

Being a Scientist at Barrs Court Primary



Barrs Court Primary School Science Knowledge and Skills progression – Reception Yearly Overview

	Enquiry	EYFS objectives Understanding the World, The Natural World (Development Matters, Early Learning Goals)	Key Knowledge and vocabulary	Key skills
Term 1	Who are we?	(DM 4-5) Explore the natural world around them. (DM 4-5) Describe what they see, hear and feel whilst outside. (DM 4-5) Understand the effect of changing seasons on the natural world around them. (ELG) Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Seasonal changes – Autumn Hand washing and self-care (Sorting within maths) Body parts?	• Observe closely • Talk about what they have found out • Name and sort materials • Begin to use some scientific language • Identifying and naming body some body parts
	What is darkness?	(DM 4-5) Recognise some similarities and differences between life in this country and life in other countries. (DM 4-5) Explore the natural world around them. (DM 4-5) Describe what they see, hear and feel whilst outside. (DM 4-5) Recognise some environments that are different to the one in which they live. (DM 4-5) Understand the effect of changing seasons on the natural world around them. (ELG) Explore the natural world around them, making observations and drawing pictures of animals and plants. (ELG) 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. (ELG) Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Light/ dark/ day/ night Link with someone in another country (different time, weather, season) and ask questions about what it is like there. Nocturnal animals Diwali	• Observe closely • Begin to answer & ask simple questions • Talk about what they have found out • Compare, sort & group (day/night, nocturnal/daytime animals) • Begin to use some scientific language
Term 2	What stories do we know?	(DM 4-5) Explore the natural world around them. (DM 4-5) Describe what they see, hear and feel whilst outside. (DM 4-5) Understand the effect of changing seasons on the natural world around them. (ELG) 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. (ELG) Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Seasonal changes – Autumn/Winter Changing states of matter - what happens when the gingerbread man falls in water? Make Gingerbread biscuits Our 5 senses – make potions – how do they look/smell...	• Observe closely • Begin to answer & ask simple questions • Talk about what they have found out • Use simple equipment • Make simple predictions • Begin to use some scientific language
Term 3	What is a celebration?	(DM 4-5) Recognise some similarities and differences between life in this country and life in other countries. (DM 4-5) Explore the natural world around them. (DM 4-5) Describe what they see, hear and feel whilst outside. (DM 4-5) Recognise some environments that are different to the one in which they live. (DM 4-5) Understand the effect of changing seasons on the natural world around them. (ELG) 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.	Seasonal changes – Winter Materials - make a raft to carry the CNY story animals across the river – floating and sinking China/ Chinese New Year	• Observe closely • Begin to answer & ask simple questions • Talk about what they have found out • Use simple equipment • Make simple predictions • Name and sort materials • Begin to use some scientific language
Term 4	What is growing?	(DM 4-5) Recognise some similarities and differences between life in this country and life in other countries. (DM 4-5) Explore the natural world around them. (DM 4-5) Describe what they see, hear and feel whilst outside.	Seasonal changes – Spring What do plants need to grow? What grows in our school/moat area?	• Observe closely • Begin to answer & ask simple questions • Talk about what they have found out • Use simple equipment • Make simple predictions

		(DM 4-5) Recognise some environments that are different to the one in which they live. (DM 4-5) Understand the effect of changing seasons on the natural world around them. (ELG) Explore the natural world around them, making observations and drawing pictures of animals and plants. (ELG) 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. (ELG) Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	What grows in other countries that cannot grow here? Why? Food to fork. Lifecycle of a frog	• Begin to use some scientific language
Term 5	How do we care for our pets?	(DM 4-5) Recognise some similarities and differences between life in this country and life in other countries. (DM 4-5) Explore the natural world around them. (DM 4-5) Describe what they see, hear and feel whilst outside. (DM 4-5) Understand the effect of changing seasons on the natural world around them. (ELG) Explore the natural world around them, making observations and drawing pictures of animals and plants. (ELG) 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.	Seasonal changes – Spring Summer Care for class caterpillars! Lifecycle of a butterfly What do living things need to survive? Wild animals/domestic pets habitats Difference between domestic/wild animals	• Observe closely • Begin to answer & ask simple questions • Talk about what they have found out • Use simple equipment • Make simple predictions • Compare, sort & group • Begin to use some scientific language
Term 6	Who helps us?	(DM 4-5) Explore the natural world around them. (DM 4-5) Describe what they see, hear and feel whilst outside. (DM 4-5) Understand the effect of changing seasons on the natural world around them. (ELG) 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. (ELG) Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Seasonal changes – Spring/Summer Meet different members of the community who help us (Who helps us in school?; Who helps us in the community?; Who keeps us healthy?; Who keeps us safe?) Teeth, healthy eating, exercise	• Observe closely • Begin to answer & ask simple questions • Talk about what they have found out • Identifying and naming body some body parts • Use simple equipment • Make simple predictions • Compare, sort & group • Begin to use some scientific language

