GUARDIAN ANGELS' RCPS
PROGRESSION OF KNOWLEDGE IN SCIENCE

Year Group	Learning Journey 1	Learning Journey 2	Learning Journey 3
Nursery	**Seasons** Day and night Recognise the Sun and moon. There are different types of weather. To talk about and be able to describe simply: rain, snow, sun, wind, cloudy. **Humans** We are human Some of us are boys and some are girls. Name some parts of the body (head, eyes, nose, mouth, ears, neck, shoulder, arms, hands, fingers, chest, tummy/belly, bottom, legs, knees, feet, toes) Know I need to wash my hands and brush my teeth. Knowing babies grow into adults.	**Seasons** Winter is cold. Spring is getting warmer. There are different types of weather. To talk about and be able to describe simply: rain, snow, sun, wind, cloudy. **Solids, liquids and gases** Some solids melt when they get warm (ice and chocolate). If liquid is frozen it becomes solid. To observe ice and frost in the morning and observe how it melts over the day. **Animals** Name some animals and types of animals (e.g. insects/minibeasts, birds, mammals, fish) Some animals are born live and some come from eggs (link to knowledge of human babies and chicks).	**Seasons** Summer is hot. There are different types of weather. To talk about and be able to describe simply: rain, snow, sun, wind, cloudy. The sun produces heat and light. It is dangerous to look at the sun because it can hurt your eyes. It is dangerous to be out in the sun too long as it can burn your skin. Sun cream is good protection for skin. Sunglasses are protection for eyes. A cap can protect the eyes and face. **Plants** Plants are living things. Some plants might live with us (house/garden plants). Recognise that plants and grow. That plants generally grow from seeds or bulbs planted in the ground. To grow runnerbeans. Name parts of plants including leaves, stem and flower. Name a daffodil and daisy.
Reception	**Seasons**	**Seasons**	**Seasons**

	The year is separated into four seasons. Autumn gets cooler. Leaves fall off many trees in Autumn Some animals hibernate over Winter – link to squirrels hiding nuts. We wear different clothes at different times of year. **Materials** A material is what something is made from. Objects can be made from different things. Name some common materials (wood, brick, stone, glass, plastic, metal, cotton). **Electricity** Look at different type of electrical appliances- what are they used for? Look at kettle, television and laptop. **Humans** Name skeleton features of the human body. Know how to keep our bodies healthy. To investigate using the five senses.	Winter is cold it usually snows in the UK. Spring is getting warmer, flowers begin to bloom. Spring is associated with new life. That rainbows can appear when it is rainy and sunny. **Solids, liquids and gases** Some solids melt when they get warm (ice, chocolate and cheese). If you heat water up in a kettle it creates steam. **Animals** Name some animals and types of animals (e.g. insects/minibeasts, mammals, birds, fish and reptiles). Some animals are born live and some come from eggs (link to knowledge of human babies and chicks) Recognise some animals have three clear stages – e.g. caterpillar-cocoon-butterfly That animals live in different habitats. General classifications of some animals e.g. farm animals, zoo animals, pets.	The year is separated into four seasons. Autumn gets cooler. Leaves fall off many trees in Autumn. Some animals hibernate over Winter – link to squirrels hiding nuts. We wear different clothes at different times of year. **Plants** Name parts of plants including leaves, stem and flower and roots. To observe plants and trees around us. What do plants need to grow? Observe how plants change and grow over time. To name a daffodil, tulip and a dandelion.
Year 1	**Animals Including Humans**	**Everyday Materials** object = item or thing, material= what the thing is made from	**Plants** Common flowering plants (daisy, sunflower, tulip, rose, pansy)

	Names of common animal groups (fish, amphibians, reptiles, birds, insects, arachnids and mammals) Names of individual common animals, native and otherwise (e.g. Native - dog, cat, horse, cow, chicken, frog, fly, goldfish, spider. Non-native – monkey, snake, elephant, lion, bear) Humans are animals – mammals. Can explain the meaning of carnivore, herbivore and omnivore. Names examples of carnivores (e.g. wolf, cat, lion) Names examples of herbivores (e.g. chicken, rabbit, snail) Names examples of omnivores (e.g. human, fox, bears) Most common animals have a skeleton. Generally, adult animals have 0, 2, 4, 6 or 8 limbs Insects have a head, thorax abdomen Name a variety of main body parts (head, shoulders, chest, arms, legs, "belly"-stomach, feet, hands, knee, elbow, bottom, back) Sight = eyes, Hearing = ears, Smell = nose, Taste = tongue, Touch = skin	Be able to name wood, plastic, glass, metal, cotton, brick, water, and rock as materials. Be able to describe given materials and give general statements about materials "Cotton is soft.". Be able to group a variety of materials based on physical properties – "The rock and the metal are together because they are hard." **Rocks and Soil** Look at different types of soil and see how they are similar and different. Sandy soil, clay soil, chalky soil	Common plant types (tree, bush, flowering plant, grass) The general structure of a flowering plant (roots, stem, leaves, flowers) Recognise the general structure of a tree (roots, trunk, branches, leaves, flowers – for some) **Sound** During music lessons talk about how sound travels using vibrations. Look at louder sounds and quieter sounds.

