



Science Knowledge Progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals	Knowledge block 1 Feeding for survival <ul style="list-style-type: none"> ● Know that animals are groups of organisms that need to consume food to survive. ● Know that food provides energy and the building blocks of growth. ● Know that there are many different groups of animals including fish, amphibians, reptiles, birds and mammals. They have different structures, and they eat different types of foods. ● Know the structure of a variety of common animals varies Mammals have hair/fur and give birth to live young, fish can breathe underwater using gills, birds have feathers, beaks and wings. Females lay eggs. Most birds can fly, reptiles are air breathing and have scaly skin and lays eggs, and amphibians have smooth slimy skin and live on land and in water. *Some eat other animals (carnivores), and others only eat vegetables (herbivores), and some like to eat both plants and meat (omnivores) 	Animal Life Cycles Knowledge Block 1- Animal timelines <ul style="list-style-type: none"> ● Know things that are living, move, feed, grow, reproduce and use their senses ● Know animals grow until they reach maturity and then don't grow any larger ● Know animals reproduce when they reach maturity (adulthood) ● Know that all animals eventually, die ● Know different animals live to different ages ● Know different animals reach different sizes before they are able to reproduce ● Know different animals reproduce at different ages ● Know animals, including humans, have offspring which grow into adults ● Know exercise, eating the right amounts of different types of food and hygiene are important to maintain good health and wellbeing 	Knowledge Block 1- Skeletons protect vital organs <ul style="list-style-type: none"> • Know all vertebrates have internal skeletons that protect vital organs. • Know invertebrates have exoskeletons that protect vital organs. 	Digestion Knowledge Block 1- Food groups <ul style="list-style-type: none"> • Know animals need a variety of foods to help them grow and survive. • Know the main food groups are: Meat, dairy and pulses provide protein for muscles. Grains and root vegetables provide carbohydrates for energy. Fat for insulation and energy. Fruit and vegetables for minerals, vitamins and fibre. These are essential to keep our bodies working well and protect us from illnesses. 	Circulation Knowledge Block 1: Getting oxygen into the blood <ul style="list-style-type: none"> • Know all animals need oxygen to survive. • Know air is breathed into the lungs where the oxygen in the air is passed into the blood. • Know every part of animals' bodies need oxygen, especially muscles. • Know muscles need a supply of oxygen and sugar (glucose) to make them work, they are supplied by the blood. 	



Science Knowledge Progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<p>*Common animals that are carnivores include lions, cats, sharks and snakes</p> <p>*Common animals that are herbivores include cows, horses, sheep, elephants and deer</p> <p>*Common animals that are omnivores include humans, bears, monkeys and seagulls</p>					
	<p>Knowledge Block 2- Moving for survival</p> <ul style="list-style-type: none"> ● Know animals must move to get their food ● Know they will move in different ways to get their food ● Know animals that eat other animals are called predators ● Know animals that are eaten by other animals are called prey ● Know animals feeding relationships can be illustrated in a food chain 	<p>Knowledge Block 2- How animals get their food</p> <ul style="list-style-type: none"> ● Know habitats are places where animals and plants live (from Year 1) ● Know animals live in habitats in which they are suited. ● Know different kinds of animals and plants depend on each other within habitat. ● Know animals get their food from plants and other animals. This can be shown in a food chain. ● Know a food chain begins with a producer. This is often a green plant because plants can make their own food. ● know that a living thing that eats other plants is called a consumer. 	<p>Knowledge Block 2- Skeletons support weight</p> <ul style="list-style-type: none"> ● Know skeletons support the weight of land animals. ● Know stronger bones can support a greater mass. 	<p>Knowledge Block 2- Variation in animals' diet</p> <ul style="list-style-type: none"> ● Know different animals require different foods to survive. ● Know animals get their food from plants and other animals. This can be shown in a food chain. (From Year 2) ● Know a food chain begins with a producer. This is often a green plant because plants can make their own food. (From Year 2) ● Know a living thing that eats other plants is called a consumer. (From Year 2) ● Know humans require a balanced diet to remain healthy but healthy diets vary depending upon the type of activity that humans do. 	<p>Knowledge Block 2: The blood circulation model</p> <ul style="list-style-type: none"> ● Know the heart is a vital organ pumps blood through the blood vessels. ● Know blood Vessels are the tubes that blood flows through. ● Know the blood circulates around the body in a way that ensures all muscles in the body get a supply of oxygen and sugar. ● Know the heart pumps blood to every muscle in the body. The circulatory route must allow the blood to collect oxygen from the lungs, sugar from the intestines and visit muscles. ● Know the blood then returns to the heart where it is pumped again. 	

