West Jesmond Primary School:

Science Curriculum

Reception

Area of Science		Vocabulary
Animals	• Name and describe animals that live in different habitats. • Describe different habitats	names of animals, live, on land, in water, jungle, desert, North Pole, South Pole, sea, hot, cold, wet, dry, snow, ice environment, polar regions, ocean, camouflage
Humans	• Describe people who are familiar to them. • Learn about how to take care of themselves.	hair (black, brown, dark, light, blonde, ginger, grey, white, long, short, straight, curly), eyes (blue, brown, green, grey), skin (black, brown, white), big/tall, small/short, bigger/smaller, baby, toddler, child, adult, old person, old, young, brother, sister, mother, father, aunt, uncle, grandmother, grandfather, cousin, friend, family, boy, girl, man, woman bald, elderly, wrinkles, male, female, freckles
Living Things and their Habitats	• Explore the plants in the surrounding natural environment • Explore the animals in the surrounding natural environment • Explore plants and animals in a contrasting natural environment	plant, tree, bush, flower, vegetable, herb, weed, animal, names of plants and animals they see, name of a contrasting environment e.g. beach, forest environment
Seasonal Changes	• Play and explore outside in all seasons and in different weather • Observe living things throughout the year	spring, summer, autumn, winter, seasons, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, windy, rainbow, animals, young, plants, flowers, hibernate, migrate, snowflake
Materials, including changing materials	• Explore a range of materials, including natural materials • Make objects from different materials, including natural materials • Observe, measure and record how materials change when heated and cooled • Compare how materials change over time and in different conditions	ice, water, frozen, icicle, snow, melt, wet, cold, slippery, smooth, big, bigger, biggest, smaller, smaller, smallest, hard, soft, bendy, rigid, wood, plastic, paper, card, metal, strong, weak, hot, apply heat, waterproof, soggy, not waterproof, best, change, change back, solid, liquid, gas, most suited
Light	• Explore shadows • Explore rainbows	Sun, sunny, light, shadow, shady, clouds, torch, see-through, non-see through, source, light source, casting a shadow, pale, dark, transparent, opaque
Forces	• Explore how to change how things work • Explore how the wind can move objects • Explore how objects move in water	float, sink, up, down, top, bottom, surface, move, roll, drop, fly, turn, spin, fall, fast, slow, faster, slower, fastest, slowest, further, furthest, wind, air, water, blow, bounce, force, rotate, solid, liquid, gravity,
Sound	• Listen to sounds outside and identify the source • Make sounds	sound, noise, listen, hear, music, voices, bird song, traffic, sirens, thunder, high, low, loud, quiet, soft, volume, crackle, thunder, hum, buzz, roar, source, crescendo, vibration, pitch
Earth and Space	• Learn about the Earth, Sun, Moon, planets and stars • Learn about space travel	Sun, Moon, Earth, star, planet, sky, day, night, space, round, bounce, float, sunrise, sunset, astronaut, astronomer, constellation, orbit, nocturnal, slow-motion, magnify

Early Learning Goals: The Natural World Children at the expected level of development will:

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

	Working Scientifically
Reception	Show curiosity and ask questions **Ask questions to find out more and to check they understand what has been said to them.** (Communication and language) • While playing and exploring, the children ask 'I wonder…' questions. • With support, the children develop their ideas for answering their questions.
	Make observations using their senses and simple equipment, Make direct comparisons & Identify, sort and group **Explore the natural world around them.** (Understanding the world) **Describe what they see, hear and feel whilst outside.** (Understanding the world) **Develop their small motor skills so that they can use a range of tools competently, safely and confidently.** (Physical development) **Count objects, actions and sounds.** (Mathematics) **Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.** (Communication and language) **Show resilience and perseverance in the face of challenge.** (Personal, social and emotional development) • Explore the natural and made world using their senses. • Use magnifying glasses or tablets with magnifiers to make observations. • Use smaller pieces of equipment such as syringes and pipettes. • With support, make comparisons, using hands and feet and other non-standard measures e.g. building blocks and beakers. • While playing and exploring, try out using resources to answer a question. • Test things out to make comparisons e.g. Does the red car go further than the blue car? • Identify and name objects by matching them with pictures. • Sort and group objects, sometimes using their own criteria.
	Record their observations by drawing, taking photographs, using sorting rings or boxes and on simple tick sheets **Connect one idea or action to another using a range of connectives.** (Communication and language) **Describe events in some detail.** (Communication and language) • Sometimes, draw and write simple labels to record their observations. • With support, they record their observations and comparisons e.g. using simple prepared tables, taking photographs, using sorting rings and boxes
	Use their observations to help them to answer their questions **Listen to and talk about selected non-fiction to develop a deep familiarity with new knowledge and vocabulary.** (Communication and language) ***Connect one idea or action to another using a range of connectives.*** *(Communication and language)* ***Describe events in some detail.*** *(Communication and language)* **Compare length, weight and capacity.** (Mathematics) • Talk about what they have observed. • Demonstrate and talk about what they have found out. • Sometimes talk about what they have found out from secondary sources, including non-fiction texts. • Notice and talk about how they made a difference to an outcome e.g. "My car went further when I pushed it harder." • Make direct comparisons or use their recorded observations to communicate what they have found out and answer the question, where appropriate.

