Progression of Substantive Knowledge in Science to support Sequential Planning, Scaffolding and Challenge in Lesson Planning

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	By the end of EYFS, the pupil can: know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.	**By the end of KS 1, the pupil can:** • name and locate parts of the human body, including those related to the senses (year 1), and describe the importance of exercise, a balanced diet and hygiene for humans (year 2) • describe the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults (year 2) • describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants (year 2) • identify whether things are alive, dead or have never lived (year 2) • describe and compare the observable features of animals from a range of groups (year 1) • group animals according to what they eat (year 1), describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships (year 2) • describe seasonal changes (year 1) • name different plants and animals and describe how they are suited to different habitats (year 2) • distinguish objects from materials, describe their properties, identify and group everyday materials (year 1) and compare their suitability for different uses (year 2)	**By the end of KS 2, the pupil can:** • name and describe the functions of the main parts of the digestive (year 4), musculoskeletal (year 3) and circulatory systems (year 6); and describe and compare different reproductive processes and life cycles in animals (year 5) • describe the effects of diet, exercise, drugs and lifestyle on how the body functions (year 6) • name, locate and describe the functions of the main parts of plants, including those involved in reproduction (year 5) and transporting water and nutrients (year 3) • use the observable features of plants, animals and microorganisms to group, classify and identify them into broad groups, using keys or other methods (year 6) • construct and interpret food chains (year 4) • describe the requirements of plants for life and growth (year 3); and explain how environmental changes may have an impact on living things (year 4) • use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved (year 6); and describe how fossils are formed (year 3) and provide evidence for evolution (year 6) • group and identify materials (year 5), including rocks (year 3), in different ways according to their properties, based on first-hand observation; and justify the use of different everyday materials for different uses, based on their properties (year 5)				
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	**Children will know:** Some foods that are grown and come from plants the basic needs to care for plants some common varieties of plants. the difference between a non-flowering and flowering plant	**Children will know:** that a fruit is a part of a flowering plant vegetables grow from plants, but they do not have seeds on or inside them. Seeds come in many different shapes and sizes. Seeds have an outer shell that protects a baby plant inside. baby plants stay inside the seed until it gets	**Children will know:** the main parts of a plant: petal, root, stalk, leaf, what is meant by life cycle that life cycles go on and on. the main parts of the plant life cycle how different seeds look. what germination means: Germination is the process by which	**Children will know:** that flowering plants consist of: stigma, , style, ovary, ovule, stem, sepal, filaments, anther, petal that a stamen is the male reproductive organ of a flower and consists of an anther held up on a filament. that the petal attracts pollinating insects and is often brightly coloured. that the stigma is the top of the female part			

		the things it needs to grow. That the basic parts of a plant are: roots, stem, leaves, flowers (petals). that the roots hold the plant in the ground and take water from the soil. the stem holds the plant up and carries the water to the leaves the leaves take in the sunshine and turn it into food for the plants. the petals attract insects so that the plants can be pollinated. that the basic structure of a tree is: roots, trunk, leaves, branches, crown. that a deciduous tree loses its leaves in the autumn. an evergreen tree keeps its leaves all year.	seeds begin to grow into plants. that a bulb is an underground bud or stem of a plant. that the tunic is the papery outer covering that the scales are the thick leaves that store the food that the bud is the future flower stored inside the bulb for protection. that plants need 5 things to survive: light, air, water, nutrients and space to grow. that a climate refers to a long term pattern of weather in an area that there are different climates all over Earth. there are 5 main types of climate: tropical, arid(dry), temperate, continental, polar. that some plants adapt to help them grow in certain climates. that all trees have clues and features that help us to identify them. that you need to look at the shape and size	of the flower which collects the pollen grains. that the ovary produces the ovules. that plants need air, light, warmth, water and nutrients to be healthy. that if these things are missing, then the plants growth may be affected or it may die. that water is an important part of a plants life and growth. that water is absorbed from the soil through the roots. that the water travels up the plant through the water transport system. plant stalks are made up of hollow tubes called xylem. Xylem tubes move the water up the plants stem to the leaves, stem and flowers. This is called capillary action. Pollination is the transfer of pollen from a male part of a plant to a female part of a plant. This starts			

