Fladbury

Church of England **Primary School** and **Preschool**

Science Curriculum

Happy Hearts, Open Minds, Bright Futures

Jesus promised: “I came that you may have life and have it to the full.”

- John 10:10

Our Vision

Every child at Fladbury will know they are loved by God, have a **happy heart** and be part of a flourishing, well-led school. When they leave Fladbury, they will be well-prepared to meet challenges, confident in their abilities and look forward to their **bright future** with an **open mind**.

Our Science Aims

At Fladbury, our science curriculum inspires our children to be curious about the world, and how it works. Through enthusiastic and carefully planned teaching children will develop a sense of excitement and awe and wonder of natural phenomena. We aim to ensure that all pupils develop scientific knowledge and conceptual understanding through the disciplines of biology, physics and chemistry; through participating in investigations and developing an open mind. Children develop an understanding of how science has changed our lives and impacts upon our bright futures.

Happy Hearts	Open Minds	Bright Futures
		
Through our Science Curriculum, the lens of our Christian value of 'joy' and our vision statement 'happy hearts', we will learn about our world, bodies and space to discover how things work and why they work the way they do. This fascination will in turn lead us to find joy in the amazing way our world works. Pupils will develop a sense of awe and wonder through carrying out scientific enquiries and discovering new knowledge about our bodies and the world around us. They will be encouraged to develop a sense of excitement and joy about natural phenomena. Our children will nurture an enjoyment of Science through carefully planned and enthusiastically delivered learning opportunities. For example, through workshops, carrying out investigations and by going on trips. Thus, creating an intrinsic passion for Science.	Through our Science Curriculum, we will learn to foster an 'Open Mind' about discovering the way in which our world works, why things are the way they are and raise further questions about our understanding of the world. Our Christian value of 'wisdom' will support our desire to acquire new knowledge and to ask questions when we need to further our understanding. The Science curriculum at Fladbury encourages our children to explore the way our world works and open their minds to new discoveries. Children are encouraged to ask questions when investigating and exploring scientific topics. Children are encouraged to think carefully about the way the world works and to be curious about understanding it. This will allow children to have an open mind about predicting how things will behave and explanations on what is happening. The natural curiosity of children at Fladbury is encouraged and nurtured to allow children to have an open mind and make their own discoveries.	Through learning about Science, children are given a sense of hope for their bright future and the impact that they could have upon it within their lifetimes. Science is continually developing and children will begin to understand that people are still discovering new ideas. This will equip the children with wisdom to use what they know to influence their decisions moving forwards. Children develop a scientific perspective by placing their growing knowledge into different contexts and therefore being able to apply their knowledge in their futures. Children will be given the opportunity to widen their horizons by having an in depth knowledge of the wider world as well as how Science can apply to their daily lives and futures. Children will learn to be curious about the world and understand its importance to the world's future prosperity which will be part of their bright future too. Science gives us hope as we develop our understanding of what is around us and discover new exciting developments that could help us in the future.

Spirituality in Science

Fladbury's definition of Spirituality is: Spirituality is about understanding that we are part of something bigger than ourselves. It's the connections and relationships we have with God, with others, with ourselves and with nature. It brings about a sense of awe and wonder and can lead to asking big questions about who we are and our place in God's world.

Sometimes science and spiritual ideas do cause conflict but in a modern society it is important to understand why these conflicts arise so we can respect the views of others and move forward. It is also seen more often that science is able to stand alongside the spiritual beliefs of many. This is looked at often from a neutral stand point within science lessons.