	Seasons Months in each season. Leaves falling off deciduous trees in Autumn. New life in Spring (plants and animals). Changes in appropriate clothing. As we move from Winter to Summer, days get longer and nights get shorter. Weather becomes warmer. As we move from Summer to Winter, days get shorter and nights get longer. Weather becomes colder. Seasons are linked to the Earth moving around the Sun.		
Year 2	**Living Things and their Habitats** The features of living things (MRS GREN – Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, Nutrition) That a dead plant or animal used to be alive. Things which have never been alive. The difference between a habitat and micro-habitat. Identify a variety of plants and animals which live in given habitats A variety of plants and animals which live in given micro-habitats Identify a variety of habitats (forest, grassland, desert etc.) Identify a variety of plants and animals which live in given habitats. Recognise ways in which animals/plants are suited to their habitats (frogs are	**Everyday Materials** Identify what materials certain items are made from. Why items are made from given materials – e.g.. walls made of bricks as they are strong, hard, heavy etc. Why certain materials would be unsuitable for given items – e.g. teapot made of chocolate unsuitable because the chocolate would melt. Solids do not change shape on their own. A force must be applied to change the shape of a solid. Solids can be squashed, bent, twisted or stretched. Different solids may take a different amount of force to change shape. **Electricity** Look at electrical appliances- How are they used? Lawnmower, mobile phone chargers,	**Plants** Show the stages of growth of a typical plant (seed, germination, roots, seedling, stem, leaves, flower, seed dispersal) look at roses, lilies and pansies. **Living Things and their Habitats** The difference between a habitat and micro-habitat. Identify a variety of plants and animals which live in given habitats A variety of plants and animals which live in given micro-habitats **Forces** Have a look at floating and sinking, use some of the materials you looked at in everyday materials–Can a stone float or sink, does all plastic sink or float? Pushing and pulling- Talk about what we might use these for. What things do we

	good swimmers, camels store fat, monkeys have feet they can use to climb) A Producer starts every food chain. It is always a plant. All animals are consumers. Animals which eat other animals are predators. Animals eaten by other animals are prey. An animal can be both predator and prey (e.g. fox) An animal with no predators is an apex predator. The arrows in a food chain show "is eaten by". Identify/create a food chain with at least three links. **Plants** Show the stages of growth of a typical plant (seed, germination, roots, seedling, stem, leaves, flower, seed dispersal). Identify plants need water, light and a suitable temperature to grow and stay healthy.	electric oven Talk about the power coming from a switch, plug and cable. If we cut off the source we stop the electricity **Animals Including Humans** Animals reproduce Live birth (mammals) Many animals lay eggs (birds, fish, reptiles, amphibians, insects, arachnids) Names of common young (baby, child, lamb, piglet, puppy, kitten, foal, calf, chick, snakelet, spiderling, larvae) Animals need oxygen to survive. Animals need water and food to survive. Exercise is important to be healthy A balanced diet is important to be healthy Sleep is important to be healthy Good hygiene (washing hands before food/drink, brushing teeth, cleaning self regularly, avoiding spread of germs) is important to be healthy.	push? What things do we pull? Is there anything in the classroom that you might push and pull? Windows, doors
Year 3	**Animals Including Humans** Animals, including humans, get nutrition from what we eat. Animals cannot make their own food. We need the right type of nutrition (carnivores, herbivores, omnivores) Omnivores (e.g. humans) need a balanced diet	**Rocks** Recognise not all rocks are the same. Recognise rocks look different. Recognise rocks can have different properties Fossils are caused by dead animals/plants.	**Light** Light is created by a light source. Light is required to see. Darkness is the absence of light. Light is reflected off surfaces. We see when the light is reflected into our eyes. The Sun is a light source. The Sun is so bright it can harm our eyes.

