HIGH LITTLETON CHURCH OF ENGLAND PRIMARY SCHOOL

SCIENCE CURRICULUM PROGRESSION

Progression of knowledge				
Plants				
		Year 1 Introduction to Plants	**Year 2** Plant growth	**Year 3** Plant reproduction
Scientific knowledge and understanding	**Plant structure and function**	To know a variety of common plants, and how they differ. To know that deciduous trees lose their leaves seasonally, but evergreen trees do not. To know the basic structure (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants,including flowering plants and trees..		To understand the functions of the basic parts of a plant and the relationship between structure and function. To know that water is transported within a plant from the root, through the stem, to the leaves.
	Plant growth and needs	To begin to understand how plants grow and change over time.	To know that seeds and bulbs grow into seedlings by producing roots and shoots. To know that seedlings grow into mature plants by developing parts, that may include stems/trunks, leaves, flowers and fruits. To know that seeds need water to germinate. To know that plants need water, light and a suitable temperature for growth and health.	To know that plants need water, light, air, nutrients/fertilizer and a suitable temperature for growth and health. To understand that the needs for growth and health vary from plant to plant.

	Plant life cycle			To know the life cycle of a plant from seed to mature plant. To know that flowers are the reproductive organ of a plant. To know that the process of pollination is the transfer of pollen to the female (part of the) flower. To know that the process of seed formation is the growth of a seed after pollination/fertilisation. To know some different methods of seed dispersal and the benefits of each.
Animals, including humans				
		Year 1 Sensitive bodies Comparing animals	**Year 2** Life cycles and health	**Year 3** Plant reproduction
Scientific knowledge and understanding	**Animal growth**	To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals).	To understand how living things change, and that animals have offspring that grow into adults. To know which offspring comes from which parent animal. To know the stages in some animal life cycles.	
	Animal structure and function	To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell). To know key parts of the human body (including head, neck, arms, elbows,		To know that animals can be grouped based on the presence of a skeleton. To know that the skeleton in humans and some animals is used for movement, protection and support.

		legs, knees, face, ears, eyes, hair, mouth, teeth). To know the five main senses: sight, smell, hearing, taste and touch. To know that eyes are used for sight, the nose is used for smell, ears are used for hearing, the tongue and mouth are used for taste and the skin is used for touch.		To know that the muscular system in humans and some animals works with the skeleton for movement. To know the main bones in the body.
	Health and Nutrition	To know that a carnivore is an animal that eats other animals and to give some examples. To know that a herbivore is an animal that eats only plants and to give some examples. To know that an omnivore is an animal that eats both animals and plants, and to give some examples.	To know that animals, including humans, need water, food and air to survive. To understand the importance of exercise, a balanced diet and hygiene for humans.	To know that animals, including humans, need the right types and amount of nutrition. To understand that humans cannot make their own food and therefore eat to get the nutrition needed. To know the main food groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions. To know that a balanced diet should include all food groups. To describe the diets of different animals.
		Year 4 Digestion and Food	**Year 5** Human Timeline	**Year 6** Circulation and exercise
Scientific knowledge and understanding	**Animal growth**		To describe the human life cycle, including the stages of growth and development (baby, toddler, child, teenager, adult, elderly). To describe changes that occur during puberty (in boys and girls).	

			To know that gestation periods vary across mammals.	
	Animal structure and function	To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions. To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions.		To know the main parts of the human circulatory system (heart, blood vessels and blood). To know that the heart pumps blood around the body. To know that the blood vessels transport blood around the body. To know that the blood transports vital substances around the body, including oxygen and nutrients. To understand the relationships between different organ systems.
	Health and Nutrition	To know that teeth can be damaged, including the effect of sugary and acidic food. To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly. To describe the teeth of carnivores and herbivores, and understand why they are different. To know that predators hunt for their food and prey are the animals being hunted. To know that producers make their own food.		To understand the impact of diet, exercise, drugs and lifestyle on the way a body functions. To know that the heart rate is the number of beats per minute and breathing rate is the number of breaths per minute. To know that exercise increases heart and breathing rates.

