

Tenbury CE Primary Academy

Science Progression Map

Chemistry

Materials						
Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key Scientists
Year 1	Naming and describing materials	<ul style="list-style-type: none"> • distinguish between an object and the material from which it is made <ul style="list-style-type: none"> ▪ identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. 	<p>Everything around us is made from materials.</p> <p>Some materials are natural materials, naturally sourced materials that are used without modification.</p> <p>Some materials are manufactured materials, made by changing natural source materials.</p> <p>Different materials have different characteristics.</p> <p>Objects can be sorted according to their source material</p>	<p>Identifying and classifying</p> <p>Observing closely using simple equipment</p> <p>Performing simple tests</p> <p>Gathering and recording data to help in answering questions.</p> <p>Using observations and ideas to suggest answers to questions.</p>	<p>Grouping and classifying</p> <p>Carrying out simple comparative tests</p> <p>Observing changes over time</p>	<p>It is important that children see science as relevant to them and their lives.</p> <p>-builders</p> <p>-clothes makers</p> <p>-engineers</p>
	Properties and uses of materials	<ul style="list-style-type: none"> ▪ distinguish between an object and the material from which it is made ▪ describe the 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. 	<p>Objects can be made from more than one material, including recycled materials.</p> <p>Materials have physical properties that make them useful for different purposes.</p>	<p>Observing closely, using simple equipment.</p> <p>Performing simple tests.</p> <p>Identifying and classifying.</p> <p>Gathering and recording data to help in answering questions.</p>	<p>Identifying and classifying</p> <p>Carrying out simple comparative tests</p>	<p>Charles Mackintosh 1766-1843 (waterproof coat)</p>

Year 2	Choosing materials	<ul style="list-style-type: none"> find identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. 	Objects can be tested and sorted according to the properties of the materials they are made from. Inventors discover new uses for materials and create new materials	<p>Asking simple questions and recognising that they can be answered in different ways.</p> <p>Performing simple tests. Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Gathering and recording data to help in answering questions.</p>	Carrying out simple comparative tests	<p>John Dunlop 1785-1842- tyres</p> <p>Children may benefit from connecting with people who use the knowledge and application of the properties of materials in their professions, such as product designers, sculptors and inventors.</p>
	Changing materials	<ul style="list-style-type: none"> find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching 	<p>Squashing, bending, stretching and twisting can change the shape of some materials.</p> <p>Different properties allow the shapes of materials to be changed in different ways.</p> <p>Objects are made from materials with properties that make them fit for purpose..</p>	<p>Asking simple questions and recognising that they can be answered in different ways.</p> <p>Performing simple tests.</p> <p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Gathering and recording data to help in answering questions.</p>	<p>Identifying and classifying</p> <p>Carrying out simple comparative and fair tests</p>	
Year 3	Rocks	<ul style="list-style-type: none"> Compare and group together different rocks on the basis of their appearance and simple physical properties Describe and explain how different rocks can be useful to us Describe in simple terms how fossils are formed when things that have lived are trapped within rock 	<p>Rocks can be compared and grouped according to their appearance and simple properties.</p> <p>Rocks change over time depending on their physical properties.</p> <p>Soils are made from rocks and organic material.</p>	<p>Setting up simple practical enquiries, comparative [and fair] tests.</p> <p>Making systematic and careful observations [and, where appropriate, taking accurate measurements using standard units, using a</p>	<p>Grouping and classifying</p> <p>Carrying out simple and comparative fair tests</p> <p>Finding things outs using secondary sources of information</p>	<p>Mary Anning (fossils)</p>

		<ul style="list-style-type: none"> • Describe and explain the differences between sedimentary and igneous rocks, considering the way they are formed • Recognise that soils are made from rocks and organic matter 	<p>Specific properties of different soils affect whether they absorb and hold water or not.</p> <p>Fossils are formed when living things are trapped within rock.</p> <p>Human knowledge of the living world has been developed through the lives and work of fossil scientists such as Mary Anning.</p>	<p>range of equipment, including thermometers and data loggers].</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, [bar charts] and tables.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>		
Year 4	Changes of state	<ul style="list-style-type: none"> • 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. 	<p>A solid holds its shape. Liquids can be poured and will spread out. Water freezes at zero degrees Celsius. Freezing is when a liquid changes state into a solid. Melting is when a solid changes state into a liquid. Different materials melt at different temperatures. Melting and freezing are reversible processes.</p> <p>Air is a gas. Gases change in shape and volume to fill the space they are in. When water changes state from liquid into gas it becomes water vapour. This process is called evaporation. When water vapour changes state from gas into liquid it becomes water. This process is called condensation. Water in the environment evaporates into the air then the warm air cools as</p>	<p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p>	<p>Identifying and classifying</p> <p>Observing over time leading to fair testing</p> <p>Carrying out simple comparative and fair tests</p>	<p>Discuss with children professions that use the science of changing state: chefs, plumbers, meteorologists, aviation experts, environmentalists, chemical engineers, astrophysicists, astronauts, climate scientists, ecologists, hydrologists, oceanographers, scenes of crime officers, and so on.</p>

