Science Curriculum at Brookfield Primary School

“Be The Best We Can Be”

National Curriculum Purpose of Study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world’s future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave and analyse causes.

National Curriculum Aims

The national curriculum for science aims to ensure that all pupils:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

How do we develop our 'Brookfield Scientists' to be the best they can be?

What is out INTENT for our Brookfield Scientists?	How do we IMPLEMENT this for our Brookfield Scientists?	How do we measure success for our Brookfield Scientists?
Our curriculum goes beyond a plan of what will be taught and when it will be taught. It covers all the experiences a child receives under our guidance. As educationalists we take our responsibility for the future of our young learners very seriously. Our curriculum will ensure that our children become confident, independent, resilient, curious learners with self -belief and our school ethos fully supports this. Our aim is for every child "To Be The Best They Can Be". We recognise the importance of science in every aspect of daily life. As one of the core subjects taught in primary schools, we give the teaching and learning of science the prominence it requires. The scientific area of learning is concerned with increasing pupils' knowledge and understanding of our world, and with developing skills associated with science as a process of enquiry. It will develop the natural curiosity of our children, encourage respect for living organisms and the physical environment and provide opportunities for critical evaluation of evidence.	Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following; Science will be taught in planned and arranged topic blocks by the class teacher. This is a strategy to enable the achievement of a greater depth of knowledge. Through our planning, we involve problem solving opportunities that allow children to find out more for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning, so that all children keep up. We build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more	Our pupils have regular opportunities to explain, either orally or in writing, their understanding of the science behind the activities they are carrying out. High quality questioning remains an important tool for measuring success in science. Questions to elicit a response from pupils form a critical feature of the best formative assessment. Whether orally or in writing, teachers are encouraged to pose questions demanding extended responses from pupils that gave teachers information about a pupil's grasp of the science ideas, and allow the teacher to affirm or correct a pupil's developing understanding. This is more often done well in small group discussions with a teacher or a teaching and learning support assistant. Marking of written work in science adheres to the school's marking policy consistently, particularly in relation to identifying and correcting errors in pupils' English and maths. Furthermore, any factual errors in terms of science content are noted and either corrected or the pupils are given a supplementary task that lead pupils to learn from their own errors. Importantly, pupils then have time in subsequent lessons to respond to those personal requests from their teachers.

	proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence. Working scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics. Teachers demonstrate how to use scientific equipment, and the various working scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and workshops with experts. Word mats/ Knowledge organisers are available for children to have out on desks to support their learning and recap previous learning.	

	How are we showing scientific working?	What will the progress of skills be in each year group?	What will an **Age-Related** Expected Standard at Brookfield look like?	What will a **Greater Depth** Standard Brookfield look like?	Vocabulary
Plants	• Asking simple questions and recognising that they can be answered in different ways • Observing closely, using simple equipment (over time) • Performing simple tests • Identifying and classifying • Using their observations and ideas to begin to suggest answers to questions • Gathering and recording simple data to help in answering questions • Use year 1 scientific language	Year 1 Pupils should be taught to: • 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	Pupils will be able to: . Write instructions to describe how to plant a bean. • Identify some garden plants that they see in photographs. • Name some garden plants from memory. • Identify some common plants in the wild. • Label the parts of a plant. • Sort leaves into groups of deciduous and evergreen. • Collect information on a Wild Plant Hunt. • Generate questions about plants. • Measure the growth of a bean plant with a ruler. • Use their observations to give reasons for their answers to questions.	Pupils will be able to: . Describe the difference between deciduous and evergreen. • Use information they have gathered to answer a question. • Suggest a way to answer a question using the equipment that has been provided.	Common Wild plants Garden plants Deciduous Evergreen Trunk Branches Tree Leaf Root Leaves Bud Flowers Blossom Petal Bulb Stem Fruit Vegetables Seed
	• Asking simple questions and recognising that they can be answered in different ways • Use simple secondary resources to answer own questions • Observing closely, using simple equipment (over time) • Performing simple tests • Identifying and classifying • Using their observations and ideas to begin to suggest answers to questions • Gathering and recording simple data to help in answering questions. • Discuss patterns and relationships • Use year 2 scientific language	Year 2 Pupils should be taught to: • Observe and describe how seeds and bulbs grow into mature plants • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Pupils will be able to: Label the main parts of plants and trees • Describe the stages in the life cycle of a plant. • Explain that plants need water, light and a suitable temperature to grow well. • Make observational drawings of plants. • Measure the growth of plants with a ruler. • Record the growth of my plants in a bar chart. • Use observations to explain how we can tell that plants are living things. • Set up a simple comparative test. • Make a simple prediction.	Pupils will be able to: Explain that different plants have different needs. • Compare the growth of different plants. • Give reasons for their answers. • Use observations to suggest conditions that food crops need to grow well.	Water Light Suitable temperature Grow Reproduction Germination Crops