Barrs Court Primary School Science Knowledge and Skills progression – Red Area Yearly Overview - Year A

	Enquiry	National Curriculum Objectives	Key Knowledge and vocabulary	Working Scientifically skills
Term 1	How are schools the same? (4)			
Term 2	What could my classroom be made of? (5)	Use of Everyday Materials Pupils should be taught to: - identify and compare the suitability 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	Ole Kirk Christiansen. Lego designer 1949 Denmark. He chose materials that were suitable for building plastic models. (Year 2 revisit, Year 1 new) Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock - Sort everyday objects into groups based on the type of material. Use a Venn diagram to record results. - Identify if an object/ material is natural or man-made. (Year 2 revisit, Year 1 new) Describe the properties of materials. - Investigate the suitability of materials linked to the enquiry (DT link). - Draw annotated designs to show suitability of materials based on their properties. - Apply knowledge of materials to build relevant models. Vocabulary: man-made, natural, stretchy, absorbent, dull, shiny, soft, waterproof, smooth, opaque, transparent, stiff, malleable	<i>(Green = Focus for Enquiry, TAPS Assessment)</i> - 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
	How can we help? (5)			
	What did Brunel do for Great Britain? (6)	Working Scientifically Pupils should be taught to: performing simple tests	Leonardo da Vinci – Parabolic-Arch Pedestrian Bridge – Norway -children to apply their knowledge of materials when planning a fair test to investigate the suitability of a material for bridge building.(link to DT testing and planning phase for their final bridge project). Vocabulary: fair test, suitability, (plus material vocabulary).	<i>Green = Focus for Enquiry, No TAPS Assessment skill assessed through enquiry lesson and teacher annotations/observations)</i> - 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
Term 3	How can we live a healthy life? (6)	Animals including humans Pupils should be taught to: - 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 food, and hygiene	Adelle Davis- An American nutritionist who believed that health would be improved through better nutrition. Nicholas Appert discovered new ways to preserve food. -Children need to understand the importance of food, water and air to their survival and healthy living. - Children need to be able to explain how to look after a domestic animal. - Children to understand they need food, water and air to enable them to exercise. Vocabulary: healthy, water, food, air, diet, hygiene, exercise, survival, nutrition, grow, move, taste, sweet, sour, salty,	<i>Green = Focus for Enquiry, TAPS Assessment)</i> - 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

		Living things and their habitats describe 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	Charles Elton- created the first food chain in 1927. -use the local environment (Moat area) to investigate within a British woodland. -to construct simple food chains eg. Grass is a plant eaten by grasshopper, which is eaten by bird, eaten by a cat/owl. -to know that some animals eat plants and some eat meat. Vocabulary: woodland food chain, leaf litter, depend, rely, sources, variety (name woodland animals)	
Term 4	What is a home? (6weeks)	Living things and their habitats Pupils should be taught to: - 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 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	David Attenborough Biologist and natural historian. -explore the local area to identify living and dead wildlife (focusing on plant life and fallen leaves within the school grounds but as a comparison to moat/forest. -To know that humans impact of an environment (playground area in comparison to the moat). -Trip to zoo/farm to compare and contrast different habitats. -To be able to explain suitability of a habitat using key features; warmth, shelter, food source and protection. -To name the plants in the local area; wild garlic, daffodils, birch, ash, willow, lavender. -To name a badger, fox, domestic cat, squirrel, domestic dog. - To name invertebrates: spider, ant, slug etc -To apply knowledge of suitable habitats and to be able to create a suitable habitat. Vocabulary: living, dead, never alive, micro-habitat, shelter, woodland, seashore, ocean, rainforest, variation, conditions, warm, humid, damp, bright, shaded, dark,	Green = Focus for Enquiry, TAPS Assessment) - 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
		Animals including humans Pupils should be taught to: notice that animals, including humans, have offspring which grow into adults	-To observe the lifecycle of a duck/ butterfly -To identify similarities and differences between offspring and adult within a human. -To explain the stages of a lifecycle using baby, child, adult. -To know that not all lifecycles start with the same process. -To name a badger, fox, domestic cat, squirrel, domestic dog and correctly identify their offspring (e.g. cat = kitten, dog = puppy, fox = cub etc.) Vocabulary: egg, caterpillar, pupa, chrysalis, butterfly, .spawn, tadpole, frog.	

Term 5	What grows near me? (4)	Plants Pupils should be taught to: - identify and name a variety of common wild and garden plants; - identify and describe the basic structure of a variety of common flowering plants, including trees.	Reach out to Oldland Parish Council for contacts with local allotment owners in Warmley Golf Course for potential visitor. - Distinguish between wild and garden plants - Label a plant diagram using the enquiry vocabulary - Be able to explain their plant diagram and describe the features of a plants structure - Begin to comment on evergreen and deciduous trees. Vocabulary: Common, Wild, Structure, Root, Stem, Leaves, Flower, Forest, soil, vegetation, garden, seasons and weather, city, town, farm, country, evergreen and deciduous.	Green = Focus for Enquiry, TAPS Assessment) - 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
Term 6	How will we get around in the future? (6)		Science learning to take place linked to DT. Introduction to forces (not a KS1 curriculum but a preteach opportunity). Vocabulary to introduce: pull and push.	

