Science Knowledge Progression Document

Strands
At EYFS, the knowledge progression takes full account of the Early Learning Goals of: • Changes in the Natural World
• At key stage 1, the knowledge progression takes full account of the national curriculum's strands of: • Biology • Chemistry • Physics • Working Scientifically
At key stage 2, the knowledge progression takes full account of the national curriculum's strands of: • Biology • Chemistry • Physics • Working Scientifically

EYFS and National Curriculum Subject Content		
Strand	**The Natural World** At the expected level of development will: • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand the effect of the changing seasons on the natural world around them.	
EYFS	Explore the natural world around them. Describe what they see, hear and feel whilst outside, including plants and animals Begin to name a range of common animals Draw pictures of animals and plants around them Be able to sort animals, plants and humans. To develop an understanding of how animals grow and change over time To make observations of animals and plants and explains why some things occur To observe and know how to talk about patterns and changes To know how to show care and concern for living things and the environment To know the changes that happen in each season and the effect on the world around them Experience natural and human made materials. Use the vocabulary needed to name specific features of the natural world, both natural and manmade Begin to understand the need to respect and care for the natural environment To know some similarities and differences in the natural world around them and contrasting environments, drawing on their experiences and what has been read in class To know their senses and use them to explore objects To explore materials and name things that are the same and different. Name and describe everyday materials based on their simple properties Play with a range of materials and discover whether they can be changed Identify a range of materials and experiment with how they behave in different conditions. To know some forces and explore the impact they have on different objects	**Oracy – 'Talk like a' Scientist** similarities differences hard runny soft It changed from/to I wonder I found out changes Pictures Series of pictures I can see season weather best worst prior learning question tests sets of tasks

	To explore and name different forces they can feel <u>Questioning:</u> -showing curiosity and asking questions (UTW) Predicting (Non-statutory): -use 'I wonder…' sentence starter -use talk to help explain why things might happen (C+L) <u>Planning:</u> -use talk to help organise thoughts and activities (C+L) -use talk to help work out problems and organise thinking (C+L) <u>Gathering evidence:</u> -make observations using their senses and simple equipment (UTW) -record their observations by drawing, taking photographs, using sorting rings or boxes and on simple tick sheets (UTW) -begin to use one handed tools and equipment. (PD) -develop their fine motor skills so that they can use a range of tools competently (PD) -to observe and know how to talk about patterns and changes (UTW) <u>Analysing and interpreting:</u> -make direct comparisons (UTW) -identify, sort and group (UTW) <u>Drawing conclusions:</u> -talk about what they have done and found out (UTW) -Use their observations to help them to answer their questions (UTW) <u>Sharing:</u> -Begin to use gestures to support delivery meaning e.g. pointing at parts of a plant -Use talk in play to practice new vocabulary: e.g: lighter, heavier. -Begin to speak in sentences, joining phrases with words such as "if, because, so, could, but." -Use 'because' to develop their ideas	question compare guess

