Science long-term knowledge growth

Rationale for content sequencing

Grange Park Primary School

Year N	Substantive scientific content	Recurring themes, ideas and language	Contribution to wider scientific knowledge and what later content this prepares for
Daily	**Seasonal Change** Pupils sing a twice-daily weather song: "What's the weather today?" They focus on the types of weather we experience and how it changes throughout the day.	**Daily Weather**	**Pupils are developing skills that will help them meet the Natural World Early Learning Goal by the end of Reception:** **ELG: 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. ● Recognize 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, including the seasons and the changing states of matter. Pupils are developing skills in asking and answering questions. Pupils build on this knowledge in Year 2, where they learn how to keep the body healthy,
Autumn	**Wonderful Me** Pupils share and discuss information about themselves, including members of their family, using vocabulary such as: boy, girl, brother, sister, mum, and dad. They also paint portraits and discuss and use vocabulary relating to facial features, including: eyes, nose, mouth, skin, and hair.		
Spring/ Summer	In our topics "**Let's go Outside" and "Exploring Nature,"** children will notice, discuss, and learn about features of the **natural world.** Activities include: ● Bug hunts, nature walks, and exploring different plants and living creatures. ● Naming parts of a plant, such as the stem and leaves. Throughout the year, we will focus on our senses and how we use them to explore the world around us.		

Daily	**Water play** Our water area is set up to encourage both independent discovery and adult-supported exploration. Pupils investigate floating and sinking by testing various items, such as cork and pebbles. They use boats to transfer objects, stimulating discussions about why some items float while others sink. Adults guide children by asking questions like, "Why do you think the cork floats?" to help deepen understanding.		including understanding the parts of the body introduced in this unit. This foundational knowledge is expanded in subsequent years: ● **Reception:** Seasonal Change, All About Me, Living and Growing ● **Year 1**: Animals including humans ● **Year 3**: Musculoskeletal system ● **Year 4**: Digestion ● **Year 6**: Circulatory system
Daily	**Materials** Within the provision, children begin to explore different materials in various areas, including materials to create 3D structures, represent small worlds, and build models in the workshop. Staff support children in selecting materials and using vocabulary such as: rough, smooth, hard, soft, bumpy, shiny, and stretchy.		Pupils will develop skills in selecting materials and enhance their language abilities in Reception, where continuous provision demonstrates progress through hands-on exploration and structured activities.such as choosing materials for creative tasks, discussing their choices, and using descriptive language to explain their reasoning.
Year R	**Substantive scientific content**	**Recurring themes, ideas and language**	**Contribution to wider scientific knowledge and what later content this prepares for**
	Weather/ Seasonal Change Pupils update a daily weather board, observing seasonal changes like falling leaves or changing colors. They also use a weather app on the iPad to record the day's conditions. Seasonal changes are explored further through planned activities, including nature walks, ice experiments, and sun safety discussions.	Pupils build on their understanding of daily weather by learning how to look it up in advance and on the day to determine the forecast. They also deepen their knowledge of seasonal changes and the weather patterns we can expect throughout the year.	Pupils have the opportunity to explore this unit throughout their school career. Pupils will revisit this is the recurring topic: Year 1: Our Changing World Sensing Seasons
	All About Me Pupils explore and understand their bodies, senses, and the world around them. Through activities such as; identifying body parts, discussing how they use their senses, and observing differences in features such as eye or hair color. Pupils begin to develop foundational scientific skills like	Pupils build on the "Wonderful Me" topic from Nursery, with plenty of opportunities to revisit body parts while expanding their vocabulary and understanding.	Pupils have the opportunity to explore this unit throughout their school career. Pupils will revisit this is the recurring topic: Year 1-4: Animals including Humans

