Science at Grove Church of England Primary

Revised 2022

LONG TERM PLAN OF KNOWLEDGE AND SKILLS

Intent

"Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less."

– Marie Curie

Science affects every aspect our lives and is vital to the world's future. The intent of our science offer is for all pupils to be taught the essential knowledge, methods, processes and applications of science. Our science curriculum intends to build up a body of key foundational knowledge and concepts by being rich with opportunities for pupil investigation and classification through understanding, where pupils are encouraged to recognise the power of rational explanation and develop a sense and of excitement and curiosity about natural phenomena. As a result, every pupil will view himself or herself as a Scientist.

- 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
- We ensure that the Working Scientifically skills are built-on and developed throughout children's time at the school so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions and be curious about their surroundings
- 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
- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

Implementation

We teach the National Curriculum alongside the Scientific aspects found in the EYFS Understanding the World – The Natural World framework, supported by a clear skills and knowledge progression. This ensures that skills and knowledge are built on year by year and sequenced appropriately to maximise learning for all children. It is important that the children develop progressive skills for Working Scientifically and

learn to question and interpret information throughout their time at Grove CE Primary School and do not just learn about the work of others. Through the following, we aim to provide a rich and broad experience in the study of Science.

Planning and Lessons

Our whole school approach to the teaching and learning of science entails teachers creating a positive attitude to science learning within their classrooms and reinforcing the expectation that all children can achieve high standards in science. This involves the following:

- From the long-term overview, teachers plan a sequence of lessons, using the skills and knowledge progression document alongside the National Curriculum
- Pupils should be learning scientific knowledge and vocabulary and 'working scientifically' appropriate to their developmental age through practical science linked to their termly topic. (In EYFS the specific area of Understanding the World contains the Science objectives which should be covered.)
- Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to activate prior knowledge and skills, they assess children regularly to identify those children with gaps in their learning, so that all children make progress.
- Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and are given opportunities to use their scientific skills and research to discover the answers. This is enhanced by hands-on practical experiments whenever possible.
- Teachers demonstrate how to use scientific equipment along with the necessary skills for Working Scientifically to embed scientific understanding
- The skills for Working Scientifically 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.
- We build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more 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
- Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and having areas of English with a scientific focus as well as highlighting where the Maths curriculum overlaps with Scientific data collation and interpretation.

Enhancements

We ensure that every pupil, regardless of SEN(D) or ability, can participate in projects and access the curriculum. The hands-on experiences help pupils to build up their scientific competence. Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class. For example, Year 1 visit the Explorer Dome, Year 2 and 4 explore the local waterway looking at plants, creatures and adaptions for aquatic survival and Year 4, 5 and 6 are given the opportunity to join an afterschool STEM club. Through our participation in the Ogden Trust Partnership, we hold regular events with a focus on physics and have access to shared learning within the partner schools. External visitors and kit loans supplement teaching in school. Children learn the possibilities for careers in science, because of our community links and connection with Science Oxford, they learn from and work with professionals, providing children with access to positive role models within the field of science from the immediate and wider local community.

Impact

Assessment: Pupils in years 2 and 6 are assessed against the criteria in our progression and skills document. Pupils are assessed using Target Tracker for each topic taught.

Impact

By the time the children at Grove CE Primary School leave our school, they should have developed:

- A passion for Science and an enthusiastic engagement in scientific learning, which develops their sense of curiosity about scientific phenomena and builds their foundation of knowledge for understanding the world
- Recognise that scientific ideas change and develop over time
- Can select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information
- Draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings

EYFS

		Knowledge	Skills	Autumn Key Vocabulary
	Over the year	1) Know the 5 senses 2) Know that materials can be hard, soft, wet, dry, heavy, and light 3) Know that some objects float and some sink 4) Know that ice melts 5) Know that water freezes 6) Know that plants grow from seeds 7) Understand the key features of the life cycle of a plant and an animal. 8) Begin to understand the need to respect and care for the natural	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties • Talk about the differences between materials and changes they notice. • Plant seeds and care for growing plants. environment and all living things. • Describe what they see, hear, and feel whilst outside.	Animals Insects Plants Leaves Living (alive) Grow Hard Soft Wet Dry Heavy Light Float Sink Frozen Melting Sight See Hear Listen Smell Taste Touch Hot Cold

