

Year 5 Science

By the end of Year 5 children will be able to...	NC PoS	Key Learning & Key Vocabulary
Living Things and their habitats		
<p>Living things and their habitats</p> <ul style="list-style-type: none"> Describe the life cycles of a mammal Describe the life cycles of an amphibian Describe the life cycles of an insect Describe the life cycles of a bird <p>(Recap on mammals, amphibians, insects, reptiles and birds from Year 4)</p> <ul style="list-style-type: none"> Compare the life cycles of 2 of the above Explain how offspring are produced e.g. live, eggs Explain how some young undergo a further change before becoming adults – metamorphosis Describe the sexual reproduction of animals Describe the asexual reproduction of animals Describe the sexual reproduction of plants Describe the asexual reproduction of plants Explain the difference between asexual and sexual reproduction in plants Give examples of plants that reproduce in both ways 	<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 	<p>Key Learning</p> <p>As part of their life cycle plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals including humans have offspring which grow into adults. In humans and some animals these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis.</p> <p>Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.</p> <p>Key vocabulary</p> <p>Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings</p>
<p>Scientific enquiries for living things & their habitats</p> <ul style="list-style-type: none"> How are the life cycles of animals and plants in our local environment different to those in Nordic countries? (research) How are the life cycles of animals and plants different in Baghdad to Bradford? (research) Can we grow a new plant that will survive in Bradford and Baghdad? (Comparative and fair testing) 		
<p>Key experiences</p> <ul style="list-style-type: none"> Planting seeds and observing their germination Observe and grow plants that reproduce asexually – grow strawberries and potatoes Take cuttings from a range of plants e.g. mint Plant bulbs and then harvest to see how they multiply Use secondary sources and first hand experiences to find out about life cycles of animals and plants in UK and other countries 		
Animals including humans		
<p>Animals and Humans</p> <ul style="list-style-type: none"> Describe the changes of humans from birth to death Name and order the different stages of human life e.g. foetus, baby, child, adolescent, adult, old age Describe how a baby changes physically as it grows and what it is able to do Explain the changes during puberty for boys Explain the changes during puberty for girls Explain some of the difficulties involved with old age and how they can be treated Explain the gestation period of different animals 	<ul style="list-style-type: none"> describe the changes as humans develop to old age 	<p>Key Learning</p> <p>When babies are young they grow rapidly. They are very dependent on their parents. As they develop they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce.</p> <p>This needs to be taught alongside PSHE Useful guidance can be obtained at: http://www.ase.org.uk/news/aseviews/teaching-about-puberty/ http://www.ase.org.uk/documents/2016-joint-statement-on-reproduction/</p> <p>Key vocabulary</p> <p>Puberty: the vocabulary to describe sexual characteristics Gestation, fertilisation, sperm cell, egg cell, offspring, womb, foetus,</p>
<p>Scientific enquiries for animals including humans</p> <ul style="list-style-type: none"> If the animal is bigger, the gestation period longer? True or false? (Pattern seeking) Are the oldest children in our class the tallest? Are the oldest adults the tallest? When does the pattern between height and age change? (Pattern seeking) Do we look different? How do we change as we get older? E.g. body proportions, hair, height, weight, skills. Do we only get older on our birthdays? (Observing over time) 		
<p>Key Experiences</p> <ul style="list-style-type: none"> Looking at photographs of themselves over their lifetime Looking at people at different stages of their life Meeting people at different stages of their life – babies, child, old age Watch time lapses of changing throughout lives 		
Properties and changes of materials		
<p>Properties and changes of materials</p> <p><i>Carousel of activities to recap previous learning as follows:</i></p> <ul style="list-style-type: none"> Describe the properties of objects 	<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 	<p>Key Learning</p> <p>Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some</p>