			of the tree, the bark, leaves, flowers, fruits, buds and twigs to help you identify a tree.	fertilisation (making a new seed). Most plants rely on bees and other insects to transport the pollen. That dispersal talks about how a plant spreads its seeds as far as possible. That there are different types of seed dispersal. Plants need to disperse their seeds to survive. Wind dispersal refers to plants that use the wind to carry their seeds far away. Burst dispersal refers to plants that have pods full of seeds that burst showering the ground with seeds. Water dispersal refers to plants that often make very light seeds and grow near water. The seeds float away on the water. Animal dispersal refers to seeds that are caught on animals and insects that pass by and are then dropped at a later date.			
Vocabulary	Plant, seed, bulb, soil water flowering plant	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch,	Leaf; stem; roots; petals; light; soil; water; seed; bulb;	Germination; pollination; dispersal; life cycle; attract;			

		stem, bark, stalk, bud, deciduous, evergreen	temperature; healthy, climate, nutrients, Weather, place, tropical, dry, mild, continental, polar	fertilisation, reproduction, Photosynthesis, pollen, pollen, roots, stem, trunk, leaves, absorb, nutrients, stamen, style			
Animals including humans	**Children will know:** different body parts. The order of the human lifecycle from birth to old age. the various stages of the life cycle of a caterpillar/butterfly the five senses. How to keep themselves healthy How germs can spread what a carnivore and herbivore is how to sort animals into categories – sea creatures, farm animals, wild animals · the different environments animals would be found · the names of some Minibeasts and recognise their natural habitats	**Children will know:** the names and locations of the main parts of the human body that humans have 5 main senses and what they are. which parts of the body are linked to those senses. some main animal categories. how to sort animals using simple characteristics. what an amphibian is: cold-blooded vertebrates that don't have scales. They live part of their lives in water and part on land. what a reptile is: an air-breathing animal that has scales instead of hair or feathers. what a mammal is: an animal that breathes air, has a backbone, and grows hair at some point during its life	**Children will know:** what the word 'offspring' means. that animals including humans have offspring which grow into adults. what the term 'lifecycle' refers to the basic lifecycles of Chicken, butterfly, human and frog what it means to be 'alive'. what animals, including humans, need to stay alive. that some creatures have special features (eg. Whales and their blubber) that help them live longer. what humans need to do to stay healthy (eg. exercise, diet, hygiene). the impact of exercise on heart rate. some of the healthy foods that humans	**Children will know:** that the bones of the body form a framework called the skeleton. some of the main bones in the human body that this framework supports and protects the softer tissues. that a muscle is made up of long threads, or fibres. that skeletal muscle controls movement, posture (position of the body), and balance. that skeletal muscle controls movement, posture (position of the body), and balance. what an invertebrate is: Invertebrates are animals without a backbone or bony skeleton. that skeletons and muscles provide protection and allow us to move.	**Children will know:** that the outsides of our teeth are covered with enamel the insides of our teeth have blood vessels and nerves. that front teeth are called incisors. 4 sharp teeth are called canines. Back teeth are called molars. Children have 20 milk teeth Adults have 32 teeth. Acids, like fruit juice, vinegar, cola dissolve the enamel on teeth. the oesophagus takes food from mouth to stomach so digestion can begin. that the stomach is filled with powerful acids that break down the food into smaller pieces. that the liver creates enzymes to help process nutrients. that a producer is: something that makes	**Children will know:** that gestation is the length of time a mammal is pregnant. that the gestation period starts when the sperm from the male fertilises the female egg. that the length of gestation is different for each type of mammal. (Larger animals usually have longer gestations than smaller animals). that the gestation period finishes when the baby is born. that human babies develop for about nine months before their birth days. that during this time they move through different stages, starting as a single cell and then growing into an embryo and then a foetus. that the 4 main stages of human life are baby(4 weeks – 1yr), child (1yr – 18yrs), adult	**Children will know:** the names of the key organs in the circulatory system and their function. the structure of the heart what heart rate is. how heart rate can be measured and affected. (heart dissection lesson available if required) about the structure of blood. the functions of the component parts of blood. the ways in which nutrients and water are transported within animals and humans. the impact of diet, exercise, drugs and lifestyle on the way that our bodies function.