Science Knowledge Progression



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				<ul style="list-style-type: none"> • Know humans have 2 sets of teeth in their lifetimes • Know humans have three main types of teeth- incisors, canines and molars. Incisors help to bite off and chew pieces of food. Canines are used for tearing and ripping food. Molars help to crush and grind food. 	<ul style="list-style-type: none"> • Know exercise helps the heart to work more efficiently. • Know eating a healthy diet helps to keep the blood vessels from getting blocked. • Know avoiding smoking and alcohol puts less stress on the whole system and keeps it healthier. 	
	Knowledge Block 3- Sensing for survival <ul style="list-style-type: none"> ● Know the five sense organs are the eyes (for seeing), nose (for smelling), ears (for hearing), tongue (for tasting), and skin (for touching or feeling). ● Know animals have senses to help them survive ● Know animals have developed a range of ways to find prey or avoid being eaten 		Knowledge Block 3- Skeletons support movement <ul style="list-style-type: none"> • Know bones are connected (but can move relative to each other) at joints. • Know muscles connect to bones and move them when they contract. • Know stronger bones can anchor stronger muscles. 	Knowledge Block 3- How humans digest food <ul style="list-style-type: none"> • Know the nutrients in food have to get to every part of the body. The blood transports them. • Know the role of digestion is to get the nutrients in food to dissolve in the blood, if it doesn't dissolve it can't enter the blood and be transported. 		
Plants	Knowledge Block 1- Where do plants come from <ul style="list-style-type: none"> ● Know a seed contains a miniature plant that can develop into a fully grown plant. ● Know a bulb has underground vertical 	New Plants Knowledge Block 1- What flowers are for <ul style="list-style-type: none"> ● Know all flowering plants make seeds (reproduction) that can grow (germinate) into new plants ● Know plants need water, light and a suitable 	Plants and their food production Knowledge Block 1- Plants don't go to McDonalds <ul style="list-style-type: none"> • Know plants do not eat food so have to make their own. • Know this food provides then with energy, and materials to grow 	Plant reproduction Knowledge Block 1- The reproductive parts of a flowering plant <ul style="list-style-type: none"> • Know flowering plants reproduce by the process of pollination • Know pollination leads to the formation of a seed which can grow into a new plant 		

Science Knowledge Progression



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	<p>shoots which already has modified leaves</p> <ul style="list-style-type: none"> ● Know seeds and bulbs need water to grow but most do not need light (germination) ● Know seeds and bulbs have food stores inside them to help the plant start to grow. 	<p>temperature to grow and stay healthy</p>	<ul style="list-style-type: none"> • Know to make the food (sugar) plants need water from the ground, carbon dioxide from the air and light from the sun. <ul style="list-style-type: none"> o Know the water is taken up through the roots from the soil o Know the carbon dioxide is taken in through the leaves • Know as well as food, plants also make oxygen which is given out back into the air through the leaves 	<ul style="list-style-type: none"> • Know flowering plants have evolved specific parts to carry out pollination and seed growth • Know those parts are stamen where pollen is produced, stigma where pollen is collected, and the ovaries which contains the eggs that become a seed when the pollen travels down the stigma and meets the egg • Know flowers have petals also are a range of colours, patterns, and smells to attract insects 		
	<p><u>Knowledge Block 2- Plant survival</u></p> <ul style="list-style-type: none"> ● Know to survive plants, need to get water, light, and avoid being eaten 	<p><u>Knowledge Block 2- What happens after a plant has produced seeds</u></p> <ul style="list-style-type: none"> ● Know some plants die after it has produced its seed and sometimes the plant lives for many generations producing seeds each year 		<p><u>Knowledge Block 2- All flowers are similar but different</u></p> <ul style="list-style-type: none"> • Know plants and flowers look different because they pollinate in different ways. • Know there are two types of pollination Insect and wind • Know insect pollinated flowers are usually bright coloured and strong scents • Know wind pollinated flowers have less colourful petals and much less scent 		

