SCIENCE		
MILESTONE THREE		
Cycle A		
Autumn	**Spring**	**Summer**
Understand light and seeing	**Understand animals and humans**	**Understand the Earth's movement in space**
• Understand 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 eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes. • 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. **Work scientifically:** • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.	• Describe the changes as humans develop to old age. • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions. • Describe the ways in which nutrients and water are transported within animals, including humans. **Work scientifically:** • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.	• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. **Work scientifically:** • Present findings in written form, displays and other presentations. • Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.
KO: Light Y6	**KO: Animals including humans Y5**	**KO: Earth and Space Y5**
Person of importance: **Leonardo da Vinci** Leonardo was known as an expert scientist, inventor, engineer, architect, writer, sculptor and painter. His most famous painting, The Mona Lisa, is thought to be the best known and most visited work of art in the world.	**Person of importance:** **Marie Maynard Daly** Marie Maynard Daly is known for her work on how the heart and circulatory system are affected by sugar and cholesterol.	**Person of importance:** **Stephen Hawking** Stephen Hawking was an astrophysicist whose theories, including those concerning black holes, have changed the way we understand the universe. **Margaret Hamilton** Margaret worked for NASA and was responsible for programming the onboard flight software on the Apollo spacecraft computers. She wrote the code that the computer used to navigate from Earth to the Moon and made sure that the computer would land the spacecraft safely on the Moon.
Investigate sound and hearing	**Investigate properties and changes of materials**	**Work scientifically in investigations**
• 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 increase **Work scientifically:**	• Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. • Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.	To be completed across units of work where investigations are appropriate. Specific teaching opportunities as identified.

• Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations.	• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • 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, oxidisation and the action of acid on bicarbonate of soda. **Work scientifically:** • Plan enquiries, including recognising and controlling variables where necessary. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations. • Use test results to make predictions to set up further comparative and fair tests.	
KO: Sound Y4 (revision)	**KO: Properties and changes of materials Y5**	
Person of importance: **Alexander Graham Bell** While Bell is best known as one of the inventors of the telephone, he had a deep knowledge of the science of sound and made important contributions to the detection of hearing loss. Among his 30 patented inventions, Bell created the audiometer, which he used to test the hearing of hundreds of people, including children. This device is still used today to measure how well a person can hear.	**Person of importance:** **StephanieKwolek** While trying to find a lighter material for car tyres, Stephanie created a very hard, but light, material called Kevlar. This invention was used in cars but also in bulletproof vests and is still used to protect the police and armed forces today.	

SCIENCE

MILESTONE THREE

Cycle B

Investigate Living things	Understand evolution and inheritance	Understand electrical circuits
• 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.	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of

• Describe how living things are classified into broad groups according to common observable characteristics. • Give reasons for classifying plants and animals based on specific characteristics. **Work scientifically:** • Plan enquiries, including recognising and controlling variables where necessary. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Present findings in written form, displays and other presentations.	• 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 different ways and that adaptation may lead to evolution. **Work scientifically:** • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations. • Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.	bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram. **Work scientifically:** • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Present findings in written form, displays and other presentations.
KO: Living things and their habitats Y6	**KO: Evolution and inheritance Y6**	**KO: Electricity Y6**
Person of importance: **Libbie Hyman** Libbie Hyman was a zoologist who is best known for her work on the classification of invertebrates. **David Attenborough** David is a wildlife film-maker and naturalist who has written and presented many popular documentaries about animals and their behaviour. He has been on TV for over 60 years and is recognised all over the world.	**Person of importance:** **Mary Leakey** Mary Leakey discovered many fossils of early hominins and their tools. These fossils provide evidence for the evolution of humans.	**Person of importance:** **Michael Faraday** Michael Faraday turned a wealth of 19th century knowledge into practical technology with his development of what would become the electric motor.
Work scientifically in investigations	**Understand movement, forces & magnets**	
To be completed across units of work where investigations are appropriate. Specific teaching opportunities as identified.	**Magnets** • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing. **Forces** • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces. • *Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.* • *Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.* • Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect. **Work scientifically:**	

	• Plan enquiries, including recognising and controlling variables where necessary. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations. • Use test results to make predictions to set up further comparative and fair tests.	
	KO: Forces Y5	
	Person of importance: **Isaac Newton** Newton developed the theory of gravity, the laws of motion (which became the basis for physics), a new type of mathematics called calculus, and made breakthroughs in the area of optics such as the reflecting telescope.	

