Progression and Planning: Science

FS		Topics	Y1/2		Y3/4		Y5/6	
My World, Seasons and Celebrations Where Does the Snow Go? Traditional Tales Marvellous Minibeasts, Fun on the Farm			<u>CYCLE A</u> London Move It, Me On My Map Scented Garden, Seaside	<u>CYCLE B</u> Toys, Under the Sea Springfield to India Wriggle and Crawl	<u>CYCLE A</u> Natural Disasters Explorers, South America (Rainforest) Water (Rivers), Ancient Egypt	<u>CYCLE B</u> The Mayan Civilisation, Chocolate Grimsby's Fishing Industry, Our Local Area Prehistoric Britain, Coastlines	<u>CYCLE A</u> WW2 Extreme Environments, Shackleton Olympic Legacies	<u>CYCLE B</u> Town and Country, Guy Fawkes Viking Raiders, Fair Trade Keen To Be Green
Understanding The World	**The Natural World** **By the end of the Foundation Stage children will be able to:** Explore the natural world around them, making observations and drawing pictures of animals and plants. Plant sunflower seeds and be able to talk about the lifecycle of a sunflower. Children will be able to name the different parts of a flowering plant and describe some of their functions e.g. roots, stem, flower, leaves. Explore the insides of fruits, locating and discussing their seeds. Children will investigate growing plants and identify the purposes for growth e.g. for food, aesthetics, habitats for wildlife etc… Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. Melting and freezing. Explore ice melting and freezing through polar regions small world role play. Explore waterproof materials by making a raft for The Gingerbread Man Explore the lifecycles of a penguin, a chick, a caterpillar and a sunflower through quality texts, videos and real life experiences. Represent these in different ways including drawings, labels, playdough/modelling. We will discuss throughout the year the changing seasons and identify the weather, celebrations and activities associated with each of the 4 seasons. We will make seasons calendars and enjoy fiction, non-fiction texts and poems about the seasons. **Personal Social and Emotional Development** Manage their own basic hygiene and personal needs e.g brushing teeth, using the toilet and understanding the importance of healthy food choices. Children will learn about the importance of a healthy diet and make a healthy meal. We will discuss oral hygiene and demonstrate how to brush our teeth. We will learn about dentists and how they can help us to keep our teeth healthy.	**Working Scientifically (Procedural Knowledge)**	- asking simple questions and recognising that they can be answered in different ways - observing closely, using simple equipment - performing simple tests - identifying and classifying - using their observations and ideas to suggest answers to questions - gathering and recording data to help in answering questions		Use the following practical scientific methods, processes and skills through the teaching of the P.O.S content - asking relevant questions and using different types of scientific enquiries to answer them - setting up simple practical enquiries, comparative and fair tests - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions - using results to draw to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions - using straightforward scientific evidence to answer questions or to support their findings		Use the following practical scientific methods, processes and skills through the teaching of the P.O.S content - planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate - recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - using test results to make predictions to up further comparative and fair tests - reporting and presenting 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 presentations - identifying scientific evidence that has been used to support or refute ideas or arguments	
		Plants (Declarative Knowledge)	**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.** **Observe and describe how seeds and bulbs grow into mature plants** **Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy** Identify and describe the basic structure of common flowering plants and trees by making and labelling pictures of plants - Plant beans and observe over time. Identify and name a variety of wild plants by going on a wild plant hunt. Identify and name a variety of common garden plants by drawing a garden featuring these plants. Explore real garden plants including some with roots attached. Identify deciduous and evergreen trees by walking around the school grounds and photographing the different types of trees – create pic collage.		**Identify and describe the functions of different parts of flowering plants: roots, stem, trunk, leaves flowers** **Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary from plant to plant** **Investigate the way water is transported within plants** **Explore the part that flowers play in the lifecycle of flowering plants, including pollination, seed dispersal** Introduce relationship between structure and function: the idea that every part has a job to do Explore – stem/roots for nutrition and support, leaves for nutrition, flowers for reproduction Practically demonstrate the transportation of water in plants.		**Describe life processes of reproduction in some plants** Study lifecycle changes e.g. plants in a vegetables garden, flowers border Find out about different types of reproduction including sexual and asexual reproduction in plants