Science Knowledge Progression



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	<u>Knowledge Block 3- How plants get what they need to survive</u> <ul style="list-style-type: none"> ● Know a seed produces roots to allow water to get into the plant. ● Know a seed produces shoots to produce leaves to collect the sunlight. ● Know a basic plant structure can include leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem 			<u>Knowledge Block 3- Seed dispersal</u> <ul style="list-style-type: none"> • Know plants have evolved many different ways to disperse their seeds • Know seed dispersal increases the chances of seeds germinating and growing into a mature plant 		
				<u>Knowledge Block 4- What a seed does</u> <ul style="list-style-type: none"> • Know a seed contains a miniature, undeveloped version of the plant • Know they contain a food store for the first stage of growth (until the plant can make its own food) • Know they are surrounded with a protective coat. 		
Variation and Evolution	<u>Habitats</u> <u>Knowledge Block 1- Adapted to survive</u> <ul style="list-style-type: none"> ● Know there is variation in all living things ● Know animals and plants live in a variety of different places called habitats ● Know animals and plants have adapted to survive in different habitats 			<u>Living things</u> <u>Knowledge Block 1- Classifying living things</u> <ul style="list-style-type: none"> • Know living things can be divided into groups based upon their characteristics • Know classification keys help group, identify and name living things • Know animals can be classified as vertebrates (having a spine) or 	<u>Fossils, geological time and classification</u> <u>Knowledge Block 1- What is evolution and how do we know it happened?</u> <ul style="list-style-type: none"> ● Know the Earth is very old. Around 4.2 billion years. We know this from dating rocks ● Know life first appeared on Earth 	<u>Knowledge Block 1: Natural selection</u> <ul style="list-style-type: none"> • Know evolution is the change of physical form in a population over a long-time span • Know natural selection is the process which controls that change. • Know in any population there is variation and competition for

Science Knowledge Progression



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	<ul style="list-style-type: none"> ● Know wild plants such as ferns, daisies, nettles and dandelions grow randomly. ● Know garden plants such as roses, tulips, poppies, daffodils are planted intentionally. 			invertebrates (lacking a spine) <ul style="list-style-type: none"> • Know in any habitat there are food chains and webs where nutrients are passed from one organism to another when it is eaten • Know if the population of one organism in the chain or web is affected, it has a knock-on effect to all the others 	around 3.8 billion years ago. <ul style="list-style-type: none"> ● Know life was, at first, very simple but over millions and millions of years life became more complex through the process of evolution 	resources (food, water, mates). <ul style="list-style-type: none"> • Know within that variation, organisms that have features which make them better adapted at securing food, water, and mates, are more likely to survive and produce offspring which have inherited those same successful features. Those that are not well adapted will eventually go extinct. • Know over a long enough timeline all organisms in a population will have those successful features. • Know this is known as the Theory of Evolution by Natural Selection and was developed by Charles Darwin in 1859
	<u>Knowledge Block 2- Plants adaptations for survival</u> <ul style="list-style-type: none"> ● Know plants have specific adaptations for survival ● Know to survive they need to get water, light, and avoid being eaten Year 1- Seasons Knowledge Block 1- Surviving the changing seasons			<u>Knowledge Block 2- Life cycles</u> <ul style="list-style-type: none"> • Know mammals, amphibians, insects and birds have different life cycles. • Know lifecycles vary in time depending on the species of animal- it can be as short as just a few weeks for insects, to up to 200 years for sea urchins. 	<u>Knowledge Block 2- Evidence for evolution</u> <ul style="list-style-type: none"> ● Know there are many sources of evidence for evolution ● Know fossils are one of the main sources of evidence for evolution. They show when new organisms appear and when they go extinct. ● Know due to the nature of fossil formation and 	<u>Knowledge Block 2: How Charles Darwin discovered the process of Evolution by Natural selection</u> <ul style="list-style-type: none"> • Know before Darwin, Lamarck's Idea of acquired characteristics was proposed. (Giraffes stretch their necks in life, which made their