		what a vertebrate is: organisms which have an internal backbone surrounded by bone what an invertebrate is: animals without a backbone or bony skeleton the differences between these categories. what a carnivore is: an animal that mostly eats other animals what a herbivore is: an organism that feeds mostly on plants what an omnivore is: animals that eat both plants and other animals. that our skeletons and muscles help to make the different parts of our body move. each of our senses send messages to our brains. that a minibeast is a small animal. Spiders, worms, snails, slugs, beetles, earwigs and caterpillars are common minibeast. that camouflage is a natural 'skill' used by	should have in their diet. what the food wheel shows us some facts about food groups what is meant by 'diet' that humans need a balanced diet: A healthy, balanced diet includes foods from all 5 food groups: fruit, vegetables, grains, proteins and dairy. what a balanced diet consists of. what hygiene means what a germ is how germs can spread some of the problems caused by spreading germs. that the body performs better when it is clean and healthy. why soap is important. what a microbe is: Microorganisms, or microbes, are a diverse group of minute, simple forms of life that include bacteria, algae, fungi, protozoa, and viruses.	that muscles can only pull – they can't push. that muscles are fleshy tissue attached to the skeleton. that every muscle is made up of a pair. that nutrition refers to substances that support our immune system, maintain healthy bones and teeth and support growth. That animals and humans get nutrients from the food they eat. that there are 7 nutrition food groups: carbohydrates, proteins, fibre, fats, vitamins, minerals and water. humans need a balance of the nutrients to help them grow healthily. nutritional value refers to the measure of the different nutrients in items of food that the Eatwell Guide has been developed to help people maintain a healthy, balanced diet.	its own food (like plants) that a predator is: an animal that eats other animals that prey means: animals that are eaten by other animals. that a food chain is a diagram that shows us how animals are linked by what they eat that a food web shows the links between animals who eat or are eaten by more than one kind of animal. that a food chain is a single list which connects a producer with several different consumers.	(18yrs – 65yrs), old age (65yrs +). some of the features of each stage. that puberty is when a child's body begins to develop and change as they become an adult. that the average age for girls to start puberty is 11, while boys the average age is 12. some emotional changes that occur during puberty: mood swings some of the physical changes that happen during puberty (Changes in boys include: voice breaking, testicles dropping and growing, hair under arms, face and between legs. Changes in girls include: develop breasts, hair under arms and between legs, periods. Changes in boys and girls include: increase in oily hair and skin, spots, sweats, body grows and changes shape). some of the changes that take place as we grow older: hair often	