			<p>it rises, leading to condensation and the formation of clouds. Water droplets in the clouds fall as rain (or as snow or hail if cooled below freezing point). The water returns to the sea via streams, lakes and rivers to continue the water cycle</p>	<p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>		<p>Joseph Priestly (1733-1804) (discovered oxygen)</p>
Year 5	Properties and uses of materials	<ul style="list-style-type: none"> • Compare and group together everyday materials on the basis of their properties, including hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • Give reasons, based on evidence for comparative and fair tests for the particular uses of everyday materials, including metals wood and plastic 	<p>Materials have physical properties that make them fit for certain purposes. The properties of liquids include having a fixed weight, a fixed volume, an ability to flow, a level of viscosity; and they take on the shape of a container. The viscosity of a liquid describes how thick or thin it is and how fast or slowly it will flow. A thermal insulator is a material that does not transmit heat through it well. A thermal insulator keeps hot things hot and cold things cold.</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p>	<p>Identifying and classifying</p> <p>Carrying out simple comparative and fair tests</p>	<p>Jamie Garcia (invention of a new kind of plastic)</p> <p>Dr Raquel Prado Renewable Materials Engineer</p>

			<p>A thermal conductor is a material that transmits heat through it very well. Materials can be absorbent and can soak up and take in liquid. Some materials are permeable and let water pass through. Some materials are waterproof and do not let water pass through</p>	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>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.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>		
Separating mixtures and changing materials	<ul style="list-style-type: none"> • Use knowledge of solids, liquids and gases to decide and describe how mixtures might be separated, including through filtering, sieving, evaporating • Demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda 	<p>Solid, dry mixtures of materials can be separated by sieving. Some solids dissolve in water while others do not. Solids that do not dissolve can be separated from a liquid by filtering. Solids which dissolve can be retrieved from a solution if the liquid is evaporated. Some changes of state are reversible, and others are non-reversible. Non-reversible changes result in the formation of new materials</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising, and controlling variables, where necessary.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Learn to use apparatus and techniques, such as filtering, sieving and evaporating, to separate materials.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships, and explanations of and degree</p>	<p>Grouping and classifying</p> <p>Carrying out simple comparative and fair tests</p> <p>Finding things out using secondary sources of information</p>		

				of trust in results, in oral and written forms such as displays and other presentations.		
--	--	--	--	--	--	--

Biology

Animals including Humans						
Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key Scientists
Year 1	Human body and senses	<ul style="list-style-type: none"> identify, name, draw and label basic parts of the human body and say which part of the body is associated with each sense 	<p>Humans are mammals.</p> <p>The main parts of the human body are head, arms and hands, torso and legs and feet.</p> <p>Humans have five basic senses which help us to make sense of the world around us: sight, touch, hearing, smell and taste.</p> <p>Although humans are all the same generally, they vary in, for example, their skin, hair, eye colour, shoe size and fingerprint.</p>	<p>Asking simple questions and recognising that they can be answered in different ways.</p> <p>Observing closely, using simple equipment.</p> <p>Identifying and classifying.</p> <p>Gathering and recording data to help in answering questions.</p>	Identifying and classifying	Linda Brown Buck (biologist linked to sense of smell)
	Animals (vertebrates)	<ul style="list-style-type: none"> 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, 	<p>Vertebrates are animals that have a backbone.</p> <p>There are five vertebrate groups in the animal kingdom – mammals, amphibians, reptiles, birds and fish.</p> <p>Features of reptiles: eggs, claws, teeth, scaly skin and living on land</p> <p>Features of birds: eggs, feathers, beaks, claws and wings.</p> <p>Features of amphibians: eggs, water and land living, changes to them as they grow. Features of fish: water</p>	<p>Observing closely, using simple equipment.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	Identifying and classifying	Prem Singh Gill - Polar scientist animal welfare workers, vets, veterinary nurses