Science Knowledge Progression



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	<ul style="list-style-type: none"> • know there are four seasons, Spring, summer, autumn and winter ● Know each season is about three months long ● Know in Spring, young animals like lambs and chicks are born, the flowers bloom and the weather starts to become warmer. ● Know in autumn, the leaves fall off the trees and the amount of time we have in the day becomes less. ● Know winter has the shortest amount of time during the day and the weather is at its coldest. ● Know in summer the trees are full of green leaves and the weather is at its warmest. <p>(THIS SUBSTANTIVE KNOWLEDGE APPEARS IN THE PROGRESSION WITHIN THE PHYSICS-EARTH AND SPACE)</p> <ul style="list-style-type: none"> • Know animals and plants have adapted ways of surviving the changing seasons • Know these include hibernating, storing food, fattening up, migration, loss of leaves 			<p>Larger animals often have longer life cycles but not always.</p> <ul style="list-style-type: none"> • Know all animal life cycles begin with growth and development followed by reproduction. • Know some animals undergo a complete metamorphosis as they grow. <p>Metamorphosis is a process where animals undergo an abrupt and obvious change in the structure of their body and their behaviour.</p> <ul style="list-style-type: none"> • Know some animals are eusocial. This means they live in colonies (groups) with one animal or group producing young and the others working to care for them. 	<p>discovery, fossils only provide an incomplete record of evolution.</p> <ul style="list-style-type: none"> ● Know scientists use fossils along with other pieces of evidence (DNA, Embryology, comparative anatomy, artificial selection) to work out how organisms have evolved ● Know fossils form when dead organisms are rapidly buried or leave an imprint and are turned to stone over a long period of time. If they survive in the Earth, they then have to be found by a palaeontologist who will study them. 	<p>children have longer necks).</p> <ul style="list-style-type: none"> • Know Darwin as a young man travelled around the world on the HMS Beagle. On this 5-year voyage he saw lots of things and recorded down lots of evidence which allowed him to work out how organisms change over time by a different mechanism of Natural selection

Science Knowledge Progression



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	<ul style="list-style-type: none"> • Know trees can be either evergreen or deciduous. • Know evergreen trees keep their green leaves all year round and that deciduous trees lose their leaves every autumn 					
	<p>Year 1- Seasons</p> <p><u>Knowledge Block 1- Surviving the changing seasons</u></p> <ul style="list-style-type: none"> • know there are four seasons, Spring, summer, autumn and winter ● Know each season is about three months long ● Know in Spring, young animals like lambs and chicks are born, the flowers bloom and the weather starts to become warmer. ● Know in autumn, the leaves fall off the trees and the amount of time we have in the day becomes less. ● Know winter has the shortest amount of time during the day and the weather is at its coldest. ● Know in summer the trees are full of green leaves and the weather is at its warmest. 			<p><u>Knowledge Block 3- Environmental change</u></p> <ul style="list-style-type: none"> • Know environmental change affects different habitats differently • Know human activity significantly affects the environment • Know different organisms are affected differently by environmental change 	<p><u>Knowledge Block 3: Classification of life</u></p> <ul style="list-style-type: none"> ● Know all living (and extinct) organisms are classified into groups based upon their physical features. ● Know this includes animals, plants, fungi, and microorganisms like bacteria. ● Know within each of these broad groups, organisms are classified into small subgroups. Animals- invertebrates, mammals, birds, amphibians, reptiles and fish, Plants- flowering plants, ferns, conifers, moss. ● Know bacteria are a group of organisms that are not visible to the naked eye but are very abundant and have distinct physical features we can only see under powerful microscopes. 	