Intent	Implementation	Impact
It is our intention at Fladbury for Science to develop in all young people a lifelong curiosity and interest in the sciences. When planning for the science curriculum, we intend for children to have the opportunity, wherever possible, to learn through varied systematic investigations, leading to them being equipped for life to ask and answer scientific questions about the world around them. As children progress through the year groups, they build on their skills in working scientifically, as well as on their scientific knowledge, as they develop greater independence in planning and carrying out fair and comparative tests to answer a range of scientific questions. Our Science curriculum ensures that children have a varied, progressive and well-mapped-out science curriculum that provides the opportunity for progression across the full breadth of the science national curriculum for KS1 and KS2.	The acquisition of key scientific knowledge is an integral part of our science lessons. Each lesson has a clear focus. Scientific knowledge and enquiry skills are developed with increasing depth and challenge as children move through the year groups. They complete investigations and hands-on activities while gaining the scientific knowledge for each unit. The sequence of lessons helps to embed scientific knowledge and skills, with each lesson building on previous learning. There is also the opportunity to regularly review and evaluate children's understanding.	The impact will be seen across the school with an increase in the profile of science and the visibility of progression in the science curriculum. The learning environment with Scientific technical vocabulary displayed will ensure Science is loved by children across the school. The children will have a developed understanding of Scientific facts at an age appropriate level. They will be confident in discussing science, enjoying lessons and looking forward to finding and investigating more. They will see the relevance of what they learn in science lessons to real-life situations and also the importance of science in the real-world.

Our Curriculum

Rationale

As a school, we use the Grammasaurus scheme to teach Science and have carefully adapted it to meet the needs of our mixed-age classes.

We have chosen to adopt this scheme because it is written by teachers and adapts itself to make it real and relevant in our ever-changing world. There is a huge library of high quality teaching resources across multiple units for each year group – all of which are mapped against the National Curriculum for Science. Each unit is progressive and has opportunities to be adapted to suit all abilities. There are also knowledge organisers, assessments, challenges and plenty of investigations to adapt. The scheme prides itself on its Science curriculum.

Adaptive Teaching

Fladbury CE First School has a robust approach to adaptive teaching, ensuring that all children receive an education that responds to their strengths and needs. The use of scaffolding techniques allows teachers to break down complex concepts into manageable chunks, providing children with the support they need to work towards the same objectives as their peers. Visual resources such as word banks, diagrams and flash cards are often used in lessons to support all children to meet their learning objectives. Our school also embraces technology, utilising educational software such as Clickr and Widgit that engage children and provide opportunities for personalised learning. Additionally, active learning strategies, such as collaborative projects and hands-on activities, encourage children to engage with their lessons, fostering both peer interaction and critical thinking skills. Teachers ensure that children have access to practical concrete resources to further support their understanding and to give alternate ways of finding solutions to problems. Modelling is another critical strategy used by teachers, where they demonstrate thought processes and outline how they would complete a task to meet the learning objective. This allows children to observe and understand what they are working towards.

Through this multifaceted approach, Fladbury CE First School creates an inclusive learning environment where every child is supported in their educational journey, promoting not only academic success but also a lifelong love for learning.

National Curriculum

Working Scientifically

Key Stage One	Lower Key Stage Two	Upper Key Stage Two
• Asking simple questions and recognising that they can be answered in different ways • Observing closely, using simple equipment • Performing simple tests • Identifying and classifying • Using their observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions.	• Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Identifying differences, similarities or changes related to simple scientific ideas and processes • Using straightforward scientific evidence to answer questions or to support their findings.	• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments.

Age Related Statutory Coverage

Reception

Development Matters:

- Use all their senses in hands-on exploration of natural materials
- Explore collections of material with similar and/or different properties
- Talk about what they see, using a wide vocabulary
- Talk about the differences between materials and changes they notice.
- Plant seeds and care for growing plants.
- Understand the key features of the life cycle of a plant and an animal
- Begin to understand the need to respect and care for the natural environment and all living things.
- Explore and talk about different forces they can feel.
- Explore the natural world around them
- Describe what they see, hear and feel whilst outside.
- Understand the effect of changing seasons on the natural world around them.

Year 1

Plants

- 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.

Animals Including Humans

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)
- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Year 2

Plants

- 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.

