Hipswell Church of England Primary School

Science

Curriculum intent.

Our curriculum provides the foundations for understanding the world. Pupils are taught essential aspects of the knowledge, methods, processes, skills and uses of science. We aim to develop a sense a sense of excitement and curiosity in all pupils about natural phenomena, the world around them and the part science has to play in it.

We develop in pupils an understanding that science is the study and exploration of the world around them using observations and experiments to ask and answer questions in order to gain knowledge about how and why things happen the way they do.

Year group	Unit	National Curriculum objectives	Coverage (knowledge and skills)	Sequencing and progression	Working Scientifically			
					Observing	Investigating	Classifying	Recording
1	**Plants** **Significant scientists** **Carl Linnaeus (1707-1778)**	to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees to identify and describe the basic structure of a variety of common flowering plants, including trees	Name and describe the petals, stem, leaf, bulb, flower, seed and root of a plant. Name a range of common plants and trees. Recognise deciduous and evergreen trees. Name the trunk, branches and root of a tree.	Build on observations made in EYFS of local area, plants and trees. Link back to growing plants and vegetables, how they needed to be looked after and where our	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: 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			

				food comes from. Build on understanding by studying a wider variety of plants and grouping.	**Observing** Talk about what they see, touch, smell, hear or taste. Use simple equipment to help them make observations. Investigate by watching, listening, tasting, smelling and touching. Identify patterns.
		Seasonal changes to observe changes across the 4 seasons to observe and describe weather associated with the seasons and how day length varies	Name the four seasons in order. Observe and describe weather associated with the seasons. Observe and describe how day length varies. Observe features in the environment and explain that these are related to a specific season. Observe and talk about changes in the weather.	Refer back to seasonal walks made in EYFS. Build on understanding of when and why some changes occur. Continue to make more detailed observations throughout the year.	**Investigating** Perform a simple test. Tell other people about what they have done. Give a simple reason for their answers Research to answer questions **Identifying, classifying and grouping** Identify and classify things they observe. Ask and answer simple scientific questions, giving reasons. Explain what they have found out. Talk about similarities and differences and explain what they have found out using scientific vocabulary.
1	**Animals, including humans.** **Significant scientists** **Jane Goodall**	to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals to identify and name a variety of common animals	Sort photographs of living and non-living things. Point out some of the differences between different animals. Identify and name a variety of common animals (birds, fish,	Link to observations and talk about pets at home in EYFS. Study similarities	**Recording findings** Show their work using pictures, labels and captions. Record their findings using standard units. Record some information in a chart or table. Use ICT to show their working. Measure using simple equipment.

		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) to identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense **Seasonal changes** to observe changes across the 4 seasons to observe and describe weather associated with the seasons and how day length varies	amphibians, reptiles, mammals, invertebrates). Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Classify animals by what they eat. Name, draw and label basic parts of the human body. Identify the main parts of the human body and link them to their sense. Name the parts of an animal's body and compare the bodies of different animals. Name a range of domestic animals. Name some parts of the human body that cannot be seen. Say why certain animals have certain characteristics. Name the four seasons in order. Observe and describe weather associated with the seasons. Observe and describe how day length varies. Observe features in the environment and explain that these are related to a specific season. Observe and talk about changes in the weather.	and differences in animals at home, care and needs of animals, compare with wild animals. Build on understanding of how our bodies work and how to take care of them. Refer back to seasonal walks made in EYFS. Build on understanding of when and why some changes occur. Continue to make more detailed observations throughout the year.	

1	**Everyday Materials**	to distinguish between an object and the material from which it is made to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock to describe the simple physical properties of a variety of everyday materials to compare and group together a variety of everyday materials on the basis of their simple physical properties	Describe materials using their senses. Explain what material objects are made from. Explain why a material might be useful for a specific job. Name some different everyday materials e.g. wood, plastic, metal, water and rock. Sort materials into groups by a given criteria. Explain how solid shapes can be changed by squashing, bending, twisting and stretching. Describe things that are similar and different between materials. Explain what happens to certain materials when they are heated, e.g. bread, ice, chocolate.	Link to baking, building and creative activities in EYFS. Build on understanding of materials that are appropriate for different tasks and how materials change when mixed/cooked.	
		Seasonal changes to observe changes across the 4 seasons to observe and describe weather associated with the seasons and how day length varies	Name the four seasons in order. Observe and describe weather associated with the seasons. Observe and describe how day length varies. Observe features in the environment and explain that these are related to a specific season. Observe and talk about changes in the weather.	Refer back to seasonal walks made in EYFS. Build on understanding of when and why some changes occur. Continue to make more detailed observations	

				throughout the year.	