		plants and animals to help them blend into their surroundings. some creatures use camouflage to protect themselves some animals use camouflage to help them attack other creatures.	some good and bad microbes what microbes do.			thins and turns grey, and skin wrinkles. Muscles begin to shrink, and bones become more fragile. We often lose some of our height or part of our vision or hearing. We think more slowly, and our short-term memory may suffer. some of the factors that influence life expectancy: smoking, overeating, drug use, genetic conditions.	
Vocabulary	Habitat, bird, winter animal, carnivore, herbivore Home; environment, ocean; sea; farm; savannah, Minibeast names	Amphibian; reptile; bird; mammal; diet; teeth; carnivore; omnivore; herbivore; protection; camouflage; prey; predator; touch; smell; taste; sight; hear; senses; human body	Lifecycle; exercise; diet; balanced; hygiene; food; offspring; survival	skeleton, bones, support, protect, skull, ribs, spine, muscles, joints Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water,	Incisor; molar; pre molar; canine; filling; tooth decay; plaque Digestive system, digestion, oesophagus, stomach, small intestine, large intestine, nutrients, rectum, anus, herbivore, carnivore, omnivore, producer, predator, prey, food chain.	Gestation, pregnant, grow, sperm, egg, fertilise, birth, Adolescent, death, teenager, elderly, toddler, reproduction, foetus, growth, puberty, vary. adult, sexual reproduction, fertilization, death, menstrual cycle,	Arteries; blood vessels; blood pressure; capillaries; heart; circulation; circulatory system; platelet; plasma; red blood cells; white blood cells; transfusion; vein; pulse
Materials	**Children will know:** why things float or sink. That materials can have different properties That materials can be the same and some can be different	**Children will know:** **<u>Everyday Materials</u>** the difference between an object and the material how to sort common materials including wood, plastic, glass, metal, water and rock. how to group different materials using a range	**Children will know:** **<u>Uses of Everyday Materials</u>** that objects can be sorted according to their materials and their properties. that natural materials are those found in nature such as plants, rocks and water.	**Children will know:** **<u>Rocks</u>** what a rock is that rocks vary in appearance. how to classify rocks using appearance how to classify rocks using simple physical properties.	**Children will know:** **<u>States of matter</u>** what 'matter' is that there are 3 states of matter; solid, liquid, gas (and plasma Y4 do not do plasma). that a liquid is a material whose particles have gaps between them.	**Children will know:** **<u>Properties and Changes of Materials</u>** how to group together everyday materials of the basis of their properties. how to use my knowledge of solids, liquids and gases to decide	

		of criteria such as how they feel how to describe how different materials feel. what is meant by a property when talking about materials the simple physical properties of a variety of everyday materials what opaque and transparent mean what stretchy means. what waterproof means and some sample materials what floating and sinking mean some objects that float and some that sink. how to carry out a fair test. what a magnet is and how they work	that synthetic materials are man made that the shape of some materials can be changed when they are stretched, twisted, bent and squashed. that waterproof means that water cannot pass through the object.	the three main rock types: igneous, metamorphic and sedimentary that some rocks are hard/durable and others will crumble that some rocks absorb water and others do not. that some rocks are acidic. what a fossil is how fossils are formed how rocks are made that there is more than one type of soil that soil is made from rock and organic matter.	That a liquid takes the shape of the container it is in. that a solid is a substance that holds its shape because its particles are packed closely together. that a gas is a substance whose particles are constantly moving rapidly. that different types of matter behave in different ways. that some materials change when they are heated or cooled. the melting and boiling points of water. That if a liquid changes into a solid by lowering the temperature it is called freezing. That if a liquid changes to a solid by increasing the pressure, it is called solidifying. that evaporation is what happens when a liquid is heated. that condensation is when water vapour (gas) changes into a liquid.	how mixtures might be separated through filtering, magnetic attraction, sieving and evaporating. what dissolving is. that some solids will dissolve in liquid to form a solution what melting is the difference between dissolving and melting that some things melt when heat is applied. what soluble and insoluble mean. some materials that are soluble or insoluble. that the original solid material is recoverable from some solutions through the process of evaporation. that the addition of heat increases the rate of evaporation what reversible means. that dissolving, mixing and changes of state are reversible changes that some changes result in the formation of new materials and that this kind of change	

					what is meant by The Water Cycle Heat makes water evaporate. That water from the lakes turns into a gaseous substance (water vapour). Condensation is the process by which a gas turns back into a liquid. Condensation is the opposite of evaporation. the part played by evaporation and condensation in the Water cycle that the water cycle is continuous and has been in operation since the creation of the earth. that some liquids can contain gas. that adding salt lowers the freezing point of a liquid. that not all liquids freeze at 0 degrees.	is not usually reversible (burning, acid on bicarb) what a 'conductor' is. what a 'thermal insulator' is. which materials are thermal conductor and insulators and why they are used. the reasons for the use of metal wire compared to wood and plastic in an electrical circuit. about a famous scientific discovery. how glue is made and its properties.	
Vocabulary	Melting, heating, hard, soft, bendy, mixing float, sink	Material; opaque; transparent; magnetic; non-magnetic; waterproof; bendy; strong	Solid; rough; smooth; waterproof; transparent; strong; opaque; rigid; glue; natural; stickier;	Compression; fossil; metamorphic; sedimentary; humus; topsoil; parent material; bedrock Rock, stone,	Solid; liquid; gas; particles; melting; freezing; heating; cooling; viscosity; water cycle; precipitation;	Solid; liquid; gas; particles; melting; freezing; heating; cooling; viscosity; water cycle; precipitation;	

