

 Science Curriculum Year 5 and 6 – Cycle A		
Purpose of study A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world’s future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. Aims The national curriculum for science aims to ensure that all pupils: ♣ develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics ♣ develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them ♣ are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. Scientific knowledge and conceptual understanding The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils’ engagement with and motivation to study science.		
Attainment targets - By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.		
The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. ‘Working scientifically’ is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.	The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. ‘Working scientifically’ must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.	The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. ‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read, spell and pronounce scientific vocabulary correctly.
Working Scientifically - The nature, processes and methods of science ‘Working scientifically’ specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how ‘working scientifically’ might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. ‘Working scientifically’ will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.		
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.	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 ♣ 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.	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 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

Plants Pupils should be taught to: ♣ identify and name a variety of common wild and garden plants, including deciduous and of a variety of common flowering plants, including trees. Pupils should be taught to: ♣ 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.	Plants Pupils should be taught to: ♣ 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 ♣ explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	
Animals including Humans Pupils should be taught to: ♣ identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals ♣ identify and name a variety of common animals that are carnivores, herbivores and omnivores ♣ describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) ♣ identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Pupils should be taught to: ♣ 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.	Animals including Humans Pupils should be taught to: ♣ 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. Pupils should be taught to: ♣ 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.	Animals including Humans Pupils should be taught to: ♣ describe the changes as humans develop to old age. Pupils should be taught to: ♣ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood ♣ recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function ♣ describe the ways in which nutrients and water are transported within animals, including humans.
Everyday Materials Pupils should be taught to: ♣ 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.	Rocks Pupils should be taught to: ♣ compare and group together different kinds of rocks on the basis of their appearance and simple physical properties ♣ describe in simple terms how fossils are formed when things that have lived are trapped within rock ♣ recognise that soils are made from rocks and organic matter.	Properties and changes of Materials Pupils should be taught to: ♣ compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical 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 ♣ 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 and the action of acid on bicarbonate of soda.
Uses of Everyday Materials Pupils should be taught 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 ♣ find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Light Pupils should be taught to: ♣ 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.	Light Pupils should be taught to: ♣ 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.
Seasonal Changes Pupils should be taught to: ♣ observe changes across the four seasons ♣ observe and describe weather associated with the seasons and how day length varies.	Forces and Magnets Pupils should be taught to: ♣ 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	Earth and Space Pupils should be taught to: ♣ 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.

	♣ describe magnets as having two poles ♣ predict whether two magnets will attract or repel each other, depending on which poles are facing.	
Living Things and their habitats Pupils should be taught to: ♣ 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 microhabitats ♣ 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.	Living Things and their habitats Pupils should be taught to: ♣ recognise that living things can be grouped in a variety of ways ♣ explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment ♣ recognise that environments can change and that this can sometimes pose dangers to living things.	Living Things and their habitats Pupils should be taught to: ♣ 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. Pupils should be taught to: ♣ describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals ♣ give reasons for classifying plants and animals based on specific characteristics.
	States of matter Pupils should be taught to: ♣ 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.	Forces: Pupils should be taught to: ♣ explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object ♣ identify the effects of air resistance, water resistance and friction, that act between moving surfaces ♣ recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
	Sound Pupils should be taught to: ♣ identify how sounds are made, associating some of them with something vibrating ♣ recognise that vibrations from sounds travel through a medium to the ear ♣ find patterns between the pitch of a sound and features of the object that produced it ♣ find patterns between the volume of a sound and the strength of the vibrations that produced it ♣ recognise that sounds get fainter as the distance from the sound source increases.	Evolution and Inheritance Pupils should be taught 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 ♣ 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
	Electricity Pupils should be taught to: ♣ 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.	Electricity Pupils should be taught to: ♣ 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 bulbs, the loudness of buzzers and the on/off position of switches ♣ use recognised symbols when representing a simple circuit in a diagram.