	Early Years Foundation Stage (EYFS) In Reception we firmly believe that a child learns best through child-initiated play where they can build important life skills such as curiosity, concentration, creativity, problem solving, use of their imagination and independence through purposeful play experiences. We then look for 'teachable moments' to take children's learning to the next step. By doing this we encourage children to become lifelong learners who are willing to take risks and challenge themselves. In order to do this we have an enabling environment inside and outside for children to explore and access independently with the support of skilled adults. Although we follow the child's lead and recognise each child's different starting points, our environment is resourced to ensure children cover the Statutory EYFS Framework. The early stages of Science are covered in the seven areas of learning and more specifically Understanding the World. At Grove, children ask why things happen and how they work, observe and comment on changes, play with small world toys, explain why things happen.			
Year 1				
		Knowledge	**Skills**	**Key Vocabulary**
	Year round **Seasonal Changes**	1) Know that the seasons change over the year 2) Name the seasons and suggest the type of weather in each season 3) Know how the amount of daylight in a day will change over the year	• Observe changes across the 4 seasons. • Observe and describe weather associated with the seasons and how day length varies. • ask simple scientific questions • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions.	Temperature Thermometer Wind Rain Rain Gauge Snow Fog Sunshine Cloudy partly cloudy Summer Autumn Winter Spring Light and Dark Day and Night
	Autumn **Materials**	1) Know the difference between an object and the material it is made from.	• Distinguish between an object and the material from which it is made.	Flexible Solid Liquid

		2) know the materials that an object is made from. 3) name wood, plastic, glass, metal, water, and rock. 4) know the properties of everyday materials. 5) Know how to group objects based on the materials they are made from. 6) know why a material might be useful for a specific job 7) know that solid shapes can be changed by squashing, bending, twisting and stretching	• 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 and classify things • use simple equipment to make observations • carry out simple tests	Material names (such as plastic, wood, glass etc), Hard Rigid Bumpy Rough Soft
		Knowledge	**Skills**	**Vocabulary**
	Spring **Plants**	1) Know and name a variety of common wild and garden plants 2) Know and name the petals, stem, leaf, and root of a plant 3) Know and name the roots, trunk, branches, and leaves of a tree 4) Know what a deciduous tree is 5) Know what an evergreen tree is	• 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. • identify and classify things	Leaves Flowers Petals Stem Trunk Branch Root Seed Bulb Wildflower Deciduous Evergreen

		Knowledge	Skills	Vocabulary
	Summer **Animals including Humans**	1) Know and name a variety of animals including fish, amphibians, reptiles, birds and mammals 2) Know how to classify animals by what they eat (carnivore, herbivore and omnivore) 3) Know that animals can be sorted into categories (including fish, amphibians, reptiles, birds and mammals) 4) Know what makes something living or non-living (MRSGREN) 5) Know the parts of the human body that I can see 6) Know the correct part of the human body to each sense	• 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. • identify and classify animals	Omnivore Carnivore Herbivore Mammal Amphibian Reptile Bird fish Living Not-Living Eyes See Ears Hear Mouth Taste Nose Smell Hands Touch Head Neck Shoulders Arms Elbows Wrists Fingers Thumb Torso

				Stomach Back Legs Knees Ankles Feet toes
Year 2				
		Knowledge	**Skills**	**Key Vocabulary**
	Autumn **Living Things and their habitats**	1) Know how to identify things that are living, dead and never lived 2) Know how a specific habitat provides for the basic needs of things living there (plants and animals) 3) Know and name plants and animals in a range of habitats 4) Know living things that live in a habitat 5) Know how animals find their food 6) Know some different sources of food for animals 7) Know the different parts of a simple food chain	• 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 • 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	Habitat Food Shelter Water Predator Prey Hunt Graze Carnivore Herbivore Omnivore Living Dead never lived

			and name different sources of food. • Ask simple questions and recognising that they can be answered in different ways • Use observations and ideas to suggest answers to questions	
		Knowledge	**Skills**	**Vocabulary**
	Spring **Materials and their uses**	1) Know a range of materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard 2) Know why a material might or might not be used for a specific job 3) Know how shapes can be changed by squashing, bending, twisting and stretching	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • identifying and classifying • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment	Flexible Rigid Soft, Hard Strong, Durable Waterproof absorbent. Brick Glass Plastic Metal Cardboard Wood paper. Twist Squash Press Bend Stretch