	Humans and some other animals have skeletons. Difference between vertebrates and invertebrates. Endoskeletons are inside the body (with examples e.g. humans) Exoskeletons are outside the body (with examples e.g. tortoise) Skeletons and muscles support the body – keep it in shape. Skeletons and muscles protect the organs – know which, e.g. ribs protect heart and lungs. Skeletons and muscles are used in movement – note: learn about how muscles pull the bones and work in pairs.	Dead matter is trapped within rock and compressed over thousands/millions of years. Dead matter rots/decays and the imprint is left behind. Fossil casts can be created by pouring plaster into the space left by dead matter. Soil is made from broken down rock & organic matter. Soil is formed over time. **Forces and Magnets** Recognise that items move differently on different surfaces. Understand the concept of friction. Recognise friction as a pulling force – pulls against movement. Predict how an item will move on a given surface e.g.. ice/ gravel. Recognise friction can create heat. Know forces as a push or pull. Recognise that most forces are a push or pull between two objects through contact. Recognise magnetism acts at a distance. Magnets have two poles – North and South. Magnets can attract and repel. Like poles (S/S, N/N) repel. Opposite poles (S/N) attract. Magnets can attract materials or have no effect on them. Magnets only attract metals. Magnets do not attract all metals.	Other bright lights can harm our eyes. We can protect our eyes (sunglasses, shade, coloured lenses). Shadows are formed when light is blocked. Shadows can change size and shape. Shadows can change size and shape. The closer the light source to the object, the bigger the shadow, and vice versa. The angle of the light source to the object will change the shape of a shadow. **Plants** Identify: roots, stem, leaves, flower, petals. Name the functions of roots (anchor & nutrition), stem/trunk (support and water transportation), leaves (photosynthesis), flower, petals Basic needs – air, light, water, nutrients, room Most common plants need all of these. Identify examples of plants which have different requirements (cactus less need for water, orchids don't really need soil, air plants grow on other plants and not in the ground) Plants are limited by the amount of room they have – discuss repotting plants to allow larger growth. Water is taken into plants by the root. Water is transported up the stem to the rest of the plant.

		Identify whether a material is magnetic or not.	Some water evaporates from the leaves. Recognise the flower is linked to reproduction in plants. Plants produce seeds to reproduce. Name and explain function of parts of flower (petal – attract, stamen (filament/anther) – male: pollen, carpel (ovary, style, stigma) – female: receive pollen. Pollination – insects and birds going to different flowers carry pollen and fertilise the other. Some flowers can self-pollinate (peanut, orchid, peas, sunflowers). Seed dispersal – wind, animals, water, explosion. Children to look at different varieties of the same plants and observe what they notice, does it have similar of different characteristics. Herbs, shrubs, trees, creepers, climbers
Year 4	**<u>Animals Including Humans</u>** Parts of the digestive system – mouth, oesophagus, liver, stomach, pancreas, small intestine, large intestine, rectum, anus. Basic understanding of the job of each part. Mouth – teeth break down food and mix with enzymes in saliva. Oesophagus – thin tube connecting mouth to stomach. Liver – releases bile into intestines. Bile	**<u>Sound</u>** Sound is caused by vibration. Sound travels via vibration. Sound can travel through gas, liquid or solid media. Pitch (high/low) is determined by the speed of the vibrations. Pitch is affected by the features of the vibrating object. Volume (loud/quiet) is determined by the strength of the vibrations.	**<u>Living Things and their Habitats</u>** Living things have characteristics by which they can be grouped. Identify some characteristic of each of main living thing types. Main types of living thing are: reptile, mammal, amphibian, bird, fish, insect, arachnid, plant We would use a classification key when we see an animals which we are unsure of.