Caythorpe Consistencies – Working Scientifically		
Year 5 and Year 6 W1: Plan enquiries, including recognising and controlling variables where necessary. W2: Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. W3: Take measurements, using a range of scientific equipment, with increasing accuracy and precision. W4: Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. W5: Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. W6: Present findings in written form, displays and other presentations. W7: Use test results to make predictions to set up further comparative and fair tests. W8: Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments. Vocabulary: Investigation, enquiry, what to change, what we used, what we did, what we found out Investigation, enquiry, prediction, variable, dependent variable, independent variable, constant, patterns, equipment, apparatus, method, results, conclusion Investigation, enquiry, prediction, variable, dependent variable, independent variable, constant, patterns, equipment, apparatus, method, results, conclusion		
	Autumn	Spring
		Summer

Hierarchies	How do we keep ourselves healthy? Animals including humans B3: Describe the changes as humans develop to old age. B5: Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions.	How do we see things? Investigate Light and Seeing P7: Understand that light appears to travel in straight lines. P8: 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. P9: 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. P10: 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.	What happens if I mix substances together? Properties of materials and changes in materials C2: Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. C3: Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. C4: Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. C5: Demonstrate that dissolving, mixing and changes of state are reversible changes. C6: 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, oxidation and the action of acid on bicarbonate of soda.	Where are we in the Solar System? Understand the Earth's Movement in Space P17: Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. P18: Describe the movement of the Moon relative to the Earth. P19: Describe the Sun, Earth and Moon as approximately spherical bodies. P20: Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	Where do they belong in the animal kingdom? <u>Investigate Living Things</u> B9: Describe how living things are classified into broad groups according to common observable characteristics, including micro-organisms, plants and animals <u>Understand Evolution and Inheritance</u> B10: Give reasons for classifying plants and animals based on specific characteristics.	Why are animals so suited to their environment? Evolution and inheritance <u>Understand Evolution and Inheritance</u> B10: Give reasons for classifying plants and animals based on specific characteristics. B11: Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. B12: Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. B13: Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Resources	iPads, Tissue paper, coloured card, felt tips, coloured pencils, crayons, Laptops/computers/tablets for internet research, graphing software on laptops, squared paper	Torches, shadow puppets, plain paper/screen, diagram of an eye, mirrors, rulers	Beakers, thermometers, stopwatch, water (warm), jelly cubes, knives, spoons, water, filter paper, different sizes of sieve, teaspoons, pepper, rice, glitter, marbles, sand, salt, sugar, paperclips, Diet Coke, Mentos, Film canister, water, effervescent tablets, Candle, glasses, safety matches, stopwatch, heat safety mats, Batteries, bulbs and wires; magnets; torches; weights; water and a variety of materials to be tested according to their properties	Split pins, skewers, polystyrene balls, oratories, inflatable planets for solar system, posters, access to internet	Clipboards, Magnifying glasses, digital Cameras, Books, internet, posters,	iPads and laptops, internet access – research, reference materials, examples of fossils,
Flashback	- The 5 main food groups are fruits/vegetables, carbohydrates, protein, dairy, oils and spreads - Opposite magnetic poles attract, the same poles repel one another. - Magnetic materials are always made from metal but not all metals are magnetic.	- Construct and interpret a variety of food chains, identifying, produces, prey and predators. - Living things can be grouped in a variety of ways and we can use classification keys to help us sort them. - Humans change a develop as they grow into old age. These changes could include poorer vision, hearing decreases, skin wrinkles and injuring repair less quickly, muscle strength is lost, organs work less effectively, nutrients are absorbed less efficiently.	- Environments can change and that this can sometimes pose dangers to specific habitats. - Drugs effect the mind and the body. They sometimes have positive effects but can have negative effects on the body. - Exercise, a healthy diet, appropriate amounts of sleep and reduced stressed can all prolong the effects of aging.	- Light appears to travel in straight line. - We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. - Some substances will dissolve in liquid to form a solution, We can use evaporation, sieving and filtering to recover the substance to the solution.	- A shadow changes shape depending on the position of a light source and this is why a shadow changes length throughout the day (when the sun changes position). - Dissolving, mixing and changes of state are all reversible changes. - Changes that involve burning and oxidation are often irreversible. - The Sun is at the centre of our solar system, anything that orbits the sun is part of our solar system. - The Earth orbits the Sun, and the moon orbits the Earth. The Earth spins on its axis every 2 hours, this causes day and night.	- Living things are organised into groups based on common observable characteristics. - The planets in the solar system Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune - The phases of the moon are New Moon, waxing crescent, first quarter, waxing gibbous, full Moon, waning gibbous, third quarter and waning crescent. - Linnaeus creates a classification system to sort living things into groups based on their structure and characteristics. - Microorganisms are organisms that cannot be seen with the naked eye.
