Science Progression Overview

Richmond Methodist Primary and Nursery School – Vertical progression – Understanding the World – The world - Science overview			
Biology ELG - **- Explore the natural world around them, making observations and drawing pictures of animals and plants** **- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class** **- Understand some important processes and changes in the natural world around them, including the seasons**			
Focus	**Living things and their habitats**	**Plants**	**Animals, including humans**
Nursery	• Explore different habitats outdoors, e.g. scent, colour & shape of flowers attracting bees • Observe growth & decay over time • Begin to understand the need to respect & care for the natural environment & all living things • Talk about what they see, using a wide vocabulary • Understand the key features of the life cycle of a butterfly	• Most plants start growing from a seed or bulb • All plants need water & light to grow & survive • Observe plants closely through a variety of means e.g. magnifiers & photographs • Extend vocabulary: leaves, petals, roots, bulb, trunk, branches, stem, garden plants, wild plants, seeds • Use all the senses in hands-on exploration of plants • Understand the key features of the life cycle of a plant	• Observe animals closely through a variety of means e.g. magnifiers & photographs • Look at key stages of development from birth to adult • Name & identify body parts • Observe & describe in words or actions the effects of physical activity on body • Understand the key features of the life cycle of an animal
Reception	• Describe what they see, hear & feel whilst outside • Observational drawings of the natural world • Discuss how to care for the living things & their habitats • observe how flora & fauna behave differently as the seasons change • Examine change over time • Use correct terms e.g. chrysalis, pupa when observing life cycle of butterfly & ladybirds • Express opinions on natural & built environments & opportunities to hear different points of view on the quality of the environment. Use words such as busy, quiet, pollution	• All plants need water, light and warmth to grow and survive • A seed produces roots to allow water to get into the plant and shoots to produce leaves to collects the sunlight • Extend vocabulary: blossom, buds, bulb, evergreen, deciduous • Describe what they see, hear & feel whilst outside • Name & describe some plants • Draw pictures of plants • Understand the effect of changing seasons on the natural world around them	• Shows some understanding that good practices with regard to exercise, eating, drinking water, sleeping & hygiene can contribute to good health • Describe what they see, hear & feel • Identify different parts of their body & animals • Be able to show care and concern for living things • Know the effects exercise has on their bodies • Have some understanding of growth and change • Talk about things they have observed including animals • Observational drawings of animals

Science Progression Overview

Chemistry & Physics ELG -
- Explore the natural world around them, making observations and drawing pictures of animals and plants
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class
- Understand some important processes and changes in the natural world around them, including the seasons

Focus	Materials
Nursery	• Use all their senses in hands-on exploration of natural materials • Explore collections of materials with similar and/or different properties • Talk about what they see, using a wide vocabulary • Explore how things work e.g. pulleys • Explore & talk about different forces they can feel e.g. stretch, snap, rigid, magnetic repulsion, water pushing up when pushing a boat under it • Talk about the differences between materials and changes they notice e.g. cooking, melting, shadows, floating & sinking • Characteristics of liquids & solids e.g. cooking eggs, melting chocolate
Reception	• Observe & interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object & a boat floating on water • Use vocabulary to name specific features of the natural world, both natural & man-made • Notice & discuss patterns around them e.g. the effect of seasons on flora & fauna

