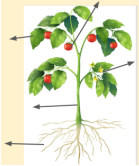
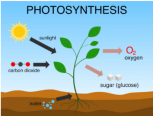


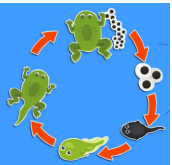
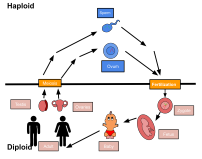
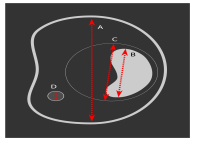

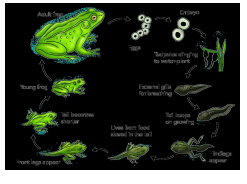
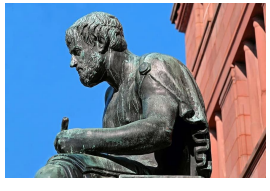






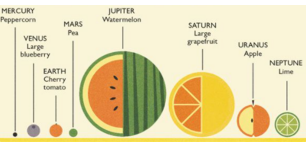
Year 5 Science Knowledge Spring 1

	<p>Each part of a plant is necessary for its survival and has a purpose. Leaves take in sunlight and carbon dioxide, which is vital for photosynthesis to take place successfully. It also excretes waste products (oxygen). Roots stabilise the plant into the soil so it does not get blown away by the wind. It also absorbs water and minerals needed for photosynthesis. The function of the flower is to produce pollen, which is essential for the reproduction of the plant.</p>
	<p>Photosynthesis is the process by which plants use sunlight, water, and carbon dioxide to create oxygen and energy in the form of sugar. Photosynthesis takes place inside chloroplasts which are small objects inside plant cells. Chloroplasts contain a green substance called chlorophyll. This traps the light energy needed to make photosynthesis happen. Plants and algae can only carry out photosynthesis in the light.</p>
	<p>Plants thrive best under certain conditions, for example desert plants such as Shepherd's tree can survive in harsh conditions (high temperature and less water access). They have long roots (70m) which allows the plant to take in water and minerals.</p>
	<p>All living things need to make more of themselves so that their species does not die out. Reproduction is the process by which new living things are made. Sexual reproduction in plants requires two plants to create a new plant. Not all plants reproduce by transporting pollen between each other. Some plants are able to reproduce asexually.</p> <p>Asexual reproduction is when a plant creates a new plant from itself without the help of another plant. When there is only one parent plant, there is no fusion of gametes, and no mixing of genetic information. The new plants are identical to the parent plant. They are clones</p>
	<p>Different groups of species have different ways to reproduce.</p>

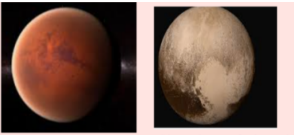

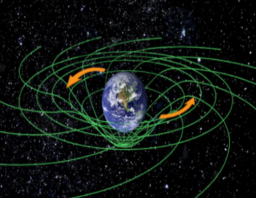

Year 5 Science Knowledge Spring 2

	<p>A lifecycle is a series of changes in the life of an organism including reproduction.</p> <p>There are 12 stages of a human life cycle.</p> <p>Prebirth, birth, early childhood, middle childhood, late childhood, adolescence, early adulthood, midlife, mature adulthood, late adulthood and death. These are each key milestones that humans pass over the course of their lives.</p>
	<p>Gestation is the period of developing inside the womb</p> <p>Gestational age allows medics to know if the baby is developing as it should be.</p> <p>The stages are pre embryonic stage, embryonic stage and Foetal period</p> <p>Foetus changes and develops at different points</p>
	<p>The time of gestation differs for different animals</p> <p>The 2 factors that affect the gestation period of animals are the size of the mammal and level of development at birth.</p> <p>The larger something has to grow, the longer it will take to grow. Exception to this is the velvet worm</p>
	<p>Metamorphosis is a biological process by which an animal physically develops including birth transformation or hatching.</p> <p>Amphibians, Insects and other animals go through metamorphosis but human <u>do not</u> undergo metamorphosis</p> <p>Stages of Frogs life cycle: egg, tadpole, tadpoles with legs, froglets and adult frogs egg hatches to produce tadpoles, back legs are developed first, then front legs and then a fully grown frog</p>
	<p>Natural Scientists pupils should be aware of:</p> <p>Charles Darwin - Analysis of plants and animals that species grow over time and give rise to new species</p> <p>Chris Packham - Wildlife conservationist and zoologist David Attenborough - Dedication and protection of our planet and its nature. Alfred Russel Wallace - Ideas on evolution similar to Charles Darwin</p> <p>Steve Backshall- Conservationist (someone who acts for the protection of wildlife) with passion for the natural world</p> <p>Steve Irwin - Wildlife expert best known as 'Crocodile hunter' Jane Goodall - first person to observe chimpanzees creating and using tools</p> <p>George McGavin - famous zoologist and entomologist (someone who studies insects)</p>