Lesson 1	WALT: know how scientific ideas about food and diet were tested in the past and how this has contributed to our knowledge of a balanced diet. Activities: Children will learn about historical health problems caused by poor diet, and how the work of scientists such as James Lind helped develop a better understanding of how diet affects health. They will then consider and	WALT: know how shadows are formed. Activities: Children revisit their knowledge about how shadows are formed and the objects which create them. They focus specifically on the shapes of the shadows and why shadows are the shape of the object which creates them. Children will know:	WALT: know that some materials will dissolve in liquid to form a solution Activities: Children will explore what happens to substances when they are mixed with water. In their independent activities, they will conduct a fair test to find out which substances are soluble, and which are insoluble. In the FSD? activity, children will	WALT: know the movements of the Sun, Earth and Moon. Activities: Children will learn about the celestial bodies of the Sun, Moon and Earth and how they are related to one another. They will learn that each of them are a roughly spherical shape and investigate and define the word 'orbit'. They will use these scientific words in a brief description	WALT: know ways of grouping organisms according to their characteristics. Activities: Children will learn about some of the broad groups used to classify animals, then identify, sort or describe organisms within those groups according to some of their characteristics. Children will know: that organisms can be grouped according to their characteristics	WALT: know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Activities: Children will learn about traits that are passed from one generation by the next, and consider ways in which in which some inherited characteristics may vary. They may then identify ways in which families or groups

	describe how medical tests and trials might be conducted, or improved. Children will know: • some examples of how doctors in the past tested ideas about food and diet • how these tests in the past have affected our ideas about healthy eating today • that in order to be healthy we need a balanced diet which includes different food groups Vocabulary: Balanced diet – eating the right amounts of different types of food to stay healthy. Nutrients – substances in food that the body needs to grow, repair itself, and stay healthy (like vitamins, minerals, proteins, etc.). Scurvy – a disease caused by a lack of vitamin C, common in sailors in the past. Clinical trial – a test or experiment to find out if a treatment (like a new diet or medicine) works.	• examples of light sources and describe how light travels • how light travels and explain how a shadow is created • why a shadow takes the shape of the object casting it Vocabulary: Light source – an object or substance that gives off light, such as the Sun, a lamp, or a flashlight. Shadow – a dark area formed when an object blocks light. Opaque – an object that does not let light pass through, which is why it casts a shadow. Reflection – the bouncing back of light from a surface, which can also be linked to how light travels and interacts with objects.	explore what factors other than temperature can help jelly cubes to dissolve more quickly Children will know: • the terms ‘dissolve’, ‘soluble’, ‘insoluble’ and ‘solution’. • which materials are soluble and insoluble through their enquiry Vocabulary: Dissolve – when a solid mixes completely with a liquid, creating a solution. Soluble – a substance that can dissolve in a liquid (like sugar in water). Insoluble – a substance that cannot dissolve in a liquid (like sand in water). Solution – a mixture formed when a substance (solute) dissolves in a liquid (solvent).	of the Sun, Earth and Moon’s movements around each other. Children will know: • the Sun, Earth and Moon’s shape as roughly spherical • what an orbit is • the Sun, Earth and Moon’s movements in relation to one another Vocabulary: Orbit – the curved path that one object follows around another, like how the Earth orbits the Sun and the Moon orbits the Earth. Spherical – the shape of an object that is roughly round, like the shape of the Earth, Sun, and Moon. Rotation – the spinning of an object around its axis, like how the Earth rotates to create day and night. Revolution – the movement of one object around another in an orbit, such as the Earth's revolution around the Sun.	• the characteristics of different classifications of animals • how to match animals to their group according to their characteristics Vocabulary: Classification – the process of sorting organisms into groups based on shared characteristics. Characteristics – the features or traits that make an organism unique, such as shape, size, behaviour, or habitat. Vertebrate – animals with a backbone, such as mammals, birds, reptiles, amphibians, and fish. Invertebrate – animals without a backbone, such as insects, arachnids, molluscs, and crustaceans.	of people have some similar or shared characteristics. Children will know: • that animals produce offspring that are like themselves • why variation in offspring occurs Vocabulary: Offspring – the young produced by an organism, such as a baby, chick, or calf, which inherits traits from its parents. Inheritance – the process by which traits or characteristics are passed from parents to their offspring through genes. Variation – the differences between individuals of the same species, which can occur in traits like size, colour, or behaviour. Genes – units of inheritance that carry information about an organism's traits, passed from parents to offspring