Science Knowledge Progression



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	<p>(THIS SUBSTANTIVE KNOWLEDGE APPEARS IN THE PROGRESSION WITHIN THE PHYSICS- EARTH AND SPACE)</p> <ul style="list-style-type: none"> • Know animals and plants have adapted ways of surviving the changing seasons • Know these include hibernating, storing food, fattening up, migration, loss of leaves • Know trees can be either evergreen or deciduous. • Know evergreen trees keep their green leaves all year round and that deciduous trees lose their leaves every autumn 					
Materials	<p>Describing Materials Knowledge Block 1- The big idea about materials</p> <ul style="list-style-type: none"> • Know there are many different materials that have different observable properties • Know materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass) 	<p>Changing Materials Knowledge Block 1- How materials can change</p> <ul style="list-style-type: none"> • Know the properties of a material determine whether they are suitable for a purpose. • Know materials can be changed by physical force (twisting, bending, squashing and stretching). (The purpose of the activities within this learning journey is for children to 	<p>Solids, liquids and gases Knowledge Block 1- Properties of solids, liquids and gases</p> <ul style="list-style-type: none"> • Know materials can be divided into solids, liquids and gases. • Know solids hold their shape unless forced to change. • Know liquids flow easily but stay in their container because of gravity. The more viscous a liquid the less runny it is. • Know gases move everywhere and are not 	<p>Mixtures and separating them Knowledge Block 1- What mixtures are</p> <ul style="list-style-type: none"> • Know a substance is an object with the same properties throughout. • Know a mixture is when more than one substance is present in the same container 	<p>Making new substances Knowledge Block 1: Reversible and irreversible changes</p> <ul style="list-style-type: none"> • Know all matter, including gas, has mass. • Know sometimes, mixed substances react to make a new substance. These changes are usually irreversible. • Know heating can sometimes cause materials to change permanently. When this happens, a new substance is made. 	

Science Knowledge Progression



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		understand why we choose certain materials to do certain jobs. Children will plan how to test materials (wood, metal, plastic, glass, brick, paper, rock, cardboard)	held in containers by gravity.		These changes are not reversible. • Know indicators that something new has been made are the properties of the material are different (colour, state, texture, hardness, smell, temperature) • Know if it is not possible to get the material back easily it is likely that it is not there any	
			Knowledge Block 2- Changing state • Know heating causes solids to melt into liquids and liquids to evaporate to gases. • Know cooling causes gases to condense to liquids and liquids to freeze to solids.	Knowledge Block 2- What dissolving is • Know when a substance is added to a liquid the substance can disappear this is called dissolving • Know a mixture of a substance that has dissolved in a liquid is called a solution • Know not every substance can dissolve in water		
			Knowledge Block 3- Melting, freezing, boiling and condensation temperatures • Know different substances change state at different temperatures but the temperatures at which given substances changes state is always the same.	Knowledge Block 3- Separating mixtures • Know mixtures can be separated if the substances have different properties • Know this is because the substances in the mixture are still present and are unchanged • Know there are different techniques for separating mixtures.		

Science Knowledge Progression



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				<ul style="list-style-type: none"> - know filtration requires the substances be one that does not dissolve in a liquid to work. - Know sieving requires the substances to be of different sizes to work - Know magnets requires the substances to be some magnetic materials and some non-magnet materials to work. - Know evaporation requires a solid substance dissolved in water and the solid has a higher boiling point in water to work. - Know floating requires some substances to float and some substances to sink to work. 		
			<p><u>Knowledge Block 4- All about the water cycle</u></p> <ul style="list-style-type: none"> • Know the temperature at which a substance melts from a solid to a liquid is the same at which it freezes from a liquid to a solid. • Know the temperature at which a substance boils from a liquid to a gas is the same at which it condenses from a gas to a liquid. • Know liquids evaporate slowly, even below their boiling temperatures. 			

Science Knowledge Progression



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			<ul style="list-style-type: none"> • Know the water cycle is the process by which water is continuously transferred between the surface of the earth and the atmosphere. • Know liquid water evaporates into water vapor, condenses to form clouds, and precipitates back to earth in the form of rain and snow. 			
			<p><u>Rocks and soils</u></p> <p><u>Knowledge Block 1- The different types of rocks</u></p> <ul style="list-style-type: none"> • Know a rock is a solid material made up of minerals forming part of the surface of the Earth • Know rocks are exposed on the surface at cliffs, hills and mountains but are also under the surface. • Know some rocks, called ores contain metals • Know some rocks are made of grains squashed together and can contain the remains of long-dead organisms, called fossils. This type of rock is called sedimentary rock, an example would be limestone, sandstone or mudstone 			