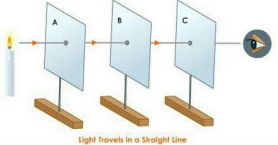
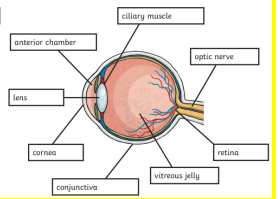
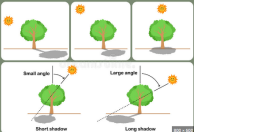


Year 5 Science Knowledge Summer 1 - Earth and Space

	<p><u>Solar system and size of planets</u></p> <p>An orbit is a repeating path that one object in space takes around another. All orbits are elliptical in shape, meaning they are egg-shaped, or oval, rather than circular. The solar system consists of the sun and everything that orbits, or travels around, the sun. The sun is 109 times wider than the Earth and the moon is a quarter of the Earth's size.</p>
	<p><u>Day and night</u></p> <p>The sun is at the centre of our solar system (heliocentric). The Earth spins on its axis which takes 24 hours as it rotates around the sun. When the Earth faces the sun we experience day time and when it is not facing the sun we experience night.</p>
	<p><u>Position of Earth and its impacts</u></p> <p>The Earth rotates on its axis, but it also orbits the Sun once a year in an anticlockwise direction, which impacts Earth's seasons in different parts of it. The spheres are split into the northern hemisphere and southern hemisphere. When the earth's axis points towards the sun, it is summer for that hemisphere. When the earth's axis points away, winter can be expected.</p>
	<p><u>Moon phases</u></p> <p>The moon shines because its surface reflects light from the sun. Only half of the Moon is lit at any one time (just like the Earth!). Sometimes on Earth we don't get to see all the lit half of the Moon – we see segments of it lit and shaded! The lit segments of the Moon we can see at different times are called phases.</p>
	<p><u>Similarities and difference between planets</u></p> <p>The solar system consists of the Sun and the bodies which orbit it (held in place by gravity), including planets, dwarf planets & asteroids. Each planet has different atmosphere, climate and forces depending upon its distance to the sun.</p>

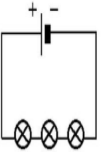
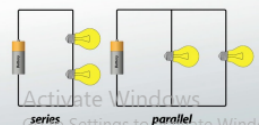
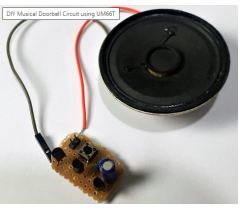
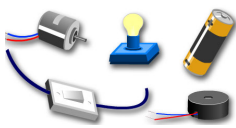
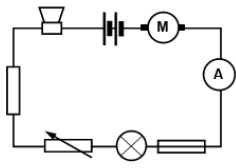
Year 5 Science Knowledge Summer 2 - Earth and Space

 <p>Mars Pluto (Dwarf planet)</p>	<p><u>Dwarf planets and planets</u> The key difference between a planet and a dwarf planet is the kinds of objects (asteroids) that share its orbit around the Sun. A planet has cleared its path of orbit (there are no asteroids) but a dwarf planet hasn't.</p>
	<p><u>Moon's impact on Earth</u> For many animals, particularly birds, the moon is essential to <u>migration and navigation</u>; others time their reproduction to coincide with the specific phases of the lunar cycle. High tides and low tides are caused by the moon. The moon's gravitational pull generates something called the tidal force.</p>
	<p><u>Duration of planet's orbit</u> Solar system is the collection of eight planets and their moons in orbit around the sun, together with smaller bodies in the form of asteroids, meteoroids, and comets. If a planet is close to the Sun, the distance it orbits around the Sun is fairly short. This distance is called an orbital path. The closer a planet travels to the Sun, the more the Sun's gravity can pull on the planet. The stronger the pull of the Sun's gravity, the faster the planet orbits.</p>
	<p><u>Apparatus usages</u> Apparatus are vital in carrying out investigations to ensure accurate and fair results. They all have a purpose, for example, force metre helps to identify how much force is exerted.</p>