Year 1

	Unit / Big Question / Working Scientifically Opportunities	Key Learning / *Possible learning activities*	Focus Scientists	Vocabulary
Y1 Autumn 1	**Animals Including Humans** Big Question: What makes me human? • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense  Foundation for: Y2 Animals	Humans have key parts in common, but these vary from person to person. Humans (and other animals) find out about the world using their senses. Humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body. *• Make first-hand close observations of parts of the body e.g. hands, eyes.* *• Compare two people.* *• Take measurements of parts of their body.* *• Compare parts of their own body.* *• Look for patterns between people e.g. Do people with big hands have big feet?* *• Classify people according to their features.* *• Investigate human senses e.g. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match?*	Michelle Williams - Radiologist	head, body, eyes, ears, mouth, teeth, leg, parts of the body including those within the school's RSE policy, senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ear, tongue

	Seasonal Change (3 weeks) Big Question: What is the difference in the seasons? • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies 	The weather changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer. The change in weather causes many other changes. Some examples are: numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people. • *Visit a deciduous and evergreen tree in the Orchard – observe features. Collect items on the ground around it. Link to senses from Animals Unit.* • *Collect weather data (link to Weather Humanities unit)* • *Collect a set of leaves – children to identify and classify eg biggest to smallest, different shades, different shapes* • *Discuss the signs of autumn – Autumn, breezy, changing, chilly, cloudy, cool, cooler darker, fog, fruits, rainy, warm, windy. How what does what we have collected show this?*		weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length
Y1 Autumn 2	**Materials** Big Question: What is it made from? • 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  Foundation for: Y2 Materials	All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons. • *Classify objects made of one material in different ways e.g. a group of object made of metal.* • *Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials.*	Jyoti Sehdev – Senior Civil Engineer	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through

	Seasonal Change (2 weeks) **Big Question: What are the difference in the seasons?** • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies	• *Visit a deciduous and evergreen tree in the Orchard – observe features. Collect items on the ground around it.* • *Collect weather data (link to Weather Humanities unit)* • *Feeding birds in winter – activities in Seasonal Change document*		
Y1 Spring 1	**Materials** **Big Question: How does a scientist describe materials?** • 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  Foundation for: Y2 Materials	Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties. • *Classify materials based on their properties.* • *Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.*	John Dunlop	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through
	Seasonal Change (1 week) **Big Question: What are the difference in the seasons?** • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies	• *Visit a deciduous and evergreen tree in the Orchard – observe features.* • *Collect weather data (link to Weather Humanities unit)* • *Egg box collection (link to Materials): Collect things that are the same put them in one of the egg slots. You could collect different textures e.g. hard, soft, smooth, rigid, bendy, dull etc*		

Y1 Spring 2	**Animals Including Humans** **Big Question: How do you know what we are?** • 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)  Foundation for: Y2 & Y3 Animals	Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals. *• Make first-hand, close observations of animals from each of the groups.* *• Compare two animals from the same or different groups.* *• Classify animals using a range of features.* *• Identify animals by matching them to named images.* *• Classify animals according to what they eat.*	Daniella Dos Santos - Vet	head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals experienced first-hand from each vertebrate group
	Seasonal Change (1 week) **Big Question: What are the difference in the seasons?** • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies	*• Visit a deciduous and evergreen tree in the Orchard – observe features. Collect items on the ground around it.* *• Collect weather data (link to Weather Humanities unit)* *• Linked to Animals unit – what animals can you observe in our locality? How are they different from each other? Why are they here?*		