Living Things and their Habitats

- Explore and compare the differences between things that are living, dead, and things that have never been alive
- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- Identify and name a variety of plants and animals in their habitats, including microhabitats
- 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.

Year 3

Plants

- 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.

Animals Including Humans

- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- Identify that humans and some other animals have skeletons and muscles for support.

Year 4

Living Things and their Habitats

- 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.

Animals Including Humans

- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their simple functions
- Construct and interpret a variety of food chains, identifying producers, predators and prey.

Year 5

Animals Including Humans

- Describe the changes as humans develop to old age.

Living Things and their Habitats

- 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

Properties and Changes of 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
- 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

Year 6

Animals Including Humans

- 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.

Living Things and their Habitats

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics.

Early Learning Goals: • 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.	**Everyday Materials** • Distinguish between an object and the material from which it is made • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Describe the simple physical properties of a variety of everyday materials • Compare and group together a variety of everyday materials on the basis of their simple physical properties. **Seasonal Changes** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies.	**Animals Including Humans** • Notice that animals, including humans, have offspring which grow into adults • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. **Uses of Everyday Materials** • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses	**Rocks** • 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. **Light** • 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. **Forces and Magnets** • Compare how things move on different surfaces • Notice that some forces need contact between two objects, but magnetic forces can act at a distance • Observe how magnets attract or repel each other 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 two poles	**States of Matter** • Compare and group materials together, according to whether they are solids, liquids or gases • Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. **Sound** • 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 variations that produced it • Recognise that sounds get fainter as the distance from the sound source increases.	• 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. **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.	**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 • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. **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.

				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 and buzzers • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit	**Forces** • 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.	**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.

Our Cycles of Learning

Cycle A	Autumn	Spring	Summer
Wye Preschool Reception	**3-4 year olds** Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary. Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice. **Reception** Explore the natural world around them. Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them. (**See Early Years Curriculum)**		
Avon Year 1/2	Animals Including Humans (Y1 & Y2)	Plants (Y1) Seasonal Changes (Spring)	Plants (Y2) Seasonal Changes (Summer)
Teme Year 3/4	Animals Including Human (Y3) Rock (Y3)	Plants (Y3)	Electricity (Y4) Forces and Magnets (Y3)
Severn Year 5/6	Animals Including Humans (Y5) Animals Including Humans (Y6)	Evolution and Inheritance (Y6)	Electricity (Y6) Properties and Changes of Materials (Y5)

Our Cycles of Learning

Cycle B	Autumn	Spring	Summer
Wye Preschool Reception	**3-4 year olds** Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary. Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice. **Reception** Explore the natural world around them. Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them. (**See Early Years Curriculum)**		
Avon Year 1/2	Seasonal Changes (Autumn) Seasonal Changes (Winter)	Living Things and Their Habitats (Y1 & Y2)	Everyday Materials (Y1) Uses of Everyday Materials (Y2)
Teme Year 3/4	States of Matter (Y4) Animals Including Humans (Y4)	Water Cycle (Y4)	Light and Shadow (Y3) Sound (Y4)
Severn Year 5/6	Earth and Space (Y5)	Living Things and Their Habitats (Y5 & Y6)	Light (Y6) Forces (Y5)