SCIENCE

MILESTONE TWO

Cycle A

Autumn	Spring	Summer
Understand light and seeing	**Investigate materials:** **States of matter**	**Understand animals and humans**
• 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 a solid object. • Find patterns in the way that the size of shadows change. **Work scientifically:**	• 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 the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. **Work scientifically in investigations:** • Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers • Gather, record, classify and present data in a variety of ways to help in answering questions. • Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables. • Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. • Use straightforward, scientific evidence to answer questions or to support their findings.	• Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat. • Construct and interpret a variety of food chains, identifying producers, predators and prey. • Identify that humans and some animals have skeletons and muscles for support, protection and movement. • 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.
KO: Light Y3	**KO: States of matter Y4**	**KO: Animals including humans Y4**
Person of importance: **Lewis Latimer** Lewis Latimer played an important role in the development of the modern lightbulb. He improved on others' inventions to produce a lightbulb with a carbon filament.	**Person of importance:** **Antoine Lavoisier and Joseph Priestley** These two scientists were mainly responsible for the discovery of oxygen.	**Person of importance:** **Washington Sheffield** Washington Sheffield was an American dentist, and he was famous for inventing the first modern toothpaste in a tube. **Marie Curie** Marie Curie was a famous scientist who developed the use of x-rays, which meant that a lot more patients could be correctly diagnosed and treated
Investigate sound and hearing	**Investigate materials:** **Rocks and soils**	**Work scientifically in investigations**
• Identify how sounds are made, associating some of them with something vibrating. • Recognise that vibrations from sounds travel through a medium to the ear. **Work scientifically in investigations:**	• Compare and group together different kinds of rocks on the basis of their simple, physical properties. • Relate the simple physical properties of some rocks to their formation (igneous or sedimentary).	To be completed across units of work where investigations are appropriate. Specific teaching opportunities as identified.

• Ask relevant questions. • Set up simple, practical enquiries and comparative and fair tests. • Gather, record, classify and present data in a variety of ways to help in answering questions. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	• Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock. • Recognise that soils are made from rocks and organic matter. **Work scientifically in investigations:** • Gather, record, classify and present data in a variety of ways to help in answering questions. • Identify differences, similarities or changes related to simple, scientific ideas and processes.	
KO: Sound Y4	**KO: Rocks Y3**	
Person of importance: **James West and Gerhard M. Sessler** West and Sessler invented an efficient microphone which is used in most modern phones.	**Person of importance:** **William Smith** William studied geology and would study the pattern of fossils. He realised that he could tell the age of a rock by looking at fossils. **Mary Anning** Mary Anning was a famous English fossil hunter. She spent months uncovering the body of her first fossil, a marine reptile that swam in the time of the dinosaurs.	
Knowledge focus here?		

SCIENCE

MILESTONE TWO

Cycle B

Understand movement, forces and magnets	Investigate living things and their habitats	Understand electrical circuits
• Compare how things move on different surfaces. • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials on the basis 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. **Working scientifically in investigations** • Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.	• Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys. • Recognise that environments can change and that this can sometimes pose dangers to specific habitats. **Working scientifically in investigations** • Ask relevant questions. • Gather, record, classify and present data in a variety of ways to help in answering questions. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Identify differences, similarities or changes related to simple, scientific ideas and processes.	• 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. **Working scientifically in investigations** • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

• Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.		• Use straightforward, scientific evidence to answer questions or to support their findings.
KO: Forces and Magnets Y3	**KO: Living Things and their habitats Y4**	**KO: Electricity Y4**
Person of importance: **Inge Lehmann** Inge was a seismologist and looked at the waves of energy caused by earthquakes. She concluded that the earth has a solid core at the centre.	**Person of importance:** **Gerald Durrell** Gerald Durrell was a conservationist who worked hard to save Madagascar's unique plants and animals.	**Person of importance:** **Thomas Edison** Thomas Edison's inventions made it possible for people to enjoy the benefits of electricity.
	Understand plants	**Working scientifically in investigations**
	• Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • Investigate the way in which water is transported within plants. • Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. **Working scientifically in investigations** • Set up simple, practical enquiries and comparative and fair tests. • Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. • Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. • Identify differences, similarities or changes related to simple, scientific ideas and processes.	To be completed across units of work where investigations are appropriate. Specific teaching opportunities as identified.
	KO: Plants Y3	
	Person of importance: **George Washington Carver** George came up with more than 100 uses of a peanut so farmers could sell these plants at a higher price. The uses of peanuts included paints, face creams, plastics and medicines.	