Y1 Summer 1	**Forces (from Y3)** **Big Question: How would you win the race?** • compare how things move on different surfaces  Building on: Y1 Materials Foundation for: Y3 Magnets	A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. • *Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc.*	Rasfan Choudhury– Mechanical Engineer	move movement surfaces forces push pull contact friction materials distance cm
	Seasonal Change (1 week) **Big Question: What are the difference in the seasons?** • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies	• *Visit a deciduous and evergreen tree in the Orchard – observe features. Collect items on the ground around it.* • *Collect weather data (link to Weather Humanities unit)*		

Y1 Summer 2	**Plants** **Big Question: How do you know a tree is a plant?** • 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  Building on: Y1 Seasonal Change Foundation for: Y2 Plants and Y2 Seasonal Change	Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring. *• Make close observations of leaves, seeds, flowers etc.* *• Compare two leaves, seeds, flowers etc.* *• Classify leaves, seeds, flowers etc. using a range of characteristics.* *• Identify plants by matching them to named images.* *• Make observations of how plants change over a period of time.* *• When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them.*	Kelsey Archer Bamhill – Deep Sea Ecologist	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area Names of garden and wild flowering plants in the local area
	Seasonal Change (2 weeks) **Big Question: What are the difference in the seasons?** • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies	*• Visit a deciduous and evergreen tree in the Orchard – observe features. Collect items on the ground around it.* *• Collect weather data (link to Weather Humanities unit)* *• Take hand lenses and observe plants and living things first hand close up* *• Compare differences and similarities observed though the year*		

Y1	**Working Scientifically** • Explore the world around them and raise simple questions • Begin to recognise different ways in which they might answer scientific questions • Carry out simple tests • Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying) • Ask people questions and use simple secondary sources to find answers • Observe closely using simple equipment, with help observe changes over time and With guidance, they should begin to notice patterns and relationships • Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data • Record simple data • Talk about what they have found out and how they found it out • With help, record and communicate findings in a range of ways and begin to use simple scientific language

Year 2

	Unit / Big Question / Working Scientifically Opportunities	Key Learning / *Possible learning activities*	Focus Scientists	Vocabulary
Y2 Autumn 1 and 2	**Seasonal Change (2/3 Weeks building on Year 1) across the term** Big Question: How do you know it's autumn? • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.	In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again. The weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer. The change in weather causes many other changes. Some examples are: numbers of minibeasts found outside; seed and plant growth; leaves on trees ***See suggested activities in the Science folder:*** K:\Subject Folders\Science\Seasonal Change • *Predict what we expect to find in the local environment in this time of year. Visit the school ground and orchard to see if predictions are correct* • *Use paint colour charts (Greens/Browns) to collect items that closest match to the shade* • *Tally the number of minibeasts found in the school grounds and/or orchard at this time of year* • *Record sunset and sunrise times on a particular date(s) each month* • *Plant bulbs (Nov/Dec) ready for Plants unit in Summer term*		weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length
	Materials Big Question: Could you live in a house made of Lego? • 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	All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling,	Charles MacIntosh John McAdam	wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials – as for Year 1 Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-throughplus opaque, transparent and translucent, reflective, nonreflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

	Building on: Y1 Materials Foundation for: Y3 Rocks	pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness. • *Classify materials.* • *Make suggestions about alternative materials for a purpose that are both suitable and unsuitable* • *Test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for Elastigirl's costume, test materials for waterproofness to select the most appropriate for a rain hat*		
Y2 Autumn 2	**Electricity (2 Weeks taken from Y4 Objectives)** **Big Question: How do the Christmas tree lights light up?** • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers  Foundation for: Y4 Electricity	An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. • *Construct a range of circuits.* • *Identify components in a circuit (not circuit diagrams)*		electricity simple circuit light bulb cell wire buzzer switch motor battery
Y2 Spring 1 and 2	**Seasonal Change (2/3 Weeks building on Year 1 at pints across the term)** **Big Question: How do you know it is winter?** • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.	• *Predict what we expect to find in the local environment in this time of year. Visit the school ground and orchard to see if predictions are correct* • *Tally the number of minibeasts found in the school grounds and/or orchard at this time of year* • *Record sunset and sunrise times on a particular date(s) each month* • *What are people wearing? Why? Why is it suitable?(consolidation from materials)*		
	Animals including humans **Big Question: Which came first – the chicken or the egg?** • 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)	Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles. All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To grow into healthy adults, they also need the right	Tessa Nash – Poultry Scientist	offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/hen, kitten/cat, caterpillar/butterfly), survive, survival, water food, air, exercise, heartbeat, breathing, hygiene, germs, disease, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy)

	• describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene  Building on: Y1 Animals Foundation for: Y3 Animals (diet)	amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses. • *Ask people questions and use secondary sources to find out about the life cycles of some animals.* • *Observe animals growing over a period of time e.g. chicks, caterpillars, a baby.* • *Ask questions of a parent about how they look after their baby.* • *Ask pet owners questions about how they look after their pet.* • *Explore the effect of exercise on their bodies.* • *Classify food in a range of ways, including using the Eatwell Guide.* • *Investigate washing hands, using glitter gel.*		
	Plants **Big Question: Who can grow the healthiest plant?** • 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.  Building on: Y1 Plants Y1&2 Seasonal Change Foundation for: Y3 Plants	Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy. • *Make close observations of seeds and bulbs.* • *Classify seeds and bulbs.* • *Research and plan when and how to plant a range of seeds and bulbs.* • *Look after the plants as they grow – weeding, thinning, watering etc.* • *Make close observations and measurements of their plants growing from seeds and bulbs.* • *Make comparisons between plants as they grow*	Dawood Qureshi – Marine Biologist	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling

Y2 Summer 1	**Seasonal Change (1 Week building on work from Year 1)** Big Question: How do you know it is Spring/Summer? • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.	• *What would we expect to see and find at this time of year – collect items that match paint shade colour charts (Greens/BrownsYellows) for Living Things* • *Tally the number of minibeasts found in the school grounds and/or orchard at this time of year* • *Record sunset and sunrise times on a particular date(s) each month* • *Take a hoop to Orchard or Allotment: Lay it on the grass. How many different plants can you spot in the grass, can you find more than five? What else can you find in your patch of grass, are there any flowers, animals or evidence of humans?*		
	Living Things and their Habitats Big Question: Who lives here? • 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  Building on: Y1 Living Things Y2 Plants Foundation for: Y4 Living Things	All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.) An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels). Animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water. • ***Seasonal Change*** *– what would we expect to see and find at this time of year – collect items that match paint shade colour charts (Greens/BrownsYellows) to…* • *Explore the outside environment regularly to find objects that are living, dead and have never lived.* • *Classify objects found in the local environment*	Dr Jo Montgomery – Animal Behaviourist	living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, names of local habitats (e.g. pond, woodland etc.), names of micro-habitats (e.g. under logs, in bushes etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and microhabitats studied

Y2 Summer 2	**Plants/ Seasonal Change (2 Weeks consolidation of previous units)** Big Question: Who can grow the healthiest plant? • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.	Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. • *Make close observations and measurements of their plants growing from seeds and bulbs.* • *Make comparisons between plants as they grow* • *Explain how we know it is summer (work from **Seasonal Change**)*	Dr Sarah Bearchell – Children's Science Writer	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling
	Living Things and the Habitats Big Question: Who lives here? • identify and name a variety of plants and 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, and identify and name different sources of food.  Building on: Y1 Living Things Y2 Plants Foundation for: Y4 Living Things	Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain. • *Observe animals and plants carefully, drawing and labelling diagrams.* • *Create simple food chains for a familiar local habitat from first-hand observation and research.* • *Create simple food chains from information given e.g. in picture books (Gruffalo etc.).* • *Compare data from **Seasonal Change** about number of minibeasts found each season and suggest reasons for that*	Dr Angie Burnett – Plant Biologist	living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, names of local habitats (e.g. pond, woodland etc.), names of micro-habitats (e.g. under logs, in bushes etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and microhabitats studied
Y2	**Working Scientifically** • Explore the world around them and raise simple questions • Begin to recognise different ways in which they might answer scientific questions • Carry out simple tests • Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying) • Ask people questions and use simple secondary sources to find answers • Observe closely using simple equipment, with help observe changes over time and With guidance, they should begin to notice patterns and relationships • Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data • Record simple data • Talk about what they have found out and how they found it out • With help, record and communicate findings in a range of ways and begin to use simple scientific language			