Animals Including Humans

	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Knowledge	• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • Identify and name a variety of common animals that are carnivores, herbivores and omnivores • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • Identify, name, draw and label the basic parts of the human body and say which part of the body links with each sense. • Understand how to take care of animals taken from their local environment • Learn the names of the main body parts	• Describe the basic needs of animals including humans for survival (water, food and air) • Know the importance for humans of exercise, eating the rights amounts of different types of food and hygiene • Explore the life cycle of a human and notice that animals, including humans, have offspring which grow into adults	• Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food • They get nutrition from what they eat • Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	• Describe the simple functions of the basic parts of the digestive system in humans • Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey	• describe the changes as humans develop to old age.	• 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.
Working Scientifically	They could… • Use observations to compare and contrast animals at first hand or through videos and photographs • Describe how they identify and group animals • Group animals according to what they eat and simple criteria • Use their senses to compare different textures, sounds and smells.	They could… • Observe, through video or first-hand observation and measurement, how different animals, including humans, grow • Ask questions about what things animals need for survival and what humans need to stay healthy • Suggest ways to find answers to their questions.	They could… • Identify and group animals with and without skeletons and observe and compare their movement • Explore ideas about what would happen if humans did not have skeletons • Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat • Research different food groups and how they keep us healthy and design meals based on what they find out.	They could… • Compare the teeth of carnivores and herbivores and suggest reasons for the differences • Find out what damages teeth and how to look after them • Draw and discuss their ideas about the digestive system and compare them with models or images.	They could… • Draw a timeline to indicate stages in the growth and development of humans. • Learn about the changes experienced in puberty. • Research the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.	They could… • build on their learning about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. • Learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. • Explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Investigation	• Label a human body large scale	• Clean v dirty hands experiment • Exercise investigation (pulse rate etc)	• Observing human skeleton • Design an eat well plate	• Which drink casues the most tooth decay? Egg shell test – reaction to various substances: milk, coke, vinegar, water	• Investigate the human life cycle	• How does exercise affect my heart rate? (investigate which activity increases my heart rate the most)
Vocabulary	Fish Amphibians Reptiles Birds Mammals Pets Carnivore Herbivore Omnivore Head Neck Arm Mouth Teeth Elbows Legs Knees face Ears Eyes Hair	Offspring Survival Exercise Growth Baby Toddler Child Teenager Adult Egg Hygiene	Skeleton Muscle Contract Relax Joint Bone Skull Ribcage Pelvis Femur Food groups Carbohydrates Exoskeleton Proteins Dairy Fats Sugars Vitamins Minerals Fibre Growth Repair Health Energy Vertebrate Invertebrate	Oesophagus Stomach Small and large intestine Carbohydrates Protein Digestive system Colon Dairy Fats Sugars Vitamins Minerals Fibre Growth Repair Health Energy Vertebrate Invertebrate Bone Skill Ribcage Pelvis Femur Saliva Canine Incisor Molar Enamel plaque	Puberty Gestation Mass Birth Conception Fertilisation Death Develop Egg Foetus Sperm Womb	Circulatory System Blood vessels Nutrients Heart Lungs Blood Veins Arteries Heart rate
Assessment Points	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	Describe the importance for humans of exercise, eating he right amounts of different types of food and hygiene.	Identify that humans and some other animals have skeletons and muscles for support, protection and movement. (Grammasaurus end of unit assessment/cumulative quiz)	Identify the different types of teeth in humans and their simple functions. (Grammarsaurusend of unit assessment/cumulative quiz)	Grammasaurus end of unit assessment/cumulative quiz	Grammarsaurus end of unit assessment/cumulative quiz

Plants

	Year One	Year Two	Year Three
Knowledge	• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Identify and describe the basic structure of a variety of common flowering plants, including trees.	• Observe and describe how seeds and bulbs grow into mature plants • Describe what plants needs for survival such as water, light and a suitable temperature to grow and stay healthy. • Identify plants within habitats and micro-habitats	• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • Know 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 • Observe, investigate and know the way in which water is transported within plants • Know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
Working Scientifically	They could… • Observe closely, perhaps using magnifying glasses, and compare and contrast familiar plants; • Describe how they were able to identify and group them, and draw diagrams showing the parts of different plants including trees. • Keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.	They could… • Observe the local environment • Explore the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants • Record with some accuracy the growth of a variety of plants as they change over time • Observe similar plants at different stages of growth.	They could… • Compare the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser • Discover how seeds are formed by observing the different stages of plant life cycles over a period of time • Look for patterns in the structure of fruits that relate to how the seeds are dispersed. • Observe how water is transported in plants