Barrs Court Primary School Science Knowledge and Skills progression – Red Area Yearly Overview - Year B

	Enquiry	National Curriculum Objectives	Key Knowledge and Vocabulary	Working Scientifically skills
Term 1	What is my hat made of? (5)	Everyday materials	Knowledge: Cai Lun – Chinese inventor of the modern paper making process. Considered the founder. https://kidskonnnect.com/people/cai-lun/	TAPs Assessment Green = Focus for Enquiry, Waterproof TAPS Assessment)

		Pupils should be taught to: - 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	- Charles Mactintosh – Waterproof coat. Scottish Chemist. - Understand the difference between man-made and natural materials. - Understand how paper is made from trees, wool from sheep, cotton from plants. - Understand how a hat (cap) incorporates different materials (man-made materials) and evaluate the different styles of hat for the purpose of the material. (Sun hat = Opaque, Rain hat = Waterproof, Bike helmet = solid) - Understand how materials can be waterproof naturally and how some materials are made to be waterproof. - Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock <u>Vocabulary:</u> Identify, describe, physical properties, solid, waterproof/not waterproof, absorbent, opaque, transparent, material, function, purpose.	- 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
	How does Barrs Court change? - Autumn? (1)	Seasonal Changes Pupils should be taught to: - observe changes across the 4 seasons - observe and describe weather associated with the seasons and how day length varies	<u>Knowledge:</u> - Twelve hats for Lena by Karen Katz https://www.youtube.com/watch?v=i-UkjSLEefU - Pumpkin Soup by Helen Cooper - Observe and identify the key characteristics of the Autumn season: Colours, temperature change (change of clothes), trees shed their leaves and longer nights. - Understand how not all things change (Some trees keep their leaves). - Autumn can also be called fall. <u>Vocabulary:</u> Autumn, Deciduous, Evergreen, climate, rainfall, weather, seasons, change.	(Green = Focus for Enquiry. No TAPs assessment until final repeat of this enquiry) - 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
Term 2	Who helps who?(4)			
	What do artists do? (2)			
Term 3	How does Barrs Court change? Winter (1)	Seasonal Changes - observe changes across the 4 seasons - observe and describe weather associated with the seasons and how day length varies	<u>Knowledge:</u> - Secrets of Winter by Carron Brown & Georgina Tee - Observe and identify the key characteristics of the Winter season: Colours, temperature change (change of clothes ** hats **), trees bare, animal behaviours (hibernation and migration) and long nights. - Understand how not all things change (Some trees keep their leaves). - Understand how stay safe during colder days: warm clothes. Understand the dangers of the weather in Winter. - See change in water. <u>Vocabulary:</u> Winter, Deciduous, Evergreen, climate, Hibernation, Migration, weather.	(Green = Focus for Enquiry. No TAPs assessment until final repeat of this enquiry) - 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

	Where is Barrs Court Primary School? (5)			
Term 4	What are we? (4)	Animals including humans Pupils should be taught to: - 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	- Linda Brown Buck – American Biologist who discovered mammals have smell receptors in the nose. Nobel Prize winning scientist. - David Attenborough – World famous biologist and nature conservation campaigner. Knighted by the Queen and Member of the Royal Society. - Animal visitor from farm/ Grimsbury farm visit. Knowledge: - Identify animals in the local area (Barrs Court Moat/Forest etc.) and classify these animals: Badger, Fox, Domestic animals, squirrel, terrapins, herons, goldfish, carp, ducks, frogs, and invertebrates. - Children to observe and study the domestic cat as an omnivore (Mittens) and study the Brown Bear. - Children to observe and study the fox as a carnivore (introduce scavenger aspect) and to study the shark. - Children to observe and study the herbivore animals at Grimsbury farm (sheep etc.) and study the Arctic hare. - Children to draw a picture of their body and label the components of their body. - Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)	<i>TAPS= Animal classification</i> <i>(Green = Focus for Enquiry)</i> - 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
	How does Barrs Court change? Spring (2)	Seasonal Changes Pupils should be taught to: - observe changes across the 4 seasons - observe and describe weather associated with the seasons and how day length varies	- Goodbye Winter, Hello Spring by Kenard Pak Knowledge: - Observe and identify the key characteristics of the Spring season: Colours, temperature change (change of clothes ** hats **), flowers growing and trees baring leaves etc., animal behaviours (end of hibernation and reproduction) and short nights. - Understand how Spring is start of many life cycles. Vocabulary: Spring, Deciduous, Ever-green, climate, Hibernation, Reproduction, offspring, flowers, weather.	<i>(Green = Focus for Enquiry. No TAPs assessment until final repeat of this enquiry)</i> - 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
Term 5	How do we play in different ways? (6)			