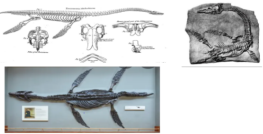
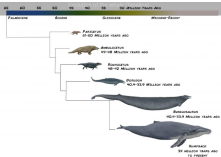
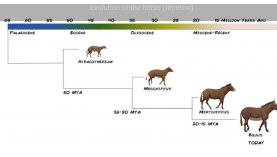

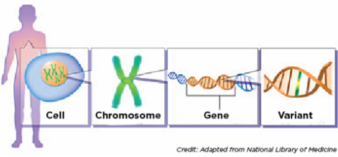
Year 6 Science Knowledge Autumn 1 - Light

	<p>The moon is <u>not</u> a source of light but reflects the Sun's light back to Earth. Stars however <u>are</u> sources of light but do not give us the same light and heat that the Sun does (our closest star) due to the distances involved. The stars appear to disappear in the daytime due to the brightness of the Sun.</p> <p>Light travels as waves. Light waves don't always need particles to travel through. They can also travel through outer space or a vacuum. Light waves travel in straight lines. You can detect them with your eyes, and also with instruments such as cameras. They are reflected by mirrors and change direction when they travel from the air into glass or water. Light travels very fast. It has a speed of 300 million metres per second in a vacuum. It only takes 8 minutes and 20 seconds for light to travel from the Sun to the Earth. Light travels through the air about a million times faster than sound, which explains why you see lightning before you hear thunder.</p>
	<p>We are able to see because light enters our eyes. Our eyes make use of any available light so that we can see things with faded colours and at night there often is some light (reflected light from the Moon, lights from homes, etc.)</p> <p>The light bounces off the objects that we see and travels into our eyes so that we can see the objects. As the image passes through the lens, muscles in our eye adjust the lens so that it focuses just like a camera. The image is then projected onto the back wall (retina) of the inside of the eye. This then sends a message to our brain to tell us what it is we are looking at. As the image passes through the lens it gets turned outside down, it is our brain that turns it back up the right way so that we see things the right way up!</p>
	<p>Since light travels in straight lines, a shadow is formed when a light source produces light rays that are blocked by an opaque object. Behind this, since there is no light there is an absence of light, or a shadow. The shadow decreases in size as the light sources decrease in distance. The closer an object is to the light source, the larger the shadow it casts. This is because an object closer to the source will block a larger area of the light, increasing its shadow size.</p>
	<p>A fair test is a test that controls all but one variable when attempting to answer a scientific question. Only changing one variable allows the person conducting the test to know that no other variable has affected the results of the test.</p>
	<p>When drawing conclusions it is important to link it directly to the question and hypothesis. Did you prove or disprove your question and were there any barriers impacting the experiment.</p>

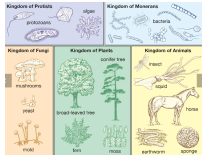
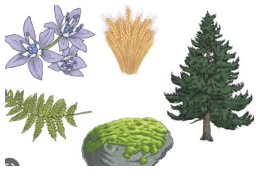

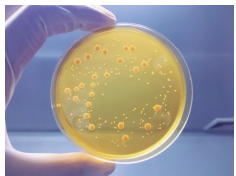

Year 6 Science Knowledge Autumn 2 - Electricity

	<p>A circuit is a complete path around which electricity can flow .We use scientific symbols to represent the components (parts) of a circuit. Engineers need to be able to understand how electrical circuits are drawn and communicated. This includes the use of circuit symbols to produce circuit diagrams and schematics. This knowledge could be used when investigating, designing or making electrical and electronic circuits in the future</p>
	<p>The brightness of a bulb or the loudness of a buzzer is affected by the number of cells in a circuit. The brightness of a bulb or the loudness of a buzzer is affected by the voltage of cells in a circuit. The number of components in a circuit can affect how they function. The arrangement of components in a circuit can affect how they function. The length of wires in a circuit can affect how the components function</p>
	<p>A light is not essential for a successful circuit. We do not need something to light up to show electricity i.e think about a doorbell. This is connected to a circuit - when the circuit is complete the doorbell will make a sound.</p>
	<p>A fair test is a test that controls all but one variable when attempting to answer a scientific question. Only changing one variable allows the person conducting the test to know that no other variable has affected the results of the test.</p>
	<p>When drawing conclusions it is important to link it directly to the question and hypothesis. Did you prove or disprove your question and were there any barriers impacting the experiment.</p>