		Animals, Including Humans (Declarative Knowledge)	**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.** **Notice that animals, including humans, have offspring which grow into adults.** **Find out about 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 amounts of different types of foods and hygiene.** Human timeline in pictures. Healthy Eating- food diaries, eat well plates, design a balanced packed lunch. How to prepare food safely and hygienically Exercise- Discuss the effects of exercise on the human body. <u>Human Body</u> Through actions, songs, drawings and labels, children identify parts of the body. <u>Senses</u> Identify the parts of the body associated with each sense. Sense Detectives investigation. <u>Animals</u> Classifying animals through sorting activities. Sorting animals into categories by their features. Sorting cards for the chn to work in pairs and create questions eg have they got fur? Animal poo investigation! Which animal is a herbivore, omnivore, carnivore?		**Construct a variety of food chains, identifying producers, predators and prey** **Identify humans** **Identify that some animals have skeletons and muscles for support and protection** **Describe the simple functions of the basic parts of the digestive system** **Identify the different types of teeth in humans** **Identify animals and humans need the right amount of nutrition and they cannot get their own food; they get nutrition from what they eat** Introduce main body parts associated with the skeleton and muscles. E.g. cranial bones to protect brain, ribcage to protect heart and internal organs, spine for structural support and protect spinal cord Extend KS1 knowledge about healthy eating and balanced diet by exploring different food groups and their nutritional value Know the different types of human teeth and their functions Begin to learn about effects of foods on the body. e.g. sugar on tooth Introduce the main body parts associated with the digestive system, for example: mouth. tongue, teeth, oesophagus, stomach, small and large intestine and explore questions that help them to understand their special functions		**Identify and name the parts of human circulatory system and functions of heart, blood vessels and blood** **Describe ways in which nutrients & water are transported within animals and humans** **Recognise impact of diet, exercise, drugs, lifestyle** **Describe the changes as humans develop to old age** Build on prior learning about main body parts and internal organs (skeleton, muscular, digestive systems) to explore and answer questions that help them understand how the circulatory system enables the body to function Learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body Explain and show stages in growth and development of the humans in a timeline Learn about the changes experienced in puberty

		Living Things and their Habitats (Including Seasonal Change and Evolution and Inheritance) (Declarative Knowledge)	**Living Things and their Habitats** **Explore 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, describe how different habitats provide for the basic needs of different kinds of animals & plants, & how they depend on each other** **Identify/name a variety of plants & animals in their habitats, including micro-habitats** **Describe 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.** Compare the differences between things that are living and dead. Answer questions to explain how they know something is dead or alive or has never been alive. Visit the forest school and identify and name a variety of plants and animals in their habitat. Mini-beast hunt and identify them in their micro-habitat. Identify most living things live in habitats to which they are suited, describe how different habitats provide for the basic needs of different kinds of animals and plants, by researching habitats and the animals that live in them – use internet, fact books, images etc. Food chains Creating a variety of food chains using images. Bog Baby- design shelter for The Bog Baby – link to DT **Seasonal Change** **Observe changes across the four seasons** **Observe and describe weather associated with the seasons and how day length varies** Tables and charts about the weather Signs of Spring/Summer walk around the school/village. How is it different to Autumn/winter?	**Recognise environments can change and this can sometimes pose dangers to living things** **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** Explore possible ways of grouping a wide selection of living things including animals, flowering/ non-flowering plants Know and use terms; food chain/web, producer, consumer, predator, prey Use the local environment to raise and answer questions to identify and study plants in their habitat. Identify how the habitat changes throughout the year Begin to group vertebrates into fish, amphibian, birds, reptiles and mammals and invertebrates into snails and slugs, worms, spiders and insects.	**Living Things and their Habitats** **Describe how things are classified into broad groups according to observable characteristics and based on similarities and differences, including micro-organisms, plants and animals** **Give reasons for classifying plants and animals based on specific characteristics** **Describe the differences in the lifecycles of a mammal, an amphibian, a bird** **Describe life processes of reproduction in some plants and animals** Extend knowledge of classification (Find out about significance of the work of Carl Linnaeus classification system) Classify animals into commonly found invertebrates, vertebrates and micro-organisms and give reasons for why living things are placed in one group and not another Study and raise questions about local environment throughout the year Study lifecycle changes e.g. plants in a vegetables garden, flowers border, animals in local environment Find out about different types of reproduction including sexual and asexual reproduction in plants and animals **Evolution and Inheritance** **Recognise that living things have changed over time and fossils provide information about living things that inhabited Earth millions of years ago** **Recognise living things produce offspring of same kind but not identical to parents** **Identify how animals and plants have adapted to their environment in different ways and adaptation may lead to evolution** Find out how living things on Earth have changed over time. Know that characteristics are passed from parents to offspring. E.g. relate to what happens when different breeds of dogs are crossed Appreciate variation over long period of time can make animals more or less able to survive in particular environments. E.g. explore the development of insulating fur on the arctic fox Find out about the work of palaeontologists. E.g. Build on learning from KS1 about the importance of Mary Anning's work.