Science Knowledge Progression



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			<ul style="list-style-type: none"> • Know some rocks are made of crystals that are locked tightly together. These are called igneous and metamorphic rocks; an example of igneous rock is granite, and an example of metamorphic rock is slate 			
			<p><u>Knowledge Block 2- The properties of rocks</u></p> <ul style="list-style-type: none"> • Know the three types of rocks all have different properties to each other, including porosity, hardness, reaction to chemicals • Know the properties of the rock depend on how the rock was formed, e.g. Some igneous rocks form from lava from volcanoes and cool very quickly leading to very small crystals. 			
			<p><u>Knowledge Block 3- The structure of soils</u></p> <ul style="list-style-type: none"> • Know soil is made up of small broken-down pieces of rock. • Know soil contains a range of different size rock pieces, e.g., sand grains or stones. • Know soil also contains humus (rotted plant material) 			

Science Knowledge Progression



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			<ul style="list-style-type: none"> • Know soil made of very fine rock is called silt or clay. 			
Earth in Space	<p>Year 1- Seasons Knowledge Block 1- Surviving the changing seasons</p> <ul style="list-style-type: none"> • Know there are four seasons, Spring, summer, autumn and winter ● No each season is about three months long ● Know in Spring, young animals like lambs and chicks are born, the flowers bloom and the weather starts to become warmer. ● Know in autumn, the leaves fall off the trees and the amount of time we have in the day becomes less. ● Know winter has the shortest amount of time during the day and the weather is at its coldest. ● Know in summer the trees are full of green leaves and the weather is at its warmest. • Know animals and plants have adapted ways of surviving the changing seasons • Know these include hibernating, storing food, fattening up, migration, loss of leaves 				<p>Space and Gravity Knowledge Block 1: Our Solar system</p> <ul style="list-style-type: none"> • Know a Solar system is a collection of planets, which orbit (a curved path) a star. • Know there are huge number of stars in space and therefore a huge number of solar systems • Know our solar system consists of 8 planets, many of those planets have moons which orbit around them. • Know Earth's moon is not a planet but is a satellite which orbits Earth. It is around a quarter of the size of Earth. • Know as the Moon orbits the Earth, the Sun lights up different parts of it, making it seem as if the Moon is changing shape. We call these the phases of the moon. • Know the Moon doesn't emit (give off) light itself, the 'moonlight' we see is actually the Sun's light reflected off the lunar surface. • Know our solar system can be represented with a model, but it isn't 	

Science Knowledge Progression



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	<ul style="list-style-type: none"> • Know trees can be either evergreen or deciduous. • Know evergreen trees keep their green leaves all year round. • Know deciduous trees lose their leaves every autumn. <p>(THIS SUBSTANTIVE KNOWLEDGE APPEARS IN THE PROGRESSION WITHIN THE BIOLOGY-VARIATION AND EVOLUTION)</p>				<p>possible to draw it to scale.</p> <ul style="list-style-type: none"> • Know the planets and moons are rotating (spinning) • Know the time it takes one planet to rotate is called a day. On Earth this is 24 hours • Know the time it takes a planet to complete one orbit around its star is called a year. On Earth this is 356.25 days • Know the solar system is with a massive collection of stars called the galaxy (called the Milky way) • Know the Milky way is one of billions of galaxies in the Universe. 	
					<p>Knowledge Block 2: <u>What else is in the solar system?</u></p> <ul style="list-style-type: none"> • Know stars are huge balls of gas that produce vast amounts of light and heat. • Know asteroids are lumps of rock that orbit a star (there are millions in between Mars and Jupiter) • Know comets are objects that are made of ice, which melts when they get closer to the sun leaving a tail. 	

Science Knowledge Progression



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					<u>Knowledge Block 3:</u> <u>Gravity and its effects</u> <ul style="list-style-type: none"> • Know gravity is force of attraction between two objects with mass (a quantity of matter) • Know the bigger the mass the bigger force it exerts • Know gravity works over distance but gets weaker as distance increases • Know stars, planets, moons have a very large amount of mass. They exert a gravitational attraction on each other • Know differences in gravity result in smaller mass objects orbiting around larger mass objects, e.g., planets around stars and moons around planets 	
Electricity				<u>Electricity</u> <u>Knowledge Block 1-</u> <u>Electricity as a power source</u> <ul style="list-style-type: none"> • Know lots of devices are powered by electricity • Know electricity comes from a source There are two main sources- batteries and mains 		<u>Controlling electrical circuits</u> <u>Knowledge Block 1:</u> <u>Pushing electrical current</u> <ul style="list-style-type: none"> • Know current is the flow of electricity around a circuit. • Know the power supply in a circuit pushes the current round the circuit • Know the voltage of the power supply is a measure of this push • Know voltage is measure in volts