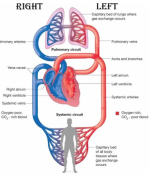
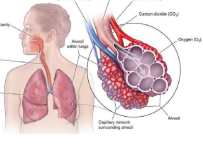
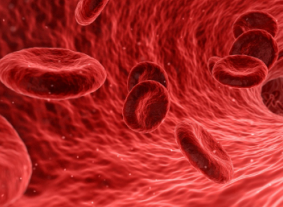
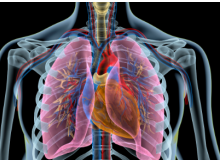
Year 6 Science Knowledge Spring 1 - **Evolution and Inheritance**


	<p>The two key elements in evolution are: Adaptation and Natural Selection.</p> <p>Adaptation and evolution is the process whereby a living thing changes over time to suit its environment in order to survive.</p> <p>Natural Selection is the process whereby organisms better adapted to their environment tend to survive and produce more offspring.</p>
	<p>Living things have differences or vary. This means that some are more likely to survive than others. If they survive longer it is more likely that they will reproduce and pass on these variations to their children (offspring).</p> <p>As time goes on more and more of the plants or animals inherit this useful variation because the ones without it don't live as long. In this way plants and animals can change over time. This process is called evolution.</p> <p>Charles Darwin was the first scientist to come up with the theory of evolution for explaining how living things change over time.</p>
	<p>Adaptation It is a special skill which helps an animal to survive and do everything it needs to do. Adaptations could be physical change to the animals body or behavioural changes in how an individual animal or a society do things in their daily lives.</p> <p>Animals adapt over time to better suit their environment. Adaptation may lead to evolution</p>
	<p>The study of human origins, or beginnings, involves figuring out how and when human beings began to exist. Scientists have many different theories about human origins. But they agree that humans developed over many millions of years from early ancestors that were like apes. The process by which one type of living thing develops into another type is called evolution.</p> <p>Modern humans evolved in stages from a series of ancestors, including several earlier forms of humans. The bodies of these ancestors changed over time. In general, their brains became larger. The jaws and teeth became smaller. Human ancestors also began walking upright on two feet and using tools. As they did, the shape of their legs, feet, hands, and other body parts changed.</p>
 <p><small>Credit: Adapted from National Library of Medicine</small></p>	<p>Inheritance is the process by which genetic information is passed on from parent to child. This is why members of the same family tend to have similar characteristics. We actually have two genomes each (a genome is the complete set of genetic information in an organism). We get one copy of our genome from each of our parents.</p> <p>Acquired traits are the ones that a person develops during his lifetime. These are not passed from one generation to another. On the other hand, inherited traits are present in a person since the time of his birth and are passed on from one generation to another.</p>

Year 6 Science Knowledge Spring 2 - Living Things and their Habitats

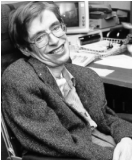



	<p>Scientists sort and group living things according to their similarities and differences. This is called classification. Scientists who classify living things are called taxonomists- the system of classification was created by Carl Linnaeus.</p> <p>Vertebrates is an animal that has a backbone e.g. fish, snake, human.</p> <p>Invertebrates is an animal lacking a backbone e.g. jellyfish, snail, spider.</p>
	<p>There are millions of different plant species. Botanists (scientists who study plants) must find a way to categorise the many different species. While all plants are made up of similar parts that are essential in maintaining their survival (i.e. having roots, stem, leaves, etc.), they often look different. These differences in characteristics are used to group plants into species, which provides a way of classifying and therefore organising plants. All green plants, algae, ferns and mosses (plants that do not produce seeds), conifers (gymnosperms) and angiosperms (flowering plants)-plants that do produce seeds. The two groups can be split into further, smaller groups. For example, one way is to group them into vascular and non-vascular plants.</p>
	<p>Microorganisms are living things that are too small to be seen with the naked eye. They are normally viewed using a microscope. Bacteria, viruses, and some moulds are examples of microorganisms. Most microorganisms are essential to life on earth. However, some of them are harmful to humans, animals, and plants and can cause disease. Microorganisms will be classified into three sub strands: Monera (bacteria), Protista (virus) and Fungi.</p>
	<p>Investigation to compare bacteria growth on two petri dishes containing nutrient agar: one that has been touched by a finger washed only with water and one that has been touched by a finger washed with soap.</p> <p>A dependent variable is a part or variable of an experiment that is kept the same to be used for comparison and controlled, e.g. the petri dishes. A control is needed to compare results when the experiment is done.</p>
	<p>The microorganisms transferred on to the agar from the washed hand, will grow less bacteria than the fingerprint created by the hand that was unwashed with soap.</p>