Year 3

	Unit / Big Question / Working Scientifically Opportunities	Key Learning / *Possible learning activities*	Focus Scientists	Vocabulary
Y3 Autumn 1	**Light** Big Question: Can a shadow grow? • 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  Foundation for: Y6 Light	We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface. • *Explore how different objects are more or less visible in different levels of lighting.* • *Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible.* • *Explore how shadows vary as the distance between a light source and an object or surface is changed.* • *Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground.* • *Choose suitable materials to make shadow puppets.* • *Create artwork using shadows.*	Colin Webb – Laser Physicist	light dark (absence of light) reflect shadow opaque mirror reflective surface sun protection sunglasses sun cream

Y3 Autumn 2	**Animals including Humans** Big Question: How do I stand up? • identify that humans and some other animals have skeletons and muscles for support, protection and movement • 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  Building on: Y1 Animals Foundation for: Y4 Animals	Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support. • *Classify food in a range of ways.* • *Use food labels to explore the nutritional content of a range of food items.* • *Use secondary sources to find out the types of food that contain the different nutrients.* • *Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks?* • *Explore the nutrients contained in fast food.* • *Use secondary sources to research the parts and functions of the skeleton.* • *Investigate patterns asking questions such as:* ▪ *Can people with longer legs run faster?* ▪ *Can people with bigger hands catch a ball better?* • *Compare, contrast and classify skeletons of different animals.*	Tanesha Aleen - Zoologist	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine

Y3 Spring 1	**Magnets (Other forces taught in Year 1)** **Big Question: Do opposites attract?** • 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  Building on: Y2 Materials Foundation for: Y5 Materials	A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract. For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts. • *Explore what materials are attracted to a magnet.* • *Classify materials according to whether they are magnetic.* • *Explore the way that magnets behave in relation to each other.* • *Use a marked magnet to find the unmarked poles on other types of magnets.* • *Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table.* • *Devise an investigation to test the strength of magnets.* • *Explore how magnets are used in everyday life*	Gunay Shamilova – Corrosion Engineer	Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

Y3 Spring 2	**Plants** Big Question: Which seed grows the biggest plant? • 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.  Building on: Y2 Plants Foundation for: Y4 Living Things	Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth. *• Observe what happens to plants over time when the leaves or roots are removed.* *• Observe the effect of putting cut white carnations or celery in coloured water.* *• Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.* *• Spot flowers, seeds, berries and fruits outside throughout the year.* *• Observe flowers carefully to identify the pollen.* *• Observe flowers being visited by pollinators e.g. bees and butterflies in the summer.* *• Observe seeds being blown from the trees e.g. sycamore seeds.* *• Research different types of seed dispersal.* *• Classify seeds in a range of ways, including by how they are dispersed.* *• Create a new species of flowering plant.*	Ben Woodcock – Ecological entomologist	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport functions nutrients nutrition air transport (water) life cycle pollination seed formation seed dispersal reproduce fertiliser air, light, water, nutrients roots, stem/trunk, leaves and flowers

Y3 Summer land 2	**Rocks** **Big Question: How are rocks different?** • 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  Building on: Y2 Materials Foundation for: Y5 Space & Y6 Evolution	Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water. • *Observe rocks closely.* • *Classify rocks in a range of ways, based on their appearance.* • *Devise a test to investigate the hardness of a range of rocks.* • *Devise a test to investigate how much water different rocks absorb.* • *Observe how rocks change over time e.g. gravestones or old building.* • *Research using secondary sources how fossils are formed.* • *Observe soils closely.* • *Classify soils in a range of ways based on their appearance.* • *Devise a test to investigate the water retention of soils.* • *Observe how soil can be separated through sedimentation.* • *Research the work of Mary Anning.*	Mary Anning Fangxian Fang – Earth Scientist	rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, soil, types of soil (e.g. peaty, sandy, chalk, clay)
	Plants **Big Question: Which seed grows the biggest plant?**	Revisit allotment to ,measure and observe plants and answer Plant Big Question		