	observation, questioning, and classification. This topic also introduces concepts such as health, growth, and the importance of self-care, fostering curiosity about living things and how they work.		
	Living and Growing Pupils explore the basic needs of living things and the stages of growth. Activities such as planting seeds (what do they need to grow?), observing animals, and discussing how humans grow and change introduce concepts such as life cycles and habitats. A trip to the zoo provides real-life experience, allowing children to observe a variety of animals, their behaviors, and environments, fostering curiosity and a deeper understanding of the natural world.	Pupils build on learning from Nursery by deepening their understanding of the natural world through real-life experiences, such as a trip to the zoo, where they explore animals, habitats, and life cycles in more detail. Children will expand their vocabulary, learning new terms related to animals, environments, and life processes, while developing a greater appreciation for the diversity of living things.	Pupils have the opportunity to explore this unit throughout their school career. Pupils will revisit the elements of plants across key stage 1 and 2: Year 1: Plant Detectives & Plants in our local environment Year 2: Plants: Basic needs, main changes from bulbs to adult plants Year 3: Plants: How does your garden grow? Year 5: Main parts of the plant Reproduction in Plants Year 6: Plants including photosynthesis
	Floating and Sinking A "Floating and Sinking" workshop in Reception engages children in hands-on learning by allowing them to explore buoyancy and materials. Pupils predict, test, and observe which objects float or sink, then apply their understanding by designing and making their own boats.	Pupils build on the skills developed in the water area by engaging in a more structured floating and sinking workshop. Through hands-on activities, they investigate various materials and objects, testing whether they float or sink. Using boats to transfer items, children discuss why certain objects float while others sink, further expanding their understanding. Adults continue to support learning by asking probing questions like, "Why do you think the cork floats?" to encourage critical thinking and help deepen their scientific understanding of buoyancy and materials.	Pupils have the opportunity to explore this unit throughout their school career, developing their scientific skills and linking to units focused on materials (see below).
	Materials Within the provision, children explore a variety of materials across different areas, using them to create 3D structures, represent small worlds, and build models in the workshop. Staff support children in selecting materials and encourage them to use vocabulary such as: rough, smooth, hard, soft, bumpy, shiny, stretchy, and rigid to describe their properties.	Within the areas of provision, the role of the adult is crucial in deepening pupils' thinking when selecting materials. Children will begin to consider how materials can be joined, which are best suited for outdoor use, and expand their vocabulary related to materials and construction.	Pupils have the opportunity to explore this unit throughout their school career. Pupils will revisit this is the recurring topic: Year 1: Everyday Materials: identify and group Year 2: Materials (Suitability for different uses) Year 5: Properties and Changes of Materials
Year 1	**Substantive scientific content**	**Recurring themes, ideas and language**	**Contribution to wider scientific knowledge and what later content this prepares for**

Year 1 Autumn 1	Identify and name the basic parts of the human body. Draw and label the basic parts of the human body. Say which part of the body is associated with each sense	Pupils build on their knowledge of themselves (All about Me topic - EYFS), with plenty of opportunities to learn and recall the main parts of the human body by using their own bodies as a reference. They use their senses to compare different textures, sounds and smells.	Pupils have the opportunity to build on this knowledge in year 2 where they learn how to keep the body healthy, including the parts of the body learned about in this unit. Pupils build on this basic knowledge of the human body throughout their Science careers with: Year 3: Musculoskeletal Year 4: Digestion Year 6: Circulatory system Pupils continue to learn about hearing and sound in year 4
	Observe and describe weather associated with the seasons Observe and describe how day length varies. What animals live in and around our school? What flowers do we see? What colour are the leaves on the plants?	Through this unit, pupils have the opportunity to observe and record their immediate environment at this time of the year. This also builds on their EYFS learning of the seasons, what they are and some particular observable details that define them.	Pupils have the opportunity to explore this unit throughout their school career building animals and plants into the topic. In year 5 pupils build on their understanding of day length in a unit about the sun, moon and earth
Year 1 Autumn 2	Identify and name a variety of common animals including: fish amphibians reptiles birds animals Identify and name a variety of common animals that are: carnivores herbivores omnivores	Pupils use the local environment throughout the year to explore and answer questions about animals in their habitat. They understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets. Pupils compare observable features from a range of groups. Pupils use classification to group animals according to what they eat.	Pupils build on their observations of animals in their immediate environment. Pupils develop this classification throughout their Science careers at Grange Park: Year 2: Pupils develop their knowledge of what groups of animals eat to learn about food chains Year 4: Pupils develop their knowledge of what groups of animals eat to learn about food webs Year 6: Pupils build on their knowledge in order to classify in a more detailed manner

	Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).		
Year 1 Spring 1	Describe the basic structure of a variety of common plants	Pupils become familiar with plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).	Pupils continue to develop and build on their knowledge of plants through their Science career with units on plants in: Year 2: Pupils learn a plant's basic needs, and the main changes from bulbs to adult plants. Year 3: Transporting water and nutrients through the plant Year 5:The main parts of a plant for reproduction
Year 1 Spring 2	Identify and name a variety of common plants including: garden plants wild plants and trees those classified as deciduous and evergreen	Pupils use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Pupils observe the growth of flowers and vegetables that they have planted. Pupils become familiar with common names of flowers, examples of deciduous and evergreen trees.	Pupils develop their knowledge of plants in their environment in: Year 6: In depth classification of plants
	Observe and describe weather associated with the seasons Observe and describe how day length varies. What animals live in and around our school? Can we still see them? What flowers do we see? What colour are the leaves on the plants?	Through this unit, pupils have the opportunity to observe and record their immediate environment at this time of the year. This also builds on their EYFS learning of the seasons, what they are and some particular observable details that define them. At this point they make comparisons with what they observed in the Autumn term.	Pupils have the opportunity to explore this unit throughout their school career building animals and plants into the topic. In year 5 pupils build on their understanding of day length in a unit about the sun, moon and earth
Year 1 Summer 1	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.	Pupils explore, name, describe, classify, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent.	Pupils continue to explore materials in: Year 2: Pupils test the suitability of certain materials Year 5: Pupils deepen their understanding of sorting materials, properties of materials and mixtures: reversible and irreversible changes