Investigation	• Plant a seed within the school grounds/forest school/eco area, to record changes over time. Time	• Comparative test to show that plants need light and water to stay healthy	• Go to the community orchard and look at the blossom trees (plant life cycle) • Placing cut, white carnations into coloured water and observe how water travels up the stem to the flowers. • Test the effect of fertiliser or light on different types of plants and measure their growth over a set period of time.
Vocabulary	Deciduous Evergreen Blossom Leaves Flowers (Blossom) Fruit Seed Trunk Branches Flowering Plant Trees Petals Roots Bulb Stem Temperature Growth	Year 1+ Temperature Water Light, Healthy Germination Growth Survival Reproduction	Anchor Nutrients Transport Seeds Carbon Dioxide Sunlight Absorb Soil Evaporate Temperature Petal Stamen Filament Stigma Style Ovary Ovule Pollen Tube Pollination Fertilization Blossom
Assessment Points	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees;	Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy;	Grammasaurus end of unit plants assessment/cumulative quiz

Living Things and Their Habitats

	Year Two	Year Four	Year Five	Year Six
Knowledge	• Explore the difference between things that are living, dead and that which was never alive. • Identify that most living things live in habitats, explain what a habitat is, how these can be the same or different, and how some animals and plants suit one habitat better than another. • Describe how different habitats provide for the basic needs of different kinds of animals and plants • Identify and name a variety key plants and animals from a variety of habitats including micro-habitats • The adaptations these plants and animals have to survive these habitats. • Know how these animals and plant depend on each other for survival. • What a food chain is and why they are important. • Understand interdependency and food chains, explained thorough diagrams, written and spoken presentations • Understand what a food source is.	• 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	• 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	• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals give reasons for classifying plants and animals based on specific characteristics
Working Scientifically	They could… • Sort and classify things according to whether they are living, dead or were never alive, and recording their findings using charts. • Describe how they decided where to place things, exploring questions such as: 'is a flame alive? Is a deciduous tree dead in winter?' And talk about ways of answering their questions. • Construct a simple food chain that includes humans (e.g Grass, cow, human). • Describe the conditions in different habitats and micro- habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there.	They could… • Use and make simple guides or keys to explore and identify local plants and animals • Make a guide to local living things • Raise and answer questions based on their observations of animals and what they have found out about other animals that they have researched.	They could… • Observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. • Try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. • Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.	They could… • Use classification systems and keys to identify some animals and plants in the immediate environment. • Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Investigation	• Explore and record through questioning	• Investigate invertebrates first hand	• Comparing animals that look after their young • Gestation periods for different mammals	• Identify and classify some animals and plants in the local area.
Vocabulary	Living habitat Energy Food chain Predator Prey Woodland Desert Source Adapt. Living, Dead Alive Non-living Micro habitat	Amphibians, Reptiles Mammal Vertebrates Invertebrates Insects	Mammal Amphibian Reproduction Life processes	Classify Characteristics Microorganisms Keys Vertebrate Invertebrate Exoskeleton Vascular Non-vascular Taxonomy
Assessment Points	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. Investigation into the conditions woodlice preferred.	Grammasaurus cumulative quiz/end of unit Y4 assessment on Living Things and Their Habitats.	Grammasaurus cumulative quiz/end of unit Y5 assessment on Living Things and Their Habitats.	Grammasaurus cumulative quiz/end of unit Y6 assessment on Living Things and Their Habitats.