Y3	**Working Scientifically** • Raise relevant questions about the world around them • Start to make decisions about the most appropriate type of scientific enquiry to answer questions • Set up simple practical enquiries, comparative and fair tests Recognise when a simple fair test is necessary and help to decide how to set it up • Talk about criteria for grouping, sorting and classifying; and use simple keys • Recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations • Make systematic and careful observations • Begin to look for patterns and relationships and decide what data to collect to identify them • Take accurate measurements using standard units with a range of equipment • Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and analyse this data • With help, look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions • With support, identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done

Year 4

	Unit / Big Question / Working Scientifically Opportunities	Key Learning / *Possible learning activities*	Focus Scientists	Vocabulary

Y4 Autumn 1	*Autumn 1* **States of Matter – Water Cycle** Big Question: Where do raindrops go? • 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  Building on: Y2 Materials Foundation for: Y5 Materials	A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0°C. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle. *• Observe closely and classify a range of solids. Observe closely and classify a range of liquids.* *• Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind.* *• Classify materials according to whether they are solids, liquids and gases.* *• Observe a range of materials melting e.g. ice, chocolate, butter. • Investigate how to melt ice more quickly.* *• Observe the changes when making rocky road cakes or ice-cream.* *• Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate.* *• Explore freezing different liquids e.g. tomato ketchup, oil, shampoo.* *• Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration). • Observe water evaporating and condensing e.g. on cups of icy water and hot water.* *• Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers.*	Anwar Khan – Atmospheric Scientist Zoe Ayres – Water Scientist Prem Singh Gill – Polar Scientist	solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle

		• *Use secondary sources to find out about the water cycle.*		
Y4 Autumn 2	**Sound** Big Question: How can we save Mr Jones' hearing? • 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.  Building on: Music curriculum	A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds. • *Classify sound sources.* • *Explore making sounds with a range of objects, such as musical instruments and other household objects.* • *Explore how string telephones or ear gongs work.* • *Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks.* • *Measure sounds over different distances.* • *Measure sounds through different insulation materials*		Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

Y4 Spring 1 and 2	**Animals including Humans – Teeth and Digestion** Big Question: What is the journey of a pea? • 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  Building on: Y3 Animals Foundation for: Y6 Animals	Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing). Dental hygiene is important to stop tooth decay. • *Research the function of the parts of the digestive system.* • *Create a model of the digestive system using household objects.* • *Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing).* • *Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls.* • *Investigate how different drinks decay teeth*	Shirley Ferber – Equine Nutritionist	Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore,

Y4 Spring 2	**Electricity (4–5 weeks)** Big Question: How can you stop a circuit? • identify common appliances that run on electricity • 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.  Building on: Y2 Electricity Foundation for: Y6 Electricity	Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity. *• Construct a range of circuits.* *• Explore which materials can be used instead of wires to make a circuit.* *• Classify the materials that were suitable/not suitable for wires.* *• Explore how to connect a range of different switches and investigate how they function in different ways.* *• Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm.* *• Apply their knowledge of conductors and insulators to design and make different types of switch.* *• Make circuits that can be controlled as part of a DT project.* *N.B. Children should be given one component at a time to add to circuits*	Erusa Adizie – Innovation Engineer	Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol N.B. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6

Y4 Summer 1 Y4 Summer 2	**Living Things and their Habitats** Big Question: How can we attract more birds to the secret garden? • 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.  Building on: Y3 Animals Foundation for: Y6 Living Things and Evolution	Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year. *• Observe plants and animals in different habitats throughout the year.* *• Compare and contrast the living things observed.* *• Use classification keys to name unknown living things.* *• Classify living things found in different habitats based on their features.* *• Create a simple identification key based on observable features.* *• Use fieldwork to explore human impact on the local environment e.g. litter, tree planting.* *• Use secondary sources to find out about how environments may naturally change.* *• Use secondary sources to find out about human impact, both positive and negative, on environments.*	Telam Laurentino – Evolutionary Biologist	vertebrate animals: fish, birds, mammals, amphibians, reptiles invertebrate animals: snails, worms, slugs, spiders, insects Classification, classification keys, environment, habitat human impact – litter, deforestation, population increase, nature reserves human impact, positive, negative, migrate, hibernate
	Animals including Humans – Food Chains (2-3 Weeks) Big Question: What is for dinner? • construct and interpret a variety of food chains, identifying producers, predators and prey.  Building on: Y2 Living Things Foundation for: Y6 Living Things and Evolution	Living things can be classified as producers, predators and prey according to their place in the food chain *• Use food chains to identify producers, predators and prey within a habitat.* *• Use secondary sources to identify animals in a habitat and find out what they eat.*		herbivore, carnivore, omnivore, producer, predator, prey, food chain