	Compare and group together a variety of everyday materials on the basis of their simple physical properties.		
Year 1 Summer 2	Distinguish between an object and the material from which it is made. Explain why certain materials are used for particular jobs Compare the strength of different structures	The pupils get the opportunity to perform simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?' By doing these simple tests the pupils are able to compare the strength of different structures.	Pupils continue to explore materials in: Year 2: Pupils test the suitability of certain materials Year 5: Pupils deepen their understanding of sorting materials and testing the properties of materials.
	Observe changes across the four seasons. What animals live in and around our school? What do we notice now? What flowers do we see? What colour are the leaves on the plants?	Through this unit, pupils have the opportunity to observe and record their immediate environment at this time of the year. This also builds on their EYFS learning of the seasons, what they are and some particular observable details that define them.	Pupils have the opportunity to explore this unit throughout their school career building animals and plants into the topic.
Year 2	**Substantive scientific content**	**Recurring themes, ideas and language**	**Contribution to wider scientific knowledge and what later content this prepares for**
Year 2 Autumn 1	Fieldwork: What lives in and around our school? (Specific habitats) How do plants change over time?	In year 1 children have spent time exploring what they see in and around our school. They named and classified these animals. In this unit the children build on this knowledge describing the animals' habitats Year 1 also learn about plants	In Year 4 (Living things and their habitats): Pupils build on their understanding of local habitats by learning how living things can be grouped, exploring simple classification, and investigating how environments change and the impact on living things. The Year 2 topic introduces these ideas through first-hand observation. In Year 5 (Life cycles and reproduction): Observing plant changes over time helps prepare pupils to understand plant reproduction, including pollination and seed formation. Noticing seasonal growth or life cycles in Year 2 supports this

			progression. In Year 6 (Classification and evolution): Year 2 experiences with habitat-specific species support later learning about how animals and plants are classified based on characteristics and how species adapt to environments over time. Development of scientific enquiry: This topic encourages skills in observing over time, recording changes, and identifying living things, which are essential for future investigations and fieldwork tasks at KS2 and beyond.
	Identify and compare the suitability of a variety of everyday materials for particular uses including: wood, metal, plastic, glass, brick, rock, paper and cardboard	Pupils build on their year 1 learning by identifying and discussing the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass).	In year 5, Pupils deepen their understanding of sorting materials and testing the properties of materials.
Year 2 Autumn 2	Find out how the shapes of some solid objects can be changed by squashing and twisting Identify which materials bend and stretch	They build on their year 1 learning by also thinking about the properties of materials that make them suitable or unsuitable for particular purposes and they are encouraged to think about unusual and creative uses for everyday materials.	
Year 2 Spring 1	Describe the importance for humans to exercise Describe the importance for humans to eat the right amounts of different types food	In this unit children build on their EYFS knowledge of body hygiene and keeping fit and healthy, covered in two units: people who help us and living and growing. Pupils extend this knowledge	Pupils continue to develop their knowledge of the human body throughout their Science curriculum in units such as:

	Recognise the importance of hygiene Find out and describe the basic needs of animals, including humans, for survival (water, food and air)	by being introduced to the basic needs for survival of animals and humans.	Year 3: Pupils learn about the musculoskeletal system and how it provides form, support, stability and movement to the body Year 4: Pupils learn about the digestive system. Year 6: Pupils learn about the human circulatory system. They also build on this learning specifically by learning about the effects of diet, exercise, drugs and lifestyle on body function
	Identify that animals including humans have offspring which grow in to adults	Pupils are introduced to the processes of reproduction and growth in animals. This is also a topic learned in EYFS living and growing. Continuous provision allows the children to explore and have pets in their learning environment, such as chicks, butterflies and frogs. The following examples are used in year 2: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult.	When pupils reach year 5 they continue their learning of life cycles and develop their knowledge by making comparisons within the animal kingdom
	Fieldwork: What lives in and around our school? (Specific habitats) How has the habitat changed? How has the living thing changed? How do plants change over time? What shall I plant for my soup?		
Year 2 Spring 2	Know that plants need water, light and a suitable temperature to grow healthily Observe how seeds and bulbs grow into mature plants Identify and name a variety of plants	Pupils should use the local environment throughout the year to observe how different plants grow. To build on their knowledge of the parts of a plant (year 1) they are introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants. Pupils should learn that seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.	Pupils' knowledge of plants is a recurring subject. Each year the pupils build on their knowledge: Year 3: Explore the parts of plants and their functions, the requirements of plants for healthy growth and how this varies from plant to plant, start to investigate the life cycle. Year 4: Classification Year 5: Reproduction (building on the life cycle) Year 6: Classification (building on year 4)
Year 2 Summer 1			