Year 6 Science Knowledge Summer 1 - Animals including Humans

	<p>The human circulatory system is referred to as a double circulatory system. All mammals have a double circulatory system as there are two loops. One loop sends blood from the heart to the lungs and the other loop is from the heart to the rest of the body. The circulatory system is a network consisting of blood, blood vessels, and the heart. This network supplies tissues in the body with oxygen and other nutrients, transports hormones, and removes unnecessary waste products. The word circulation means ‘the movement to, fro or around something’.</p>
	<p>The lungs are responsible for transferring oxygen into the blood system. It is important that they start to understand that humans don't just inhale oxygen and exhale carbon dioxide.</p> <p>The exchange of gases that happens in the lungs is known as respiration. The act of breathing in and out through our nose (& mouth) replenishes the oxygen and removes the carbon dioxide from our blood. The blood in the arteries transports the oxygen to all the parts of the body & then the veins carry the deoxygenated blood back to the heart.</p>
	<p>Blood is made up of components. Four of the main components: Plasma – 55% Red blood cells – 44% Platelets – 0.05% White blood cells – 0.05%</p> <p>Blood is pumped around the body through blood vessels: arteries, blood vessels that carry blood away from the heart; veins that carry blood back towards the heart & capillaries, tiny blood vessels that carry blood to the individual cells Capillaries join the arteries to the veins. There are about 59,962 miles or about 96,500 kilometres (twice round the world) of blood vessels in one body! Blood has many functions: it transports oxygen to the cells (carried by the red blood cells); carries nutrients (food) to the cells; transports waste away from the cells (including carbon dioxide); helps protect the body from infection (the white blood cells); carries hormones (chemical messengers) to the cells, and helps keep the body at 37°C. Blood is composed of red blood cells (44%), which carry oxygen throughout the body, white blood cells (1%), which fight infections/germs by engulfing and destroying them or by producing antibodies against them (which help identify the invading germs), platelets, which are small cells that help you stop bleeding (blood clotting) if you get a cut and plasma (55%), carries nutrients, hormones, and proteins throughout the body.</p>
	<p>When your heart beats, it pumps blood around your body to give it the energy and oxygen it needs. As the blood moves, it pushes against the sides of the blood vessels. The strength of this pushing is your blood pressure. If your blood pressure is too high, it puts extra strain on your arteries (and your heart) and this may lead to heart attacks and strokes. Eating healthily & exercising can help keep your blood pressure normal.</p>

	<p>Investigation on what exercise has the most impact on our hearts and lungs.</p>
--	--

Year 6 Science Knowledge Summer 2 - Inventors

	<p>Stephen Hawking was an English scientist. One of his theories was that mini black holes were formed following the big bang. These mini black holes contain one billion tons of mass but occupy less than the space of an atom.</p>
	<p>Libbie Hyman was a zoologist who researched vertebrates and invertebrates..She described the anatomy and characteristics of different vertebrates and invertebrates and explained how they should be classified. Vertebrates is an animal that has a backbone e.g. fish, snake, human. Invertebrates is an animal lacking a backbone e.g. jellyfish, snail, spider.</p>
	<p>Marie Maynard Daly became the first black woman with a PhD in chemistry in the USA. She made huge advances in our understanding of how the heart and circulatory system are affected by sugar and cholesterol in our diets. Her work has demonstrated that too many fatty and sugary foods can make the arteries narrower and can cause heart disease.</p>
	<p>Alexander Fleming In 1928 a Scottish doctor named Alexander Fleming discovered the effects of penicillin. During research on bacteria, Fleming noticed that the bacteria would not grow near a certain mold. He found that the mold was a type called <i>Penicillium notatum</i>. This mold is similar to the green fuzzy mold that grows on bread. From the mold Fleming developed the antibiotic now known as penicillin.</p>

Super Scientist

Working for excellent performance - always.



Mary Leakey (first mentioned in Year 3) was a British paleoanthropologist who discovered many fossils of early hominins and their tools. These fossils provide evidence for the evolution of humans.