		Year 3 Pupils should be taught to: • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • Investigate the way in which water is transported within plants • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Pupils will be able to: Explain the functions of the different parts of plants. • Set up an investigation and make predictions. • Make observations and conclusions. • Identify different parts of a flower. • Identify and describe the stages of the life cycle of flowering plants. • Be able to answer questions based on their learning.	Pupils will be able to: Set up reliable and accurate investigations. • Make and explain predictions. • Make and record accurate observations. • Use scientific language to explain their findings. • Explain the functions of the different parts of a flower. • Be able to ask and answer questions based on their learning using scientific language.	Flowering plants Nutrition Support Reproduction Food production Air Light Water Nutrients Fertiliser Pollination Seed formation Seed dispersal
Forces and Magnets	• Observe that magnetic forces can act without direct contact unlike most forces • Explore the behaviour and everyday uses of magnets • Compare and group how different things move • Raise questions and carry out tests on how things move on different surfaces • Gather and record data to find answers to questions • Explore strengths of different magnets and find a fair way to compare them • Sort materials into magnetic and non-magnetic • Look for patterns in the way that magnets behave and what might affect this	Year 3 Pupils should be taught to: • 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 on 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	Pupils will be able to: • Identify the type of force required to carry out an action. • Investigate the force of friction produced by different surfaces. • Explain that magnets produce an invisible pulling force. • Identify magnetic materials. • Identify different types of magnet. • Investigate the strength of different magnets. • Identify when magnets will repel or attract based on their poles. • Construct a bar chart of their results. • Explain their predictions and conclusions using key words or prompts.	Pupils will be able to: • Make generalisations about the types of surfaces that produce the most or least friction. • Identify and describe the invisible magnetic field around a magnet. • Make generalisations about the types of materials that are attracted to magnets. • Use a magnetic compass with 8 points. • Construct a bar chart of their results. • Explain their predictions and conclusions.	Force Push Pull Open Surface Magnet Magnetic Attract Repel Magnetic poles North South
Forces	• Explore falling objects and raise questions about the effects of air resistance • Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall • Experience forces that make things begin to move, get faster or slow down • Explore the effects of friction on movement and find out how it slows or stops moving objects through observations • Explore the effects of levers, pulleys and simple machines on movement	Year 5 Pupils should be taught to: • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Recognise that some mechanisms, including levers, pulleys and gears, allow a	Pupils will be able to: Identify and explain the different forces acting on objects; • Explain Newton's role in discovering gravity; • Accurately measure an object's weight and mass; • Explain how to increase the effects of air resistance; • Explain Galileo's 'Tower of Pisa' experiment into gravity and air resistance; • Identify streamlined shapes;	Pupils will be able to: Identify and explain balanced and unbalanced forces; • Explain the difference between weight and mass; • Explain the link between the weight and mass of an object; • Make generalisations about how to increase the effects of air resistance; • Explain the conclusions and implications of Galileo's 'Tower of Pisa' experiment;	Gravity Air resistance Water resistance Friction Surface Force Effect Move Accelerate Decelerate Stop Change direction Brake Mechanism Pulley