	Fieldwork: What lives in and around our school? (Specific habitats) How has the habitat changed? How has the living thing changed? How do plants change over time? How can I make my soup?		
Year 2 Summer 2			
Year 3	**Substantive scientific content**	**Recurring themes, ideas and language**	**Contribution to wider scientific knowledge and what later content this prepares for**
Year 3 Autumn 1	Identify and describe the functions of different parts of flowering plants: roots stem/trunk leaves flowers. Explore the requirements of plants for life and growth: air light water nutrients from soil room to grow Recognise how these requirements 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 seed dispersal	**Progression from Year 1:** In Year 1, pupils identify and name common plants and describe basic parts of a plant (roots, stem, leaves, flowers). In Year 3, this is extended by exploring the **functions** of each part and understanding **how plants grow, survive, and reproduce**. **Progression from Year 2:** Plants are not a main focus in Year 2 science, but pupils continue to develop observation and enquiry skills through seasonal changes and simple habitats. Year 3 builds on these skills through **practical investigations**, such as how water is transported in plants and the conditions plants need to grow.	In Year 5 (Life cycles and reproduction): Pupils revisit plant life cycles in more detail, including sexual and asexual reproduction. The Year 3 understanding of pollination, seed formation, and dispersal directly supports this. In Year 6 (Classification and adaptation): The knowledge that different plants have varying requirements helps pupils understand how plants are classified and adapted to different environments. Understanding systems and processes: Learning how water and nutrients are transported prepares pupils for later studies of more complex systems in humans (e.g. the circulatory system in Year 6). Scientific enquiry and investigation skills: The practical investigations in Year 3, such as observing how water moves through a plant, help pupils build skills in planning, measuring, observing, and drawing conclusions, which are essential throughout KS2 and into secondary science.
Year 3 Autumn 2	Rocks and soils Compare and group together different kinds of rocks on the basis of their appearance.	New unit Materials for physical properties	**I**n Year 5 (Properties and changes of materials): Pupils build on their understanding of rocks by exploring reversible and irreversible changes, such as the effects of heat on different materials,

	Compare and group together different kinds of rocks on the basis of their simple physical properties. Recognise that soils are made from rocks and organic matter.		including rocks. Knowing the physical properties of rocks helps when comparing materials based on hardness, permeability, or durability. In Year 6 (Evolution and inheritance): Knowledge of fossils found in rocks and how soils preserve evidence helps pupils understand how living things have changed over time and how scientists learn about past life through rock layers. Earth science foundations for secondary: This topic introduces key vocabulary and concepts such as sedimentary, igneous, and metamorphic rocks, forming the basis for more advanced geological learning at KS3 (e.g. rock cycles, plate tectonics, and erosion). Scientific skills development: Observing and comparing physical properties encourages careful observation, use of classification criteria, and beginning to make evidence-based conclusions, which are essential skills in scientific investigations throughout KS2.
Year 3 Spring 1	Describe in simple terms how fossils are formed when things that have lived are trapped within rock.	This is new learning, children learn about how fossils are formed.	This body of knowledge is developed in year 6 when the children learn what fossils tell us about the past
	Our changing world		
Year 3 Spring 1 and Spring 2	Identify that animals, including humans, need the right types and amount of nutrition. Identify that animals, including humans cannot make their own food; Identify that animals, including humans, get nutrition from what they eat. Identify that humans and some other animals have skeletons. Identify that humans and some other animals have muscles for support.	**Progression from Year 1:** In Year 1, pupils learn that animals, including humans, need food to survive and are introduced to different types of animals based on diet. In Year 3, this develops into understanding that animals cannot make their own food and must get the right types and amounts of nutrition from what they eat. **Progression from Year 2:** In Year 2, pupils learn about the importance of	This Year 3 unit transitions pupils from recognising basic needs and health habits to understanding biological systems (nutrition, skeletons, and muscles) that support life processes. It establishes a foundation for later learning about body systems in upper Key Stage 2, such as digestion and circulation.

	Identify that humans and some other animals have muscles for protection. Identify that humans and some other animals have muscles for movement.	exercise, hygiene, and a balanced diet. Year 3 builds on this by introducing the role of nutrition more scientifically and adding knowledge of the skeleton and muscles for support, protection, and movement.	
Year 3 Summer 1	Light Recognise that light is needed in order to see things. Know that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous. Recognise that there are ways to protect eyes. Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the sizes of shadows change.	This is a new topic. It is language rich and builds excellent investigation skills	The children learn that light is necessary to see things (year 3), this is developed to include the path of light from objects to our eyes in order to see things (year 6). In year 3 children learn that light travels in a straight line, this is developed to an explanation of the consequences of the way light travels e.g. this affects the shape of a shadow. The children's knowledge of shadows is developed by the fact that shadows are made by opaque objects, to the size and shape of shadows according to the position of the light source. Patterns are investigated in year 6.
Year 3 Summer 2	Forces and Magnets Compare how things move on different surfaces. Notice that some forces need contact between two objects. Notice that magnetic forces can act at a distance. Observe how magnets attract or repel each other. Observe how magnets 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. Identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.	This is a new topic. The children learn about a push and a pull force that is exerted on an object, and the effects that this force has. The children also learn that without this force, movement is not possible. In this unit the children also extend their knowledge of forces to include the attraction and repulsion of a magnet. This unit is language rich and children should learn this language in order to stand them in good stead for the forces units that follow. Although this is a new unit the children have prepared for this learning in year 1 and year 2 when they study Materials and their properties. The children exert a push, pull, twist and bend force onto various materials to see the effects.	**How this prepares for Year 5 – Magnets and Forces:** **Understanding different types of forces:** ○ Year 3 introduces **push, pull, and magnetic forces**. ○ Year 5 builds on this by comparing **how things move on different surfaces** and linking **resistance (friction) to force**. ○ Pupils can now explain why motion changes depending on surface type, connecting to earlier contact forces. 2. **Non-contact forces:**