Lesson 2	WALT: know why a variety of foods is important for a healthy diet. Activities: Children will learn about food groups: what they provide our bodies with, and what quantities of each we need in a balanced diet. They will then either design balanced meals or study food labelling. Children will know: • the different food groups • which types of foods are included in different food groups • why each different food group is important for a healthy lifestyle Vocabulary: Food groups – categories of foods that share similar nutrients, like fruits, vegetables, proteins, dairy, and grains. Carbohydrates – foods that give the body energy, such as bread, rice, and pasta. Proteins – foods that help the body grow and repair itself, like meat, fish, eggs, and beans. Fats – foods that provide energy and help protect organs, found in things like oils, butter, and nuts.	WALT: investigate how we can change shadows. Activities: Children conduct an investigation into how we can change and manipulate shadows ‘shape, length, intensity and in particular, size. They conduct an experiment, identifying the key variables, and observe the results. They then draw conclusions from their results. Children will know: • a clear, scientific description of translucent, transparent and opaque and how this property affects an object’s shadow • how an object’s shadow can be manipulated Vocabulary: Transparent – an object that allows light to pass through it, so it does not cast a distinct shadow. Translucent – an object that allows some light to pass through, creating a faint or blurry shadow. Variable – something that can change in an experiment, such as the distance between the light source and the object or the angle at which the light is shone.	WALT: use knowledge of solids, liquids and gases to decide how mixtures and solutions might be separated Activities: Children will explore ways in which the original materials in some mixtures and solutions may be recovered, by the process of evaporation, or by sieving or filtering. In their independent activities they will use their knowledge and understanding of soluble and insoluble substances to explain how mixtures could be separated. Children will know: • what the terms soluble and insoluble mean • that evaporation can be used to separate soluble materials from water • that filtering can be used to separate insoluble materials from water Vocabulary: Evaporation – the process where a liquid turns into a gas, often used to separate a soluble material from a liquid (e.g., water evaporating to leave salt behind). Filtration – a method used to separate insoluble solids from liquids by passing the mixture through a filter (e.g., separating sand from water). Mixture – a combination of two or more substances that are not chemically bonded and can be separated by physical methods (e.g., sand and salt).	WALT: know how the rotation of Earth creates day and night. Activities: Children will learn that the rotation of Earth on its axis is what creates day and night. They will conduct an investigation using sundials and make observations on what they record throughout the experiment. Alternatively, they will explore time zones using the internet and how, and why, locations have different time zones. Children will know: • how the rotation of Earth on its axis creates day and night • how to explain the apparent movement of the sun across the sky • how long it takes Earth to make a full rotation Vocabulary: Rotation – the spinning of the Earth on its axis, which causes day and night. Axis – an imaginary line that Earth spins around, running from the North Pole to the South Pole. Time zones – regions of the Earth where the time is the same, determined by the Earth's rotation and position relative to the Sun. Apparent movement – the way the Sun seems to move across the sky due to the Earth’s rotation, creating the cycle of day and night.	WALT: know ways of distinguishing between organisms that have similar characteristics. Activities: Children will consider ways in which animals which belong to the same broad group can be distinguished and further classified. Children will know: • how to classify organisms according to broad characteristics • ways to distinguish between organisms that are similar • know how to use appropriate scientific vocabulary to describe organisms and their features Vocabulary: Taxonomy – the science of classifying organisms into groups based on their characteristics, such as species, genus, family, etc. Species – the most specific group in classification, where organisms can interbreed and produce fertile offspring (e.g., a dog species). Genus – a classification group that is broader than species and groups together closely related organisms (e.g., the genus <i>Canis</i> for dogs). Adaptation – the specific features or behaviours that help an organism survive in its environment, often used to distinguish between similar species.	WALT : know how animals and plants are adapted to suit their environment in different ways. Activities: Children will learn about how random mutations may or may not be passed from one generation to the next, and how this process results in variation. They will then consider whether certain variations are advantageous, giving reasons why Children will know: • the conditions of an environment • characteristics which help an organism to be well suited to its environment • why different organisms in the same environment may have different characteristics Vocabulary: Adaptation – a feature or characteristic of an organism that helps it survive and thrive in its environment (e.g., the long neck of a giraffe helps it reach high leaves). Mutation – a random change in an organism's genetic material that may result in a new trait or characteristic. Variation – differences among individuals in a species, which can result from mutations or genetic recombination. Survival advantage – a characteristic that increases an organism’s chances of surviving and reproducing in its environment (e.g., camouflage that helps animals avoid predators).