Year group	Topic	National Curriculum objectives	Coverage (knowledge and skills)	Sequencing and progression	Working Scientifically			
					Observing	Investigating	Classifying	Recording
2	**Uses of Everyday Materials:** **Andre Konstantin Geim**	*Floating and sinking.* *Choosing materials for particular purposes.* to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses to find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of materials based on their simple physical properties. Describe the properties of different materials using words like, transparent or opaque, flexible, etc. Sort materials into groups and say why they have sorted them in that way.	Link to work from Year 1, naming and sorting different materials, and extend to find similarities and differences between materials and identifying properties.	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: 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 **Observing** Use senses to help them answer questions.			

			Explore how the shapes of solid objects can be changed (squashing, bending, twisting, stretching). Find out about people who developed useful new materials (John Dunlop, Charles Macintosh, John McAdam). Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper, cardboard for particular uses. Explain how materials are changed by heating and cooling.		Use some scientific words to describe what they have seen and measured. Compare several things. Suggest ways of finding out through listening, hearing, smelling, touching and tasting. **Investigating** Research to answer questions - use information from books and online information to find things out. Carry out a simple fair test. Explain why it might not be fair to compare two things. Say whether things happened as they expected. Suggest how to find things out. Use prompts to find things out. **Identifying, classifying and grouping** Organise things into groups. Find simple patterns (or associations). Identify animals and plants by a specific criteria, eg, lay eggs; have feathers. Suggest more than one way of grouping animals and plants and explain their reasons. **Recording findings** Use text, diagrams, pictures, charts, tables to record their observations. Measure accurately using simple equipment.
2	**Animals, including humans** **Louis Pasteur (1822 -1895)**	to notice that animals, including humans, have offspring which grow into adults to find out about and describe the basic needs of animals,	Describe what animals need to survive. Explain that animals grow and reproduce. Describe the life cycle of some living things (e.g. egg, chick, chicken).	Link to work completed in Year 1, naming different animals and grouping according to characteristics develop further by finding out about their offspring.	

		including humans, for survival (water, food and air) to describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	Explain the basic needs of animals, including humans for survival (water, food, air) Describe why exercise, balanced diet and hygiene are important for humans. Explain that animals reproduce in different ways.	Build on understanding of the body, senses and how the body works by learning about how to keep ourselves healthy and what we need to grow and develop.	
	Living things and their habitats	to explore and compare the differences between things that are living, dead, and things that have never been alive to 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 to identify and name a variety of plants and animals in their habitats, including microhabitats to describe how animals obtain their food from	Match certain living things to the habitats they are found in. Explain the differences between living and non-living things. Describe some of the life processes common to plants and animals, including humans. Decide whether something is living, dead or non-living. Describe how a habitat provides for the basic needs of things living there. Describe a range of different habitats. Describe how plants and animals are suited to their habitat. Create a simple food chain.	Link to observations made in EYFS and Year 1 about how plants and animals are affected by the seasons. Build on knowledge and explore how animals are adapted to their habitat Link to seasonal changes observations and how this affects animals and plants and consider how they might adapt.	

		plants and other animals, using the idea of a simple food chain, and identify and name different sources of food	Name some characteristics of an animal that help it to live in a particular habitat. Describe what animals need to survive and link this to their habitats.		
2	**Plants** **George Washington Carver(1864-1943)**	to observe and describe how seeds and bulbs grow into mature plants to find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Describe what plants need to survive. 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	Build on observations and work from EYFS and Year 1 to develop understanding of the different parts of a plant, observe how they develop and consider how they help the plant to grow.	

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					Planning	Evidence	Conclusion
3	**Plants** **Agnes Arber (1879-1960)**	to identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers to 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	Identify and describe the functions of the different parts of flowering plants (roots, stem/trunk, leaves and flowers). Explore the requirement of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and explain how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering	Build on observations and investigations in KS1 and explore how different plants have different needs to develop and grow. Further develop how the parts of the plant are important and how they are all needed	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range		