	How do plants grow near me? (3)	Plants Pupils should be taught to: - 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	Andy Bending is a Bristol based designer. https://www.andybendinggardendesign.co.uk/about-andy-bending-garden-design-pl George Washington Carver- inspirational black scientist involving in the development of crop rotation. Knowledge (Year 2 revisit) Learners explore different parts of a flowering plant – and can name the four parts: seed, root, leaves and petals - Learners know that plants have seeds which grow into new plants. - Learners understand that plants are grown from seeds/bulbs and need water and light for growth. - Learners understand how light, water and nutrition (not food, that is a term used for animal nutrition), and suitable temperature are required for successful growth. - Learners can perform a simple test, to investigate growth conditions; Inside, in the dark with water; Inside, in the light with water; Outside, with shade and water; Outside, with sunlight and water. - Learners can observe plants and write up findings using photographic evidence and observation notes. Vocabulary: environment, plants, reproduce, produce young, produce new plants, mature, shoot, bud, blossom, petals stem, within, under, next to, deciduous, evergreen, wild, garden plant, trunk, leaves, branches, roots, water, light, temperature	<i>Green = Focus for Enquiry, TAPS Assessment)</i> - 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
Term 6	How do we move around?(4)		<u>Skills focus only.</u> <u>DT will involve the children reviewing their understanding of biological learning linked to ‘how the body can move’.</u>	<i>(Green = Focus for Enquiry. NO TAPs, assessed through teacher annotations and judgements.)</i> - 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
	What might I do in the future?		<u>Skills focus only.</u>	<i>(Green = Focus for Enquiry. NO TAPs, assessed through teacher annotations and judgements.)</i> - 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

	How does my school change-summer? (2)	Seasonal Changes - observe changes across the 4 seasons - observe and describe weather associated with the seasons and how day length varies	<u>Knowledge:</u> - Observe and identify the key characteristics of the summer season: Colours, temperature change (change of clothes ** hats **), longer days. - Understand how stay safe during sunnier days: sunblock, hats and staying hydrated. Understand the dangers of the weather in Summer. - Take care of a plant to ensure its survival. - See change in water. <u>Vocabulary:</u> Summer, Deciduous, Ever-green, climate, weather, germination, hydration.	<i>(Green = Focus for Enquiry and SEASON TAPs)</i> - 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
--	---------------------------------------	---	--	---

Barrs Court Primary School Science Knowledge and Skills progression – Blue Area Yearly Overview - Year A

	Enquiry	National Curriculum Objectives	Key Knowledge and vocabulary	Working Scientifically skills
Term 1	Why do we live here? (6)			
Term 2	What is sound?(6)	Sound Pupils should be taught to: - 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 - find patterns between the volume of a sound and the strength of the vibrations that produced it - recognise that sounds get fainter as the distance from the sound source increases	<u>Knowledge:</u> - To know that sound is something we hear. Sound is a vibration that travels through a medium air or water that we pick up with our ears. - Sound is a type of energy. - Pitch is a measure of how high or low a sound is. - The size of the vibration is called the amplitude. - The bigger the waves are (amplitude), the stronger the vibrations are, and the louder the sound is. - use musical instruments to investigate and then explain how sounds get fainter as the distance from the sound source increases. - Explain how sound is what we hear. Noise can be pleasurable or unwanted. -Inside your ear, the vibrations hit the eardrum and are then passed to the middle and then the inner ear. They are then changed into electrical signals and sent to your brain. Your brain tells you that you are hearing a sound. -explain how ear plugs restrict the vibration and impact on the level of sound heard. - Identify how sounds are made and how these are linked to pitch. - Explain how the material used to make instruments impacts on volume and the strength of vibration produced. <u>Vocabulary:</u> Sound waves, vibration, medium, ear drum, amplitude pitch, volume, fainter sound, louder sound. Sound source, vacuum	(Green – Focus for Enquiry) - 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - Using straightforward scientific evidence to answer questions or to support their findings.
	What is creativity? (3)			

Term 3	How can we switch off? (6)	Electricity Pupils should be taught to: • 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 • identify 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	Invite an electrician into school and/or arrange for a green energy company to visit. We can trace solar power's roots back as far as 1839. That's when 19-year-old French physicist Edmond Becquerel discovered the photovoltaic effect when he remarked that shining light on an electrode submerged in a conductive solution created an electric current. <u>Knowledge:</u> - 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 -identify 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. -that bulbs get brighter if more cells are added -that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. -They recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. -record findings using simple scientific language - DT link-They can apply their electrical circuit skills to design and make a product -They can use their understanding of electricity and energy use to discuss energy consumption within the school and wider world. - They describe and understand the distribution of energy, including renewable or 'clean' energy. They explore solar, wind and hydro energy as sustainable alternatives to burning fossil fuels <u>Vocabulary:</u> Simple series electrical circuit, cells, wires, bulbs, switches and buzzers, conductor, insulator, energy.	(Green = <i>Focus for Enquiry</i>) • 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.
--------	----------------------------	--	---	--