Y4	**Working Scientifically** • Raise relevant questions about the world around them • Start to make decisions about the most appropriate type of scientific enquiry to answer questions • Set up simple practical enquiries, comparative and fair tests Recognise when a simple fair test is necessary and help to decide how to set it up • Talk about criteria for grouping, sorting and classifying; and use simple keys • Recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations • Make systematic and careful observations • Begin to look for patterns and relationships and decide what data to collect to identify them • Take accurate measurements using standard units with a range of equipment • Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and analyse this data • With help, look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions With support, identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done

Year 5

	Unit / Big Question / Working Scientifically Opportunities	Key Learning / *Possible learning activities*	Focus Scientists	Vocabulary
Y5 Autumn 1 and 2	**Materials** Big Question: How do materials change? • 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  Building on: Y4 States of Matter	Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Mixtures can be separated by filtering, sieving and evaporation. Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible. *• Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat.* *• Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate.* *• Investigate rates of dissolving by carrying out comparative and fair test.* *• Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture.* *• Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning.* *• Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced?* *• Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton).*	Spencer Silver Ruth Benerito Pearl Agyakwa – Materials Scientist	Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

Y5 Spring 1 Y5 Spring 2	**Forces** **Big Question: What forces are around me?** • 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  Building on: Y3 Magnets Foundation for: Y5 Space	A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines. • *Investigate the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter.* • *Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water.* • *Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats.* • *Explore how levers, pulleys and gears work.* • *Make a product that involves a lever, pulley or gear.* • *Create a timer that uses gravity to move a ball.* • *Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.*	Galileo Galilei Isaac Newton	Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears
	Animals, including Humans *(3 – 4 weeks in conjunction with PSHE lessons)* **Big Question: How will I change as I get older?** • describe the changes as humans develop to old age  Building on: Y4 Living Things Foundation for: Y5 Living Things	When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. **This needs to be taught alongside PSHE.** • *This unit is likely to be taught through direct instruction due to its sensitive nature, although children can carry out a research enquiry by asking an expert e.g. school nurse to provide answers to questions that have been filtered by the teacher.*	School Nurse – ask about career	Humans, growth, change, puberty, gestation, baby, toddler, child, teen, adult

Y5 Summer 1	**Living things and their habitats** **Big Question: Do all living things have the same life cycle?** • 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  • Building on: Y5 Animals Foundation for: PSHE curriculum	As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects. *• Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals. • Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth.* *• Look for patterns between the size of an animal and its expected life span.* *• Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes.* *• Take cuttings from a range of plants e.g. African violet, mint.* *• Plant bulbs and then harvest to see how they multiply.* *• Use secondary sources to find out about pollination.*	David Attenborough Jane Goodall	life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, bulbs, cuttings

Y5 Summer 2	**Space** **Big Question: What makes the world go round?** • 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  Building on: Y5 Forces	The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365 days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical. • *Use secondary sources to help create a model e.g. role play or using balls to show the movement of the Earth around the Sun and the Moon around the Earth.* • *Use secondary sources to help make a model to show why day and night occur.* • *Make first-hand observations of how shadows caused by the Sun change through the day.* • *Make a sundial.* • *Research time zones.* • *Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel.*	Ptolemy Alhazen Copernicus Maggie Aderin – Pocock Helen Mason – Space Scientist (Video)	Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit safety time, day, night, season, shadow
Y5	**Working Scientifically** • Use science experiences to explore ideas and raise different kinds of questions • Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions • Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why • Use and develop keys and other information records to identify, classify and describe living things and materials • Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact • Make decisions about what observations to make, what measurements to use and how long to make them for • Look for different causal relationships in their data and identify evidence that refutes or supports their ideas • Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate • Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and explain their degree of trust in results • Use results to make predictions and identify when further observations, comparative and fair tests might be needed			