	• Find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation • Exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective • Explore resistance in water by making and testing boats of different shapes • Design and make products that use levers, pulleys, gears and/or springs and explore their effects	smaller force to have a greater effect.	• Explain how friction is used in brake pads; • Investigate the effects of friction; • explain how different mechanisms work; • Design their own mechanism to achieve a given purpose; • Identify the variables in an investigation; • Make observations and conclusions; • Be able to answer questions based on their learning.	•Explain how to minimise the effects of water resistance; • Make generalisations about the properties of materials that create the most friction; • Explain how a mechanism they have designed alters force and motion to achieve a purpose; • Identify dependent, independent and controlled variables; • Set up reliable and accurate investigations; • Make and explain predictions; • Make and record accurate observations; • Use scientific language to explain their findings; • Use their results to make generalisations and further predictions; • Be able to ask and answer questions based on their learning using scientific language.	Gear Spring Theory of gravitation Galileo Galilei Isaac Newton
Seasonal Change	• Observe and talk about changes in the weather and the seasons. • Make tables and charts about the weather • Make displays of what happens in the world around them, including day length, as the seasons change.	Year 1 Pupils should be taught to: Pupils should be taught to: • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies	Pupils will be able to: Interpret simple data • Name an event or occasion which happens in each season • Describe how day length varies between two seasons • Make a more detailed comparison between two seasons	Pupils will be able to: Interpret and identify patterns in simple data and begin to suggest explanations for this • Explain seasonal changes across the four seasons • Describe how day length varies across the four seasons • Make comparison across the four seasons	Season Summer Autumn Winter Spring Day time Day Weather Wind Snow Hail Rain Sleet Hot Sun Fog Warm Cold
	• Observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time • Using a hand lens or microscope to help them to identify and classify rocks	**Year 3** Pupils should be taught to: • Compare and group together different kinds of rocks on the basis	Pupils will be able to: • Children will be able to give examples of natural and human-made rocks.	Pupils will be able to: • Make systematic observations. • Explain the main processes of fossilisation.	Appearance Physical Properties Hard / soft Shiny / dull Rough / smooth

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 • Explore how fossils are formed • Explore different soils and identify similarities and differences between them • 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	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.	• They will be able to group rocks by their properties and identify simple similarities and differences. • Children will be able to explain the difference between a bone and a fossil. • They will be able to explain, using simple scientific language, how soil is formed. • They will make and record observations accurately.	• They will be able to identify the importance of Mary Anning's work to the field of palaeontology. • use simple scientific language accurately in oral and written work.	Absorbent Not absorbent Fossils Sedimentary Rock Soils Organic matter Buildings Gravestones Grains Crystals
Living Things, animals and their habitats (inc. humans)	• Asking simple questions and recognising that they can be answered in different ways • Observing closely, using simple equipment (over time) • Performing simple tests • Identifying and classifying • Using their observations and ideas to begin to suggest answers to questions • Gathering and recording simple data to help in answering questions. • Use appropriate year group scientific language	**Year 1 –** N.C. Pupils will be taught to… • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated which each sense. **Year 2 -** N.C. pupils will be taught to… • 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).	Pupils will be able to understand… • That animal's need food to survive. • Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy. • Animals move in order to survive. • Exercise keeps animals' bodies in good condition and increases survival chances. • Animals have sense to help individuals survive. • When animals sense things they are able to respond. Pupils will be able to understand… Simple animal timelines – • All animals eventually die. • Animals reproduce new animals when they reach maturity. • Animals grow until they reach maturity and they don`t grow any larger.	Pupils will be able to: • Use prior learning, experiences to justify their answers through talk and in the written form. (age appropriate) • They will be able to use scientific language correctly. • Interpret and identify patterns in simple data and begin to suggest explanations for this. • Make comparison across scientific theories based on previous learning and experiences. Pupils will be able to: • Use prior learning, experiences to justify their answers through talk and in the written form. (age appropriate) • They will be able to use scientific language correctly. • Interpret and identify patterns in simple data and begin to suggest explanations for this	**KS1** Fish Reptiles Mammals Birds Amphibians (+ examples of each). Herbivore Carnivore Omnivore Leg Arm Elbow Head Ear Nose Back Wing **Also in Year 2….** Survival Water Air Food Adult Baby Offspring Kitten Puppy Hygiene