	Animals including humans	1) Know the basic stages in a life cycle for animals, including humans 2) Know that animals grow and reproduce 3) Know what animals and humans need to survive 4) Know why exercise, a balanced diet and good hygiene are important for 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. • asking simple questions • observing closely	Embryo Baby Adolescent Adult Hygiene Exercise 5-a-Day Protein Carbohydrate Sugars and Fats Vitamins and Minerals
		Knowledge	**Skills**	**Vocabulary**
	Summer Plants	1) Know seeds and bulbs grow into plants 2) Know what plants need to grow and stay healthy (water, light and suitable temperature) 3) Know how plants grow and reproduce 4) Know how plants grow in different conditions by making measurements 5)	• 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. • Observing closely, using simple equipment • Perform simple tests	Germinate, Flower, Life cycle, Bulbs, Seeds, Growth rate, seed, bulb, flower, roots, stem, veins, temperature, reproduce, water, light, warmth, plant.
Year 3				

		Knowledge	Skills	Key Vocabulary
	Autumn **Forces and Magnets**	1) know how objects move on different surfaces 2) know that some forces require contact, and some do not, giving examples 3) know that objects attract and repel in relation to objects and other magnets 4) Know which materials are magnetic and which aren't 5) Know how magnets work	• Compare how things move on different surfaces. • Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials based on whether they are attracted to a magnet and identify some magnetic materials. • predict whether objects will be magnetic and carry out an enquiry to test this out • predict whether magnets will attract or repel and give a reason • Describe magnets as having 2 poles. • Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.	Poles Attract Repel Resistance Force Contact force

			• set up a test to compare two things • set up a fair test and explain why it is fair • gather, record, classify and present data in diverse ways to answer scientific questions	
	Light	1) Know that dark is the absence of light 2) know that light is needed to see 3) Know that light is reflected from a surface 4) Know how a shadow is formed 5) Know that shadow size can change and explain why 6) Know the danger of direct sunlight and describe how to keep protected	• Recognise that they need light 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.	Opaque Transparent Translucent Shadow Waves Reflection Sight Eyeball Lens retina

			• set up a simple enquiry to explore a scientific question • use diagrams, keys, bar charts and tables to represent findings • use scientific language	
		Knowledge	**Skills**	**Vocabulary**
	Spring **Animals including Humans**	1) Know the importance of a nutritious, balanced diet 2) Know how nutrients, water and oxygen are transported within animals and humans 3) Know about the skeletal system of a human and name some of the bones 4) Know muscular system of humans	• Identify that animal, 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 human and some other animals have skeletons and muscles for support, protection, and movement. • ask relevant scientific questions	Nutrition Carbohydrate Protein Muscles ball and joint sockets hinged joints tendons

	Rocks and Soils	1) Know groups of rocks based on their appearance and physical properties, giving a reason. 2) Know how fossils are formed. 3) Know how soil is made. 4) Know and explain the difference between sedimentary and igneous rock. 5) Know how different rocks can be useful to us	• Group together different kinds of rocks based on 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. • identify differences, similarities and changes related to an enquiry • using their observations and ideas to suggest answers to questions	Porous Solid Chalky soft vs hard brittle fossilise humus loam soil compost sediment sedimentary igneous metamorphic
		Knowledge	**Skills**	**Vocabulary**
	Summer **Plants**	1) Know the function of various parts of flowing plants and trees 2) Know the needs of different plants for survival 3) Know how water is transported within plants 4) Know the life cycle of different plants, especially the importance of flowers	• 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	Photosynthesis Pollination Respiration Transpiration Germination

			• 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. • use observations and knowledge to answer scientific questions • make careful and accurate observations, including the use of standard units • gather, record, classify and present data in diverse ways to answer scientific questions	
Year 4				
		Knowledge	**Skills**	**Key Vocabulary**
	Autumn **Living Things and their Habitats**	1) Know the seven different life processes 2) Know that living things can be grouped in various ways 3) Know that a classification key can be used to group, identify and name living things 4) Know how to create classification keys to group, identify and name living things (for others to use) 5) Know how changes to an environment could endanger living things	• 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	Classification Key Endangered Living Extinct Sort Invertebrate Amphibian mammal

			and that this can sometimes pose dangers to living things. • ask relevant scientific questions • use observations and knowledge to answer scientific questions • set up a simple enquiry to explore a scientific question set up a test to compare two things	
	Animals including Humans	1) Know and name the parts of the human digestive system 2) Know the functions of the organs in the human digestive system 3) Know and identify the different types of teeth in humans 4) Know the functions of different human teeth 5) Know what a food chain is 6) Know the different parts of a food chain and identify producers, predators and prey	• 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 • ask relevant scientific questions • use observations and knowledge to answer scientific questions	Molars Canines Incisors form and function peristalsis saliva throat stomach intestines liver pancreas enzymes producer predator prey,