Science Knowledge Progression



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						<ul style="list-style-type: none"> • Know batteries have a limited store of energy and when this is gone, they can no longer push the current a device it makes it work
				Knowledge Block 2- What batteries do <ul style="list-style-type: none"> • Know a battery pushes electricity to the device. • Know that to be able to push electricity the battery must be connected to the device using wires and this is called a circuit. 		Knowledge Block 2: Electrical current <ul style="list-style-type: none"> • Know current is the flow of electricity through a conductor • When current passes through • Know increasing the voltage (the number of cells in the battery) increases the current. The larger the flow of current, the harder the device works
				Knowledge Block 3- Making devices work harder <ul style="list-style-type: none"> • Know if there are more batteries added to a circuit this provides a bigger push on the electricity • Know this will make the device work harder e.g., brighter bulbs, faster spinning motor, louder buzzer 		Knowledge Block 3: Electrical resistance <ul style="list-style-type: none"> • Know all parts of a circuit offer resistance to electrical current including the wires. • Know resistance is the slowing down of electrical current • Know the more devices added into a circuit the greater the resistance • Know this means less current flows around the circuit

Science Knowledge Progression



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				Knowledge Block 4- Insulators and conductors <ul style="list-style-type: none"> • Know some materials will allow electricity to flow through them- Conductors • Some metals such as silver, gold and copper are good conductors. Water is also a conductor of electricity. • Know that other materials will not allow electricity to flow through them - Insulators • Know that plastic, wood, glass and rubber are good electrical insulators. That is why they are used to cover materials that carry electricity. • Know a switch opens and closes a circuit 		
Energy Pathways			<u>Light</u> Knowledge Block 1- Light and sight <ul style="list-style-type: none"> • Know there must be light for us to see. • Know light comes from a source. • Know we need light to see things, even shiny things. • Know light from the sun can be dangerous and that there are ways to protect their eyes 			<u>How light behaves</u> Knowledge Block 1: How light travels <ul style="list-style-type: none"> • Know when light is emitted from a light source, it travels in straight lines until it hits an object. This can be represented by an arrow. • Know shadows form when light hits an opaque object. The area behind the object is in darkness because light can only travel in straight lines.

Science Knowledge Progression



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			<p><u>Knowledge Block 2- What light does when it hits materials</u></p> <ul style="list-style-type: none"> • Know if an object is transparent light will go through it and we will be able to see through it. • Know if an object is opaque, it will block the light and no light will get through. This is what forms shadows. • Know the closer to the light source an object is, the bigger the shadow will be. This is because the object blocks more of the light. • Know the further away from the light source an object is, the smaller the shadow will be. This is because the object blocks less of the light. • Know if an object is perfectly reflective, light will bounce back off it and we will see reflections of objects. • Know if the material is translucent, it will allow light through, but we won't be able to see through it. 			<ul style="list-style-type: none"> • Know shadows have the same shape as the objects that cast them. <p><u>Knowledge Block 2: How light behaves when it hits objects</u></p> <ul style="list-style-type: none"> ● Know when light hits a transparent object, it goes through it in a straight line so we can see a clear image through it. ● Know when light hits a translucent material, it goes through it but is scattered, this means light can pass through, but we can't see an image through it. ● Know when light hits a mirrored surface, it reflects off it in straight lines, so we can see an image in the reflective material. ● Know sometimes when light hits a material it reflects off it in many different directions (it is scattered). In this case light will be reflected but no image will be seen in the material. ● Know shiny surfaces are better reflectors and rough surfaces scatter light more. Opaque objects don't allow any light to pass through them