	Everyday Materials	Uses of Everyday Materials	Rocks	States of Matter	Properties and Changes of Materials
	Year One	Year Two	Year Three	Year Four	Year Five
Knowledge	• Distinguish between an object and the material from which it is made • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Describe the simple physical properties of a variety of everyday materials • Compare and group together a variety of everyday materials on the basis of their simple physical properties.	• Identify the suitability of a variety of everyday materials. • Understand how some materials can be changed. • Recall the importance of recycling. • Identify inventors whom have created a range of materials; ie. Dunlop, Macintosh and Mcadam.	• 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.	• 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.	• 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.
Working Scientifically	They could… • Performing 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?'	They could… • Compare a variety of everyday materials. • Explore how materials can be used for more than one thing. • Observe to classify uses. • Record observations. • Sort and justify materials suitable to recycle.	They could… • Observe rocks, including those used in buildings and gravestones, and explore how and why they might have changed over time. • Use a hand lens to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. • Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. • Explore different soils, identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. • Raise and answer questions about the way soils are formed.	They could… • Grouping and classifying a variety of different materials • Exploring the effect of temperature on substances. • Research the temperature at which materials change state. • Observe and record evaporation over a period of time.	They could… • Explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. • Explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. • Find out about how chemists create new materials, for example, spencer silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. • Carry out tests to answer questions, for example, 'which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?'

Investigation	Is a piece of wood bendy? Preform through raising and answering questions.	Suitability for purposes	Observe different types of rock Investigate what rocks are best used for in everyday life by testing what happens in water, rubbed together, acid rain. Test different types of soil in water to test how adsorbent they are. Create their own type of fossil. Explore the graveyard next to school to identify rocks and how they have changed over time	Examining a puddle in the playground or washing on a line for evaporation. – also paper towel in various locations. Melting chocolate/ice Insulators – testing different materials in boiling water to see which allows heat to pass through easily and which doesn't e.g. Metal, plastic, wood. Condensation on a cold mirror/window.	Investigate reversable and irreversible changes – thermal insulation Separate some mixed materials though different processes.
Vocabulary	Materials Wood Plastic Glass Metal Water Rock Hard/soft Stretchy Stiff Shiny Dull Rough Smooth Bendy Waterproof Absorbent Opaque Transparent Brick Paper Fabrics Elastic Foil	Year 1+ Squashing Bending Twisting Stretching	Rock Limestone Sandstone Slate Marble Chalk Granite Crystals Fossils Soil Organic matter Sedimentary Igneous Metamorphic Rock cycle Pressure Minerals Durable Permeable Non-permeable	Condensation Evaporation Gas Solid Liquid precipitation Ground water-flow surface run-off Solid Liquid Gas Evaporation Particles Freezing Solidify changing state Degrees Celsius water cycle water vapour Evaporation	Reversable Irreversible Solution Dissolving Mixing Acid
Assessment Points	Identifying the best material for a particular purpose, e.g. the egg test, from a choice of 3 materials	Invent a material to protect and egg and give clear reasons	Grammasaurus end of unit Rock assessment task/mini quizzes and questions	Grammasaurus end of unit States of Matter assessment task/mini quizzes and questions	Grammasaurus end of unit assessment task/mini quizzes and questions

	Seasonal Changes	Earth and Space	Forces and Magnets	Light	Electricity	Sound
	Year One	Year Five	Year Three		Year Four	
Knowledge	• Observe and describe changes across the four seasons • Describe weather associated with the seasons and how day length varies. • Making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change.	• 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.	• Compare how things move on different surfaces • Notice that some forces need contact between two objects, but magnetic forces can act at a distance • Observe how magnets attract or repel each other 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 two poles • Predict whether two magnets will attract or repel each other, depending on which poles are facing.	• 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	• 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	• Identify common appliances that run on electricity • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Recognise some common conductors and insulators, and associate metals with being good conductors