Science Curriculum Map

Key: **substantive knowledge = red** **disciplinary knowledge = black**

	T1	T2	T3	T4	T5	T6

Year 1		Meteorology & Botany	Nutrition	Zoology	Engineering	Botany
		• To know how to observe changes in weather across the four seasons. • To know how to observe and describe the weather associated with each season. • To know that the length of day changes throughout the year. • To know that other places around the world that have the same weather as the UK. • To know that it is important that we never look directly at the sun. **Botany** • To know how plants and trees change over time – leaves falling, blossom and flowers dying/changing colour. • To know a range of deciduous and evergreen trees -to know about the work of past and present scientists: Past -Anders Celsius/Daniel Fahrenheit Present - Laura Tobin -explore the world around them and raise their own questions -ask people questions and use simple secondary sources to find answers -observing closely, using simple equipment -gathering and recording data to help in answering questions -observe changes over time -use simple measurements and equipment (for example, hand lenses, egg timers) to gather data -identify and classify -use simple features to compare objects, materials and living things -with help, decide how to sort and group objects, materials and living things -Using vocabulary appropriately specific to the topic in hand e.g.	• To know the importance of eating the right amounts and types of food -to know the important of exercise for humans • To know about the importance of being hygienic around food and cooking methods. Anatomy • Identify, name, draw and label the basic parts of the human body and identify parts used for senses. • To know the names of the main body parts (head, neck, arms, elbows, legs, knees, face, hair, teeth) -to know about the work of past and present scientists: Past - Edward Jenner Present -Tom Howard or Prof Chris Whitty -identify and classify -use simple features to compare objects, materials and living things -with help, decide how to sort and group objects, materials and living things -talk about what they have found out and how they found it out	• To know a range of common animals, including fish, amphibians, reptiles, birds and mammals – use animals that children should have seen in zoos/museums. • To know the type of diet that animals have – herbivore, omnivore, carnivore. • To know and describe and compare the basic structure of a range of different animals (fish, amphibians, reptiles, mammals and birds). -to know about the work of past and present scientists: Past -Steve Irwin Present - David Attenborough -explore the world around them and raise their own questions -use simple measurements and equipment (for example, hand lenses, egg timers) to gather data -use simple features to compare objects, materials and living things -with help, decide how to sort and group objects, materials and living things	• To Know the difference between an object and a material from which it is made. • To know the names of a variety of everyday materials including wood, plastic, metal, glass, water and rock. • To know how to describe the simple physical properties of a range of everyday materials. • To know how to compare and group together a variety of everyday materials on the basis of their simple properties (hard/soft, absorbent/not absorbent, rough/smooth etc.). • To know how to Identify and compare the suitability of materials. -to know about the work of past and present scientists: Past -Charles Macintosh Present - Charlotte McCurdy -use simple features to compare objects, materials and living things -with help, decide how to sort and group objects, materials and living things -identify and classify -using their observations and ideas to suggest answers to questions -using their observations and ideas to suggest answers to questions - record and communicate their findings in a range of ways and begin to use simple scientific language -use simple measurements and equipment (for	• Identify the basic structure of flowering plants and trees – stem/trunk, flower, blossom, petals, seeds, leaves, roots, branches. • Identify and name different sources of food for animals. • Understand the difference between evergreen and deciduous trees. • Identify a range of deciduous and evergreen trees. -to know about the work of past and present scientists: Past - David Douglas Present -Parent/grandparent of child or Alan Titchmarsh -explore the world around them and raise their own questions -ask people questions and use simple secondary sources to find answers -observing closely, using simple equipment -gathering and recording data to help in answering questions -observe changes over time -use simple measurements and equipment (for example, hand lenses, egg timers) to gather data - record simple data using drawings, taking photographs and simple tables - record and communicate their findings in a range of ways and begin to use simple scientific language -talk about what they have found out and how they found it out

		lighter/heavier rather than bigger and smaller			example, hand lenses, egg timers) to gather data	
Year 2	**Botany** • To know how seeds and bulbs grow into mature plants and how they need a suitable temperature, light and water. • To know how plants and trees change over time – leaves falling, blossom and flowers dying/changing colour. • To know a variety of flowering plants and trees. • To know the difference between evergreen and deciduous trees. • To know a range of deciduous and evergreen trees. -to know about the work of past and present scientists: Past -George Forrest Present – Charlotte Taylor			**Science - Zoology** • To know that living creatures have offspring which grow into adults. • To know the difference between living, non-living and dead things. • To know the basic needs for survival of animals including humans. -to know about the work of past and present scientists: Past – Florence Nightingale Present – Bear Grylls - record and communicate their findings in a range of ways and begin to use simple scientific language	**Science - Engineering** • To know the suitability of a range of everyday materials including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses. • To know that some solid objects can have different properties -to know about the work of past and present scientists: Past - Wallace Carothers Present - Genevieve Dion -with help, decide how to sort and group objects, materials and living things -using their observations and ideas to suggest answers to questions	**Science -Zoology & Ecology** -Classify and sort things into the categories of living, non-living and dead things. **Ecology** • To know that living creatures need habitats which give them the basic things they need to survive (water, food, air) • To know that animals and plants need each other to survive. • To know how animals obtain their food from plants and other animals. • To know a variety of plants and animals in their habitats, including micro-habitats. • To know and name a variety of common wild and garden plants that can be found in the UK.