		to investigate the way in which water is transported within plants to explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal **Light** to recognise that they need light in order to see things and that dark is the absence of light to notice that light is reflected from surfaces to recognise that light from the sun can be dangerous and that there are ways to protect their eyes to recognise that shadows are formed when the light from a light source is blocked by an opaque object to find patterns in the way that the size of shadows change	plants, including pollination, seed formation and seed dispersal. Classify a range of common plants according to many criteria (environment found, size, climate required, etc. Recognise that light is needed so we can see things. Recognise that dark is the absence of light. Explore how light reflects off different surfaces. Discuss how light travels. Discuss why it is important to protect their eyes from bright lights. Look for, and measure, shadows; find out how they are formed and what might cause the shadows to change. Explain the difference between transparent, translucent and opaque. Explain why their shadow changes when the light source is moved closer or further from the object.	to ensure healthy growth. Build on observations of insects and animals using plants and flowers from EYFS and KS1 and develop understanding of how plants and animals need each other.	of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables reporting on findings from enquiries and research, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings. **Planning** Use different ideas and suggest how to find something out. Make and record a prediction before testing. Plan a fair test and explain why it was fair. Set up a simple fair test to make comparisons. Explain why they need to collect information to answer a question. **Obtaining and presenting evidence** Measure using different equipment and units of measure. Observe over time when required.
	Animals including humans	identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own	Explain the importance of a nutritionally balanced diet. Describe how nutrients, water and oxygen are transported within animals and humans and identify	Further develop knowledge from KS1 work on Animals including	

	Significant scientists Rosalind Franklin (1920-1958)	food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement	that animals, including humans, cannot make their own food: they get nutrition from what they eat. Describe and explain the skeletal system and muscular system of a human and explain their purpose. Identify that other animals have skeletal and muscular systems. Explain how the muscular and skeletal systems work together to create movement.	Humans to explore what a healthy, balanced diet should include.	Record their observations in different ways, labelled diagrams, charts etc. Describe what they have found using scientific language. Look for patterns and explain their findings. Identify, order and classify. Research to answer questions and obtain information. Make accurate measurements using standard units. **Conclusion and evaluation** Explain what they have found out and use their measurements to say whether it helps to answer their question. Use a range of equipment (including a data-logger) in a simple test. Suggest how to improve their work if they did it again.
	Forces and Magnets	to compare how things move on different surfaces to notice that some forces need contact between 2 objects, but magnetic forces can act at a distance to observe how magnets attract or repel each other and attract some materials and not others to 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 to describe magnets as having 2 poles to predict whether 2 magnets will attract or repel each other, depending on which poles are facing	Observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary. Explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe. Compare how different things move and group them; raise questions and carry out tests to find out how far things move on different surfaces. Gather and record data to find answers to their questions. Sort materials into those that are magnetic and those that are not. Look for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another.	Build on earlier work in KS1 on materials to help identify materials that are magnetic. Also develop understanding of properties of different materials and link to friction and how this can affect movement. Build on observations and investigations of the uses of materials for different purposes and explore how a greater variety of properties are used in everyday life.	

			Identify how these properties make magnets useful in everyday items and suggest creative uses for different magnets. Investigate the strengths of different magnets and find fair ways to compare them.		
3	**Rocks** **Mary Anning (1799-1847) Charles Francis Richter (1900-1985)**	to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties to describe in simple terms how fossils are formed when things that have lived are trapped within rock to recognise that soils are made from rocks and organic matter	Explore different kinds of rocks and soils, including those in the local environment. Observe rocks, including those used in buildings and gravestones, and explore how and why they might have changed over time. Use a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. Raise and answer questions about the way soils are formed. Classify igneous and sedimentary rocks. Begin to relate the properties of rocks with their uses.	Link to observations in EYFS and KS1 of the local environment, building on the use of equipment to observe and record appropriately. Link to work in Y2 on materials and how properties of materials make them suitable for different purposes. Build on understanding of grouping from KS1 to develop ways in which to classify.	

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4	**Sound** **Significant scientists** **Thomas Edison (1847-1931)** **Nikola Tesla (1856-1943)**	to identify how sounds are made, associating some of them with something vibrating to recognise that vibrations from sounds travel through a medium to the ear to find patterns between the pitch of a sound and features of the object that produced it to find patterns between the volume of a sound and the strength of the vibrations that produced it to recognise that sounds get fainter as the distance from the sound source increases	Describe a range of sounds and explain how they are made. Associate some sounds with something vibrating. Compare sources of sound and explain how the sounds differ. Explain how to change a sound (louder/softer). Recognise how vibrations from sound travel through a medium to an ear. Find patterns between the pitch of a sound and features of the object that produce it; explain ways to change the pitch of a sound. Find patterns between the volume of the sound	Link to observations made in EYFS and KS1 topic Animals including Humans, about how we hear and what can affect our ability to hear clearly. Refer to experiences using different materials in KS1 and Y3 to identify how different sounds are made and to predict which would be good sound insulators.	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables		