		amphibians, reptiles, birds and mammals, including pets).	living, scales, gills, teeth, fins and eggs. Features of mammals: hair or fur covering their bodies; give birth to live young; produce milk for their offspring; nurture offspring; Animals can be groups by what they eat as carnivores, herbivores and omnivores.			
Year 2	Growing Up (animals and humans)	<ul style="list-style-type: none"> 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. 	<p>Animals grow and change throughout their lives. All animals need food, water and air to survive. Humans need to eat food from the four main food groups each day: fruit and vegetables; dairy; meat, fish, pulses and eggs; and starchy foods including bread, potatoes, pasta and rice. Humans needs to stay clean and hygienic to be healthy. Regular physical activity is important for good health.</p>	<p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	<p>Identifying and classifying Observing over time</p>	<p>Adelle Davis 1904-1974- Nutritionist</p>
Year 3	Movement and Nutrition for the Human Body	<ul style="list-style-type: none"> identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement. 	<p>The different types of food we eat contain different nutrients. These are useful for our bodies in different ways. A healthy diet contains a balance of different nutrients. Some of the bones in our skeleton protect our vital organs. Other bones provide support so that our body can remain upright. Our joints allow us to move our bones so that our bodies can move. Muscles work in pairs to move the bones in our skeleton. Vertebrate bodies are supported by an internal bony skeleton.</p>	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, [keys, bar charts, and tables].</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p>	<p>Grouping and classifying Finding things out using secondary sources of information</p>	<p>Marie Curie 1867-1934 – radiation, X-rays Radiographers Physiotherapists</p>

			<p>Invertebrates have no bony skeleton. Vertebrate skeletons all have a spine.</p>	<p>Identifying differences, similarities [or changes] related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions [or to support their findings].</p>		
Year 4	Digestion and Food Chains	<ul style="list-style-type: none"> 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. 	<p>The digestive system breaks down food we eat into smaller pieces that our body can use for energy and growth and gets rid of waste. The main parts of the digestive system are the mouth, oesophagus, stomach, small intestine, large intestine, rectum and anus. Humans have different types of teeth: incisors, canines and molars. Food is chemically broken down in the stomach and small intestine, the large intestine absorbs water and the rectum stores poo. A food chain shows how energy and nutrients pass from one living thing to another as they eat or get eaten by each other. A producer (a plant) makes the food using water, air and the energy of the sun. This is passed to the consumer (a herbivore) that eats it. It is then passed to any animal (a carnivore) that eats the consumer.</p>	<p>Making systematic and careful observations [and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers].</p> <p>Recording findings using simple scientific language, [drawings,] labelled diagrams, keys, [bar charts, and tables].</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Identifying differences, similarities [or changes] related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>	<p>Identifying and classifying</p> <p>Finding things out using secondary sources of information</p>	<p>Dentists</p> <p>William Beaumont 1785-1853 Digestion</p>
Year 5	Plant and Animal life cycles.	<ul style="list-style-type: none"> describe the differences in the life cycles of a mammal, 	<p>All living things have a life cycle which includes growth and reproduction, eventually ending in death and decay.</p>	<p>Recording data and results of increasing complexity using scientific diagrams and</p>	<p>Identifying and classifying</p> <p>Observing over time</p>	<p>Links can be made to the work of historical and</p>

		<ul style="list-style-type: none"> an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals. 	<p>Female birds lay eggs with hard shells. These may or may not be fertilised. Mammals reproduce by sexual reproduction.</p> <p>Some amphibians go through a process of metamorphosis. The majority of insects go through a process of complete metamorphosis. Flowers contain male sex organs called stamens and female sex organs called carpel. Pollen must be moved to a part of the carpel called the stigma for reproduction to take place. This process is called pollination. Seeds are the product of sexual reproduction.</p>	<p>labels, [classification keys, tables, scatter graphs, bar and line graphs].</p> <p>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.</p>	<p>Pattern seeking</p>	<p>contemporary scientists e.g. David Attenborough, Jane Goodall, Roger Arliner Young, Ernest Everett Just.</p> <p>Eva Crane 1912-2007 -reproduction in bees</p>
	Human Growth	<ul style="list-style-type: none"> describe changes as humans develop to old age. describe the life process of reproduction in humans. 	<p>The female body changes as it goes through puberty, from about age 12. There is a fast period of growth and the changes occur that prepare women to have babies.</p> <p>The male body changes as it goes through puberty, from about age 12. There is a fast period of growth and sexual organs develop. (see PHSE Unit Puberty)</p> <p>The human body changes as it gets older. The human life cycle has different stages: gestation, infancy, childhood, puberty, adulthood, ageing and death</p>	<p>Reporting and presenting findings from enquiries, [including conclusions, causal relationships and explanations of and degree of trust in results,] in oral and written forms such as displays and other presentations</p>	<p>Finding things outs using secondary sources of information</p>	<p>Discuss as many science-related jobs as appropriate including midwives, paediatricians, ultrasound technicians, doctors who specialise in the diseases of old age – sight loss, heart disease and dementia, care workers, chemists who develop anti-aging skin care products.</p>
Year 6	Human Circulation	<ul style="list-style-type: none"> identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood 	<p>Blood carries water and the nutrients from food that are used for energy, health and growth around the body. The circulatory system pumps blood from the heart to the lungs, back to</p>	<p>Recording data and results of increasing complexity using scientific diagrams and labels, [classification keys, tables, scatter graphs, bar and line graphs].</p>	<p>Finding things outs using secondary sources of information</p>	<p>William Harvey (a doctor who discovered the nature of blood circulation and the</p>