			○ Recognising that **magnetic forces act at a distance** in Year 3 lays the groundwork for understanding **gravity and magnetism in Year 5**, including predicting effects of forces without direct contact. 3. **Predicting magnetic interactions:** ○ Year 3 pupils learn to **predict attraction or repulsion** between poles. ○ In Year 5, this is deepened: pupils systematically **compare and group materials**, **identify magnetic materials**, and use their knowledge of **magnetic poles** to make accurate predictions. 4. **Scientific observation and classification:** ○ Year 3 encourages **observing and recording magnetic effects**. ○ Year 5 extends these skills, requiring **more detailed comparisons, grouping, and explanations** based on evidence, linking material properties to magnetic behaviour.
Year 4	**Substantive scientific content**	**Recurring themes, ideas and language**	**Contribution to wider scientific knowledge and what later content this prepares for**

Year 4 Autumn 1	States of matter Compare and group materials together, according to whether they are: solids liquids gases. Observe that some materials change state when they are heated or cooled Measure or research the temperature at which this happens in degrees Celsius (°C). Identify the part played by evaporation in the water cycle. Identify the part played by condensation in the water cycle. Associate the rate of evaporation with temperature.	This is a new topic. The children learn about the states of matter and observe how things change state. This is a vocabulary rich unit and gives the children great opportunities to relate their learning to real life - the water cycle. This unit also lends itself to excellent if… then… investigation and pattern seeking. The children should be given the opportunity throughout this unit to measure temperature accurately. Although this is a new topic, some of the Materials work (Year 1 and year 2) sets up a good basic understanding of the properties of different materials. This is woven through the learning in this unit as it is the properties of matter that defines what state it presents itself in.	Pupils' knowledge of the states of matter, the change of state and the properties of matter in its various states, prepares them for their Materials unit in year 5. The vocabulary they learn in year 4 will be used and secured in this unit. The process of change of state is built upon in their learning of reversible and irreversible changes. Their learning of the change of state of water (in the water cycle) will be explored in other materials.
Year 4 Autumn 2	Sound Identify how sounds are made. Associate some sounds 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.	This is a new topic. The children learn what sound is, how it travels and how it behaves. It is vocabulary rich and has lots of opportunities for if… then… type investigations. It also lends itself to pattern seeking. Although the children would not have come across the learning in this unit, their basic knowledge of the human body (especially the ear) and the 5 senses (especially hearing) from year 1 is a good starting point. Also, the children learned about the behaviours of light (year 3) which can be contrasted with the behaviours of sound (from this unit).	This unit is a stand alone unit and the knowledge learned here is not extended in KS2. Although the children do learn about the behaviours of light (year 3 and year 6), which can be contrasted with their knowledge of the behaviours of sound (from this unit), sound is not repeated or built upon. It is imperative this is taught thoroughly and the children have a good understanding of the knowledge taught in this unit.
Year 4 Spring 1	Electricity Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including: cells wires bulbs switches	This is a new topic. The children learn to construct a simple circuit and some simple ways that electricity behaves. It is vocabulary rich and has lots of opportunities for if… then… type investigations. It also lends itself to pattern seeking.	In year 6 the pupils' knowledge of electricity is developed through the scientific representation of the various components of the circuit. Their knowledge is also deepened by further if… then… investigation with various different components in one circuit.