	breaks down lipids. Stomach – muscular bag mixes food and drink with acid. Pancreas – releases enzymes into the intestines, which break down carbohydrate, proteins and lipids. Small intestine – proteins, carbohydrate, and lipids digest. Nutrients absorbed into the blood. Large intestine – food which can't be broken down (mainly fibre) passes into here. Water absorbed into the blood. Rectum – undigested food is stored here as faeces. Anus – opening where faeces leave the body. There are different types of teeth in the mouth with different jobs. Teeth have an enamel coat which is hard and strong. Incisors – bite off and chew food. Canines – for ripping and tearing food Molars – for crushing and grinding food. How to build a food chain. Arrows show "eaten by" or transfer of energy. Producers are plants – they produce their own food.	Louder sounds are created by stronger vibrations. Sound dissipates over distance. Sound gets fainter as it moves further from its source. **States of Matter** All materials are solid, liquid or gas. Solids have a rigid particle structure, with particles packed close together. A solid cannot be poured. Liquids have a fluid particle structure with particles further apart which will fill a container from the bottom. Liquids can be poured. Gases have a very fluid particle structure with particles which expand to fill a container. Gases can be poured but will expand into the space. Adding or reducing heat can change the state of an object. Solids can be melted into liquid. Liquids evaporate into gas Gas condenses into liquid. Liquid freezes into a solid. Different materials change state at different temperatures. Water on Earth is all part of the water cycle. Evaporation cause water to become gas and rise into the air. Condensation creates clouds.	Environments can change. Humans can affect the environment. Environment changes can affect plants and animals living there. Environment change can be dangerous for living things. **Electricity** Name a variety of common appliances using electricity (kettle, microwave, clock, shower, toaster etc.) A circuit is a path for electricity. A component is a part of a circuit. A cell is the power source. A battery is more than one cell together, wires connect components, bulb is a component that gives out light, a buzzer is a component which gives out sound. A motor is a component which produces movement. A switch is a component which can make or break a circuit. Identify a circuit must be a complete loop with a cell/battery to work. A switch can be open or closed. An open switch breaks the circuit. A closed switch completes the surface. Open: off – closed: on A conductor is a material Electricity can travel through. An insulator is a material electricity can't travel through.

	Prey is the name for animals which are eaten by others. Predators are animals which eat other animals. Animals can be both predator and prey – e.g. a fox. An apex predator is a predator which is not eaten by any other animals.	When the clouds are heavy enough, the water falls as rain. When the temperature is warmer, water evaporates faster.	Identify some conductors (metal, graphite etc.) Metals are particularly good conductors, which is why wires are made from metal.
Year 5	**<u>Forces</u>** Forces are a push or a pull. Gravity is a pulling force produced by the Earth. Gravity pulls towards the centre of the Earth. All objects have gravity, but an object has to be truly massive to allow the gravity to have an effect. Air resistance acts when something moves through the air. Water resistance acts when something moves through water. Friction acts when something moves against a solid. Air resistance, water resistance and friction are all pulling forces Basic knowledge of what levers, pulleys and gears are and how they work. The longer the lever, the less force needed to move the object.	**<u>Properties and Changes of Materials</u>** Group a variety of materials independently based on properties such as hardness, waterproof, density etc. Some materials dissolve in liquid to form a solution. Dissolving is a reversible change. Substances can be recovered from a solution. A mixture can be separated. Identify, using properties, why given materials are used for specific products. Dissolving, mixing and changes of state are reversible changes. Understand a reversible change means the original material can be retrieved. Reversible changes are a physical change Irreversible change forms new materials. Irreversible changes are a chemical change. Understand an irreversible change means the original is gone forever.	**<u>Animals Including Humans</u>** Baby – toddler – child – teenager – adult – old age Babies feed only on milk and then smooth food. Toddlers begin to eat solid food. Children go through puberty as they move into teenage years. Puberty involves changes such as - Girls: menstruation, breast growth, pubic hair, spots; Boys: pubic hair (& chest), genital growth, voice deepens, sweat more, begin to produce sperm, spots. Puberty also means both sexes produce lots of hormones which can affect mood and behaviour. As we reach old age, our bodies don't work as well. We become more vulnerable to disease and injury. Some people may shrink in old age.

	Earth and Space The names and order of the planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto-note "dwarf planet") The relative sizes of the planets. Different types of planets (rock, gas giants, dwarf planets) General facts – e.g. Saturn's rings. Earth and the other planets orbit the sun One orbit of the sun is known as a year. Earth's year is 365 days, 6 hours, 9 minutes and 10 seconds (a sidereal year). The extra hours are made up every 4 years as an extra day – A Leap Year. The planets take different times to orbit the sun (length of a "year" is different). The orbits of the planets are different shapes and none are exactly circular. Sun, Earth and Moon are approximately spherical. None of them are exact spheres. Understand that the Moon orbits the Earth. The Moon's orbit is approx. 28 days which is approx. one month The Earth turns on its axis. Earth takes approx. 24 hours (23 hours, 56 mins – called the sidereal period) to spin on its axis. The axis is the reason for the seasons – when tilted away from the Sun, it is	Recognise burning is irreversible. **Sound** Revisit sound and recap the knowledge learnt- vibrations, how sound travels, pitch, volume. Talk about how sound travels, can it travel through different materials- solids, liquids and gases. **Living Things and their Habitats** Mammals life cycle – live birth, child, adult, Amphibian – egg birth, tadpole, adult (start in water, end on land Bird – egg, chick, adult Insect – egg, larvae, pupa, adult Asexual reproduction is where the parent reproduces completely on its own. This is most common in plants but can also happen in animals Sexual reproduction is where two parents mate and reproduce, with the eggs of one being fertilised by the other. Understand the difference between internal fertilisation (e.g. mammals, reptiles, birds) and external fertilisation (e.g. fish) A basic understanding of human sexual reproduction. Children to look at oak trees, silver birch trees, elder tree and fruit bushes, include palm leaves as these are from a tropical habitat.	