		<ul style="list-style-type: none"> describe the ways in which nutrients and water are transported within animals, including humans. 	<p>the heart and onto the rest of the body in a figure-of-eight system. The heart is a muscle. It has two separate sides. One side pumps blood full of oxygen from the lungs, the other side pumps blood with the oxygen used up, from the body. Arteries are blood vessels that carry blood away from the heart. Veins carry the blood from the rest of the body back to the heart. Veins have valves to stop the blood flowing backwards.</p>	<p>Reporting and presenting findings from enquiries, [including conclusions, causal relationships and explanations of and degree of trust in results,] in oral and written forms such as displays and other presentations.</p>		<p>function of the heart as a pump)</p>
Body Health	<ul style="list-style-type: none"> Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. 	<p>A healthy diet helps maintain or improve general health in humans and other animals. When people do not eat a balanced diet they are at risk of malnutrition. Our pulse increases when we exercise. Regular physical activity prevents obesity; keeps heart, lungs and muscles healthy; increases flexibility and strength; and helps to fight off infections. Drugs are any substances that alter the way the body works.</p>	<p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<p>Finding things out using secondary sources of information Pattern seeking</p>	<p>James Lind, who discovered a cure for scurvy in the 18th century. Sir Richard Doll (1912–2005), who proved the link between lung cancer and smoking</p> <p>Covid-19 scientists</p>	

Plants

Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key Scientists
Year 1	Identifying plants and their parts	<ul style="list-style-type: none"> 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. 	<p>The names of the parts of a flowering plant that grow above the ground are stem, leaf and flower.</p> <p>Roots grow under the ground and different plants have different roots. Some trees are flowering plants which have roots, stems, leaves and flowers. There are differences between deciduous and evergreen trees.</p> <p>There are similarities and differences between flowering plants.</p>	<p>Observing closely, using simple equipment.</p> <p>Identifying and classifying.</p>	Identifying and classifying	<p>gardeners, botanists, horticulturists, florists and working in a garden centre.</p> <p>Beatrix Potter 1866-1943</p>
Year 2	Growing seeds and bulbs	<ul style="list-style-type: none"> observe and describe how seeds and bulbs grow into mature plants. 	<p>Germination is when a seed starts to sprout and grow.</p> <p>Seeds need certain conditions to germinate. All require water, some require warmth, and most do not need light.</p> <p>Seeds come in a variety of sizes.</p> <p>The size of the seed does not determine how tall the mature plant that grows from it will be.</p> <p>Mature plants can grow from either seeds or bulbs.</p>	<p>Observing closely, using simple equipment.</p> <p>Performing simple tests.</p> <p>Identifying and classifying.</p> <p>Gathering and recording data to help in answering questions.</p>	<p>Identifying and classifying</p> <p>Observing over time</p> <p>Comparative testing</p>	<p>Alan Titchmarsh - botanist and gardener</p>
	Growing healthy plants	<ul style="list-style-type: none"> find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 	<p>Seeds germinate into seedlings and then grow into mature plants.</p> <p>Mature plants need light and water to grow healthily.</p> <p>Different mature plants require different temperatures to grow healthily depending on the type of plant</p>	<p>Performing simple tests.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	<p>Comparative testing</p> <p>Pattern Seeking</p>	