Year 1/2 Working scientifically	Autumn A Why is Richmond Special?	Spring A What's it made of and why?	Summer A How do people tell their stories?	Autumn B How do I care for my body and mind?	Spring B What makes a good home?	Summer B Why is our environment precious?
-ask simple questions and recognise that they can be answered in different ways -observe closely, using simple equipment -perform simple tests -know how to identify and classify -use their observations and ideas to suggest answers to questions -know how to gather and record data to help in answering questions	**Plants** **Common plants** **Plant structure** -know and name a variety of common wild and garden plants, including deciduous and evergreen trees -know and name the petals, stem leaves and roots of a plant -know and name the roots, trunk, branches and leaves of a tree **Seasonal change** **The four seasons** **Seasonal weather** -know changes across the four seasons	**Everyday materials** **Properties of materials** **Grouping materials** -distinguish between an object and the material from which it is made -know 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 **Uses of Everyday Materials**	**Plants** **Plant and seed growth** **Plant reproduction** **Keeping plants healthy** -know and describe how seeds and bulbs grow into mature plants -know and describe how plants need water, light and a suitable temperature to grow and stay healthy	**Animals including humans** **Human body and senses** -know, draw and label the basic parts of the human body -know which part of the body is associated with each sense -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 -know and compare the structure of a variety of	**Everyday materials** **Identify different materials** **Name everyday materials** **Properties of materials** -know a variety of everyday materials, including wood, plastic, glass, metal, water and rock - know how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	**All living things and their habitats** **Alive or dead** **Habitats** **Adaptations** **Food chains** -know and compare the differences between things that are living, dead, and things that have never been alive -know that most living things live in habitats to which they are suited -describe how different habitats provide for the

Science Progression Overview

	-know and describe weather associated with the seasons and how day length varies	-know and compare the suitability of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses		common animals (fish, amphibians, reptiles, birds and mammals, including pets) **Animals reproduction** **Healthy living** **Basic needs** -know that animals, including humans, have offspring which grow into adults -find out and describe the basic needs of animals, including humans, for survival (water, food and air) -describe the importance for humans of exercise, eating the right amount of different types of food, and hygiene		basic needs of different kinds of animals and plants, and how they depend on each other -know a variety of plants and animals in their habitats, including micro-habitats -know how animals obtain their food from plants and other animals, using the idea of a simple food chain -identify and name different sources of food
Year 3/4 **Working scientifically**	**Autumn A** **Why is Richmond special?**	**Spring A** **What is beneath us and why does it matter?**	**Summer A** **How do we get our message across?**	**Autumn B** **How do I care for my body and mind?**	**Spring B** **Why is history worth knowing?**	**Summer B** **How can I have my say?**
-ask relevant questions and use different types of scientific enquiries to answer them -know how to set up simple practical enquiries, comparative and fair tests -make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - know how to gather, record, classify and present data in a variety of ways to help in answering questions	**Forces** **Different forces** **Magnets** -compare how things move on different surfaces -know how some forces need contact between two objects, but magnetic forces can act at a distance -know 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 know some magnetic materials -know that magnets have two poles	**Sound** **How sounds are made** **Sound vibrations** **Pitch and volume** -know how sound is made, associating some of them with vibrating -know that vibrations from sounds travel through a medium to the ear -know the correlation between pitch and the object producing a sound -know the correlation between the volume of a sound and the strength of the vibrations that produced it	**States of matter** **Compare and group materials** **Solids, liquids and gasses** **Changing state** **Water cycle** -group materials based on their state of matter (solid, liquid, gas) -know that some materials change state when they are heated or cooled, and measure or research the temperature at which this happened in degrees Celsius(°C) -know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature **Electricity** **Uses of electricity** **Simple circuits and switches** **Conductors and insulators** -identify common appliances that run on electricity -construct a simple series circuit	**Animals including humans** **Skeleton and muscles** **Nutrition** **Exercise and health** -know 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 -know that humans and some other animals have skeletons and muscles for support, protection and movement **Digestive system** **Teeth** **Food chains** -know the simple functions of the basic parts of the digestive system in humans	**Plant life** **Basic structure and functions** -know the function of different parts of flowering plants: roots, stem/trunk, leaves and flowers **Grouping living things** **Classification keys** **Adaptation of living things** -know that living things can be grouped in a variety of ways -use classification keys to help group, identify and name a variety of living things in their local and wider environment -know how environments can change and that this can	**Light** **Reflections** **Shadows** -know that dark is the absence of light -know that light is needed in order to see -know that light is reflected from surfaces -know that shadows are formed when the light from a light source is blocked by an opaque object -know that light from the sun can be dangerous and that there are ways to protect their eyes