		To know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on.		
Living things and their habitats				
		Year 1	**Year 2** Habitats and Microhabitats	**Year 3**
Scientific knowledge and understanding	**Characteristics of living things**		To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition. To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes.	
	Variation and Inheritance		To know a variety of plants and animals and describe some differences.	
	Habitats and interdependence		To name a variety of habitats, including woodland, ocean, rainforest and Seashore. To know that a habitat is the environment where an animal or plant lives/ grows, because it provides what they need to survive. To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter). To know that living things depend upon each other (e.g. for food, shelter.) To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals.	

		Year 4	Year 5 Life cycles and reproduction	Year 6 Classifying big and small Evolution and inheritance
Scientific knowledge and understanding	**Characteristics of living things**			To know that 'organism' is a term used to refer to an individual living thing. To know that microorganisms are incredibly small and cannot usually be seen by the naked eye. To know the characteristics of the different groups of vertebrates and commonly found invertebrates.
	Variation and Inheritance		To know that a life cycle shows the changes an animal or plant goes through until the reproduction of a new generation when the cycle starts again. To know that all living things must reproduce for the species to survive. To know that sexual reproduction requires two parents, whereas asexual reproduction only requires one parent. To know that there are different processes plants and animals use to reproduce (asexual and sexual reproduction).	To know that living things have changed over time. To know that fossils provide us with information about living things that inhabited the Earth millions of years ago. To know that characteristics are passed from parents to their offspring, but that all offspring vary from their parents. To know that over time, variation in offspring can affect animals' chances of survival in particular environments.
	Habitats and interdependence			To know that animals and plants have adapted to suit their environment over many millions of years and that this process can be called evolution.

Materials

Scientific knowledge and understanding		Year 1 Everyday materials	Year 2 Uses of everyday materials	Year 3 Rocks and soils
	Identifying and naming	To know that objects are items or things. To know that a material is what an object is made from. To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.		To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.) To know that rocks may contain grains, crystals or fossils. To know that grains and crystals appear differently and can be used to classify rocks. To know that soils are made from rocks and dead matter.
	Properties and uses	To know that property refers to how a material can be described. To describe the physical properties of a variety of everyday materials. To understand that materials can be grouped based on their physical properties.	To know why objects are made from particular materials and to give examples of their suitability. To know that one material can be used for a range of purposes (and to give examples.) To know that different materials can be used for the same purpose (and to give examples.) To know why certain materials are unsuitable for particular objects.	To understand the relationship between the properties of rocks and their uses.
	Change		To know that a force must be applied to change the shape of a solid object. To know that solid objects can be squashed, bent, twisted or stretched.	To know that fossils can form from the remains of living things. To know that rocks can change over time (e.g. erosion, weathering).

			To know that different solid objects may take a different amount of force to change shape.	
		Year 4 States of matter	**Year 5** Mixtures and separation Properties and changes	**Year 6**
Scientific knowledge and understanding	**Identifying and naming**	To know that all substances around us can exist as solids, liquids and gases.		
	Properties and uses	To know that a property of a solid is that it keeps its shape unless a force is applied to it. To know that a property of a liquid can flow freely and take on the shape of a Container. To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.	To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.	
	Change	To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating). To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing). To know that water can exist as a solid, a liquid or a gas. To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius.	To know that some substances will dissolve in a liquid to form a solution. To know the factors that affect the time taken to dissolve, including temperature and stirring. To understand that dissolving, mixing and changes of state are reversible changes. To know that some liquids and solids can be separated using sieving, filtering and evaporation and to describe these processes. To understand that some changes result in the formation of new materials and that these are usually irreversible. (e.g. burning, rusting, the action of acid on bicarbonate of soda.)	

		To know that water flows around the world in a continuous process called the water cycle. To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour. To know that in the water cycle, condensation is the process of water vapour cooling to form water droplets in clouds, which can result in precipitation. To know that the rate of evaporation increases as temperature rises.		
Energy				
		Year 1	**Year 2**	**Year 3** Light and shadows
Scientific knowledge and understanding	**Sources**			To know that light travels from a source (e.g. the Sun, light bulbs and torches). To know that light travels in a straight line from a light source. To know that light is needed to see things and that dark is the absence of light. To know that light from the Sun can be dangerous and how to protect their eyes.
	Transfer			To know that materials reflect light. To know that light is reflected uniformly from a shiny surface, such as a mirror. To know that shadows are formed when the light from a light source is blocked by an opaque object.