Living Things, animals and their habitats (inc. humans)	• To plan, take accurate measurements and understand variables. • To be precise and repeat readings. • To report data using scientific diagrams, labels, keys, tables, scatter graphs, bar graphs and line graphs. • To make predictions • To conduct both comparative and fair tests. • To report findings both orally and in the written form. • To describe patterns in their findings. • To be systematic in their approach. • To explain the concept 'degrees of trust'. • To support or oppose results using scientific evidence	• Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene. • Explore different 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 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 micro-habitats. • Describe how animals, using the idea of a simple food chain, and identify and name different sources of food. **Year 3 –** N.C. pupils will be taught – • To identify that animals, including humans need the right type and amounts 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 skeleton and muscles for support, protection and movement.	• Different animals live for different ages. • Different animals reach different sizes before they are able to reproduce. • Different animals reproduce at different ages. Habitats – • Some things are living, some were once living but are now dead and some things have never lived. • There is variation between all living things. • Different animals and plants live in different places. • Living things are adapted to survive in different habitats. • Environmental change can affect the plants and animals that live there. Pupils will be able to understand… 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. • To recognise that environments can change and that this can sometimes pose dangers to living things.	• Make comparison across scientific theories based on previous learning and experiences. Pupils will be able to: • Explain why humans need some types of nutrients. • Identify the similarities and differences between animals based on their diets. • Identify the pros and cons of different types of skeletons and explain how the different parts of a skeleton work. • Extend their knowledge by identifying the main bones in the skeleton of animals other than humans. • Make modifications to their practical enquiry while conducting it and be able to write a conclusion that links their findings to support or refute general scientific ideas	**KS2** Movement Muscles Bones Skull Nutrition Skeleton Mouth Tongue Oesophagus Stomach small intestine large intestine canine incisor molar. Vertebrate Invertebrate Nutrients Energy Saturated fat Unsaturated fat

Living Things, animals and their habitats (inc. humans)		**Year 4 –** N.C. pupils will be taught – • To describe the simple functions of the basic parts of the digestive system in humans. • To identify the different types of teeth in humans and their simple function. • To construct and interpret a variety of food chains, identifying the producer, predator and prey.	Pupils will be able to understand… • Living things and their habitats – • To describe the differences in the life cycles of a mammal, an amphibian, an insect, and a bird. • To describe the life processes of reproduction in some plants and animals.	Pupils will be able to: • Explain, using evidence, how they have identified invertebrates. • Explain in more detail how changes to the environment have affected endangered species.	
		Year 5 – N.C. pupils will be taught – • To describe the changes as humans develop to old age.	Pupils will be able to: • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. • Give reasons for classifying plants and animals based on specific characteristics. • To describe the changes as humans develop to old age • Identify the stages in the process of sexual reproduction. • Identify different types of mammals and describe the differences between three types of mammal. • Give three facts about Jane Goodall. • Describe threats faced by chimpanzees. • Identify familiar animals that undergo metamorphosis. • Order the stages of the life cycles of mammals, birds, insects and amphibians. • Identify similarities and differences between the life cycles of different plants and animals.	Pupils will be able to: • Explain the classification of different mammals. • Give five facts about Jane Goodall. Explain how the threats faced by chimpanzees could lead to the extinction of the species. • Compare the stages of the life cycles of plants, mammals, birds, insects and amphibians.	**Upper KS2** Foetus Embryo Womb Gestation Baby Toddler Teenager Elderly Growth Development Puberty Circulation Heart Blood vessels Veins Arteries Oxygenated Deoxygenated Valve Exercise Respiration