			• construct food chains to identify producers, predators and prey	
		Knowledge	**Skills**	**Vocabulary**
	Spring **States of Matter**	1) Know that materials can be groups based on their state of matter (solid, liquid, gas) 2) Know how some materials can change state 3) Know the names of the processes when materials change state 4) Know the temperature at which materials change state 5) Know about the different stages of the water cycle 6) Know the part played by evaporation and condensation in the water cycle	• 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. • use equipment, including thermometers and data loggers to make measurements • gather, record, classify and present data in a	Solid Liquid Gas Evaporation Freeze Melt Condensation Precipitation Water Cycle

			range of ways to answer scientific questions • use diagrams, keys, bar charts and tables • using scientific language • use findings to report in diverse ways, including oral and written	
	Electricity	1) Know appliances that require electricity to function 2) Know how to construct a simple and a series circuit 3) Know the name of components in a series circuit (including cells, wires, bulbs, switches and buzzers) 4) Know how to draw a circuit diagram and use the correct symbols 5) Know when a circuit will work and when it won't work, explaining why 6) Know the function of a switch in a circuit 7) Know the difference between a conductor and insulators, giving examples of each	• 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	Circuit positive and negative components battery/cells conductor insulator switch

			metals with being good conductors. • set up a simple enquiry to explore a scientific question • set up a test to compare two things • set up a fair test and explain why it is fair	
		Knowledge	**Skills**	**Vocabulary**
	Summer **Sound**	1) Know how sound is made 2) Know how sound travels from a source to our ears 3) Know the place of vibration in hearing 4) Know how pitch affects how sound is produced 5) Know that the louder the sound, the stronger the vibrations 6) Know that a sound gets fainter when it moves away from the source	• 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. • set up a simple enquiry to explore a scientific question	Frequency Pitch Volume Tone Soundwaves Eardrum Cochlea Pinna Vibration

			• use equipment, including sound meters and data loggers to make measurements • use diagrams, keys, bar charts and tables to represent findings • use scientific language	
Year 5				
		Knowledge	**Skills**	**Key Vocabulary**
	Autumn **Living Things and their Habitats**	1) Know the life cycle of different living things e.g mammal, amphibian, insect, bird 2) Know the difference between different life cycles 3) Know the process of reproduction in plants and how different seeds are dispersed 4) Know the process of reproduction in animals	• 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 • ask relevant scientific questions • use observations and knowledge to answer scientific questions	Mammal Amphibian Insect Bird Reptile Embryo Foetus Gestation Reproduction Asexual Egg Pollination Spores Tubers Bulbs Metamorphosis

	Animals including Humans	1) Know the different stages of human development and growth 2) Know how a human change as they get older physically, including puberty 3) Know that animals including humans grow at different rates (height, weight) 4) Know what gestation is and the different amount of time that animals take to grow a baby	• Describe the changes as humans develop to old age. • ask relevant scientific questions • use further research to answer scientific questions	Puberty Hormones Aging Adolescent Baby Toddler Child Adult Birth Death Gestation Reproduction growth rate
		Knowledge	**Skills**	**Vocabulary**
	Spring **Earth and Space**	1) Know the Earth takes 365 days to orbit the sun 2) Know how the Earth being tilted on its axis and orbit round the Sun causes the seasons 3) Know the Earth rotates and orbits the Sun in an anti-clockwise way 4) Know the Earth and other planets in the solar system orbit the Sun 5) Know the Sun the only star in our solar system 6) Know the moon orbits the Earth 7) Know that the Earth rotates on its axis causing night and day 8) Know the different phases of the moon	• 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. • relate the outcome from an enquiry to scientific	Planets Moons Asteroids solar system orbit gravitational pull solar spherical reflection rotate solar eclipse lunar eclipse seasons waning gibbous waxing gibbous waning crescent waxing crescent

			knowledge to state whether the evidence supports or refutes an argument or theory • Read, spell and pronounce scientific vocabulary accurately	full moon new moon half moon
	Forces	1) Know what gravity is and its impact on our lives 2) Know what air resistance is and draw force diagrams to represent it 3) Know how water resistance (upthrust) is a balanced force when something floats 4) Know why friction is an important force in our everyday lives 5) Know how a fulcrum can be used to lift heavy objects when using a lever 6) Know how levers, pulleys and gears allow a smaller force to have a greater effect	• 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. • use the outcome of test results to make predictions and set up a further comparative fair test • report findings from enquiries in a range of ways • explain a conclusion from an enquiry	Gravity air resistance water resistance buoyancy friction motion inertia pulleys gears levers pivot centre of balance fulcrum