SCIENCE		
MILESTONE ONE		
Cycle A		
Autumn	**Spring**	**Summer**
Investigate materials	**Investigate sound and hearing**	**Work scientifically**
• Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. • Describe the simple physical properties of a variety of everyday materials. • Compare and group together a variety of everyday materials on the basis of their simple physical properties. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses. **Work scientifically:** • Ask simple questions. • Observe closely, using simple equipment. • Perform simple tests. • Identify and classify. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions.	• *Observe and name a variety of sources of sound, noticing that we hear with our ears.* **Work scientifically:** • Ask simple questions. • Perform simple tests. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions.	To be completed across units of work where investigations are appropriate. Specific teaching opportunities as identified.
KO: Everyday materials Y1, Uses of materials Y2	**KO: (non-statutory)**	
Person of importance: **John McAdam** John McAdam was a Scottish engineer who experimented with using new materials to build roads, inventing a new process called 'macadamisation' **Charles Macintosh** Charles Macintosh invented the first waterproof fabric **Ole Kirk Christiansen** Ole Kirk Christiansen invented Lego in 1949.	**Person of importance:** **Helen Keller** Helen Adams Keller was an American author, disability rights advocate, political activist and lecturer. She lost her sight and her hearing after a bout of illness at the age of 19 months.	
Understand light and seeing	**Understand animals and humans**	**Understand the Earth's movement in space**
• *Observe and name a variety of sources of light, including electric lights, flames and the Sun, explaining that we see things because light travels from them to our eyes.*	• Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates.	• *Observe the apparent movement of the Sun during the day.* • Observe changes across the four seasons.

Work scientifically: • Ask simple questions. • Use observations and ideas to suggest answers to questions.	• 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 (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets). • Identify name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. • Notice that animals, including humans, have offspring which grow into adults. • Investigate 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. **Work scientifically:** • Ask simple questions. • Observe closely, using simple equipment. • Identify and classify. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions.	• Observe and describe weather associated with the seasons and how day length varies. **Work scientifically:** • Ask simple questions. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions.
KO: (non-statutory)	**KO: Animals including humans Y1 & Y2**	**KO: Seasonal changes Y2**
Person of importance: **Anne Sullivan** Anne Sullivan was Helen Keller's teacher who taught her the manual alphabet and communication by finger spelling. Within a few months of working with Sullivan, Keller's vocabulary had increased to hundreds of words and simple sentences.	**Person of importance:** **Elizabeth Garrett Anderson** Elizabeth was the first woman to qualify as a doctor. She qualified in 1865. **Louis Pasteur** Louis Pasteur discovered that germs are living things that can be spread by touch or through the air	**Person of importance:** **Mae Jemison** In 1992, Mae Jemison became the first African American woman in space. She was a scientist.
SCIENCE		
MILESTONE ONE		
Cycle B		
Understand electrical circuits	**Understand living things and their habitats**	**Understand evolution and inheritance**
• *Identify common appliances that run on electricity.* • *Construct a simple series electrical circuit.* **Work scientifically:** • Ask simple questions. • Use observations and ideas to suggest answers to questions.	• Explore and compare the differences between things that are living, that are dead and 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.	• *Identify how humans resemble their parents in many features.* **Work scientifically:** • Ask simple questions. • Use observations and ideas to suggest answers to questions.

	Work scientifically: • Ask simple questions. • Observe closely, using simple equipment. • Identify and classify. • Use observations and ideas to suggest answers to questions.	
KO: (non-statutory)	**KO: Living things and their habitats Y2**	**KO: (non-statutory) The environment Y2**
Person of importance: **James Blyth** James Blyth invented the wind turbine in 1887. He used it to power the lights in his holiday home.	**Person of importance:** **Rachel Carson** Rachel Carson was a scientist who studied ocean habitats. She discovered that pollution from farms was affecting the oceans and the animals in them. **George Mottershead** George Mottershead founded Chester Zoo in 1931. This zoo was unusual at the time as the animals did not live in cages. They lived in larger enclosures.	**Person of importance:** **Charles Darwin** Darwin was an English scientist who studied nature. He is known for his theory of evolution by natural selection. According to this theory, all living things are struggling to survive. The living things that have the most helpful traits for their environment tend to survive.
Understand movement, forces and magnets	**Work scientifically**	**Understand plants**
• *Notice and describe how things move, using simple comparisons such as faster and slower.* • *Compare how different things move.* **Work scientifically:** • Ask simple questions. • Observe closely, using simple equipment. • Perform simple tests. • Gather and record data to help in answering questions.	To be completed across units of work where investigations are appropriate. Specific teaching opportunities as identified.	• Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. • Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers. • 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. **Work scientifically:** • Ask simple questions. • Observe closely, using simple equipment. • Perform simple tests. • Identify and classify. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions.
		KO: Plants Y1
Person of importance: **Albert Einstein** Albert Einstein is considered one of the best scientists to have ever lived. He discovered lots of important things in the world of science and some people think he was one of the smartest people of the 20th century.		**Person of importance:** **Jane Colden** Jane worked with plants all her life. Her work on plants is now displayed in the Natural History Museum in London.