			absorbent; consistency; flexible	pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb, water, soil, fossil, marble, chalk, granite, sandstone, slate	condensation; evaporation; collection	condensation; evaporation; collection	
Living things and their habitats	**Children will know:** The parts of a spider and a reindeer how to categorise bugs using observable features. Some minibeast habitats Some animal habitats under the sea How to respect and care for different habitats Some materials that can be recycled · some items found in a rock pool	**Children will know:**	**Children will know:** what 'alive' means what 'dead' means how to group objects into the 3 categories: alive, dead, never been alive. what the word 'biome' means that each biome has a variety of habitats within it. (Biomes- rainforest, desert, grassland, temperate forest, tundra, savannah) that animals and plants live in habitats that their basic needs are met by that habitat. that animals and plants depend upon each other. what is meant by 'micro-habitat' and can give examples. what type of habitat suits which type of creature.	**Children will know:**	**Children will know:** the names and identities of a variety of living things in the environment. that environments can change, that these changes can have an impact on living things. what endangered means: An endangered species is any type of plant or animal that is in danger of disappearing forever at least 3 of the top ten endangered species why one of the endangered animals is in danger, how humans have impacted the environment how we can support the environment for this animal. how environmental changes can cause	**Children will know:** That an amphibian has 3 common stages in its lifecycle and what they are. That a bird has 7 recognised stages of its life cycle and what they are. That a mammal has 4 common stages of its life cycle and what they are. That an insect has 4 common stages of its life cycle and what these are called. That metamorphosis refers to a dramatic change that some animals and insects go through during their life cycles. The names of some creatures that undergo a metamorphic life cycle. That Pollen is carried by insects or blown by the wind from one flower to another. This	**Children will know:** how living things are classified into broad groups. some common observable features, similarities and differences. – specifically leaves and some animals how to use the Linnaeus classification to classify some animals. what a microorganism is. I know that some microorganisms can be bad for us. what bacteria is I know that there can be a link between some bacterium and food poisoning.

			what that habitat needs to provide. know what a food chain is how animals obtain their food from plants and other animals different sources of food.		dangers to living things; (including litter, pollution, oil spills, deforestation, development and global warming). how we can support the environment for this animal.	process is called pollination. That Pollen reaches the new flower and travels to the ovary where it fertilises egg cells (ovules) to make seeds. This is fertilisation. That the seeds are scattered by animals or the wind. This process is called dispersal. Some of the seeds will grow into new plants. That all mammals reproduce through sexual intercourse/mating. The female egg is fertilized internally. In nearly all mammals it is the female that carries the developing young in her body after mating. The young develop inside a part of the mother's body called the uterus, or womb. This is called gestation and this period can vary between species. They receive nutrition through the mother's body. Nearly all female mammals give birth to live young.	

						That conservation refers to protecting our environment and the wildlife that lives in it. It includes looking after biodiversity and the health of the planet. That Conservation aims to protect species from extinction through maintaining habitats and ecosystems that may be under threat from humans or natural events	
Vocabulary	Habitat, bird, plant, animal Sea; ocean; fish; seaweed; rock; shell,		Life cycle; minibeast; invertebrates; food chain; habitat; micro-habitat, prey; predator; source; consumer; energy; survival; diet; hygiene; camouflage; exercise		Vertebrate; invertebrate; mammal; amphibian; fish; reptile; bird; environment	micro-organisms; bacteria; viruses life cycle, live, young, fertilises, egg, runners, reproduce, sperm, metamorphosis gestation, cuttings, plantlets, bulb, sexual/asexual reproduction	habitat; biodiversity; ecosystem; dense; Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering, bacteria, bacterium, danger.