Year 6

	Unit / Big Question / Working Scientifically Opportunities	Key Learning / *Possible learning activities*	Focus Scientists	Vocabulary
Y6 Autumn 1	**Living things and their habitats** Big Question: How can we classify the class? • 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  Building on: Y4 Living Things & Y5 Living Things	Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms. Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants. *• Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important.* *• Use first-hand observation to identify characteristics shared by the animals in a group.* *• Use secondary sources to research the characteristics of animals that belong to a group.* *• Use information about the characteristics of an unknown animal or plant to assign it to a group.* *• Classify plants and animals, presenting this in a range of ways e.g. Venn diagrams, Carroll diagrams and keys.* *• Create an imaginary animal which has features from one group.*	Carl Linnaeus	vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, warm-blooded, cold-blooded, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers

Y6 Autumn 2	**Electricity** **Big Question: How can we control a circuit?** • 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  Building on: Y4 Electricity	Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams. *• Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower.* *• Make circuits to solve particular problems, such as a quiet and a loud burglar alarm.* *• Carry out fair tests exploring changes in circuits.* *• Make circuits that can be controlled as part of a DT project.*	Nikola Tesla Michael Faraday	Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage N.B. Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words "cells" and "batteries" are now used interchangeably.

Y6 Spring 1	**Animals including humans** Big Question: What does it take to win Olympic Gold? • 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  Building on: Y3 Living Things and Y6 Living Things	The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well out heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. This content is also included in PSHE. The new statutory requirements for relationships and health education can be found below: https://www.gov.uk/government/publications/relationships-education-relationships-and-sex-education-rse-and-health-education/physical-health-and-mental-wellbeing-primary-and-secondary • Create a role play model for the circulatory system. • Carry out a range of pulse rate investigations: ▪ fair test – effect of different activities on my pulse rate ▪ pattern seeking – exploring which groups of people may have higher or lower resting pulse rates ▪ observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate) ▪ pattern seeking – exploring recovery rate for different groups of people. • Research the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources.	Santorio Santorio Yogesh Kumar – Applications Scientist	Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle

Y6 Spring 2 and Summer 1	**Light** Big Question: How can you see around corners? • recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them  Building on: Y3 Light	Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object. • *Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card.* • *Explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets.*	James Mortimer – Photochemist (Video)	light dark (absence of light) reflect shadow opaque mirror reflective surface straight lines, light rays
Y6 Summer 1	**Evolution and Inheritance** Big Question: How have some living things adapted to survive? • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago	All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a	Charles Darwin Alfred Wallace Kelsey Byers – Evolutionary Biologist Scientist (Video)	offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils, evolve, evolution

Y6 Summer 2	• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents  Building on: Y4 Living things & Y5 Living Things Foundation for: Y6 Living Things and Animals, including Humans	very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics. • *Design a new plant or animal to live in a particular habitat.* • *Use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity.* • *Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution.* • *Make observations of fossils to identify living things that lived on Earth millions of years ago.* • *Identify features in animals and plants that are passed on to offspring and explore this process by considering the artificial breeding of animals or plants e.g. dogs.* • *Compare the ideas of Charles Darwin and Alfred Wallace on evolution.*		
Y6	**Working Scientifically** • Use science experiences to explore ideas and raise different kinds of questions • Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions • Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why • Use and develop keys and other information records to identify, classify and describe living things and materials • Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact • Make decisions about what observations to make, what measurements to use and how long to make them for • Look for different causal relationships in their data and identify evidence that refutes or supports their ideas • Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate • Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and explain their degree of trust in results • Use results to make predictions and identify when further observations, comparative and fair tests might be needed			

Enquiry Types Key

- comparative / fair testing
- research
- observation over time
- pattern seeking
- identifying, grouping and classifying

Scientist Key

Curriculum Scientists:

Standing on the Shoulder of Giants – Full lesson to include Research and Investigation

https://pstt.org.uk/SOTSOG-resources

PSTT A Scientist Just Like Me (For starter or Plenary)

Saved in Science Folder or

https://pstt.org.uk/resources/curriculum-materials/ASJLM