		Materials and their Properties (Including rocks) Changing State (Declarative Knowledge)	**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** **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** **Identify and compare the uses of a variety of everyday materials, including wood. metal, plastic, glass, brick rock, paper and cardboard for particular uses** **Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching** Which material is most suited to a specific purpose? E.g. which material is suitable to build a bridge like London Bridge? Which material is strong enough? STEM activity: What shape paper tower will be the strongest? Which materials are the most suitable/unsuitable for particular objects. E.g. spoons Compare the use of everyday materials around school and home. How can we change materials? (applying force/recycling) Which material is most suited to a specific purpose? E.g. Teddy's rain coat Which materials are the most suitable/unsuitable for particular objects. E.g. spoons	**States of Matter** **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** **Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature** **States of Matter** Observe water as a solid, liquid and gas and note how it changes when it is heated or cooled – link to Geography work on the water cycle. Explore everyday materials and develop simple descriptions of the states of matter (solids hold their shape, liquids form a pool (not a pile), gases escape from an unsealed container **Rocks** **Compare and group together different kinds of rocks on the basis of their appearance and simple properties** **Describe how fossils are formed when things that have lived are trapped within rock** **Recognise soils are made from rocks and organic materials** Link with work in Geography. Explore different kinds of rocks and soils, including those in the local environment. Explain the features of the three main types of rock: sedimentary, metamorphic and igneous Build on learning in KS1 - know fossils are usually found in sedimentary rock.	**Properties and Changes of Materials** **Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency and response to magnets.** **Give reasons, based on evidence from comparative and fair test – particular uses of materials, including metals, wood and plastic (link to DT project re: Anderson shelters)** **Compare and group materials on basis of thermal conductivity** **Know some materials dissolve in liquid to form a solution Describe how to recover a substance from a solution** **Use knowledge of solids, liquids, gases to decide how to separate mixtures, including filtering, sieving and evaporating** **Demonstrate reversible changes of dissolving, mixing, changes of state** **Explain some changes result in formation of new materials - not normally reversible, including burning, acid on bicarbonate of soda** **Compare and group materials on the basis of their electrical conductivity** **Explore changes that are difficult to reverse, for example burning, rusting etc. (in relation to recycling)** **Compare and group materials on the basis of their potential to be reused and/or recycled** Explore the properties of a range of materials building on prior learning (e.g. electricity and magnetism) Explore how different materials can conduct or insulate heat. Find and explore ways to improve their resistance to ice-cold water- insulation investigation Baked Alaska Plan and carry out an investigation to explore electrical conductivity. Explore reversible changes including evaporating, filtering, sieving, - recognise that melting and dissolving are different processes. Explore changes that are difficult to/cannot be reversed, or result in creating new products E.g. burning, rusting, mixing (E.g. mixing oil and water, vinegar and bicarb). Find out about chemists create new materials e.g. Spencer Silver - glue for post-its. Explore and compare the properties of different materials (build on Y34 magnetism) to create and make their own switch for a circuit
		Forces and Magnets (Declarative Knowledge)		**Compare how things move on different surfaces** **Notice that some forces need contact between two objects, but magnetic forces can act at a distance** **Observe how magnets attract or repel each other depending on which way poles are facing** Observe how magnetic forces can act without contact, unlike most other forces e.g. push/ pull of a door. Explore the everyday uses of different magnets Investigate how friction effects how things move. E.g. the best material for trainer soles Understand the principles of how a compass works – relate to History work about the use of compasses for explorers Make and test a compass	**Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object** **Identify and investigate effects of resistance – air, water 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** Learn how scientists developed theory of gravitational pull. E.g. Newton, Galileo Explore falling objects Raise questions about the effects of air resistance – explore this by studying parachutes and sycamore seeds fall. Investigate forces that make things: move, speed up/slow down, stop. E.g. brakes on a bicycle wheel. Explore the effects of friction – measure and compare forces uses force meters.

		Sound (Declarative Knowledge)		**Identify how sounds are made, associating some of them with something that vibrates** **Recognise vibrations from sounds travel through a medium to the ear** **Find patterns between volume and pitch, strength of vibrations that produced it** **Recognise that sounds get fainter as the distance from the sound source increases** Explore and identify the way sound is made through vibration in arrange of different musical instruments from around the world. Explore and find out how pitch and volume of sounds can be changed in a variety of ways.	
		Light (Declarative Knowledge)		**Recognise:** **- they need light to see and dark is the absence of light** **- light is reflected from surfaces** **- light from the sun can be dangerous and there are ways to protect their eyes** **- shadow forms when light is blocked by an opaque object** **Find patterns in the way that the size of shadows change** Explore what happens when light reflects off a mirror or other reflective surfaces Think about why it is important to protect their eyes from bright lights Look for and measure shadows and find out how they are formed and what might cause shadows to change	**Recognise 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 we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes** **Use idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them** Build on prior learning – explore the way light behaves, including light source, reflection and shadows. Talk about what happens and make predictions. Practically demonstrate how light travels. Know and use terms: transparent, opaque, translucent. Know the parts of the eye and explain how we see.
		Electricity (Declarative Knowledge)		**Identify common appliances that run on electricity** **Construct a simple circuit, naming parts, including cells, wires, bulbs, switches, buzzers and identify if the lamp is part of a complete loop and will light** **Recognise a switch opens/closes a circuit and associate this with whether or not a lamp will light** **Recognise some common conductors and insulators, and associate metals as good conductors** Extend KS1 learning about simple circuits - construct series circuits, trying different components E.g. bulbs, buzzers, motors including switches. Use these circuits to create simple devices Draw a circuit as a pictorial representation (not conventional symbols)	**Associate brightness of a lamp or volume of a buzzer with the number and voltage of cells used in a circuit** **Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and on/off position of switches** **Use recognised symbols when representing a simple circuit in a diagram** Build on learning from Y3/4 to explain the effect of adding components to a circuit. Use recognised symbols to represent circuits and create circuits using given diagrams. Explore creating a fruit or potato battery to light a bulb.
		Earth in Space (Declarative Knowledge)			**Describe movements 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 night and day and apparent movement of the sun across the sky**