Everyday Materials	• asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment (over time) • performing simple tests • identifying and classifying	Year 6 – N.C. pupils will be taught – • To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • To describe the ways in which nutrients and water are transported within animals, including humans. Year 1 – N.C. pupils will be taught – • Distinguish between an object and the material it is made, • Identify the name of 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. **Year 2 –** N.C. pupils will be taught – • Identify and compare the suitability of a variety of	Respiration in animals – • All animals need oxygen to survive. Air is breathed into the lungs where the oxygen in the air is then passed into the blood. Every part of animals bodies need oxygen, especially muscles. • Muscles need a supply of oxygen and sugar to make them work, they are supplied this by the blood. Pupils will be able to understand… • There are different materials. • Materials have describable properties. • Different materials have different properties. • Materials can be changed by physical force (twisting, bending, squashing and stretching). • There are many different materials that have different describable and measurable properties. • Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramic (including glass). • The properties of a material determine whether they are suitable for a purpose. All of these ideas will be explored through testing materials to see if they are appropriate for particular job.	Pupils will be able to: • Pupils will be able to use prior learning, experiences to justify their answers through talk and in the written form. (age appropriate) • They will be able to use scientific language correctly. • Interpret and identify patterns in simple data and begin to suggest explanations for this. • Make comparison across scientific theories based on previous learning and experiences. • Pupils will be able to: use prior learning, experiences	**KS1** Materials Properties Wood Plastic Glass Paper Wate Metal Rock Hard Soft Bendy Rough Smooth.

Everyday Materials	• using their observations and ideas to begin to suggest answers to questions • gathering and recording simple data to help in answering questions. • Use appropriate year group scientific language	everyday materials including wood, metal, plastic, glass, brick, brick, rock, paper and cardboard for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • Materials have describable properties. • Different materials have different properties. Materials can be changed by physical force (twisting, bending, squashing and stretching). • There are many different materials that have different describable and measurable properties. • Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastics, and ceramics (including glass). • The properties of a material determine whether they are suitable for a purpose. **Year 4 –** N.C. children will be taught – • To compare and group materials together, according to whether they are solids, liquids or gases. • Observe that some materials change state when they are heated or cooled and measure or research the temperature at which this happens in degree Celsius. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Pupils will be able to understand… Solids, Liquids and Gases – • Materials can be divided into solids, liquids and gases. • S,L and G are described by observable properties. • Heating causes solids to melt into liquids and liquids to evaporate into gases. • Cooling causes gases to condense to liquids and liquids to freeze into solids.	to justify their answers through talk and in the written form. (age appropriate) • They will be able to use scientific language correctly. • Interpret and identify patterns in simple data and begin to suggest explanations for this. • Make comparison across scientific theories based on previous learning and experiences.	**KS2 –** Solid Liquid Gas Hardness Solubility Transparency Conductivity Magnetic Filter, Evaporation Dissolving Mixing Sieving Reversible Irreversible Evaporating Evaporation

Everyday Materials		**Year 5 –** N.C. children will be taught – • To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical or thermal) and response to magnets. • To know that some materials will dissolve in liquids to form a solution, and describe how to recover a substance from a solution. • To use knowledge of S,L, and G to decide how mixtures might be separated including through filtering, sieving and evaporation. • To give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastics. • To demonstrate that dissolving, mixing and changes of state are reversible changes. • To 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.	Mixtures and separating them – • The temperature at which given substances change state are always the same. • Materials change state by heating and cooling. • Some changes can be reversed and some can`t. • When two or more substances are mixed and remain present the mixture can be separated. Pupils will be able to understand…. Making new substance – • Heating can sometimes cause materials to change permanently. When these changes happen a new substance is made. These changes are not reversible. • Sometimes mixed substances react to make a new substance. These changes are usually reversible. The big idea is IT is possible to change materials into completely different ones. This is important because new substances might have different properties to materials we currently have e.g. plastics can be moulded into intricate shapes, they are waterproof, strong and electrical insulators. Indicators that something new has been made – • The properties of the material are different (colour, taste, texture, hardness, smell, temperature) • If it is not possible to get the material back easily it is likely that it is not there anymore and something new has been made (irreversible change).	Pupils will be able to: • Explain the behaviour of the particles in solids, liquids and gases. • Explain how heating and cooling causes materials to melt and freeze. • Explain why a materials melting and freezing point is the same temperature. • Explain how heating and cooling can cause materials to evaporate and condense. • Explain why a higher temperature will speed up evaporation. • To use the water cycle to explain why the water we have on Earth today is the same water that has been here for millions of years.	