Lesson 3	WALT: know what everyday lifestyle choices are important to keep us healthy. Activities: Children will conduct a survey with class members and teachers to	WALT: investigate how shadows change throughout the day due to the sun’s position. Activities: Based on what the children found out in previous lessons about the position of the light source they will plan an investigation	WALT: know that some changes form new materials, and that these changes are not usually reversible Activities: Children will identify solutions which are the product of irreversible	WALT: know how Earth’s tilt creates seasons. Activities: Children will learn about how the seasons are created because of the tilt of Earth’s axis. They will learn how Earth is split into its Northern and Southern Hemispheres and how	WALT: classify plants according to their characteristics. Activities: Children will learn some ways in which plants are classified by botanists, then take photos, collect samples, or research, then classify plants.	WALT: know that adaptation of plants and animals to suit their environment may lead to evolution. Activities: Children will learn about how, if traits are advantageous to a species, they may

	examine what healthy lifestyle choices people make. They will then use this to create a healthy lifestyle checklist to help support others in living a healthy life. (This might include things such as drinking, 8 glasses of water a day, cleaning your teeth twice a day, washing your hands before eating, exercising regularly etc.) Children will know: - that the lifestyle choices that they make can affect their health - what some healthy lifestyle choices might be - healthy lifestyle choices they can make Vocabulary: Lifestyle – the way a person lives, including their daily habits and choices. Hygiene – keeping yourself and your surroundings clean to stay healthy and prevent illness. Exercise – physical activity that keeps the body fit and strong. Wellbeing – a person's overall health, including physical, mental, and emotional health.	about shadow position due to the sunlight. They will then conduct this investigation throughout the day. Children will know: - further questions based on investigations that have been conducted - how plan a fair investigation - measure and record results accurately - shadows are longer in the morning and evening and shortest at midday Vocabulary: Fair test – an experiment where you change only one thing at a time to make sure the results are accurate. Position of the Sun – where the Sun is in the sky at different times of the day, which affects the length and direction of shadows. Midday – when the Sun is at its highest point in the sky, making shadows the shortest.	reactions between the substances that were dissolved. They will then carry out practical investigations involving irreversible reactions. Children will know: - that when some materials are mixed together they cannot be separated again - that when an irreversible change takes place a new substance is produced - how to tell if the new substance produced is a gas Vocabulary: Irreversible change – a change that cannot be undone, where a new substance is formed (e.g., cooking an egg or burning wood). Chemical reaction – a process in which substances are mixed or heated and change into new substances (e.g., vinegar and baking soda creating gas). Substance – a type of matter with a specific composition and set of properties (e.g., water, salt, or oxygen). Gas – a state of matter that does not have a fixed shape or volume and can be produced during a chemical reaction (e.g., bubbles in a fizzy drink).	the seasons are different for the two halves of the planet. They will identify the seasons for the Northern Hemisphere based on the location of Earth in its orbit. Alternatively, the children will investigate day length and how it changes seasonally using data and graphs. Children will know: - the different changes that happen between seasons - Earth’s tilted axis causes the seasons to change - the differences in seasons between two locations in opposite hemispheres? Vocabulary: Tilt – the angle at which Earth is tilted on its axis, which affects how sunlight hits different parts of the Earth and causes the seasons. Hemispheres – the two halves of the Earth, divided by the equator: the Northern Hemisphere and the Southern Hemisphere. Seasons – the four distinct periods of the year (spring, summer, autumn, and winter) caused by Earth's tilt and its orbit around the Sun. Equator – an imaginary line around the middle of Earth that divides the planet into the Northern and Southern Hemispheres.	Children will know: - that plants can be sorted into groups according to their characteristics - the difference between vascular and non-vascular plants - the difference between flowering and non-flowering plants Vocabulary: Vascular plants – plants that have specialized tissues (xylem and phloem) for transporting water, nutrients, and food throughout the plant, such as trees and ferns. Non-vascular plants – plants that lack these specialized tissues, often smaller and found in damp environments, such as mosses and liverworts. Flowering plants – plants that reproduce by producing flowers and seeds, such as roses and sunflowers. Non-flowering plants – plants that do not produce flowers, such as conifers (which produce cones) and ferns.	be passed on and that evolution can occur. They may then undertake some of a range of activities where they will identify advantageous traits of species, learn more about evolutionary scientists, or sequence description of evolutionary processes. Children will know: - that not all inherited characteristics are advantageous - why advantageous characteristics are more likely to be passed from generation to generation - understand that whole species can evolve in this way Vocabulary: Evolution – the process by which species change over time through adaptations to their environment, where beneficial traits become more common in a population. Adaptation – a characteristic or behaviour that helps an organism survive in its environment, such as a bird’s beak shape suited to its food source. Natural selection – the process by which organisms with traits that are advantageous for survival are more likely to reproduce, passing those traits to the next generation. Species – a group of organisms that can interbreed and produce fertile offspring, sharing common characteristics and traits.