	buzzers. Identify whether or not a lamp will light in a simple series circuit; base this on whether or not the lamp is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit; associate this with whether or not a lamp lights in a simple series circuit. Recognise some common insulators. Recognise some common conductors. Associate metals with being good conductors.	Although this unit is filled with new learning, the children can compare the behaviour of sound (year 4) and light (year 3) to the flow of current.	Pupils also build on their knowledge of switches by learning about types of switches and how they can control different components in a circuit. Pupils also build on their knowledge of conductors and insulators by using different materials to make switches. Pupils also build on their knowledge of how electricity is used in everyday life, from questions like: What uses electricity? (year 4) How can switches control various connected lights in a building? (year 6).
Year 4 Spring 2	Identify the different types of teeth in humans. Identify the simple functions of teeth in humans. Describe the simple functions of the basic parts of the digestive system in humans.	Year 1: learns the names of body parts, this is the first introduction to teeth in the Science curriculum. Year 2: Learns about hygiene and a balanced diet, which includes looking after our teeth and having a healthy gut This specific biology topic is a new unit, Parts of the human body are covered in year 3, 4 and 6.	Although the digestive system is not revisited again in year 5 or 6, a healthy diet is revisited in year 6 specifically focused on the circulatory system (biology unit).
	Our changing world		
Year 4 Summer 1	Recognise that living things can be grouped in a variety of ways, children learn specifically about vertebrates and invertebrates Explore different classification keys Construct and interpret a variety of food chains. Identify producers in a food chain. Identify predators in a food chain. Identify prey in a food chain.	In Year 1, pupils identify and name a variety of common animals and begin to group them by diet (herbivores, carnivores, omnivores) and features (e.g. birds, fish, mammals). In Year 4, this early grouping progresses into more structured classification using keys, including distinguishing between vertebrates and invertebrates. Year 2 pupils explore microhabitats and consider how animals are suited to their environments. They also observe simple food chains, identifying	In Year 5 (Life cycles and reproduction): Pupils study the life cycles of mammals, amphibians, insects, and birds. Understanding the classification of animals (e.g. vertebrate/invertebrate) in Year 4 supports this learning and helps children make comparisons between groups. In Year 6 (Classification and evolution): Year 4 classification work prepares pupils to explore more detailed classification systems, including micro-organisms and adaptation. It also supports understanding of how species change over time through evolution and natural selection.

		basic relationships like predator and prey. Year 4 builds on this by developing a deeper understanding of food chains, clearly identifying producers, prey, and predators, and introducing more complex ecosystems. In Year 3, the focus is on nutrition and the skeletons of animals, helping pupils understand how animals survive and function. This supports Year 4 work by deepening understanding of how animals fit into food chains based on their nutritional needs, and reinforces how animal structure relates to their roles as predators or prey.	In Year 6 (Living things and their habitats): Pupils revisit and extend classification using more complex criteria, and understanding food chains helps with ecosystem thinking, such as how changes in one part of a food web affect others. Secondary science (KS3 Biology): This topic introduces core biological ideas such as interdependence, ecosystem dynamics, and classification systems, which are revisited in more depth at KS3 through topics like ecology, adaptation, and biological organisation. Scientific skills development: Constructing and interpreting food chains and classification keys builds analytical and reasoning skills, which are essential for interpreting scientific data and relationships in upper KS2 and beyond.
Year 4 Summer 2	Recognise that environments can change Recognise that this change can sometimes pose dangers to living things.	In Year 1, pupils learn to identify and name a variety of plants and animals in their local environment and observe seasonal changes. They begin to understand that living things depend on their environment but do not yet explore how that environment might change. In Year 4: This understanding is extended by recognising that environments are not static—they can change naturally (e.g. floods, fires) or due to human activity (e.g. pollution, deforestation). Pupils begin to explore how such changes can threaten living things, leading to discussions	In Year 5 (Living things and their habitats): Pupils learn about the interdependence of living things within an ecosystem and how changes to the environment can affect these relationships. The concept of environmental change in Year 4 supports this by providing a foundational understanding of how habitats are impacted and how organisms rely on stable conditions. In Year 6 (Evolution and inheritance): The impact of environmental changes on species is key to understanding adaptation and evolution. Year 4's introduction to how environments can change and pose dangers to living things sets the stage for studying how species evolve in response

		around habitat loss, endangerment, and conservation.	to changing environmental pressures, such as climate change or habitat loss. In Key Stage 3 (Ecology and conservation): At KS3, students delve deeper into ecosystem dynamics, climate change, and sustainability. Year 4 introduces the idea that environmental changes can pose dangers to living things, which is built upon in KS3 when studying the global impacts of human activity, such as deforestation, pollution, and global warming. Pupils will also explore the carbon cycle, nitrogen cycle, and how environmental factors like pollution or resource depletion affect ecosystems on a larger scale, all of which extend from the understanding of environmental change established in Year 4. Scientific skills development: Year 4 encourages critical thinking about how changes in the environment affect living things, which will be developed in later years through scientific investigations, data analysis, and evaluating the effects of human activities on ecosystems.
Year 5	**Substantive scientific content**	**Recurring themes, ideas and language**	**Contribution to wider scientific knowledge and what later content this prepares for**

Year 5 Autumn 1	Earth and Space 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. Define gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun Know that our Sun is a star, and there are other stars in our galaxy, and other galaxies Explain the seasons and the Earth's tilt, day length at different times of year, in different hemispheres	This is a new Science topic (although the children will have some knowledge of the learning in this unit from their LQ topics). The children will however build on their knowledge of the seasons in the 'Our changing world' unit in year 1 and 2. The seasons also affect the plants and habitats of animals that all year groups observe in their Biology topics (animals including humans). Their knowledge is extended in this unit by learning about how the earth's tilt affects seasons.	In **Key Stage 3**, the concepts introduced in Year 5 are revisited and developed further. Pupils explore in greater depth: ● **Gravity** as a non-contact force acting at a distance, influencing motion both on Earth and in space. ● The **relationship between weight, mass, and gravitational field strength** (*g = 10 N/kg on Earth). ● The **Earth's rotation and orbit** and how these relate to **day length, seasons, and the apparent movement of celestial bodies**. ● The **structure of the solar system**, including the relative positions, orbits, and sizes of planets and moons. ● **Space physics**, which develops the scientific models of stars, galaxies, and the universe — including light years, the life cycle of stars, and the scale of space. This foundational learning prepares pupils to engage with more advanced topics such as **forces in motion**, **balanced and unbalanced forces in orbit**, **light and the electromagnetic spectrum**, and the **physics of the universe**.
Year 5 Autumn 2	Forces	Forces is a topic introduced in year 3. The year 5 unit extends and deepens that initial knowledge of forces by introducing resistance. The pupils'	Forces is not a body of knowledge that is developed further in Year 6.