Term 4	Why are more people becoming vegetarian? (6)	Animals including Humans Pupils should be taught to: - 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	Marie Maynard Daly (1921–2003) Daly's early research included studies of the effects of cholesterol on the mechanics of the heart, the effects of sugars and other nutrients on the health of arteries, and the breakdown of the circulatory system as a result of advanced age or hypertension. Michael Caine is a black Michelin star chef. - Function of teeth: humans are omnivores, hence three types of teeth - Teeth are linked to digestion - Digestion is how we get nutrition from food and get rid of unwanted food - Food we eat must be balanced where possible - Most food we eat is 'prepared' or 'processed' in some way, unlike food eaten by wild animals - Understanding wild food chains, but that food chains tend not to apply to modern humans. Vocabulary: Digestive system in humans: mouth, teeth, throat, stomach, Incisors, canines, molars;; Food chains, Producers, predators and prey, Vegetarian, vegan,	<i>(Green = Focus for Enquiry)</i> - 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings.
Term 5	Where does our water come from? (4)	States of Matter Pupils should be taught to: - 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	Hydrologist: Elizabeth M. Shaw 1928 (Hebburn on Tyne, UK) - 2013 (Hornby, UK) - Children classify materials based on their properties. - Children explain the terms solid, liquid and gas. (When water and other liquids reach a certain temperature, they change state into a solid or a gas. The temperatures that these changes happen at are called the boiling, melting or freezing point). - Children explain that evaporation occurs when water turns into water vapour. Condensation is when water vapour is cooled down and turns into water. - Children explain the terms evaporate and condensation on relation to the water cycle. 1. Water is evaporated by the sun's heat, turning it into water vapour. 2. This water vapour forms water droplets in clouds (condensation). 3. This forms rain, sleet, hail or snow (precipitation). - Children explain how materials can change their properties and the impact this has on plants and human. Vocabulary: heated, cooled, temperature, degrees Celsius, evaporation, condensation, precipitation, water cycle, pool, chemical change, substances, oxygen.	<i>(Green = Focus for Enquiry)</i> - 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings.

	What should you flush down the loo? (4)	Living things and their habitats Pupils should be taught to: • 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	Jacques-Yves Cousteau a marine biologist. Use previous enquiry to develop scientific skills and knowledge. • Children know how to create a classification chart in different ways. • Children can classify living things within the local environment and compare to other habitats. • Children can explore habitats and investigate how they might change. • Children can explain the positive and negative impacts of humans on biodiversity and habitats. • Children can select evidence to support their opinion and use scientific ideas to justify these opinions. Vocabulary: Environment, classification key, habitat, vertebrate, invertebrate, fish, amphibians, reptiles, birds, mammals, human impact, nature reserves, ecological Visits: a local river/wildlife centre to explore a specific species of animal/plant affected by pollution or human intervention. Contact the whale and dolphin conservation in Chippenham to arrange a visitor or to develop ideas from the enquiry.	(Green = <i>Focus for Enquiry</i>) • 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.
Term 6	Who stood here before us?			

Barrs Court Primary School Science Knowledge and Skills progression – Blue Area Yearly Overview - Year B

	Enquiry	National Curriculum Objectives	Key Knowledge and vocabulary	skills
Term 1	Where does the darkness come from? (6)	Light Pupils should be taught to: - recognise that they need light in order to see things and that dark is the absence of light - notice that light is reflected from surfaces - recognise that light from the sun can be dangerous and that there are ways to protect their eyes - recognise that shadows are formed when the light from a light source is blocked by an opaque object - find patterns in the way that the size of shadows change	Scientist- look at modern optical physicist. Or historical scientist: Ibn-al-Haytham carried out work into light and how our works work. https://photonterrace.net/en/photon/history/ https://www.synopsys.com/optical-solutions/learn/optics-for-kids/scientists-engineers.html Children know; - Light is a form of energy that travels in a wave from a source. - Darkness is the absence of light. - Reflection is the process where light hits the surface of an object and bounces back into eyes. - Reflective means something that reflects well. - Waves of light are light rays/beams of light. - Light travels in a straight line. - How shadows are formed. - Understand how to protect themselves from the sun - Understand the ways in which light can damage the eyes and skin. Visitor: optometrist from a local optician. Vocabulary: pupil, retina, shadow, reflective light, absence of light, sun rays, bright, dull, light source, formed, changes, candle, lamp, shine Opaque, translucent, transparent, torch	(Green = Focus for Enquiry) - 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings.
Term 2	How can we find out about people in the past? (7)			