	EYFS	Year 1
Seasonal changes	**Children will know:** Some of the main seasonal changes observed over the 4 seasons. about weather associated with each season the names of the different seasons · when the different seasons appear in throughout the year · how leaves change throughout the different season	**Children will know:** that there are 4 seasons that the seasons are called: Winter, Spring, Summer and Autumn. that the seasons have different features and that some things are the same and some are different. that the season after Summer is called Autumn. that Autumn leads into Winter. that the Autumn months are September, October and November. some of the seasonal features of Autumn. that the season after Autumn is Winter.

		some of the seasonal features of Autumn. that the Winter months are December, January and February that the season after Winter is Spring. some of the seasonal features of Spring. that the Spring months are March, April, May. that the season after Spring is Summer. some of the seasonal features of Summer. that the Summer months are June, July and August. that the seasons change because the earth tilts that the length of the days change that the amount of sunlight varies.
Vocabulary	Christmas, snow, cold, freezing, wind, blow, strong, Spring, Summer, Autumn, change, same, different, leaves; crispy; brown; orange; red; blossom, warm, sun, hot, weather, rain	Seasons (winter, summer, spring, autumn) sun, sunrise, sunset, Day length, weather, leaves, colours, migration Weather, icy, snow, freezing, hibernation Weather, rain, shoots, buds, blossom, Weather, hot, sun, shade, sunburn, danger, sunscreen, protection, thirsty, dehydrated, damage, Earth tilt, compare, different, similar, seasons,
	Year 3	Year 6
Light	**Children will know:** that we need light in order to see: (Light is a form of energy that moves in straight lines. It also reflects off things, and that reflected light enters our eyes, allowing us to see). that dark is the absence of light or that light is not there some light sources. that a source of light makes light. that the Sun and other stars, fires, torches and lamps all make their own light and so are examples of sources of light. that reflection occurs when a light ray hits a surface and bounces off. the appearance of an image in a mirror is called a reflection.	**Children will know:** that light always appears to travel in straight lines, but these lines can be sent in other directions when it is reflected by different surfaces. that when light reflects off a rough surface it goes in different directions so you don't get a sharp reflection. what a periscope is. light **reflects** off things and enters our eye through the pupil. that travel through the optic nerve to the brain. that signals from the eye connect with the brain to enable us to see. that the lens focusses the light onto the retina at the back of the eye. that the light sensors in the retina change the light into electrical signals.

	that smooth, shiny surfaces (such as mirrors and polished metals) reflect light well. Dull and dark surfaces (such as dark fabrics) do not reflect light well. that a shadow is the dark shape made when something blocks light. that you must have a source of light in order to have shadows that if there is more than one light source, there will be several shadows that a shadow's outline, called a silhouette, will have the same shape as the object blocking the light. that shadows can vary in size. that moving an object towards a light source and away from a surface makes its shadow increase in size. that moving an object away from a light source and towards a surface makes its shadow decrease in size. what transparent means: light completely passes through it, and you can see clearly through it that translucent means: the material will allow light to pass through it but objects on the other side will not be clearly seen that opaque means: cannot be seen through and does not allow light to pass through it	that the signals travel along the optic nerve to the brain. that the brain 'reads' those signals and changes them to images of what we are seeing. that the shape of an object always determines the shape of its shadow that a shadow is formed by an opaque object blocking the path of the light. that the size and shape of the shadow can change. These changes are caused by the position of the light source what refraction is: the bending of light rays that light travels in straight lines *until it passes from one material to another*, for example from air to water or water to air. that light is made up of many colours and that call this full range the colour spectrum. how rainbows are formed: A rainbow is formed when sunlight bends when it enters raindrops. This splits white light into the different visible colours that are then reflected back out of the raindrops.
Vocabulary	Shadow; source opaque; transparent; reflector; natural Light, light source, dark, absence of light, translucent, , shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous;	Optical; voltage; cladding; transmit; circuit; internal reflection; optical fibres
	Year 3	Year 5
Forces and Magnets	**Children will know:** what a force is and that there are different types. that friction and gravity are forces and what they do. that there are different road surfaces how things move on those different surfaces that some surfaces are better than others and why. what magnets are and what they do.	**Children will know:** that unsupported objects fall towards the earth because of the force of gravity acting between the earth and the falling object. that the gravity on the moon is 1/6 of Earths. This is why astronauts seem more bouncy. that air resistance is a kind of friction that occurs between air and another object. Air resistance is one of the two fixed forces of nature. Air resistance is the opposing force that an object experiences as it passes through the air.