				Gathering and recording data to help in answering questions.		
Year 3	Flowering plants and plant growth	<ul style="list-style-type: none"> 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. 	<p>Leaves capture sunlight. The energy from the sunlight is used to produce the plant's food.</p> <p>Roots anchor the plant into the soil. Roots absorb water and minerals from the soil. This water is transported to the leaves and flowers via the stem. The stem also provides support for the plant and holds the leaves and flowers up.</p> <p>Plants which are able to get more sunlight, water and nutrients will grow faster and bigger than the others.</p> <p>Plants are adapted to live in different habitats.</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using results to [draw simple conclusions,] make predictions for new values, [suggest improvements and raise further questions].</p>	<p>Carrying out simple comparative tests</p> <p>Observing changes over time</p> <p>Research</p>	<p>Harriet Margaret Louise Bolus- female plant author (1877-1970)</p>

	Flowering plants life cycle	<ul style="list-style-type: none"> explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<p>The flower produces the plant's seeds. A flower has: a female part and male parts which produce pollen; petals which surround the male and female parts; and sepals which cover the flower when it is in bud.</p> <p>Pollination is when the pollen from one flower is transferred to another flower.</p> <p>After pollination, a fruit develops from the flower.</p> <p>Fruits contain at least one seed. Seeds are moved away from the plant that produced them, and this is called seed dispersal. Seeds are dispersed by wind, water, animals eating fruit, seeds becoming attached to an animal, and through explosions of a seedpod (fruit).</p>	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, [keys, bar charts, and tables].</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p>	Identifying and classifying	
Year 5	Plant and Animal life cycles	<ul style="list-style-type: none"> 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. 	<p>All living things have a life cycle which includes growth and reproduction, eventually ending in death and decay. Flowers contain male sex organs called stamen and female sex organs called carpel.</p> <p>Pollen must be moved to a part of the carpel called the stigma for reproduction to take place. This process is called pollination.</p> <p>Seeds are the product of sexual reproduction. They are genetically different to the parent plants. Asexual reproduction creates plants that are genetically identical to the parent.</p>	<p>Recording data and results of increasing complexity using scientific diagrams and labels, [classification keys, tables, scatter graphs, bar and line graphs].</p> <p>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</p>	<p>Observing over time</p> <p>Pattern Seeking</p> <p>Identifying and classifying</p>	<p>Links can be made to the work of historical and contemporary scientists e.g. David Attenborough, Jane Goodall, Roger Arliner Young, Ernest Everett Just</p> <p>Eva Crane 1912-2007 -reproduction in bees</p>

				such as displays and other presentations.		

Environmental

Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key scientists
Year 1	Seasonal Changes	<ul style="list-style-type: none"> observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies. 	<p>There are different types of weather: rain, sun, wind, fog, snow, cloudy.</p> <p>There are four seasons across the year. Autumn, summer, spring, summer.</p> <p>Each season has its own weather patterns and natural events, which happen each year.</p> <p>In autumn, the weather becomes colder, leaves change colour and drop and daylight hours become shorter.</p> <p>Winter is the season that comes after autumn. It has the coldest weather of the year. Some animals hibernate.</p> <p>In spring, the temperature and the number of daylight hours begin to increase, plants begin to grow and hibernating animals emerge.</p> <p>Summer is the warmest season of the year. The sun is highest in the sky in the summer. Many flowering plants produce fruits.</p>	<p>Observing closely [using simple equipment].</p> <p>Identifying and classifying.</p>	<p>Observing over time</p> <p>Pattern seeking</p>	Holly Green - meteorologist

Year 2	Local habitats	<ul style="list-style-type: none"> ● explore and compare the differences between things that are living, dead, and things that have never been alive ● identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other ● identify and name a variety of plants and animals in their habitats, including micro-habitats ● describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. 	<p>All things are either living, dead or have never been alive. Living things include plants and animals. Things that were once alive include dead animals and plants and parts of plants and animals that are no longer attached. Things made of rock, metal and plastic have never been alive. A habitat provides the basic needs of the animals and plants in it: shelter, food and water. There are different types of habitat. Animals and plants live in a habitat to which they are suited. Animals obtain their food from plants and other animals. Feeding relationships in a habitat can be shown in a food chain.</p>	<p>Observing closely, using simple equipment.</p> <p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p>	Identifying and classifying	
Year 4	Human impact on the environment	<ul style="list-style-type: none"> ● recognise that environments can change and that this can sometimes pose dangers to living things. 	<p>Litter is things that have been thrown away and that are lying on the ground. Some waste materials can be processed so that they can be reused. Decomposition is when dead plants and animals break down into very small pieces that can be used to help other living things grow.</p>	<p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, [keys, bar charts,] and tables.</p>	<p>Comparative testing</p> <p>Observing changes over time</p> <p>Research using secondary sources.</p>	<p>Liz Bonnin</p> <p>David Attenborough</p> <p>Chris Packham</p>