			• explain casual relationships in an enquiry • relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes a hypothesis or theory	
		Knowledge	**Skills**	**Vocabulary**
	Summer **Properties and Changes in Materials**	1) compare and group materials based on their properties (e.g hardness, solubility, transparency, conductivity, [electrical and thermal] and response to magnets) 2) describe how a material dissolves to form a solution; explaining the process of dissolving 3) describe and show how to recover a substance from a solution 4) describe how some materials can be separated 5) demonstrate how materials can be separated (e.g through filtering, sieving and evaporating) 6) know and can demonstrate that some changes are reversible and some are not 7) explain how some changes result in a formation of a new materials and	plan different types of scientific enquiry control variables in an enquiry measure accurately and precisely using a range of equipment record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs use the outcome of test results to make predictions and set up a further comparative fair test report findings from enquiries in a range of ways explain a conclusion from an enquiry explain casual relationships in an enquiry	hardness, solubility, transparency, electrical conductivity, thermal conductivity, magnetic, dissolve, melt, solution, saturation, filtration, sieving, evaporation, irreversible, reversible, chemical, freezing, cooling, heating, boiling,

		that this is usually irreversible discuss reversible and irreversible changes 8) give evidenced reasons why materials should be used for specific purposes		
Year 6				
		Knowledge	**Skills**	**Key Vocabulary**
	Autumn **Living Things and their Habitats**	1) Know how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. 2) Know who Carl Linnaeus was and his impact on the classification of living things 3) Give reasons for classifying plants and animals based on specific characteristics. 4) Know that microorganisms can be beneficial and harmful to human health 5) Know the 3 main types of microorganism – bacteria, virus and fungi	• identifying scientific evidence that has been used to support or refute ideas or arguments • ask relevant scientific questions • use observations and knowledge to answer scientific questions • To be able to classify living things • Use a classification key and dichotomous questions to identify different species within the same Genus • Carry out an investigation about the activation of yeast	Micro-organisms, plants, invertebrates, insects, spiders, snails, worms, vertebrates, amphibians, reptiles, mammals

	Animals including Humans	• Know the main parts of the human circulatory system • Know the functions of the heart, blood vessels and blood. • Know that diet, exercise, drugs and lifestyle impact the way their body functions. • Know nutrients and water are transported within animals, including humans	• Use the outcome of test results to make predictions and set up a further comparative fair test • Report findings from enquiries in a range of ways Explain a conclusion from an enquiry • Explain casual relationships in an enquiry • Relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory	Internal organs Heart Skeleton Muscle Digestion circulatory system blood vessels diet exercise lifestyle nutrients substance
		Knowledge	**Skills**	**Vocabulary**
	Spring Electricity	1) Know the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer 2) Know why components work and do not work in a circuit. 3) Draw circuit diagrams using the correct symbols.	• Plan different types of scientific enquiry • Control variables in an enquiry • Measure accurately and precisely using a range of equipment Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Use the outcome of test results to make	Voltage Switches series circuit circuit diagram bulb buzzer switch motor brightness

			predictions and set up a further comparative fair test • report findings from enquiries in a range of ways • explain a conclusion from an enquiry • explain casual relationships in an enquiry	

	Light	1) Know that light travels in straight lines 2) Know that light can be refracted when passing through a prism or water 3) Know how we see objects 4) Know that shadows have the same shape as the object that casts them 5) Know how a periscope works	• Use the outcome of test results to make predictions and set up a further comparative fair test • Report findings from enquiries in a range of ways • Explain a conclusion from an enquiry • Explain casual relationships in an enquiry • Relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes a hypothesis or theory	Straight, reflect, reflection, light source, object, shadow, mirror, periscope, filter, spectrum
		Knowledge	**Skills**	**Vocabulary**
	Summer **Evolution and Inheritance**	1) Know that the Earth and living things have changed over time 2) Know that fossils can be used to find out about the past 3) Know that reproduction and how offspring may inherit similarities to parents through physical features 4) Know animals and plants are adapted to suit their environment giving examples 5) Know about the work of Charles Darwin linked to evolution and inheritance	• identifying scientific evidence that has been used to support or refute ideas or arguments • ask relevant scientific questions • use observations and knowledge to answer scientific questions	Living things Change Fossils Offspring Characteristics Variation Charles Darwin Adapt Environment Evolution Adaptation inherit