Term 3	What is underneath our feet? (6)	Rocks Pupils should be taught to: - 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	Arthur Holmes (14 January 1890 – 20 September 1965) was a British geologist who made two major contributions to the understanding of geology. Mary Anning (1799-1847).was a famous English fossil hunter in the cliffs near where she lived in Dorset. Children know that: - fossilisation is the process by which fossils are made and can explain the process of fossilisation. -palaeontology is the study of fossils. - erosion is when water, wind or ice wears away land. - There are three types of naturally occurring rock; Igneous, Sedimentary, Metamorphic. - soil is made up of different components and can talk about the structure of these materials (topsoil, subsoil and bedrock). Vocabulary: Physical properties, formed, organic matter, fossil, sedimentary rock, grains, crystals, humus, top soil, sub-soil, weathered rock fragments, rock, hard, soft, permeable, impermeable, durable (meaning resistant to weathering), high density, low density. Density measures how ‘bulky’ the rock is (how tightly packed the molecules are)	(Green = Focus for Enquiry) - 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings.
Term 4	What is the difference between surviving and being healthy? (6)	Animals including humans Pupils should be taught to: - 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	Antoine Lavoisier, “Father of Nutrition and Chemistry.” 1770 Knowledge: Be able to explain what we need to grow and be healthy. Identify that humans and other mammals have skeletons and muscles for support, protection and movement. To explain why we need carbohydrates and nutrients in our diet. To use the categories of the Eatwell Plate (fats, sugars, carbohydrates and proteins) to discuss the diet of people within the local community; Identify differences, similarities or changes Explain why it is important to take regular exercise and eat the right types of food. Present their findings and explain the impact of their results on growth and health. Vocabulary nutrition, skeleton, muscles, functions, diet, minerals, proteins, carbohydrates, sugars, fats, dairy, vegetables, vitamins	(Green = Focus for Enquiry NO TAPs Teacher annotations and assessment) - 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings.

Term 5	How do plants die? (5)	Plants Pupils should be taught to: - identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers - explore 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 - explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Sir Joseph Dalton Hooker (1817 - 1911) - British botanist and explorer, Sir Joseph Dalton Hooker, is considered the most important botanist of the 19th century. He was friends with Charles Darwin, corresponding with him on botanical observations and evolution. Knowledge - Learners draw a diagram to show the function of each part of a flowering plant. - Learners Investigate what each plant needs (air, light, water, nutrients) using different scientific tests, making systematic and careful observations. - Learners can explain why plants might die (no air, no light, no water, no soil/nutrients, no space.) - Learners observe how water is transported within plants. - Learners can talk about different biomes/vegetation belts/climates zones across the world (tropics, rainforest, arctic and woodland). - Learners can explain how a bee collects pollen. - Leaners can explain how plants from different locations have adapted to different climates- (e.g.) cacti, water lilies, seaweed - Explain the life cycle of a flowering plant (pollination, seed formation and seed dispersal). Vocabulary Flowering, roots, stem, trunk, leaves, flower, habitat Air, light, water, nutrients, pollination, seed formation, seed dispersal, fertiliser, photosynthesis, reproduction.	(Green = Focus for Enquiry) - 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings.
	How can you feel the force? (4)	Forces and Magnets Pupils should be taught to: - compare how things move on different surfaces - notice that some forces need contact between 2 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 2 poles - predict whether 2 magnets will attract or repel each other, depending on which poles are facing	Linus Pauling was an American scientist who developed theories about how molecules connected to each other. https://www.dkfindout.com/uk/science/famous-scientists/ Knowledge - Learners draw a diagram to explain push and pull. - Learners sort objects/materials by magnetic properties. - Learners know how to record their ideas as a table. - Learners explore how magnetism can work through non-magnetic objects, such as a moving object ‘magically’ moving through a piece of card. - Learners can make predictions and plan tests to answer questions. - Learners can compare friction and magnetism using their knowledge. - Learners can explain what happens when different ends (poles) of a magnet are in close contact with each other. Vocabulary Magnetic force, distance, change, impact, attract, repel, magnet, poles, friction, magnetic materials, forces,	(Green = Focus for Enquiry) - 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 simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings.

	Why did people travel in the past? (5)			
--	--	--	--	--

Barrs Court Primary School Science Knowledge and Skills progression – Green Area Yearly Overview - Year A

	Enquiry	National Curriculum Objectives	Key Knowledge and vocabulary	Working Scientifically skills
Term 1	How are lives saved? (7)	Animals including humans Pupils should be taught to: - identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood - recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function - describe the ways in which nutrients and water are transported within animals, including humans	<u>Knowledge:</u> - William Harvey, English physician who started the discovery of the circulatory system. - Joe Wicks, Degree in Sports Science, who supported the country through lockdown with the benefits of exercise. - Children to be able to name the main circulatory parts of the system (aorta, pulmonary veins/artery, right/left atrium, right/left ventricle, renal artery/veins, digital artery/veins, capillaries, blood vessel, jugular veins, lungs, heart, bronchioles, femoral artery/vein.) - Children to know the purpose of red and blue on a diagram of the circulation system. - Children to recap the knowledge from Year 3/4 enquiry: <i>What is the difference between surviving and being health?</i> - Children to categorise foods into main groups (carbohydrates, protein etc.) and understand how this knowledge should be applied to a healthy diet. - Children to practically explore the benefits of exercise (explore both the benefits physically and mentally). - Children to understand the impact of drugs on the human body. - Children to know how water and food is processed by the human body and 2 animals. <u>Vocabulary:</u> circulatory system, heart, blood vessels, blood, exercise, diet, drugs, lifestyle, nutrients, internal organs, aorta, pulmonary veins/artery, right/left atrium, right/left ventricle, renal artery/veins, digital artery/veins, capillaries, blood vessel, jugular veins, lungs, heart, bronchioles, femoral artery/vein	(Green = Focus for Enquiry) - 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 set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments
Term 2	How do we all live together? (7)			
Term 3	Where does our food really come from? (6)			