Lesson 4	WALT: how the human body changes into old age. Activities: Children will describe how the human body changes into old age and consider how life style choices might speed up or slow down these effects. Children will know: - that human bodies change over time - some of the effects of old age - how lifestyle choices speed up or slow down these effects Vocabulary: Ageing – the natural process where the body and its functions change over time. Development – the process of physical, mental, and emotional growth and change over a lifetime. Degeneration – the gradual decline in body function (like muscles weakening or bones becoming more fragile) that happens with age. Lifestyle factors – choices like diet, exercise, and habits that can influence how we age.	WALT: know how we see objects. Activities: The children will conduct demonstrations to prove that light travels in straight lines. Children will know: - the names of the parts of the eye and briefly describe what the main parts do - how light travels in a straight line to allows us to see an object - that all objects reflect an amount of light Vocabulary: Reflection – when light bounces off an object, allowing us to see it. Lens – part of the eye that focuses light to form an image. Optic nerve – the part of the eye that sends signals from the eye to the brain, allowing us to process what we see.	WALT: know when a change caused by heating or cooling is reversible or irreversible Activities: Children will learn about reversible and irreversible changes caused by heating or cooling materials. They will then either predict and sort materials according to what may happen when they are heated or cooled, or explore irreversible reactions by cooking. Children will know: - that heating and cooling materials can cause them to change - reversible and irreversible changes caused by heating and cooling - how to reverse a change caused by heating or cooling Vocabulary: Reversible change – a change that can be undone, where the material returns to its original state (e.g., melting chocolate or freezing water). Melt – to change from a solid to a liquid when heated (e.g., ice melting into water). Freeze – to change from a liquid to a solid when cooled (e.g., water freezing into ice).	WALT: know the phases of the Moon. Activities: Children will be guided through the lunar month and the eight phases of the Moon that can be seen as the Moon orbits Earth. They will learn to identify the shapes of each phase and the names of these shapes, including if the phase is waxing or waning. They will create their own spinning diagram of each of these phases. Children will know: - the different phases of the moon - the order the phases of the moon - the phases of the moon are created Vocabulary: Lunar month – the period of about 29.5 days it takes for the Moon to complete one full cycle of phases as it orbits Earth. Waxing – the phase of the Moon when the visible portion is growing larger, moving from a new moon to a full moon. Waning – the phase of the Moon when the visible portion is shrinking, moving from a full moon to a new moon. Phases – the different stages of the Moon’s appearance during its cycle, such as new moon, crescent, quarter, and full moon.	WALT: know what microorganisms are Activities: Children will learn about some ways in which microorganisms are classified, and what they need to survive. Following this, they may either write in depth about micro-organisms, or conduct an experiment to determine what food a microorganism prefers. Children will know: - what micro-organisms are - that some micro-organisms can be harmful and others can be helpful - that micro-organisms can be classified into groups Vocabulary: Linnaean system – the classification system developed by Carl Linnaeus, where organisms are grouped by shared characteristics and given a two-part Latin name (binomial nomenclature). Binomial nomenclature – the system of naming organisms with two parts: the genus name (capitalized) and the species name (lowercase), e.g., <i>Homo sapiens</i> for humans.	WALT: know the importance of the work of Darwin in understanding evolution Activities: Children will learn about the contributions of ancient Greek scientists to our understanding of evolution. They will also study in greater depth the work of Carl Linnaeus and, particularly, that of Charles Darwin. Children will know: - that our understanding of process of evolution has developed over time - what they have learned about the process of evolution Vocabulary: Evolution – the process by which species change over time due to adaptations that increase survival chances. Natural selection – the process by which organisms with traits that better suit their environment are more likely to survive and reproduce, passing those traits on to future generations. Theory – a well-supported explanation based on evidence and observations, such as the theory of evolution, which explains how species change over time.