		6) Know that adaptation over time allows us to explore evolution. 7) Know that evolution has taken place over many millions of years		

Progression of Working Scientifically skills	Asking and Answering Questions	Investigating	Observing	Equipment and measuring	Identifying and classifying	Recording and reporting findings	Analysing data	Drawing conclusions	Vocabulary
Year 1	Use everyday language/begin to use simple scientific words to ask or answer a scientific question.	Follow instructions to complete a simple test individually or in a group.	Observe objects, materials and living things and describe what they see.	Use simple, non-standard measurements in a practical task.	Sort and group objects, materials and living things, with help, according to simple observational features	Talk about their findings and explain what they have found out.	Use everyday or simple scientific language to ask and/or answer a question on given data	Explain, with help, what they think they have found out	Question, answer, identify, equipment, sort, group
Year 2	Suggest ideas, ask simple questions and know that they can be answered/investigated in different ways including simple secondary sources, such as books and video clips.	Do things in the correct order when performing a simple test and begin to recognise when something is unfair.	Observe something closely and describe changes over time.	Use simple equipment, such as hand lenses or egg timers to take measurements , make observations and carry out simple tests.	Decide, with help, how to group materials, living things and objects, noticing changes over time and beginning to see patterns.	Gather data, record and talk about their findings, in a range of ways, using simple scientific vocabulary.	Identify simple patterns and/or relationship using simple comparative language.	Use simple scientific language to explain what they have found out.	Classify, data, biology, chemistry, physics, map, compare, contrast, describe.
Year 3	Use ideas to pose questions, independently, about the	Discuss enquiry methods and describe a fair test.	Make decisions about what to observe during an	Take accurate measurements using standard units.	Talk about criteria for grouping, sorting and categorising,	Record their findings using scientific language and present in note	Gather, record and use data in a variety of ways to answer a	Draw, with help, a simple conclusion based on evidence from	Research, accurate measurements , record, diagrams,

	world around them.		investigation.		beginning to see patterns and relationships	form, writing frames, diagrams, tables and charts.	simple question.	an inquiry or observation.	keys, guide.
Year 4	Suggest relevant questions and know that they could be answered in a variety of ways, including using secondary sources (e.g. ICT). Answer questions using straight forward scientific evidence.	Make decisions about different enquiries, including recognising when a fair test is necessary and begin to identify variables.	Make systematic and careful observations.	Take accurate measurements using standard units and a range of equipment, including thermometers and data loggers.	Identify similarities/differences/changes when talking about scientific processes. Use and begin to create simple keys.	Choose appropriate ways to record and present information, findings and conclusions for different audiences (e.g. displays, oral or written explanations).	Identify, with help, changes, patterns, similarities and differences in data to help form conclusions. Use scientific evidence to support their findings.	Use recorded data to make predictions, pose new questions and suggest improvements for further enquiries.	Conclusion, systematic, evidence, data gathering, interpret
Year 5	Raise different types of scientific questions, and hypotheses.	Plan a range of science enquiries, including comparative and fair tests.	Plan and carry out comparative and fair tests, making systematic and careful observations	Take measurements using a range of scientific equipment with increasing accuracy and precision.	Use and develop keys to identify, classify and describe living things and materials.	Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar & line graphs and models.	Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas.	Use a simple mode of communication to justify their conclusions on a hypothesis. Begin to recognise how scientific ideas change over time	Accuracy, precision, variables, conclusion - relationships
Year 6	Pose/select the most appropriate line of enquiry to investigate scientific questions.	Select and plan the most suitable line of enquiry, explaining which variables need to be controlled and why, in a variety of comparative and fair tests.	Make their own decisions about which observations to make, using test results and observations to make predictions or set up further comparative or fair tests.	Choose the most appropriate equipment in order to take measurements, explaining how to use it accurately. Decide how long to take measurements for, check results with additional readings.	Identify and explain patterns seen in the natural environment	Choose the most effective approach to record and report results, linking to mathematical knowledge.	Identify and explain causal relationships in data and identify evidence that supports or refutes their findings, selecting fact from opinion.	Identify validity of conclusion and required improvement to methodology. Discuss how scientific ideas develop over time.	Quantitative and qualitative measurements, data - positive and negative correlation, degree of trust