Working Scientifically	They could… • make tables and charts about the weather and making displays of what happens in the world around them, including day length, as the seasons change.	They could… • compare the time of day at different places on the Earth through internet links and direct communication • create simple models of the solar system • construct simple shadow clocks and sundials • calibrated to show midday and the start and end of the school day • find out why some people think that structures such as Stonehenge might have been used as astronomical clocks.	They could… • Comparing how different things move and grouping them; • Raise questions and carrying out tests to find out how far things move on different surfaces, and gathering and recording data to find answers to their questions • Explore the strengths of different magnets and finding a fair way to compare them; • Sort materials into those that are magnetic and those that are not; • Look for patterns in the way that magnets behave in relation to each other and what might affect this • Identify how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.	They could…. • Look for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.	They could… • Observe patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. • Observe patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit • Work with circuits – discussing conductors, insulations and different functions of the components.	They could… • Find patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. • They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. • They could make and play their own instruments by using what they have found out about pitch and volume.
Investigation	Which material is best to keep someone dry in the rain? Observe changes across the four seasons.	What happens to the sun during the day?	Test the strength of magnets – which magnet is the strongest?	Size of shadows and how they change	Investigate circuits and their components – the impact of a switch	Does the size of the pinna effect the volume of the sound? Pan pipes and the pitch of sounds based on their size. Which material is best at muffling sound?

Vocabulary	Seasons Weather Length Summer Spring Autumn Winter	Solar system Spherical bodies Rotation Planets Orbit Axis Day Month Year Gravity	Force Push Pull Gravity Magnet Magnetic North pole South pole Attract Repel	Reflection Shadow Prism Spectrum Rainbow Ultra violet Transparent Translucent Opaque	Cells Switches Buzzers Motor, circuit Series Conductors Insulators Complete circuit Insulate	Vibration Wave Pitch Tone Percussion Wood wind Brass
Assessment Points	Observe and describe weather associated with the seasons and how day length varies.	Grammasaurus end of unit earth and space assessment task/mini quizzes and questions	Grammasaurus end of unit forces and magnets assessment task/mini quizzes and questions	Grammasaurus end of unit light assessment task/mini quizzes and questions	Grammasaurus end of unit electricity assessment task/mini quizzes and questions	Grammasaurus end of unit sound assessment task/mini quizzes and questions

	Forces	Evolution and Inheritance	Electricity	Light
	Year Five	Year Six	Year Six	Year Six
Knowledge	• 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.	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the earth millions of years ago • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	• 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.	• 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.
Working Scientifically	They could… • Compare how different things move and group them. • Raise questions and carrying out tests to find out how far things move on different surfaces, and gathering and recording data to find answers to their questions • Explore the strengths of different magnets and finding a fair way to compare them. • Sort materials into those that are magnetic and those that are not. • Look for patterns in the way that magnets behave in relation to each other and what might affect this. • Identify how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.	They could… • Observe and raise questions about local animals and how they are adapted to their environment. • Compare how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. • Analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.	They could… • Systematically identify the effect of changing one component at a time in a circuit. • Design and make a set of traffic lights, a burglar alarm or some other useful circuit.	They could… • Decide where to place rear-view mirrors on cars. • Design and make a periscope and using the idea that light appears to travel in straight lines to explain how it works. • Investigate the relationship between light sources, objects and shadows by using shadow puppets. • Extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

Investigations	Do objects fall at the same rate? Whose shoe has the greatest friction? Who can make the best plane? Which shapes have the greatest/least water resistance?	Which beak is better adapted to pick up each seed?	Effect of increasing voltage in a circuit on the brightness of a lamp. Variations in how components function in a circuit.	How do shadows change during the day? Which materials make good reflectors? Investigate refraction by observing objects in water. Investigate how light behaves in mirrors.
Vocabulary	Gravity Air resistance Water resistance Friction Mechanisms	Adaptation Evolution Offspring Environment Gene Natural selection Inheritance Organism Species	Conductors Voltage Appliance Battery Circuit Components Conductor Electrical Insulator Mains power Pylon Renewable energy Non-renewable energy	Reflect Light sources Dark Reflect Shadow Opaque Translucent Transparent Luminous Scattering Absorption Refraction
Assessment Points	Grammasaurus end of unit Forces assessment task/mini quizzes and questions	Grammasaurus end of unit Evolution and Inheritance assessment task/mini quizzes and questions	Grammasaurus end of unit Electricity assessment task/mini quizzes and questions	Grammasaurus end of unit Light assessment task/mini quizzes and questions