	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 friction Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	knowledge of friction is broadened with different materials tested. This unit introduces mechanisms and how they affect the amount of force needed. Another unit that builds on the if… then… investigation skills.	In Key Stage 3, all force knowledge is revisited and deepened. Pupils build on their Year 5 understanding to explore: ● **Pushes and pulls** as the result of interactions between two objects ● The **turning effect of a force** (moments) ● Forces that **twist, stretch and bend** (elasticity and deformation) ● **Resistance forces**, such as friction, air resistance and water resistance ● **Non-contact forces**, including **gravity** and **magnetism**, which are explored in greater depth This foundational understanding prepares pupils for studying more complex phenomena such as **pressure in fluids**, **balanced and unbalanced forces**, and **forces in motion**. It also supports later learning in **space physics**, where gravitational forces are applied to explain planetary motion and orbits.
Year 5 Spring 1	Sorting materials 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. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.	This topic follows Materials in: Year 1: sorting Year 2: properties and suitability for various uses This knowledge is developed in year 5 through investigation skills, the children explore and ask and answer their own questions. The activity of sorting is developed by including the children's	Materials is not a unit that is revisited in year 6.

		knowledge of electricity (year 4), magnets (year 3) and light (year 3).	
Year 5 Spring 2	Changes of materials Know that some materials will dissolve in liquid to form a solution 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. 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.	Pupils are prepared for this unit through their learning of the states of matter (year 4). Themes such as evaporation, condensation and solids, liquids and gases are developed in this unit.	
Year 5 Summer 1	Living things and their habitats Describe the life process of reproduction in some plants and animals. Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	In Year 1, pupils are introduced to the basic needs of plants and animals and start to identify and name common animals, learning the basics of life and growth. Year 5 deepens this by introducing **reproduction** in plants and animals, specifically focusing on the **life cycle** stages (e.g., birth, growth, reproduction, death). Pupils now understand that living things **grow, change, and reproduce** in a more complex way. In Year 2, pupils observe the **growth** and **development** of plants and animals over time, including simple concepts like **the seasonal**	In Year 6 (Evolution and inheritance): The study of life cycles in Year 5 supports later learning about adaptation and evolution, particularly how species evolve over time in response to environmental changes. The reproduction and life cycle knowledge from Year 5 helps students understand how genetic inheritance works and how characteristics are passed down through generations, leading to discussions about natural selection and how species change over time. In Key Stage 3 (Cell biology and genetics): Life cycles and reproduction form a foundation for studying cell division (mitosis and meiosis) and

		changes and **how plants grow from seeds**. In Year 5, pupils expand on this by studying **different life cycles** (e.g., mammals, amphibians, insects, birds), learning that each group has unique methods of **reproduction** and **growth**, such as metamorphosis in insects or live birth in mammals. Year 3 introduces pupils to basic concepts of **nutrition**, **skeletons**, and **muscles** in animals, providing foundational knowledge on **how animals function** and grow. Year 5 extends this by looking at the **specific life cycles** of different species, moving from simple observations of animal growth to **describing the stages** in the life cycle and the **types of reproduction** (e.g., egg-laying vs. live birth).	genetics at KS3. Pupils will revisit concepts of sexual and asexual reproduction in greater depth, exploring the role of DNA and chromosomes in inheritance. Understanding how living things grow, reproduce, and pass on traits prepares students for understanding genetic variation and heredity. In KS3, students will also explore the human reproductive system, plant reproduction, and fertilisation in greater detail, all of which build on the knowledge gained in Year 5. In Key Stage 3 (Ecology): The Year 5 exploration of life cycles sets the stage for more advanced study of ecosystems and food webs at KS3. Students will learn about how organisms fit into the broader ecosystem based on their life cycle stages and reproductive strategies. For example, understanding the role of reproduction and life cycles in the survival of species helps students explore population dynamics and species conservation in ecology. In scientific skills development: The understanding of life cycles and reproduction equips students with the foundational knowledge to conduct practical investigations and scientific observations related to biology. It encourages critical thinking about growth patterns, environmental factors, and species survival in more complex experiments and research projects in later years.