			<p>Worms, bacteria and fungi help organic materials to decompose. Some materials including plastics and glass cannot decompose. They are not biodegradable. Pollution is the introduction of non-biodegradable materials into the environment. Pollution can result in habitat destruction and cause harm to animals</p>	<p>Using results to draw simple conclusions, [make predictions for new values, suggest improvements and raise further questions].</p> <p>Identifying differences, similarities [or changes] related to simple scientific ideas and processes.</p>		

Evolution						
Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key scientists
Year 6	Evolution and Inheritance	<ul style="list-style-type: none"> recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit their environment in 	<p>A species is a group of organisms that can reproduce and have offspring which can also have offspring.</p> <p>Offspring are similar but not identical their parents.</p> <p>Any feature of an organism which helps it survive is called an adaptation. Organisms are adapted to live in specific habitats.</p> <p>If all the animals of the same species die out then they have become extinct. Fossils provide evidence of organisms that lived millions of years ago. Some of the fossil species became extinct</p>	<p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<p>Pattern seeking</p> <p>Research using secondary sources.</p>	<p>Arthur Wallace</p> <p>Charles Darwin</p>

		different ways and that adaptation may lead to evolution.	<p>while others evolved into new species.</p> <p>Over millions of years, many organisms have changed.</p> <p>Evolution is the process where one species develops into another.</p> <p>If a habitat changes, those organisms which are best suited to the new habitat are more likely to reproduce. Their offspring are more likely to have the survival adaptations of their parents. This process is called natural selection.</p>			
--	--	---	---	--	--	--

Classification						
Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key scientists
Year 4	Classification of plants and animals	<ul style="list-style-type: none"> 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. 	<p>Living things are classified into five groups. These include animals and plants.</p> <p>Classification is the process of grouping living things together based on how they look and how they're related to each other.</p> <p>Vertebrates are classified into five main groups: mammals, fish, amphibians, reptiles and birds.</p>	<p>Recording findings using simple scientific language, [drawings, labelled diagrams,] keys, [bar charts, and tables].</p> <p>Identifying differences, similarities [or changes] related to simple scientific ideas and processes.</p>	Identifying and classifying	Links can be made to the work of historical and contemporary scientists, for example, Kelsey Archer Barnhill (deep-sea ecologist who sends robots to the seafloor to collect samples of different animals)

			<p>Vertebrates have an internal backbone for support.</p> <p>Invertebrates are classified into three main groups: arthropods, molluscs and annelids.</p> <p>Using branching keys helps us to identify and name familiar and unfamiliar living things</p>			to study) and Liz Bonnin (TV presenter and wildlife conservationist).
Year 6	Classification of living things	<ul style="list-style-type: none"> 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. 	<p>Living things are classified into five groups, which are called kingdoms. They are plants, animals, fungi, protista and monera.</p> <p>Plants are divided into four smaller groups: flowering plants, ferns, mosses and conifers.</p> <p>Animals are divided into two groups: vertebrates and invertebrates.</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Recording data and results of increasing complexity using [scientific diagrams and labels,] classification keys, tables, [scatter graphs, bar and line graphs.]</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p>	<p>Identifying and classifying</p> <p>Observing over time</p>	<p>Links can be made to the work of historical and contemporary scientists such as Carl Linnaeus (1707–1778, a botanist and zoologist who developed the current taxonomy system for classifying living things).</p> <p>Hu Xiansu (1894–1968, a botanist and founder of plant taxonomy in China)</p>

Physics

Light						
Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key scientists
Year 3	Light and Shadows	<ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the Sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change. 	<p>Light comes from light sources. Dark is the absence of light. Nothing can be seen if there is no light.</p> <p>Objects are easier to see when there is more light. Shiny materials and objects are good reflectors of light. Shadows are formed when light is blocked.</p> <p>Objects made from opaque materials cast the darkest shadows.</p> <p>The size and position of a shadow can be changed by moving the light source.</p>	<p>Using straightforward scientific evidence to answer questions [or to support their findings].</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including [thermometers and] data loggers.</p> <p>Reporting on findings from enquiries, including oral and written explanations, [displays or presentations of results and conclusions].</p> <p>Identifying differences, similarities or changes related to simple scientific ideas [and processes].</p> <p>Using results to draw simple conclusions, [make predictions for new values, suggest improvements and raise further questions].</p>	<p>Grouping and classifying</p> <p>Carrying out simple comparative and fair tests</p>	<p>Percy Shaw, inventor of the cat's eye</p>