	Factors affecting energy			To understand how and why shadows change. To know that shadows change position and length throughout the day as the Sun changes position in the sky.
		Year 4 Electricity and circuits	**Year 5**	**Year 6** Circuits, batteries and switches
Scientific knowledge and understanding	**Sources**	To know that all electrical appliances need a power source, including batteries or mains electricity. To know that an electrical circuit needs a complete path for the electric charge to flow through. To know the main components in a simple series circuit. To know the precautions for working safely with electricity.		To know a wider variety of components in a series circuit (including buzzer and motor). To know the conventions used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.
	Transfer	To know that some materials allow electric charge to pass through them easily and these are known as electrical conductors (e.g. metals). To know that some materials do not allow electric charge to pass through them and these are known as electrical insulators (e.g wood and plastic). To know that metals are used for cables and wires because they are good conductors of electricity. To know that plastic is used to cover cables and wires because it is a good		

		insulator.		
	Factors affecting energy	To understand that an open switch breaks a series circuit so the components will be off. To understand that a closed switch completes a series circuit so the components will be on. To understand the relationship between bulb brightness and the number of cells in a circuit.		To know that the voltage of a circuit can be changed and how this affects bulb brightness (or buzzer volume).
Earth and space				
		Year 1 Seasonal changes	**Year 2**	**Year 3**
Scientific knowledge and understanding	**Key facts**	To know the name and order of the four seasons; spring, summer, autumn and winter. To know that it is unsafe to look directly at the Sun.		
	Forces in motion	To know weather associated with the four seasons and how it changes (in the UK). To understand that day length varies across the four seasons, with fewer daylight hours in the winter and more in the summer.		
		Year 4	**Year 5** Earth and space	**Year 6**
Scientific knowledge and understanding	**Key facts**		To know that the Sun is a star at the centre of our solar system.	

			To know that the Sun, Earth and Moon are approximately spherical bodies. To know the names, order and relative positions of the planets and other main celestial bodies. To know that a moon is a celestial body that orbits a planet and give examples of moons that orbit other planets.	
	Forces in motion		To know that the Earth and other planets orbit around the Sun. To know that the tilt of the Earth and its orbit around the Sun causes the seasons. To know that the Moon orbits around the Earth. To understand how the Earth's rotation causes day and night and the apparent movement of the Sun across the sky.	
Forces				
		Year 1	**Year 2**	**Year 3** Forces and magnets
Scientific knowledge and understanding	**Key facts**			To know some examples of contact and non-contact forces. To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism). To know the North and South poles of a magnet.

				To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other. To know some different examples of magnets, including bar, horseshoe, button and ring, To know some uses of magnets.
	Forces in motion			To know that friction is a contact force that acts between two surfaces to slow an object down. To know that magnetism is a non-contact force that affects objects containing magnetic metal. To understand that the opposite poles of a magnet attract one another and like poles repel one another.
	Factors affecting forces			To know that rougher surfaces have more friction between them than smoother surfaces. To understand that the strength of different magnets may vary.
		Year 4	**Year 5** Imbalanced forces	**Year 6**
Scientific knowledge and understanding	**Key facts**		To know that gravity is a non-contact force that pulls objects together. To know that air resistance and water resistance are both types of friction.	
	Forces in motion		To know that unsupported objects fall towards the Earth because of gravity.	

			To know that friction, air resistance and water resistance act in the opposite direction to a moving object. To know that when forces are imbalanced, the speed, shape or direction of an object changes. To know that when forces are balanced the speed, shape or direction of an object stays the same. To know that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	
	Factors affecting forces		To know that rougher surfaces have more friction between them than smoother surfaces and how that may affect movement. To know that the larger the surface area of an object the greater the air or water resistance it creates.	