Year 5 Summer 2	Plants Describe the life process of reproduction in some plants Pupils learn that plants reproduce to make new individuals and continue their species. They describe the **life process of reproduction in some plants**, understanding that this can occur in two main ways: ● **Sexual reproduction**, involving the **male** and **female reproductive parts** of flowers (stamens and carpels), **pollination**, **fertilisation**, **seed formation**, and **seed dispersal**. ● **Asexual reproduction**, where new plants grow from parts of the parent plant (e.g. runners in strawberries or bulbs in onions) without the need for seeds. Pupils observe, compare, and record evidence of these processes in familiar plants and use scientific vocabulary such as **pollen**, **ovule**, **fertilisation**, **germination**, and **dispersal** to describe life cycles accurately.	**1. Growth and survival** ● From **Year 1**, pupils explore what plants need to grow: water, light, and suitable temperature/soil. ● Across all years, the idea that **plants are living organisms that grow and develop** is reinforced. ● Language: *grow, healthy, water, sunlight, soil, survive, needs, environment*. **2. Life cycles and reproduction** ● Introduced in **Year 2–3** through observing seeds, bulbs, and basic plant growth. ● By **Year 5**, this extends to **sexual and asexual reproduction**, including pollination, fertilisation, seed formation, and dispersal. ● Language: *seed, germination, flowering, pollination, fertilisation, seed dispersal, life cycle*. **3. Structure and function** ● Early years focus on naming basic parts: roots, stem, leaves, flowers. ● Later years introduce the **function of each part** (e.g., leaves for photosynthesis, roots for water and nutrient uptake, flowers for	In **Year 6**, knowledge of plant reproduction supports learning about **classification of living things**, **adaptation**, and **evolution and inheritance**. In **Key Stage 3**, this understanding develops further through study of: ● **Reproduction in animals and plants**, including the **structure and function of reproductive systems**. ● The **role of pollination and seed dispersal** in biodiversity and ecosystems. ● **Cellular processes**, such as fertilisation and growth. ● The **continuity of life** and the **genetic transmission of characteristics** from one generation to the next. This prepares pupils to understand reproduction as a unifying biological process and connects plant biology to wider concepts in life sciences.

		reproduction). ● Language: *roots, stem, leaves, flower, petal, stamen, carpel, function, adaptation*. **4. Environmental interaction** ● Pupils learn that plants **interact with their environment** to survive and reproduce. ● Key ideas include **adaptation to conditions**, **pollination by insects or wind**, and **seed dispersal** methods. ● Language: *habitat, environment, adapt, pollination, dispersal, insect, wind*. **5. Observation and scientific investigation** ● Across KS1–KS2, pupils repeatedly **observe, record, and compare plant growth**. ● They develop skills in **measuring, predicting, and explaining**. ● Language: *observe, record, compare, measure, predict, evidence, conclusion*. **6. Variation and diversity** ● Pupils notice **differences between plant species**, and how **structure relates to function**.	

		• By Year 5, they understand that different reproductive strategies exist across plant types. • Language: *species, variety, difference, similar, adapt, reproduce*. **7. Life processes link** • The **life processes of all living things** (growth, reproduction, nutrition, etc.) are revisited each year. • Plants provide a tangible example connecting **biology, ecology, and evolution** concepts. • Language: *living, organism, growth, life cycle, reproduction, survival*.	
Year 6	**Substantive scientific content**	**Recurring themes, ideas and language**	Contribution to wider scientific knowledge and what later content this prepares for
Year 6 Autumn 1	Light 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.	Light is a topic children learn about in year 3. The children learn that light is necessary to see things (year 3), this is developed to include the path of light from objects to our eyes in order to see things (year 6). In year 3 children learn that light travels in a straight line, this is developed to an explanation of the consequences of the way light travels e.g. this affects the shape of a shadow. The children's knowledge of shadows is developed by the fact that shadows are made by opaque objects, to the size and shape of shadows according to the position of the light source. Patterns are investigated in year 6.	

Year 6 Autumn 2	Human circulatory system Identify and name the main parts of the human circulatory system Describe the functions of the: • Heart • blood vessels • 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.	This is a new topic but builds on the Biology that is the children learn throughout the Science curriculum	
Year 6 Spring 1	Electricity Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram.	Electricity is a topic children learn about in year 4. In year 6 the pupils' knowledge of electricity is developed through the scientific representation of the various components of the circuit. Their knowledge is also deepened by further if… then… investigation with various different components in one circuit. Pupils also build on their knowledge of switches (year 4) by learning about types of switches and how they can control different components in a circuit. Pupils also build on their knowledge of conductors and insulators (year 4) by using different materials to make switches.	
Year 6 Spring 2	Living things and their habitats Describe how living things are classified into broad groups ● according to common observable characteristics ● based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants based on specific characteristics. Give reasons for classifying animals based on specific characteristics.		

Year 6 Summer 1	Evolution and inheritance Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Describe variation between individuals of different species Explain how variation leads to competition which can drive adaptation Understand that changes in the environment leave some species less well adapted to compete successfully and reproduce		
Year 6 Summer 2	Evolution and inheritance Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.		