Year 6	What light does	<ul style="list-style-type: none"> ● recognise that light appears to travel in straight lines ● use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye ● explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes ● use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. 	Light appears to travel in straight lines. We can see a light source because some of the light from the source enters our eyes. Light travelling in straight lines can be used to explain why a shadow is the same shape as the object that casts it and how the shape of shadows can be changed. Light is reflected from shiny surfaces in a predictable way because it travels in straight lines. We can see objects because they reflect some of the light that falls onto them into our eyes	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, [classification keys, tables, scatter graphs, bar] and line graphs.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p>	Carrying out simple comparative and fair tests	<p>Links can be made to relevant historical scientists and their discoveries e.g. Ibn al-Haytham, Euclid, Ibn Sahl</p> <p>Careers e.g. optometrist, lighting technician, optical or laser engineer. There are also opportunities to draw on children's personal experiences e.g. of eye care professionals.</p>
--------	-----------------	--	--	--	--	---

Sound

Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key scientists
Year 4	Sound	<ul style="list-style-type: none"> ● identify how sounds are made, associating some of them with something vibrating 	Sounds are made by something vibrating; this is the source. Different sources make different sounds.	Making systematic and careful observations and, where appropriate, taking accurate measurements	Comparative testing	Links can be made to the work of historical and contemporary

		<ul style="list-style-type: none"> ● 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. 	<p>Vibrations travel from the source through a material to the ear so that we can hear them. Sounds can be quiet or loud; volume depends on the size of the vibrations.</p> <p>Sounds get fainter as the distance from the sound source increases.</p> <p>Sounds can be high or low in pitch. Pitch depends on the size of the object vibrating. The pitch of a note played on a stringed instrument depends on the length, thickness and tautness of the vibrating string.</p>	<p>using standard units, using a range of equipment, including [thermometers and] data loggers.</p> <p>Reporting on findings from enquiries, including oral and written explanations, [displays or presentations of results] and conclusions.</p> <p>Using results to draw simple conclusions, make predictions for new values, [suggest improvements and raise further questions.]</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p>		<p>scientists, for example, Pythagoras, Aristotle, John William Strutt</p> <p>Adam Kissiah (inventor of the cochlear implant), and careers such as audiologist or sound engineer.</p>
--	--	---	---	---	--	---

Forces						
Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key scientists
Year 3	Forces, friction and magnets	<ul style="list-style-type: none"> ● compare how things move on different surfaces ● notice that some forces need contact between two objects, but magnetic 	<p>A force is a push or pull that can make something move. The surface a spinning top is moving on affects how long it spins for.</p> <p>The surface on which an object rests affects how it slides. Magnets have a North and a</p>	<p>Setting up simple practical enquiries, comparative [and fair] tests.</p> <p>Making systematic and careful observations and, where appropriate, taking</p>	<p>Pattern seeking</p> <p>identifying and classifying</p> <p>simple comparative testing.</p>	<p>Some links can be made to relevant scientists, careers and scientific discoveries, for example,</p>

		<p>forces can act at a distance</p> <ul style="list-style-type: none"> ● observe how magnets attract or repel each other and attract some materials and not others ● compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials ● describe magnets as having two poles ● predict whether two magnets will attract or repel each other, depending on which poles are facing. 	<p>South pole. Unlike poles attract and like poles repel each other. Some metals are attracted to a magnet and are known as magnetic. The strength of magnets varies and can be tested using the idea that magnetic forces act at a distance.</p>	<p>accurate measurements using standard units, [using a range of equipment, including thermometers and data loggers].</p> <p>Recording findings using [simple scientific language,] drawings, labelled diagrams, [keys, bar charts, and tables].</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements [and raise further questions].</p> <p>identifying differences, similarities [or changes] related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>		<p>Leonardo Da Vinci investigated friction, William Gilbert came up with theories about magnetism and Eric Laithwaite developed the technology behind the Maglev train.</p>
Year 5	Forces and mechanisms	<ul style="list-style-type: none"> ● explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object 	<p>Friction is a force that makes it harder to move an object across a surface or slows down an object moving over a surface. The unit of measurement of a force is Newtons (abbreviated to N). Gravity is a force that pulls all objects to the centre of</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p>	<p>Comparative and fair testing.</p>	<p>Links can be made to relevant historical scientists and their discoveries, for example, Archimedes, Isaac</p>