	that magnets attract or repel materials and sort a range of objects accordingly that some forces need contact between 2 objects. that magnetic forces can act from a distance that magnets have 2 poles that magnets repel or attract depending on which way around they are. that magnets have different strengths and different uses. how a compass works	that water resistance is a type of force that uses friction to slow things down that are moving through water that friction is a force between 2 surfaces that are sliding, or trying to slide, across each other. Friction always works in the direction opposite to the direction in which the object is moving or trying to move. Friction always slows a moving object down. That levers, pulleys and gears make heavy jobs easier to do by taking care of some of the weight. Levers make objects easier to lift
Vocabulary	Pole; force; magnetic; magnetism; attract; repel; force; force meter; gravity; natural	Force; air resistance; water resistance; buoyancy; load; gravity; up thrust; exert
	Year 4	Year 6
Electricity	**Children will know:** that an 'electrical appliance' is a tool or apparatus that we use in our day-to-day life with the assistance of electricity some everyday electrical appliances: TV, kettle, cooker, iron, computer that electricity is a form of energy that can give things the ability to move and work. that electricity can be dangerous. that a circuit is a device made of other, smaller electrical devices that can move the flow of electricity through itself to power larger devices. that every complete circuit must have a power source. how to create a simple circuit (including a lamp) that a simple electrical circuit needs: a battery (or other energy source), a light bulb (or other device that uses energy) and wires that an electrical circuit is a complete path which electrical energy can flow through that for a circuit to be complete, there must be wires connected to both the positive and negative ends of the power supply. that electricity will only travel around a circuit that is complete. that you can use a switch in a circuit to create a gap in a circuit. This can be used to switch it on and off.	**Children will know:** how to change the brightness of a bulb in my circuit. the problems caused by 'overloading' a circuit by adding more bulbs (diminished power due to dispersal). how to make a switch and add it to my circuit. some of the hazards associated with electricity. the different, recognised symbols, for these components of a circuit: Bulb Battery, Wire, Buzzer, Motor, Push Switch, Cell (battery is 2 cells). the components of a circuit. what a data logger is. what a battery is and how it works: a sort of container that stores energy until it is needed. some different sources of energy that can power a circuit. that voltage refers to a measure of how strong the current is in a circuit that a series circuit is a circuit in which the current follows one path. that in a parallel circuit: The current is divided into several paths. One of the components, such as a bulb, can be switched on or off without affecting the others in a parallel circuit. how to build simple series and parallel circuits to solve problems

	that when a switch is open (off), there is a gap in the circuit. Electricity cannot travel around the circuit. that when a switch is closed (on), it makes the circuit complete. Electricity can travel around the circuit. that some materials let electricity pass through them easily. These are known as conductors. that some good conductors include: many metals, such as copper, iron and steel. that some materials do not allow electricity to pass through them. These are known as insulators. that plastic, wood, glass and rubber are good insulators. That is why they are used to cover materials that carry electricity. that the plastic covering those surrounds wires is an electrical insulator and it stops you from getting an electrical shock. that some scientists work to develop our knowledge of electricity. that Alessandro Volta, Michael Faraday were scientists involved in the early development of electricity. Henry Snaith is a modern scientist involved in the development of solar electricity.	
Vocabulary	Conductor, insulator, current, cell, battery, wire, bulb, motor, buzzer, circuit	Series circuit, current, cell, battery, wire, bulb, motor, buzzer, circuit, voltage
	Year 4	
Sound	**Children will know:** that sounds are made by something vibrating. that sound is a type of energy that vibrations travel through a medium to the ear Sounds can travel through solids, liquids and gases. that the vibrations hit your eardrum, then pass to the middle and inner ear. the vibrations are changed into electrical signals that are sent to your brain. that the pitch of a sound varies upon the length of the object being blown Pitch is a measure of how high or low a sound is. that volume varies according to the strength of the vibrations that produce it	