	Winter, towards the Sun is Summer. Also explains shift in length of day/night. **Rocks and soil** Revisit rocks and soil talk about what the earth is made from- Can they remember any different types of rocks and soils and draw on this prior knowledge.		
Year 6	**Animals Including Humans** The Heart is a pump. It is made up of 4 chambers (ventricles and atria) Arteries carry oxygenated blood from the heart to the muscles and organs. Veins carry deoxygenated blood back from the muscles and organs to the heart. Capillaries are tiny vessels which cover a large area of muscles and organs to allow oxygen to easily diffuse from the blood to where it is needed. Blood contains red blood cells, white blood cells, plasma and platelets. Red blood cells carry oxygen around the body White blood cells work to fight disease and illness Plasma is made up of water and protein and carries the blood cells and platelets around the body. Platelets help to stop bleeding when you are cut. Diet is the most important factor in weight.	**Electricity** More/higher voltage cells in a circuit: brighter lamp/louder buzzer etc. Less/lower voltage cells in a circuit: duller lamp/quieter buzzer etc. As above with cell quantity/ voltage. A switch will cause components to begin/cease performing. Use correct symbols for: wire, cell, buzzer, bulb, switch, motor Accurately draw simple circuit diagrams.	**Living Things and their Habitats** Living things have different characteristics (nocturnal, plant, animal, herbivore, winged, predators etc.) Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into eight small groups: fish; amphibians; reptiles; birds; insects; arachnids; crustaceans and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms.

	A healthy, balanced diet will ensure your body is at its most efficient. Short term effects of exercise: increased heart rate, stronger pumps, increased breathing speed and depth, increased heat, sweat. Long term effects of exercise: slower, more efficient heart, larger heart, greater lung capacity, more efficient lungs, muscle growth, mental health benefits. Effects of drugs on body – look at alcohol, general illegal drugs Effect of lifestyle – look at smoking, drinking, laziness, overeating compared to healthy lifestyle. Nutrients and water are transported via the blood. • Nutrients diffuse into the blood from the stomach & intestines and are transported around the body. • Waste water is taken to the bladder to be removed. **Evolution and Inheritance** Many species are extinct. We only know what we have learned from fossils or written/art sources. Most living things have changed over time – they may have become bigger, smaller, or changed their diet to survive. Fossils provide information about many extinct species, but particularly dinosaurs.		Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants. Look at variations of flowers and trees- Yew tree, beech tree, sycamore tree, rose, iris, orchid **Light** Light is created by a light source. Light moves in straight lines. Light can be bent. Light can be split. Main parts of the eye (pupil, iris, cornea, retina) The pupil is where the light enters our eye. The retina is where the light is received by our eye and the information is then sent to the brain. Sight is not an "active" sense. Eyes are "input" organs, not "output" – they receive light and interpret it. They do not actively "see". Light is created by a light source. We see when light enters our eye and is read by the retina. Light reflects from objects into our eyes, and this is how we see. An object can only cast the shape of itself. The shape can be stretched or compressed by the angle of the light.

	We can tell how old fossils are using carbon dating. Living things produce offspring of the same kind (e.g. humans produce humans, tulips produce tulips) Offspring generally share similarities with their parents. Most offspring have differences to their parents. Animals and plants adapt to their environments. The best suited of animals and plants survive better. Eventually an adaptation can lead to permanent change in a species (e.g. peppered moth originally 98% white, 2% dark. After industrial revolution 95.5% black because white ones could no longer hide due to pollution). Permanent change in a species is known as evolution. Evolution can take hundreds, thousands, even millions of years. **<u>Rocks and soil</u>** Revisit rocks and soils and look at fossils- what causes fossils, how does soil formed over time?		The shape can be made larger or smaller by the distance from the light source.