Subject Knowledge Ladder	Science	CAT: STEM

	Topic (if applicable)	Knowledge Progression
	During Early Years, children begin to develop their scientific knowledge through Understanding the World and continuous exploration. This is a strong foundation for future scientific coverage.	
Early Years (Reception & Nursery)	**Animals inc Humans**	Know and talk about the different factors that support their overall health and wellbeing: regular physical activity healthy eating tooth brushing sensible amounts of screen time good sleep routines being a safe pedestrian Use all their senses in hands on exploration of natural materials Continue developing positive attitudes about the differences between people
	Plants	Plant seeds and care for growing plants Understand the key features of the life cycle of a plant Understand the key features of the life cycle of an animal
	Living things are their habitats	Begin to understand the need to respect and care for the natural environment and all living things Recognise some environments that are different to the one in which they live Explore the natural world around them

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	Materials **Seasonal Changes**	Describe what they see, hear and feel when outside Compare length, weight and capacity Explore collections of materials with similar and / or different properties Use all their senses in hands on exploration of natural materials Talk about the differences between materials and changes they notice Explore different materials freely in order to develop their ideas about how to use them Understand the effect of changing seasons on the natural world around them
Year 1	**Animals inc Humans** **Plants** **Everyday materials**	• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Identify and describe the basic structure of a variety of common flowering plants, including trees. • Identify and name the roots, trunk, branches and leaves of trees • Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.

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	Seasonal Changes	• Describe the simple physical properties of a variety of everyday materials. • Compare and group together a variety of everyday materials on the basis of their simple physical properties. • Record changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies.
Year 2	**Animals including humans**	• Understand that animals, including humans, have offspring which grow into adults • Understand the basic stages in a life cycle for animals, including humans • Describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene
	Living things in their habitats	• Examine and compare the differences between things that are living, dead, and things that have never been alive. • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including microhabitats. • Examine how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food
	Plants	• Observe and describe how seeds and bulbs grow into mature plants • Discover and describe how plants need water, light and a suitable temperature to grow and stay healthy

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	Materials	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Investigate how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
Year 3	**Animals including humans**	• Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • Identify that humans and some other animals have skeletons and muscles for support, protection and movement
	Plants	• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • Comment the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • Investigate the way in which water is transported within plants • Establish the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
	Rocks & soils	• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. • Recognise that soils are made from rocks and organic matter.
	Light	• Recognise that they need light in order to see things and that dark is the absence of light. • Comment on how light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Observe how shadows are formed when the light from a light source is blocked by a solid object.

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	Forces & magnets	• Establish patterns in the way that the size of shadows change • Compare how things move on different surfaces • Observe some forces need contact between two objects, but magnetic forces can act at a distance • Observe how magnets attract or repel each other and attract some materials and not others • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • Describe magnets as having two poles • Predict whether two magnets will attract or repel each other, depending on which poles are facing
Year 4	**Animals including humans** **Living things in their habitats** **States of matter**	• Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions. • Construct and interpret a variety of food chains, identifying producers, predators and prey. • Recognise that living things can be grouped in a variety of ways • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Recognise that environments can change and that this can sometimes pose dangers to living things. • Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

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	Sound **Electricity**	• Identify how sounds are made, associating some of them with something vibrating. • Recognise that vibrations from sounds travel through a medium to the ear. • Find patterns between the pitch of a sound and features of the object that produced it. • Establish patterns between the volume of a sound and the strength of the vibrations that produced it. • Determine that sounds get fainter as the distance from the sound source increases • Identify common appliances that run on electricity. • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • Establish whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • Recognise some common conductors and insulators, and associate metals with being good conductors.
Year 5	**Animals including humans** **Living things in their habitats** **Properties & changes to materials**	• Outline the changes as humans develop to old age. • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • Describe the life process of reproduction in some plants and animals. • Analyse and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution

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	Forces **Earth & Space**	• Implement knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. • Explain the movement of the Earth, and other planets, relative to the Sun in the solar system • Describe the movement of the Moon relative to the Earth • Describe the Sun, Earth and Moon as approximately spherical bodies • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
Year 6	**Animals including humans** **Living things and their habitats**	• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Determine the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • Explain the ways in which nutrients and water are transported within animals, including humans. - (see also Evolution and inheritance) • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.

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	Light	• Give reasons for classifying plants and animals based on specific characteristics. - (see also Evolution and inheritance) • Recognise that light appears to travel in straight lines • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
	Electricity	• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • Use recognised symbols when representing a simple circuit in a diagram.
	Evolution & inheritance	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
	Classification *Build on their learning about grouping living things in year 4 by looking at the classification system in more detail*	• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • Explain reasons for classifying plants and animals based on specific characteristics.

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