<ul style="list-style-type: none"> • Compare and group everyday objects based on their properties • Group together materials that are magnetic & non-magnetic (recap Y3) • Group together materials that are electrical conductors/insulators • Order materials from transparent to opaque • Order materials from softest to hardest • Compare the same object made of different materials e.g. water bottle and say which one is best for a given user. • Explain which material is most suitable for a given purpose drawing on wider knowledge (every day and scientific). • Talk about the changes of state; solids, liquids, gases • Explain how materials can be recovered through evaporation <p>New learning</p> <ul style="list-style-type: none"> • Explain what thermal conductivity is and which materials provide insulation • Describe what a solution is • Describe what a mixture is • Explain the difference between soluble and insoluble. • Explain what dissolving means and give examples • Explain what filtering and sieving are and give examples • Explain how materials can be recovered from solutions or mixtures through evaporation, filtering and sieving. • Describe reversible and non-reversible changes including examples. E.g. burning wood, rusting, mixing vinegar and bicarbonate of soda 	<ul style="list-style-type: none"> • 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 • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood 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 that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda 	<p>materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Mixtures can be separated by filtering, sieving and evaporation.</p> <p>Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.</p> <p>Key vocabulary</p> <p>Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material, chemical change, reaction, permanent, iron oxide, rust, corrosion, carbon dioxide, oxidation, filtration</p>
<p>Scientific enquiries for properties of materials</p> <ul style="list-style-type: none"> • Did the Vikings invent glue? (Comparative and fair testing) • How did the Vikings make babies' nappies? (Comparative and fair testing) • Which material would be the most effective for making a warm jacket? (comparative fair test) • How can we clean dirty water? (Comparative and fair testing) • Which factors affect how quickly my sugar dissolves? (Comparative and fair testing) 		
<p>Key experiences</p> <ul style="list-style-type: none"> • Explore rusting over time using a different objects and different liquids • Explore the best place to put a cup of salt solution so that the water evaporates most quickly • Explore non reversible changes which result in the formation of a new material that may be useful (making plastic with milk and vinegar) • To make a 'sodium bicarbonate' volcano using baking powder and vinegar • Growing crystals to explore changes that occur when materials are mixed, heating or cooled; crystallisation and reversible changes including dissolving and evaporating • To watch a set of videos about how to clean dirty water including real world sewage filters • To use an interactive resource 'Kitchen Chaos' (Stem.org.uk) to separate materials using their properties • To make bread to show an irreversible chemical change • To learn about the origins of Post-It Notes, wrinkle-free cotton, polar fleece and Gore-Tex 		
<p>Earth and space</p> <ul style="list-style-type: none"> • Explain the shape and relative sizes of the Earth, Sun and Moon • Explain why our shadows change and why we have day and night • Explain about the Earth's orbit around the Sun • To describe the Moon's phases and orbit of the Earth • Describe the Solar System and man's journey into space • Name the 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto reclassified as a 'dwarf planet in 2006) • To describe the moon as a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones) 	<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 • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object 	<p>Key Learning</p> <p>The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (here it is day) and half is facing away from the Sun (night). As the Earth rotates the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.</p> <p>Key vocabulary</p> <p>Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system, rotates, star, orbit, planets</p>
<p>Scientific enquiries for Earth and space</p> <ul style="list-style-type: none"> • How does the moon change over 28 days? (observing over time) • The higher I drop the meteorite, the bigger the crater will be. True or false? Prove it (pattern seeking) • What do astronomers do? (Brian Cox; research) 		
<p>Key experiences</p> <ul style="list-style-type: none"> • Watch interactive programmes about the eight planets, comets and asteroids in our Solar System. • To use the Day and Night World Map to understand the positions of the Sun and Moon and how this affects day and night (timeanddate.com) • To use models of the Earth, Sun and Moon with a light source to show how the phases of the moon are created from the point of view of Earth 		

<ul style="list-style-type: none"> To create a moon diary over one month so they can see the pattern over time To use a collection of short animations to explore the Solar System (Paxi animations Stem.org.uk) 		
<p>Forces</p> <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 Explain the effects of friction on different materials To explain that friction can occur when two surfaces are in contact with each other Identify and explain the effects of air resistance Identify and explain the effects of water resistance Explain how a lever and a pulley works Explain that levers and pulleys allow a smaller force to have a greater effect Explain that gears allow a smaller force to have a greater effect Explain that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs Explain that weight is a force Explain that gravity is a force Explain there are large forces and small forces Explain these can be measured using a force meter (newton meter) Explain the unit of force is a newton- named after Isaac Newton. Explain anything with a mass just over 100 g weighs about 1 newton on earth Explain an upwards pull is needed against gravity. Explain forces can be represented by arrows which show the direction and the size. Explain the Moon is many times smaller than the Earth so gravity on Moon is very much smaller than on the Earth. Explain no atmosphere on Moon so no air resistance. If they are released at the same instant, both the heavy object and the very light object reach the ground at the same time. 	<ul style="list-style-type: none"> identify the effects of air resistance, water resistance and friction, that act between moving surfaces recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect 	<p>Key Learning</p> <p>A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.</p> <p>Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.</p> <p>Key vocabulary</p> <p>Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears, Newton, Newton metre, mass, weight</p>
<p>Scientific enquiries for forces</p> <ul style="list-style-type: none"> How did a Viking boat make it to Britain? (Comparative and fair testing) Why does the Moon not fall out of the sky? (pattern seeking) How can we lift a 1kg weight using a lever? (pattern seeking) Which surface is easier to go sledging on? (Comparative and fair testing) What design makes the best parachute to help protect the rocket booster? (Comparative and fair testing) 		
<p>Key experiences</p> <ul style="list-style-type: none"> To look at different situations where high and low water resistance can be desirable To look at different examples of gear trains and use Lego gears to test their ideas To look at pictures of and watch clips of when pulleys are used in real life and design and make a simple pulley system To look at a short video to show children practical application of gears in the real world – How do Bike Gears Work? (Stem) Dropping objects on the Moon – watch a video of a hammer and feather being dropped on the Moon. How is this different to Earth? 		
<ul style="list-style-type: none"> Observe, describe and compare in careful detail Sort and classify with precise reasons Make predictions and explain why Plan how to collect evidence/information/data to test out an idea/prediction or answer a question Measure precisely in standard units Select the most suitable equipment for the task Plan ways to test out their own/someone else's ideas Set up and carry out fair tests Repeat observations and measurements Draw tables, bar charts and simple line graphs to record observations/data Interpret and predict from bar charts and line graphs Explain observations/results using cause and effects and scientific facts and ideas Explain what the evidence show and whether it supports any predictions Identify trends and patterns in data and explain using scientific facts and ideas Begin to identify scientific evidence that has been used to support or refute ideas or arguments Select the most appropriate way to communicate findings, evaluating the evidence as well as describing it 	<ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes 	

<ul style="list-style-type: none">• Talk about how to improve their own work giving reasons	<ul style="list-style-type: none">• using straightforward scientific evidence to answer questions or to support their findings.	
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