			and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases. Investigate how different materials can affect the pitch and volume of sounds. Work out which materials give the best insulation for sound.		reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings.
	Electricity	to identify common appliances that run on electricity to construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers to identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery to recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit	Construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. Draw the circuit as a pictorial representation. Pupils should be taught about precautions for working safely with electricity. Observe patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can, and some cannot, be used to	Build on understanding of our world from EYFS and KS1 to develop knowledge about safe uses of electricity. Refer to topic on magnetism in Y3 and compare conductors of electricity with materials that are magnetic.	**Planning** Set up a simple fair test to make comparisons. Plan a fair test and isolate variables, explaining why it was fair and which variables have been isolated. Suggest improvements and predictions. Decide which information needs to be collected and decide which is the best way for collecting it. Use their findings to draw a simple conclusion. **Obtaining and presenting evidence** Take measurements using different equipment and units of measure and record what they have found in a range of ways. Make accurate measurements using standard units. Explain their findings in different ways (display, presentation, writing).

		to recognise some common conductors and insulators, and associate metals with being good conductors	connect across a gap in a circuit.		Observe over time when required and record observations Identify patterns in results Research to collect information and to answer questions. Identify, group and classify based o results.
4	**Animals including humans** **Significant scientists Rosalind Franklin (1920-1958)**	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	Explain how certain living things depend on one another to survive. Research the main body parts associated with the digestive system: mouth, tongue, teeth, oesophagus, stomach, and small and large intestine, and explore questions that help them to understand their special functions. Identify the simple function of different types of teeth in humans. Compare the teeth of herbivores and carnivores. Explain what a simple food chain shows. Construct and interpret a variety of food chains, identifying producers, predators and prey. Classify living things and non-living things by a number of	Refer to topic in Y3 and build on understanding of what animals need to survive. Further develop knowledge from KS1 work on Animals including Humans to explore what a healthy, balanced diet should include.	**Conclusion and evaluation** Find any patterns in their evidence or measurements. Make a prediction based on something they have found out. Evaluate what they have found using scientific language, drawings, labelled diagrams, bar charts and tables. Use straightforward scientific evidence to answer questions or to support their findings Identify differences, similarities or changes related to simple scientific ideas or processes.

			characteristics that they have thought of.		
4	**States of matter**	compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Observe water as a solid, a liquid and a gas and note the changes to water when it is heated or cooled. Group and classify a variety of different materials. Explore the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. Observe and record evaporation over a period of time, for example, a puddle in the	Build on understanding from KS1 and Y3 about the properties of materials and explore if these properties can change. Develop understanding of how changing properties of materials affects/is useful in everyday life, building on observations in KS1.	

			playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting. Group and classify a variety of materials according to the impact of temperature on them.		
4	**Living Things and their Habitats.**	to recognise that living things can be grouped in a variety of ways to explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment to recognise that environments can change and that this can sometimes pose dangers to living things	Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. Identify how the habitat changes throughout the year. Explore possible ways of grouping a wide selection of living things that include animals, flowering plants and non-flowering plants. Begin to put vertebrate animals into groups, for example: fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. Group plants into categories such as	Link to observations made of seasonal changes in KS1 and how these will affect the habitat of living things. Further develop classification skills by researching a wider variety of animals and identifying similarities and differences. Build on understanding of habitats by finding out about a wider variety of habitats and how this affects the animals and plants that live there. Include nature reserves, man-made and natural habitats locally and further afield, including in different parts of the world.	

			flowering plants (including grasses) and non-flowering plants, for example ferns and mosses. Explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. Use and make simple guides or keys to explore and identify local plants and animals. Make a guide to local living things. Raise and answer questions based on observations of animals and what they have found out about other animals that they have researched.		