Term 4	Linnaeus and Darwin: What connects them? (6)	Living things and their habitats Pupils should be taught to: - 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 - give reasons for classifying plants and animals based on specific characteristics	<u>Knowledge:</u> - Karl Linnaeus, Swedish scientist who developed the classification system for the classifying on animals. - David Attenborough, Modern day naturalist and TV Broadcaster. - Children to be able to recite the features of each class of organisms from memory. - Children to use classification chart on local wildlife based on observable characteristics. - Children to use classification chart on contrasting wildlife based on observable characteristics. (<i>Trip to Zoo or Farm</i>) - Children to name and classify local trees and plants in the woodland area. - Children to list the sub-classes for invertebrates: Mollusc, Annelid, insect, Crustacean, Arachnid) - Children to list the sub-classes for micro-organisms: fungus, bacteria, virus. - Children to list the qualities for mould to grow. - Children to explain why classification is a useful tool in the separation of living organisms. (Link to Computing Data Branching Skills) <u>Vocabulary:</u> exoskeleton, insectivore, offspring, adaptation, vertebrate, invertebrate, fish, amphibians, reptiles, birds, mammals, Mollusc, Annelid, insect, Crustacean, Arachnid, fungus, bacteria, virus.	(Green = Focus for Enquiry) - 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 set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments
		Evolution and inheritance Pupils should be taught to: - 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	<u>Knowledge:</u> - Charles Darwin, world famous naturalist well-known for the Origin of Species. - Book: Origin of Species and Darwin’s Dragons. - Children to revise the process a fossil has gone through, linking back to year 3/4 enquiry: What is underneath our feet? - Children to understand the process of adaptation and evolution over the course of hundreds of years. - Children to be able to explain the significance of Darwin’s work with finches on the Galapagos isles. - Children to explain and observe the differences between parent organisms and their offspring. (Explore this in humans and husky wolves) - Children to identify adaptations in living organisms and explain their purpose. - Children to observe local wildlife and suggest possible adaptations. - Children to explain how evolution will not happen following the effects of climate change and the negative human impact on the planet and global ecosystem. - Children to observe local wildlife life-cycle and compare offspring with the parent. <u>Vocabulary:</u> offspring, adaptation, evolution, inheritance, naturalist, fossil.	
Term 5	Why are shadows important? (4)	Lights Pupils should be taught to: - recognise that light appears to travel in straight lines - use the idea that light travels in straight lines to explain that objects are seen	<u>Knowledge:</u> - Isaac Newton, Physicist who discovered that light is a mixture of colours. - Trip: Explorer Dome – Light Show. - Chn to know light travels in a straight line and demonstrate this understanding with accurately drawn diagrams. - Chn to understand how light interacts with objects. - Chn to know the order of light’s journey: Source, Object (optional Mirror), Eye.	(Green = Focus for Enquiry) - 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

Term 6		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	- Chn to recite the colour spectrum contained within light (linking to Newton's theory). - Chn to identify light sources and identify areas of misconception around light e.g. the moon being a light source. - Chn to explain how a shadow is effected by the distance and shape of the object and demonstrate this understanding within investigation diagrams. <u>Vocabulary:</u> Transparent, Opaque, Translucent, Source, Reflection, Refraction, Spectrum, Dim, Natural, Bioluminescent.	- 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 set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments
	Who were the greatest engineers? The Victorians or the Ancient Britons? (5)			
	How big is your footprint: ecological/digital/carbon?(4)	Electricity Pupils should be taught to: - 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	<u>Knowledge:</u> - Granville T Woods, Scientist and inventor for the telegraphony. - Lewis Latimer, Scientist who developed a stronger filament to ensure Edison's light bulb would work. - Thomas Edison, Scientist and inventor of the light bulb. - Pupils to understand how the current of a circuit is effected by the charge of the battery/cell (voltage) and the amount of components on the circuit. - Explain how each component in a circuit works and is powered or effected by the flow of the current: buzzer, bulb and switch. - Pupils to confidently record all circuit drawings using internationally recognised symbols and understand their importance as a unified scientific language. - Children to know how a circuit can be broken not only with a switch but faulty components. - Children to be able to create a series and parallel circuit and explain their differences and different suitability. <u>Vocabulary:</u> lamp, volume, buzzer, voltage, cells, circuit, bulb, switch, variation, component, brightness, loudness, symbols, diagram, series, parallel, break, current.	(Green = Focus for Enquiry) - 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 set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments

Barrs Court Primary School Science Knowledge and Skills progression – Green Area Yearly Overview - Year B

	Enquiry	National Curriculum Objectives	Key Knowledge and vocabulary	Working Scientifically skills
Term 1	What does the earth look like from the Solar System? (6)	Earth and Space Pupils should be taught to: - 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 - 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	<u>Knowledge:</u> - Katherin Johnson, Scientist and Mathematician who helped get the first man on the moon by correctly calculating the Moon's trajectory through space in relation to the Earth. - Mae Jemison, first Black Female astronaut who was part of the study into the effects of gravity on the human body. - Tim Peake, Modern astronaut who conducted a series of experiments on the ISS. - Nicolaus Copernicus, Physicist who theorised Heliocentrism. - Children to name, understand and explain Heliocentric theory. - Children to create a diagram to demonstrate heliocentric theory. - Children to compare geocentric and heliocentric theory. - Children to explain the journey of the moon and to name all the phases of the moon's journey in chronological order. - Children to explore the distances between the Earth, Moon and Sun. - Children to understand how day and night is created. - Children to know the Earth Moon and Sun are spheroid and be able to explain the scientific evidence that proves this theory. - Children to recite the order of the planets in the solar system. <u>Vocabulary:</u> Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Pluto, Neptune, Moon, Sun, Heliocentric, Geocentric, Orbit, Gravity, Axis, Poles, Spheroid, trajectory, New Moon, waxing crescent, first quarter, waxing gibbous, full Moon, waning gibbous, third quarter and waning crescent.	<i>(Green = Focus for Enquiry)</i> - 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 set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments
Term 2	How can we show what we believe in? (7)			

Term 3	How can science help the vulnerable? (6)	Properties and changes of materials: Pupils should be taught to: - compare 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 - use 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	Knowledge: - Children to group products based on their characteristics: Link idea to animal classification. - Children to understand and explain solubility. - Children to understand and explain transparency. - Children to understand and explain conductivity and insulators both thermal and electrical. - Children to understand and explain material magnetism. - Children to explain the process of dissolution and how this process can be effected by stirring and heat. - Children to be able to compare and group items based on their solubility. - Children to demonstrate and explain how different processes can be used to separate mixtures and solutions. - Children to identify materials used in everyday items and explain why their qualities make them suitable for their task. - Children to understand reversible and irreversible changes and explain why these changes are or are not possible. Vocabulary: Thermal insulator/conductor, dissolve, in/soluble, solution, solute, water resistance. Malleable, corrosion, irreversible change, reversible change.	(Green = Focus for Enquiry) - 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 set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments
Term 4	Who is trading with whom? (6)			
Term 5	How are you helping to save our planet? (5)	Living things and their habitats: Pupils should be taught to: - 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	Knowledge: - David Attenborough, Modern Naturalist and TV Broadcaster. - Children to identify the key stages in a mammal, bird, insect and bird life cycle. - Children to compare life cycles between mammals, birds, insects and birds. - Children to explain the life process of reproduction for a dandelion and wild garlic plant and a dandelion. - Children to explain the life process of reproduction for a human and a duck. Vocabulary: Life cycle, sexual reproduction, asexual reproduction, puberty, gestation, infant, adolescent, egg, bulb, embryo, sperm cell, egg cell, zygote, pollination, offspring, live young, mammal, bird, invertebrate, insect.	(Green = Focus for Enquiry) - 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 set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations

Term 6				identifying scientific evidence that has been used to support or refute ideas or arguments
	What do forces actually do?(4)	Forces Pupils should be taught to: - 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	<u>Knowledge:</u> - Isaac Newton, Physicist who theorised gravity. - Archimedes, Ancient Greek Scientist who theorised displacement theory ‘the Eureka Moment’. Revisit the Archimedes screw. - Children to explain the theory of gravity and its origins. - Children to demonstrate gravity on an object through accurately drawn diagrams. - Children to name and understand the different types of friction: air resistance, drag, water resistance. - Children to identify and name the forces that act on an object on the water and in the air. - Children to demonstrate friction acting on a range of objects in diagrams. - Children to identify how knowledge of friction is useful in designing of products: parachutes, tyres etc. - Children to observe the friction effects on range of items using different locations: air, moat, field, gravel/tarmac. - Explore the different mechanisms that can be used to reduce force needed to move an object and children to explain how this is achieved. <u>Vocabulary:</u> force of gravity, air resistance, water resistance, friction, mechanism, levers, pulley, gear. Newton, force meter, drag.	(Green = Focus for Enquiry) - 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 set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments
	Where is our twin? (6)			
	What makes a good performance, great? (2)			