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Science Progression Overview

-record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables -report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions -identify differences, similarities or changes related to simple scientific ideas and processes -use straightforward scientific evidence to answer questions or to support their findings	-know whether two magnets will attract or repel each other, depending on which poles are facing	-know that sounds get fainter as the distance from the sound source increases **Rocks** **Fossil formation** **Compare and group rocks** **Soil** -compare and group 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 -know how soil is made from rocks and organic matter	-identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) -predict and test whether a lamp will light within a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery -know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit -know the difference between conductors and insulators -associate metals with being good conductors	-know the different types of human teeth and their simple functions -construct and interpret food chains, identifying producers, predators and prey	sometimes pose dangers to living things	-know that there are patterns in the way that the size of shadows change **Plants** **Life cycle** **Water transportation** -know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) -know how water is transported within plants -know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
Year 5/6 **Working scientifically**	**Autumn A** **Why is Richmond special?**	**Spring A** **Where does it come from and where does it go?**	**Summer A** **How do words make us feel?**	**Autumn B** **How do I care for my body and mind?**	**Spring B** **What legacy will I leave behind?**	**Summer B** **What makes a colourful world?**
-know how to plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary -take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate -record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	**All living things and their habitats** **Life cycles – plants and animals** **Reproductive processes** **Famous naturalists** -know the life cycle of different living things e.g. mammal, amphibian, insect and bird -know the difference between different life cycles -know the process of reproduction in plants -know the process of reproduction in animals **Classification of living things and the reasons for it** -classify living things into broad groups according to observable characteristics and	**Properties and changes in materials** **Compare properties of everyday materials** **Soluble/dissolving** **Reversible and irreversible changes** - compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity [electrical & thermal] and response to magnets -know that some materials will dissolve in a liquid to form a solution -know how to recover a substance from a solution -use knowledge of solids, liquids and gases to decide how mixtures might be separated (e.g. through filtering, sieving and evaporating)	**Forces** **Gravity** **Friction** **Forces and motion of mechanical devices** -know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object -know the effect of air and water resistance acting between moving surfaces - know the effect of friction acting between moving surfaces -know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect **Light** **How light travels** **Reflection** **Ray models of light**	**Animals, including humans** **Changes as humans develop from birth to old age** -describe the changes as humans develop to old age **The circulatory system** **Impact of exercise on the body** **Water transportation** -identify and name the main parts of the human circulatory system -know the function of the heart, blood vessels and blood -know the impact of diet, exercise, drugs and lifestyle on the way the body functions	**Evolution and inheritance** **Identical and non-identical offspring** **Fossil evidence and evolution** **Adaptation and evolution** -know that living things have changed over time -know that fossils provide information about living things that inhabited the Earth millions of years ago -know that living things produce offspring of the same kind, but offspring normally vary and are not identical to their parents -know how animals and plants are adapted to suit	**Electricity** **Electrical circuits** **Fuses and voltage** -know that 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 -know recognised symbols when

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Science Progression Overview

-use test results to make predictions to set up further comparative and fair tests -report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations -identify scientific evidence that has been used to support or refute ideas or arguments	based on similarities and differences, including micro-organisms, plants and animals -give reasons for classifying plant and animals based on specific characteristics	-give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic -know and demonstrate that dissolving, mixing and changes of state are reversible changes -know how some changes result in the formation of a new material and that this is not usually irreversible, including changes associated with burning and the action of acid on bicarbonate of soda **Earth and space** **Movement of the earth and the planets** **Movement of the moon** **Night and day** -know about and describe 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 -know the Sun, Earth and Moon are 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	-know how 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	-know the ways in which nutrients and water are transported in animals, including humans	their environment in different ways -know that adaptation may lead to evolution	representing a simple circuit in a diagram