Science Knowledge Progression



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						<p><u>Knowledge Block 3:</u> <u>How we see</u></p> <ul style="list-style-type: none"> • Know animals see objects when light is reflected off the object and enters the eye through the pupil. • Know the pupil changes its size to allow enough, but not too much light into the eye. • Know too much light damages the eye and too little results in poor quality images. <p><u>Sound Knowledge Block 1: Describing Sound</u></p> <ul style="list-style-type: none"> ● Know sounds can be produced in a variety of ways. ● Know sounds have the properties of pitch and volume. ● Know when a sound is produced it spreads out from its source in all directions <p><u>Knowledge Block 2:</u> <u>How sound is made and travels</u></p> <ul style="list-style-type: none"> ● Know sound is caused by vibration (objects move rapidly back and forth or up and down) ● Know when objects vibrate it makes the objects in contact with it also vibrate. <p>This includes the air.</p>

Science Knowledge Progression



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						<ul style="list-style-type: none"> ● Know the vibration travels through the air and makes other objects it is in contact with vibrate including your ear drum.
						<p>Knowledge Block 3: Pitch and Volume changes</p> <ul style="list-style-type: none"> • Know pitch and volume are caused by how the material vibrates • Know the pitch of a sound is caused by how fast an object vibrates. This is called the frequency of vibration. Higher the frequency, higher the pitch • Know smaller objects or tighter strings tend to vibrate with a higher frequency • The volume of sound is caused by how big each vibration is. This is called the amplitude of vibration. The bigger the amplitude the higher the volume. • Know sounds get fainter as the distance from the sound source increases.
Forces		<p>Pushes and pulls Knowledge Block 1</p> <ul style="list-style-type: none"> • Know objects can move (be in Motion) in various ways-roll, slide and bounce 	<p>Magnets Knowledge Block 1- What magnets do</p> <ul style="list-style-type: none"> • Know magnets exert attractive forces on some metals 		<p>Forces that oppose motion Knowledge Block 1: Water and air resistance.</p> <ul style="list-style-type: none"> • Know when objects move through air and 	

Science Knowledge Progression



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					<p>water, they have to push it out of the way. The water and air push back with forces called water resistance and air resistance. The harder it is to push the material out of the way the greater the resistance.</p> <ul style="list-style-type: none"> • Know gases weigh less than liquids and so water resistance is greater than air resistance. 	
		<p>Knowledge Block 2</p> <ul style="list-style-type: none"> • Know the pushing or pulling of an object can affect its motion. • Know pushing or pulling can do three things, slow down, speed up or change the direction of an object. 	<p>Knowledge Block 2- Magnets don't need to touch</p> <ul style="list-style-type: none"> • Know magnetic forces work through other materials including air, so magnets don't need to be touching to exert their force. It is called a non-contact force 		<p>Knowledge Block 2: Friction</p> <ul style="list-style-type: none"> • Know friction is a force against motion caused by two surfaces rubbing against each other. It occurs because no surfaces are perfectly smooth; they have bumps and undulations that can interlock when placed on top of each other. • Know to move one interlocking surface over another, one of three things must happen: <ul style="list-style-type: none"> • The surfaces must rise slightly • The bumps on the surface must bend • The bumps on the surface must break • Know all of these actions require a force, 	

Science Knowledge Progression



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					this is what causes friction	
		Knowledge Block 3 <ul style="list-style-type: none"> • Know the larger the push/pull the bigger the effect on motion 	Knowledge Block 3- Magnets attract and repel <ul style="list-style-type: none"> • Know each end of a magnet is called a pole, opposite poles are called north and south. • Know magnets exert attractive forces on each other when the poles facing each other are north and south (opposites). • Know magnets exert repulsive forces on each other when the poles facing each other are the same. 		Knowledge Block 3: Managing Forces <ul style="list-style-type: none"> • Know some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move. • Know the use of levers can reduce the force needed to move things. The object you are lifting is called the load, and the force you apply to the arm to make the object move is called the effort. • Know the use of pulleys can reduce the force needed to move things (These are particularly complex ideas. It might be better to teach them through a design technology project where children make toys using cogs, pulleys and lever) 	
			Knowledge Block 4- what affects magnetic strength <ul style="list-style-type: none"> • Know the strength of magnetic forces is affected by: The strength of the magnet, the distance between the magnet and the object, and the material the object is made from. 			

Science Knowledge Progression