Lesson 5	WALT: know the effects of tobacco, alcohol and other drugs. Activities: Children will learn about what drugs are, how some are helpful and some are harmful. They will also consider ways in which drugs have side effects. Following this, children may explain differences between drugs, or their effects, in their own words. Children will know: - that drugs affect the way the mind or body works - that some drugs are beneficial even though they may have unpleasant side-effects - some of the negative effects of tobacco and alcohol on the body Vocabulary: Drugs – substances that change how the body or mind works. Medicines – drugs that are used to treat or prevent illness and can have both positive effects and side effects. Addiction – when a person’s body or mind becomes dependent on a substance like tobacco or alcohol. Side effects – unwanted or unexpected effects that a drug can cause in addition to its main purpose.	WALT: know the law of reflection. Activities: Children will learn about the law of reflection and use their knowledge and understanding of identifying and measuring angles to predict reflected light rays. They will identify the angle of incidence and reflection and use these to complete a light maze. Children will know: - what reflection is - that the angle of incidence is equal to the angle of reflection - examples of how angled mirrors can be used in different ways Vocabulary: Reflection – the bouncing of light off a surface, allowing us to see images or light patterns. Angle of incidence – the angle at which the incoming light ray hits a reflective surface. Angle of reflection – the angle at which the reflected light ray bounces off the surface, which is always equal to the angle of incidence. Mirror – a surface that reflects light to create an image, often used to study the law of reflection.	WALT: investigate the materials needed for something to burn and the new materials formed by burning happening. Activities: Children will consider what happens when materials are burned, including what new materials are produced. They will carry out investigations involving burning a candle and explain what is Children will know: - that new materials are formed when materials are burned - what happens when a candle burns - how to assess hazards associated with burning materials Vocabulary: Combustion – the process of burning, where materials react with oxygen to produce heat, light, and new substances (e.g., carbon dioxide and water). Fuel – a substance that can burn, such as wood, gas, or a candle wick, providing energy when it reacts with oxygen. Ash – the solid remains left after something is burned, often a product of combustion. Oxygen – a gas in the air that is necessary for combustion to occur, enabling materials to burn.	WALT: know how theories about our solar system have changed. Activities: Children will learn about and discuss how the ideas about the solar system developed and changed over the years until we arrived at the model we have today. The children will compare the similarities and differences between a geocentric and heliocentric model of the solar system. Children will know: - what the solar system is - what the differences between geo and heliocentric models of the solar system are - how to compare the ideas of the solar system we know now, with those held by Ptolemy and Copernicus Vocabulary: Solar system – the Sun and all the objects that orbit around it, including planets, moons, asteroids, and comets. Geocentric – an ancient model of the solar system in which Earth is at the centre, and all other celestial bodies orbit around it. Heliocentric – the model of the solar system proposed by Copernicus, where the Sun is at the centre and the planets, including Earth, orbit around it. Theory – a well-supported explanation of phenomena, based on evidence and experimentation, such as the theories about the structure of the solar system.	WALT: find out about Carl Linnaeus and his classification system. Activities: Children will learn about the development of Linnaeus’ classification system, then use it to help them identify, classify, and answer questions about a number of different organisms. Children will know: - who Carl Linnaeus is and how he contributed to science - that animals can be assigned to specific groups based on their characteristics - reasons for why classification systems are important Vocabulary: Microorganisms – tiny organisms, such as bacteria, fungi, and viruses, that are usually too small to be seen without a microscope. Bacteria – a type of microorganism that can be found in many environments and can be both helpful (e.g., in digestion) and harmful (e.g., causing disease). Fungi – a group of microorganisms that include moulds and yeasts, some of which are beneficial (used in food production) and others that can cause infections. Virus – a microorganism that requires a host cell to replicate and can cause diseases, such as the flu or the common cold.	WALT: recognise that living things have changed over time and that a number of factors can affect a species’ evolution. Activities: Children will learn about mutations, and how external factors can affect the evolution of a species. They will then either summarise their learning about how the fossil record provides evidence of this, or summarise given technical vocabulary in their own words, drawing on prior knowledge and learning. Children will know: - fossils provide evidence of organisms that inhabited the Earth millions of years ago - that a species can change over time due to mutations - that a species can change over time due to external factors such as competition from other species, disease or climate change Vocabulary: Evolution – the process by which species change over time due to factors like mutations and environmental influences. Mutation – a random change in an organism’s genetic material that can lead to new traits or characteristics, which may be passed on to future generations. Fossils – the preserved remains or impressions of organisms from the past, which provide evidence of life forms that existed millions of years ago. External factors – outside influences, such as climate change, disease, or competition, that can affect the survival and evolution of a species.