		<ul style="list-style-type: none"> ● 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. 	<p>the Earth. Air resistance is a force that slows down an object moving through air. The amount of air resistance depends on the surface area of the object. It is air resistance, not the object's weight, that affects how quickly an object falls. Water resistance is a force that slows down an object moving through water. The amount of water resistance depends on the shape of the object. A pulley a mechanism used for lifting heavy objects (the load) by applying a pulling force at one end of rope attached to the load which passes over a wheel. A lever is a long rigid arm that rests on a pivot. A force is applied to one part of the lever to lift the load at another point on the lever. A gear is a mechanism which consists of wheels with teeth that slot together. Gears change the direction of movement and the force required to make something move.</p>	<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>		<p>Newton, Tabitha Babbitt</p> <p>Careers, for example, mechanic, engineer, pilot, racing driver, diver.</p>
--	--	---	--	--	--	---

Electricity

Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key scientists
Year 4	Electricity: circuits	<ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors. 	<p>Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries.</p> <p>An electrical circuit consists of a cell or battery connected to a component using wires. A switch can be added to a circuit to turn the component on and off.</p> <p>If there is a break in a circuit, a loose connection or a short circuit, the component will not work.</p> <p>Metals are good electrical conductors. Non-metals are generally electrical insulators except for graphite (pencil lead), human tissue and water</p>	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using [simple scientific language,] drawings, [labelled diagrams, keys, bar charts, and tables].</p> <p>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</p>	Identifying and classifying	<p>Historical scientists, for example, Thomas Edison (inventor of the lightbulb and power grid), Joseph Swan Lewis Howard Latimer</p> <p>Contemporary scientists, for example, Ronit Kanwar (affordable, sustainable, solar-powered lights in rural India), Zubera Iqbal (chemist who explores sustainable ways to recycle electric vehicle batteries)</p>
Year 6	Electricity: Changing circuits	<ul style="list-style-type: none"> associate the brightness of a lamp or the volume of a buzzer with the 	Circuits diagrams using standard symbols are used to record circuits.	Planning different types of scientific enquiries to answer questions, including	Comparative and fair testing.	Raise children's awareness of possible scientific

		<p>number and voltage of cells used in the circuit</p> <ul style="list-style-type: none"> compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram. 	<p>Adding cells to a circuit makes a lamp brighter. A lamp gets brighter if the voltage in the circuit is increased. A lamp gets dimmer if thinner wires are used. If the voltage is increased in a circuit, a buzzer makes a louder sound and a motor turns more quickly.</p>	<p>recognising and controlling variables where necessary.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, [classification keys,] tables, [scatter graphs, bar and line graphs.]</p> <p>Using test results to make predictions to set up further comparative [and fair] tests.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>		<p>professions linked to the module, such as electrician or electrical engineer. Famous scientists whose work has influenced scientific thinking about electricity, such as Thomas Edison (studied in Y4) (who invented the light bulb), Michael Faraday and Humphrey Davy</p>
--	--	--	--	---	--	---

Earth in Space						
Year group	Module name	National Curriculum	Sticky Knowledge	Working Scientifically Skills	Enquiry type	Key scientists
Year 5	Earth and Space	<ul style="list-style-type: none"> 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 	<p>The main bodies that are found in space are the Sun, Moon, Earth and planets. They are all spherical. The Earth and the other planets all orbit the Sun. The time it takes to complete one orbit is called a year. The other planets of our solar system also orbit the Sun at different distances and taking</p>	<p>Recording data and results of increasing complexity using scientific diagrams and labels, [classification keys, tables,] scatter graphs, [bar and line graphs].</p> <p>Reporting and presenting findings from enquiries, including conclusions,</p>	<p>observing change over time</p> <p>pattern seeking</p> <p>research using secondary sources of information.</p>	<p>Galileo Galilei, Ptolemy, Nicolaus Copernicus,</p> <p>Modern: Katherine Johnson, John McFall.</p>

		<ul style="list-style-type: none"> use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. 	<p>different times to complete one orbit.</p> <p>The Sun appears to move east to west in an arc across the sky from sunrise to sunset.</p> <p>Changes in shadows during the day can be explained by the changes in the position of the Sun.</p> <p>The Earth rotates on its axis and this causes day and night, the apparent movement of the Sun across the sky and changes in shadows.</p> <p>The Moon orbits the Earth every 28 days and rotates on its axis.</p>	<p>[causal relationships] and explanations [of and degree of trust in results,] in oral and written forms [such as displays and other presentations].</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>		
--	--	--	---	--	--	--