Light	• Asking simple questions and recognising that they can be answered in different ways • Observing closely, using simple equipment (over time) • Performing simple tests • Identifying and classifying • Using their observations and ideas to begin to suggest answers to questions • Gathering and recording simple data to help in answering questions • Use appropriate year group scientific language	**Year 3 –** N.C. children will be taught – • To recognise that they need light in order to see things and that the dark in the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that they must always protect their eyes. • Recognise that shadows are formed when the light blocked by an opaque object. • Find patterns in the way that the size of shadows change. **Year 6 –** N.C. children will be taught – • 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 into our eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the object that cast them.	Pupils will be able to understand…. • There must be light for us to see. Without light it is dark. • Light comes from a source. • We need light to see things even shiny things. • Transparent materials let light through them and opaque materials don`t let light through them. • Beams of light bounce off some materials (reflection). Shiny materials reflect light beams better than non-shiny materials. Pupils will be able to understand…. • Light travels in straight lines. • Light reflects off of all objects (unless they are clack). Non-shiny surfaces scatter the light so we don`t see a single beam. • Animals see light sources when light travels from the source into their eyes. • Animals see objects when light is reflected off that object and enters their eyes.	Pupils will be able to: • Explain the properties of materials that reflect light well. • Understand why shadows change size. Pupils will be able to: • Pupils will be able to use prior learning, experiences to justify their answers through talk and in the written form. (age appropriate) • They will be able to use scientific language correctly. • Interpret and identify patterns in simple data and begin to suggest explanations for this. • Make comparison across scientific theories based on previous learning and experiences.	**KS2** Mirror, Reflective Reflection **Upper KS2** Refraction, Spectrum, Rainbow, Colour.

Sound	• To find patterns in the sounds that are made. • 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.	**Year 4-** N.C. children will be taught- • To identify how sounds are made, associating some of them with vibrating • To recognise that vibrations from sounds travel thorough a medium to the ear. • To find patterns between the pitch of a sound and features of the object that produced it. • To find patterns between the volume of a sound and the strength of the vibrations that produced it. • To recognise that sounds get fainter as the distance from the sound increases.	Pupils will be able to: • Explain why sound gets fainter or louder according to the distance • Explain how pitch and volume can be changed in a variety of ways • Work out which materials give the best insulation for sound • To identify how sounds are made, associating some of them with vibrating • To recognise that vibrations from sounds travel thorough a medium to the ear. • To find patterns between the pitch of a sound and features of the object that produced it. • To find patterns between the volume of a sound and the strength of the vibrations that produced it. • To recognise that sounds get fainter as the distance from the sound increases • explain why sound gets fainter or louder according to the distance • explain how pitch and volume can be changed in a variety of ways • work out which materials give the best insulation for sound. • Recognise some conductors and insulators and associate metals with being good conductors.	Pupils will be able to- • Explain how we hear and interpret sounds • Explain that sounds travel differently through different materials. • Identify and explain patterns between the pitch of a sound and the features of the object that made the sound. • Explain how sounds change over distance. • Explain why sounds travel better through solids than gases. • Explain why some materials absorb sounds. • Explain how their musical instruments plays different sounds.	Medium Volume Pitch Faint Fainter High Low Loud Quiet Louder String Percussion Vibrate Ear Hear Sound Vibration Vibrating Air Woodwind Brass Insulate
Earth and Space	• To plan, take accurate measurements and understand variables. • To be precise and repeat readings. • To report data using scientific diagrams, labels, keys, tables, scatter graphs, bar graphs and line graphs. • To make predictions. • To conduct both comparative and fair tests. • To report findings both orally and in the written form. • To describe patterns in their findings. • To be systematic in their approach. • To explain the concept 'degrees of trust'.	**Year 5** N.C children will be taught- • To describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day and night and the apparent movements of the sun across the sky.	Pupils will be able to: • To describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day and night and the apparent movements of the sun across the sky.	Pupils will be able to: • Name at least two different shapes the Earth was thought to be. • Identify scientific evidence that has been used to support or refute ideas. • Describe some features of the planets. • Place the planets in the solar system in the correct order. • Explain theories of planetary movement in the solar system using evidence.	Sun Star Moon Planet Sphere Spherical bodies Satellite