	that when sound vibrations spread out over a distance, the sound becomes quieter (link to ripples on a pond) that bigger harder objects will make a louder sound. If there are lots of objects then the sound is muffled as they have less space to move around. Softer materials make a duller sound.
Vocabulary	Vibration; sound waves; waves; pitch; sound proof; volume, source, vibrate, travel, pitch, faint, loud, insulation
	Year 5
Earth and Space	**Children will know:** that the Solar System consists of the Sun and everything that orbits, or travels around, the Sun. I know that this consists of: the eight planets and their moons, dwarf planets, and countless asteroids, comets, and other small, icy objects. the names of the main 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus. I know which is the largest planet in our Solar system. that there are 4 rocky, terrestrial planets and 4 gas giant planets. that the Moon orbits the Earth. This takes 28 days or one lunar month. that the Moon reflects light from the Sun and that is why we can see it. It is not a source of light but acts like a mirror. that as it orbits the Earth, we see the Moon from different angles each night. appears to change shape as we see different parts of the surface lit up. These shapes are called the phases of the Moon. that there are 4 main phases of the moon: the new moon, first quarter, full moon, and last quarter. that the moon is mostly made of rock. that the moon's surface is covered in 1,000s of tiny pits called craters that the craters form when chunks of rock and metal, called meteorites crash into the Moon. that these crashes have covered the Moon's surface with rocks and dust. that the Moon also has plains made of lava that erupted from volcanoes billions of years ago. that a planet is round because of gravity. that a planet's gravity pulls equally from all sides. that gravity pulls from the centre to the edges (like the spokes of a bicycle wheel and that makes the planets spherical. that the Earth rotates on its axis and that this is happening all the time.

	that the axis is like an invisible line. that it takes 24 hours, or one day, to make a rotation. that when parts of the Earth face the Sun, it's daytime. When they are in the shade, it's nighttime. it takes about a month for the moon to go all the way around the Earth in a circle – we call this an orbit. that it takes a whole year for both of them to go all the way around the Sun. (So, this is how we measure days, and months and years).
Vocabulary	Orbit; elliptical; crater; lunar; phase; satellite; axis; solar system; universe Earth, sun, moon, Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune, Pluto (dwarf planet), spherical, rotates, star, planets, axis, night, day, season, galaxy. Meteorite, celestial
	Year 6
Evolution and Inheritance	**Children will know:** that extinct means: no living members of a species. I know that saber-toothed cats, dodos, mammoths, ground sloths, and golden toads are examples of extinct species. that Charles Darwin was a naturalist that a naturalist is someone who studies things in nature such as animals and plants and how they live. that natural selection refers to 'the survival of the fittest'. that the best adapted organisms are able to survive. that Scientists have used fossils to look at how organisms have evolved over time. that all plants are adapted to certain conditions, that the conditions that can cause adaptations include: temperature, available water, soil type, and interactions with animals and other organisms. that genetic mutation refers to a change in one or more genes. that some mutations can lead to genetic disorders or illnesses. that inheritance refers to when living things reproduce they pass on characteristics to their offspring.
Vocabulary	Adaptation; artificial selection; DNA; evolution; extinct; fossil; selective breeding; inheritance; natural selection; species; trait; dominant; recessive; classification; gene; inherit; arch; chromosome; characteristic; classify; genetic; molecule; fingerprint; loop; whorl