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					Planning	Evidence	Conclusion
5	**Forces**	to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	Explore falling objects and raise questions about the effects of air resistance. Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. Explore falling paper cones or cupcake cases, and design and making a variety of parachutes, carrying out fair tests to determine which designs are the most effective. Experience forces that make things begin to move, get faster or slow down. Explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Explore the effects of levers, pulleys and simple machines on movement.	Refer to Y3 and how friction can slow movement. Build on this to develop understanding of a wider range of forces.	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • 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		

			Find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. Explore resistance in water by making and testing boats of different shapes. Design and make products that use levers, pulleys, gears and/or springs and explore their effects. Describe and explain how motion is affected by forces (including gravitational attractions, magnetic attraction and friction).		• identifying scientific evidence that has been used to support or refute ideas or arguments **Planning** Plan and carry out a scientific enquiry to answer questions, including recognising and controlling variables where necessary. Make a prediction with reasons. Use test results to make predictions to set up comparative and fair tests. Identify areas to research. Present a report of their findings through writing, display and presentation. Explain, in simple terms, a scientific idea and what evidence supports it.
	Earth and Space **Significant scientists** **Tiera Guinn Fletcher (present day)** **Brian Cox (present day)** **Nicolaus Copernicus (1473–1543)** **Katherine Johnson** **Steven Hawking (1942 – 2018)**	to describe the movement of the Earth and other planets relative to the sun in the solar system to describe the movement of the moon relative to the Earth to describe the sun, Earth and moon as approximately spherical bodies to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	Explain how seasons and the associated weather is created. Explore a model of the sun and Earth that enables them to explain day and night. Understand that the sun is a star at the centre of our solar system and that it has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). Understand that a moon is a celestial body that orbits a planet (Earth has 1 moon;	Build on observations from EYFS, KS1 and LKS2 to further develop understanding of our world and its place in the solar system. Build on knowledge of seasonal changes and further develop this understanding of why this happens and differences around the globe.	**Obtaining and presenting evidence** Take measurements using a range of scientific equipment with increasing accuracy and precision. Take repeat readings when appropriate. Record more complex data and results using scientific diagrams, labels, classification keys, tables, scatter graphs, bar and line graphs. Research using a range of resources as appropriate. Explain why a measurement needs to be repeated. **Conclusion and evaluation** Report and present findings from enquiries through written explanations and conclusions. Use a graph to answer scientific questions.

			Jupiter has 4 large moons and numerous smaller ones). Understand that it is not safe to look directly at the sun, even when wearing dark glasses. Find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. Compare the time of day at different places on the Earth through internet links and direct communication. Create simple models of the solar system. Construct simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day.		Link what they have found out to other science.
	Properties and changes of materials	to compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical	Explore and compare the properties of a broad range of materials, including relating these to magnetism and electricity. Explore reversible changes, including evaporating, filtering, sieving, melting and dissolving, recognising	Refer to States of Matter, Y4. Build on understanding of how states of matter can be changed and whether these changes are reversible.	

		and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution to use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic to 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	that melting and dissolving are different processes. Explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. Find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. Use the terms 'reversible' and 'irreversible'. Use their knowledge of materials to suggest ways to classify (solids, liquids, gases).	Link work from Y3, 4 and 5 on magnetism and forces and apply understanding to a wider range of investigations.	

5	**Animals including humans**	to describe the changes as humans develop to old age	Draw a timeline to indicate stages in the growth and development of humans. Learn about the changes experienced in puberty. Research the gestation periods of other animals and compare them with humans. Find out and record the length and mass of a baby as it grows. Create a timeline to indicate stages of growth in certain animals, such as frogs and butterflies.	Link to Y3 and Y4. Build on understanding of how animals grow, develop and reproduce to find differences and similarities.	

5	**Living things and their habitats** **Significant scientists** **David Attenborough (present day)** **Rachel Carson (1960s)**	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	Study and raise questions about the local environment throughout the year. Observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. Find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall. Find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. Try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow. Observe and compare the life cycles of plants and animals in their local environment with other	Refer to Y3 and Y4 as well as observations from KS1. Build on understanding of life cycles of different animals and how some plants and animals reproduce. Further develop understanding of how the local and wider environment can be affected positively and negatively and continue to research a wider variety of habitats.	

			plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times).		

Year group	Topic	National Curriculum objectives	Coverage (knowledge and skills)	Sequencing and progression	Working Scientifically		
					Planning	Evidence	Conclusion
6	**Electricity** **Michael Faraday**	to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit to 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 to use recognised symbols when representing a simple circuit in a diagram	Identify and name the basic parts of a simple electric series circuit (cells, wires, bulbs, switches, buzzers). Construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. Represent a simple circuit in a diagram using recognised symbols. Systematically identify the effect of changing one component at a time in a circuit.	Link to Y4 work on electricity, Children at War. Build on understanding of how to make a simple circuit and extend. Explore knowledge of everyday uses and develop further.	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • 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		