Progression of skills						
Working scientifically						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Posing questions	Exploring the world around them and raising their own simple questions. Recognising there are different types of enquiry (ways to answer a question). Responding to suggestions of how to answer their questions.		Beginning to raise further questions during the enquiry process. Considering what makes a testable question. Beginning to recognise that there are different types of enquiry and that they are suitable for different questions. Beginning to make suggestions.		Raising questions throughout the enquiry process. Identifying testable questions. Selecting the most appropriate enquiry method to answer questions and give justification.	
Planning	Beginning to recognise whether a test is fair. With support, deciding if suggested observations are suitable. Ordering a simple method.		Beginning to select from options which variables will be changed, measured and controlled. Suggesting what observations to make and how long to make them for. Planning a simple method, verbally and in writing. Beginning to write a simple method in numbered steps. Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.		Suggesting which variables will be changed, measured and controlled. Making and explaining decisions about what observations to make and how long to make them for. Writing a method including detail about how to ensure control variables are kept the same. Writing a method that considers reliability by planning repeated readings. Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.	
Predicting	• Suggesting what might happen, often justifying with personal experience.		Making predictions about what they think will happen by:		Making increasingly scientific predictions by: • Using previous scientific knowledge	

		• Using scientific knowledge and/or personal experience to explain their prediction (because...) • Beginning to consider cause and effect when making predictions, where appropriate. • Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)	and evidence • to inform their predictions. • Using scientific language to describe a potential outcome or explain why they think something will happen. • Making links between topics to evidence a prediction.
Observing (Qualitative data)	Using their senses to describe, in simple terms, what they notice or what has changed.	Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.	Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.
Measuring (Quantitative data)	Using non-standard units to measure and compare. Beginning to use standard units to measure and compare. Beginning to use simple measuring equipment to make approximate measurements. Reading simple numbered scales.	Using standard units to measure and compare. Using measuring equipment with increasing accuracy. Reading scales with unmarked intervals between numbers.	Using standard units to measure and compare with increasing precision (decimals). Reading a wider variety of scales with unmarked intervals between numbers.
Researching	Gathering specific information from one simplified, specified source.	Gathering specific information from a variety of sources.	Gathering answers to open-ended questions from a variety of sources.
Recording	Drawing and labelling simple diagrams.	Beginning to draw more scientific diagrams by: • Using some standard symbols. • Drawing in 2D to produce simple line diagrams. • Labelling with more scientific vocabulary.	Drawing scientific diagrams by: • Using a wider range of standard symbols. • Drawing with increasing accuracy. • Labelling with a broader range of scientific vocabulary. • Annotating diagrams to explain

			concepts and convey opinions.
Grouping and Classifying	Using a prepared table to record results including: ● Numbers. ● Simple observations. ● Tally frequency.	Using a prepared table to record results including more detailed observations. Using tables with more than two columns. Identifying and adding headings to tables. Beginning to design simple results tables.	Using tables with columns that allow for repeat readings. Suggesting headings to tables, including units. Designing results tables with increasing independence with consideration of variables where applicable. Calculating the mean average.
Graphing	Representing data using pictograms and block charts.	Representing data using bar charts. Drawing bars with greater accuracy. Reading the value of bars with greater accuracy.	Representing data by using line graphs and scatter graphs. Plotting points with greater accuracy. Reading the value of plotted points with greater accuracy.
Analysing and drawing conclusions	Using their results to answer simple questions. Beginning to recognise when results or observations do not match their predictions.	Writing a conclusion to summarise findings using simple scientific vocabulary. Beginning to suggest how one variable may have affected another. Beginning to quote results as evidence of relationships. Identifying data that does not fit a pattern (anomalous data). Recognising when results or observations do not match their predictions. Beginning to use identified patterns to predict	Writing a conclusion to summarise findings using increasingly complex scientific vocabulary. Suggesting with increasing independence how one variable may have affected another. Quoting relevant data as evidence of relationships. Identifying anomalies in repeat data and excluding results where appropriate. Comparing individual, class and/or model data to the prediction and recognising when they do not match.

		new values or trends.	Using identified patterns to predict new values or trends.
Evaluating	Beginning to recognise whether a test is fair or not.	Beginning to identify steps in the method that need changing and suggest improvements. Beginning to identify which variables were difficult to control and suggesting how to better control them. Commenting on the degree of trust by reflecting on: ● Results that do not fit a pattern (anomalies). ● The quality of results (accurate measurements and maintaining control variables). ● Beginning to identify new questions that would further the enquiry.	Identifying steps in the method that need changing and suggesting improvements. Identifying which variables were difficult to control and suggesting how to better control them. Commenting on the degree of trust by also reflecting on: ● Accuracy (human error with equipment). ● Reliability (repeating results). ● Sources of information (e.g. websites, books). Posing new questions in response to the data, that would extend the enquiry. Deciding what data to collect to further test direct relationships.