Lesson 6	WALT: evaluate what we can do to keep our bodies healthy. Activities: In the light of prior learning about the functions of the human body, children will gather their ideas about staying healthy, and present them in a variety of ways. They will do an end of unit quiz. Children will know: - the impact that diet has on the body. - why exercise is important for a healthy lifestyle. - the harmful effects some drugs can have on the body. Vocabulary: Hydration – ensuring the body gets enough water to function properly. Immune system – the body’s defence against illness and disease, which can be strengthened by healthy habits. Lifestyle – the way we live, including our daily habits, which can affect our health.	WALT: know how refraction occurs. Activities: Children will learn about how refraction can bend and change the direction of light rays. They will then need to differentiate between whether or not an object will reflect or refract light. Children will know: - what happens to light when it’s refracted - if an object will reflect or refract light - some examples of objects which use refraction in a useful way Vocabulary: Refraction – the bending of light as it passes from one material (like air) to another (like water or glass), causing it to change direction. Lenses – curved pieces of glass or other material that bend light, often used in tools like glasses, magnifying glasses, or cameras.	WALT: investigate the effect of acid on bicarbonate of soda. Activities: To conduct an investigation to test the effect of acid on bicarbonate of soda, exploring the scientific reason for this effect. Children will know: - that when vinegar and bicarbonate soda are mixed new substances are formed. - that this reaction is not reversible. - how to write observations about what they notice in the reactions and can predict what substances might have been formed. Vocabulary: Acid – A substance that can react with bases (vinegar is an acid). Base – A substance that can react with acids (bicarbonate of soda is a base). Reaction – When two substances mix and change to form something new. Carbon dioxide – A gas produced in the reaction (the bubbles).	WALT: know the planets in the solar system. Activities: Children will conduct their own research into the planets within our solar system. They will discuss the objects in our solar system as a class, including natural satellites, comets, asteroids (and the asteroid belt), planets and dwarf planets. They will work to create their own fact book or model of the solar system. Children will know: - the name the eight planets in our solar system - the order of the 8 planets Vocabulary: Planet – a large celestial body that orbits a star (in our case, the Sun) and does not produce its own light. Natural satellite – a moon or other object that orbits a planet, such as Earth’s Moon. Asteroid – a small rocky body that orbits the Sun, mostly found in the asteroid belt between Mars and Jupiter.	WALT: identify and classify organisms in the local area. Activities: Children will either look at a local environment, or study one in another country. They will identify and classify organisms in that environment. Children will know: - a variety of different organisms found in their local environment - how to classify a variety of organisms appropriately - a variety of sources of information to identify organisms they are unfamiliar with Vocabulary: Organism – any living thing, including animals, plants, fungi, and microorganisms. Classification – the process of sorting organisms into groups based on shared characteristics. Habitat – the natural environment where an organism lives, which provides the resources it needs to survive. Field guide – a book or resource that helps identify and classify organisms based on their characteristics, such as a guide to local plants and animals.	WALT: know how humans have evolved over time, and how human behaviour can affect change in species over time. Activities: Children will learn about human adaptations which allow us to thrive, then consider some impacts of human behaviour on other species. They will then either discuss these impacts in greater depths, or discuss some beliefs and misconceptions about evolution. Children will know: - that primate species (including humans) have changed over time - some ways in which human behaviour has changed the characteristics of other species - positive and negative consequences of this human behaviour Vocabulary: Evolution – the process through which species, including humans, change over time due to natural selection, genetic mutations, and other factors.

	Prevention – actions taken to avoid health problems, like a healthy diet, exercise, and avoiding harmful substances.			Dwarf planet – a celestial body that orbits the Sun and is similar to a planet but does not clear its orbit of other objects (e.g., Pluto).		Adaptation – a characteristic or feature that helps an organism survive and reproduce in its environment, such as opposable thumbs in humans. Primate – a group of mammals, including humans, apes, and monkeys, that share certain characteristics such as flexible limbs and large brains. Impact – the effect or influence that human behaviour, such as habitat destruction or domestication, has on other species and their evolution.
Key Knowledge	Children will know: • Humans change and develop as they grow into old age. These changes could include poorer vision, hearing decreases, skin wrinkles and injuring repair less quickly, muscle strength is lost, organs work less effectively, nutrients are absorbed less efficiently. • Drugs affect the mind and the body. They sometimes have positive effects but can have negative effects on the body. • Exercise, a healthy diet, appropriate amounts of sleep and reduced stress can all prolong the effects of aging.	Children will know: • Light appears to travel in straight line. • We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • A shadow changes shape depending on the position of a light source and this is why a shadow changes length throughout the day (when the sun changes position).	Children will know: • Some substances will dissolve in liquid to form a solution. We can use evaporation, sieving and filtering to recover the substance from the solution. • Dissolving, mixing and changes of state are all reversible changes. • Changes that involve burning and oxidation are often irreversible.	Children will know: • The Sun is at the centre of our solar system, anything that orbits the sun is part of our solar system. • The Earth orbits the Sun, and the moon orbits the Earth. The Earth spins on its axis every 24 hours, this causes day and night. • The planets in the solar system are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune • The phases of the moon are New Moon, waxing crescent, first quarter, waxing gibbous, full Moon, waning gibbous, third quarter and waning crescent.	Children will know: • Living things are organised into groups based on common observable characteristics. • Linnaeus creates a classification system to sort living things into groups based on their structure and characteristics. • Microorganisms are organisms that cannot be seen with the naked eye.	Children will know: • Living things change over time and fossils provide information about living things that inhabited the earth millions of years ago. • Living things produce offspring of the same kind but they are not normally identical to their parents • Animals and plants are suited to their environment because advantageous mutations are more likely to be passed on to the next generations.