring (recognising offspring normally vary and are not identical to their parents). Know the ways in which nutrients and water are transported in animals, including humans 				
Teaching Ideas								
Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research				
Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth.	What is the same/different between cuttings from a range of plants?	What's different about plants that grow asexually?	Is there a pattern between the size of an animal and its life span?	What is pollination? Life cycles of 2 diff. species TAPS - this could also be a comparison inv.				