	Light	to recognise that light appears to travel in straight lines to 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 to 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 to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Design and make a set of traffic lights, a burglar alarm or some other useful circuit. Explain how to make changes in a circuit and the impact of those changes. Explain the effect of changing the voltage of a battery. Explore the way that light behaves, including light sources, reflection and shadows. Discuss what happens and make predictions. Discuss where to place rear-view mirrors on cars and explain why. Design and make a periscope using the idea that light appears to travel in straight lines to explain how it works.	Link to Vicious Vikings, Y3, topic including light. Develop understanding of how light travels, building on understanding of reflection. Further develop understanding of how shadows are formed and how distance from a light source affects them.	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 **Planning** Explore different ways to test an idea, choose the best way, and give reasons. Vary one factor whilst keeping the others the same in an experiment. Explain why they do this. Plan and carry out an investigation by controlling variables fairly and accurately. Make a prediction with reasons. Use information to help make a prediction. Use test results to make further predictions and set up further comparative tests. Explain, in simple terms, a scientific idea and what evidence supports it. Present a report of their findings through writing, display and presentation. Make a prediction which links with other scientific knowledge. **Obtaining and presenting evidence** Explain why they have chosen specific equipment (including ICT based equipment). Decide which units of measurement they need to use. Explain why a measurement needs to be repeated.

			Investigate the relationship between light sources, objects and shadows by using shadow puppets. Extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters. Explain how different colours of light can be created.		Research effectively using a variety of sources. Record their measurements in different ways (incl bar charts, tables and line graphs). Take measurements using a range of scientific equipment with increasing accuracy and precision. Record their measurements and observations systematically. **Conclusion and evaluation** Find a pattern from their data and explain what it shows. Use a graph to answer scientific questions. Link what they have found out to other science. Suggest how to improve their work and say why they think this. Record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models. Report findings from investigations through written explanations and conclusions. Identify scientific evidence that has been used to support to refute ideas or arguments. Report and present 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.
6	**Animals including humans**	to describe the changes as humans develop to old age to identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood to recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function to describe the ways in which nutrients and water are transported within animals, including humans	Draw a timeline to indicate stages in the growth and development of humans. Learn about the changes experienced in puberty. Explore and answer questions that help them to understand how the circulatory system enables the body to function. Learn how to keep	Link to Y3, 4 and 5. Build on understanding of how animals grow, develop and reproduce to find differences and similarities. Build on knowledge of what is needed to keep humans healthy and further understanding of the human body and how to look after it.	

			their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. Explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health. Explore the work of medical pioneers, for example, William Harvey and Galen and recognise how much we have learnt about our bodies. Compare the organ systems of humans to other animals.		Link their conclusions to other scientific knowledge.

6	**Living things and their habitats** **Significant scientists** **Carl Linnaeus (1707-1778)** **Evolution: Jennifer Doudna (present day)** **Charles Darwin (1809-1882)**	to describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals to give reasons for classifying plants and animals based on specific characteristics	Explore the classification system in more detail. Understand the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Using direct observations where possible, classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). Discuss reasons why living things are placed in one group and not another. Find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. Use classification systems and keys to identify some animals and plants	Further develop understanding of living things, animals including humans and plants from Y3, 4 and 5 and how they can be grouped more specifically.	

			in the immediate environment. Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system. Group animals into reptiles, fish, amphibians, birds and mammals, and sub divide their original groupings and explain their divisions.		
	Evolution	to recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago to recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents to identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	Explore how living things on earth have changed over time. Understand that characteristics are passed from parents to their offspring (for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles) and give	Refer to We Will Rock You topic, Y3, and the importance of fossils to our understanding of the past. Further develop this by exploring how fossils are created. Build on knowledge of animals and living things from KS2 to develop understanding of how animals have evolved to adapt to environment and why some species of animals have not survived.	

			reasons why offspring are not identical to each other or to their parents. Realise that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. Explain the process of evolution and describe the evidence for this. Observe and raise questions about local animals and how they are	Build on Eco Army, Y5, to consider how we continue to affect the survival of animals and their habitats.	

			adapted to their environment. Compare how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. Analyse the advantages and disadvantages of specific adaptations, such as being on 2 feet rather than 4, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers		
6	**Catterick**				
6	**Carlton Lodge Residential**	Practical application of knowledge and skills covered in: Seasonal Changes – local walk, bushcraft, night walk. Living Things and their Habitats – local walk, bushcraft, orienteering, scavenger hunt. Materials – bushcraft, canoeing, raft building, archery. Forces – raft building, canoeing, high ropes, archery. Animals including humans – high ropes, problem solving.			