	• To support or oppose results using scientific evidence.			• Explain using evidence how night and day occur. • Explain why night and day occur at different times in different places on Earth. • Explain how the Earth and Moon move relative to the Sun	
Electricity	• 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	**Year 4-** N.C children will be taught- • To identify common appliances that run on electricity. • Construct a simple series electrical circuit, identifying and naming basic parts, including cells, wires, bulbs, switches and buzzers. • To 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. **Year 6-** N.C children will be taught- • To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, he loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit diagram.	Pupils will be able to: • Identify electrical and non-electrical appliance • To explain, with support how a circuit works. • Be able to name at least two electrical conductors and insulators. • To create a simple series circuit both with and without a switch • To accurately record their findings in a table. • To sort appliances based on whether they use mains or batteries. • They will be able to explain how a switch turns the electric current on and off. **Year 6** • Pupils will be able to: Light travels in straight lines. • Light reflects off of all objects Non-shiny surfaces scatter the light so we don`t see a single beam. • Animals see light sources when light travels from the source into their eyes. • Animals see objects when light is reflected off that object and enters their eyes. • 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	Pupils will be able to: • Explain why a circuit is incomplete. • Generalise about types of materials that conduct electricity. • Explain the conclusions they draw in investigations. Pupils will be able to: • Explain how light enables us to see an object reflected in a mirror. • Recognise that the angles of incidence and reflection are equal. • Explain how light is refracted as it travels through glass or water. • Recognise that the colours of the visible spectrum have different wavelengths. • Understand how filters reflect or absorb different colours of light. • Recognise how Isaac Newton used proof to support his ideas about light and colour.	Insulators Wood Rubber Plastic Glass Conductors Metal Water Switch Open Closed Appliances Electricity Electrical circuit Cell Wire Bulb Buzzer Danger Electrical safety Sign Reflection Refraction Spectrum Rainbow Colour Incidence Absorb Source

			sources to our eyes or from light sources to objects and then into our eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the object that cast them. Pupils will be able to: • Know the main circuit symbols and use these to draw circuit diagrams; • Explain how major discoveries led to the widespread use of electricity; • Explain the effect of increasing or decreasing the voltage on different parts of a circuit; • Identify variations in component function • Explain how our understanding of electricity has changed over time; • Draw circuit diagrams using the correct symbols and label the voltage correctly;	• Explain how major discoveries led to the widespread use of electricity; • Explain the effect of increasing or decreasing the voltage on different parts of a circuit; • Explain how they have ensured a high degree of trust in their results; • Identify variations in component function.	Voltage Brightness Volume Switches Danger Series circuit Electrical safety Sign Circuit diagram Switch Bulb buzzer Motor Symbols
Evolution and Inheritance	• To plan, take accurate measurements and understand variables. • To be precise and repeat readings. • To report data using scientific diagrams, labels, keys, tables, scatter graphs, bar graphs and line graphs. • To make predictions. • To conduct both comparative and fair tests. • To report findings both orally and in the written form. • To describe patterns in their findings. • To be systematic in their approach. • To explain the concept 'degrees of trust'. • To support or oppose results using scientific evidence	**Year 6-** N.C. children will be taught: • To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	Pupils will be able to: • The children will build upon prior learning in other units including rocks, animals including humans and use this to support the work in this topic. • Children will use their research skills to research the life and work of Charles Darwin. • Children will identify scientific evidence that has been used that has been used to support or refute ideas or arguments. • Identify inherited traits and adaptive traits. • Understand that adaptations are random mutations • Examine fossil evidence supporting the idea of evolution. • Identify the difference between selective and cross-breeding and give examples of this. • Develop an understanding of the development of evolutionary theories over time.	Pupils will be able to: • Explain the terms adaptation, evolution, and natural selection and use these in context. • Describe how living things evolve via the process of natural selection. • Explain in simple terms what genes and DNA are. • Investigate the ethical issues of human intervention in the process of evolution and natural selection	Living things Change Fossils Offspring Vary Not identical Characteristics Variation Charles Darwin Adapt Environment Extreme Condition Advantages Disadvantages Evolution Adaptation Inherit Inheritance DNA Gene

			• Explain how human evolution has occurred and compare modern humans with those of the same genus and family. • Understand that adaptation and evolution is not a uniform process for all living things.		