	-asking simple questions and recognising that that they can be answered in different ways -explore the world around them and raise their own questions -ask people questions and use simple secondary sources to find answers -use 'I wonder…' sentence starter -use talk to discuss what they think will happen based on experience or simply a guess -experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions -observing closely, using simple equipment -gathering and recording data to help in answering questions -observe changes over time -use simple measurements and equipment (for example, hand lenses, egg timers) to gather data - record simple data using drawings, taking photographs and simple tables -use simple features to compare objects, materials and living things -with help, decide how to sort and group objects, materials and living things - record and communicate their findings in a range of ways and begin to use simple scientific language -talk about what they have found out and how they found it out -Recite/deliver short pre-prepared material to an audience			- with guidance, begin to notice patterns and relationships -use simple measurements and equipment (for example, hand lenses, egg timers) to gather data -gathering and recording data to help in answering questions	-performing simple explorative or comparative tests -experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions - record simple data using drawings, taking photographs and simple tables -use 'I wonder…' sentence starter -use talk to discuss what they think will happen based on experience or simply a guess	-to know about the work of past and present scientists: Past - Jacques Cousteau Present – Nik Mitchell (Get Wild parent) -asking simple questions and recognising that that they can be answered in different ways -explore the world around them and raise their own questions -ask people questions and use simple secondary sources to find answers -observing closely, using simple equipment -gathering and recording data to help in answering questions -observe changes over time -use simple measurements and equipment (for example, hand lenses, egg timers) to gather data - record simple data using drawings, taking photographs and simple tables -with help, decide how to sort and group objects, materials and living things - record and communicate their findings in a range of ways and begin to use simple scientific language -talk about what they have found out and how they found it out
Year 3	Geology •To know how to compare and group together different kinds of rocks on the basis of their appearance and simple physical	Kinetics •To know how to compare how objects move on different surfaces depending on the properties from which they are made.	Anatomy •To know 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.			Ecology •To know the functions of different parts of trees and plants, including the stem/trunk, flower, blossom, petals, seeds, leaves, roots, branches.

	properties (e.g. metamorphic, igneous and sedimentary). •To know and be able to describe, in simple terms, how fossils are formed when things that have lived are trapped within rock. •To know that soils are made from rocks and organic matter. •To know how rocks, change over time. -to know about the work of past and present scientists: Past –Mary Anning Present - Dean Lomax -recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables -identifying differences, similarities or changes related to simple scientific ideas and processes - talk about criteria for grouping, sorting and classifying; and use simple keys -reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences -recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations -Use specialist vocabulary e.g. speak like an archaeologist -Make precise language choices e.g. instead of describing a cake as 'nice' using 'delectable'	-To know what forces can do to an object •To know that some forces need contact between two objects, but magnetic forces can act at a distance. •To know how different magnets can have different strengths. •To know how to observe how magnets attract or repel each other and attract some materials and not others. •To know how to compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. •To know magnets as having two poles. •To be able to predict whether two magnets will attract or repel each other, depending on which poles are facing. •To know how magnets can be damaged if they are dropped. Optics •To know that light is needed in order to see things and that dark is the absence of light. •To know that light is reflected from surfaces. •To know that light from the sun can be dangerous and that there are ways to protect their eyes. •To know that shadows are formed when the light from a light source is blocked by an opaque object. •To be able to find patterns in the way that the size of shadows changes. -to know about the work of past and present scientists: Past - Albert Einstein Present - Masato Sagawa -asking relevant questions and using different types of scientific enquiries to answer them	•To know that humans and some other animals have skeletons and muscles for support, protection and movement. -to know about the work of past and present scientists: Past - Elsie Widdowson Present - Christiane Scheffler - talk about criteria for grouping, sorting and classifying; and use simple keys -recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations -recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables -use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences -asking relevant questions and using different types of scientific enquiries to answer them -make simple predictions, of which some will be based on prior knowledge or experiences			•To know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and understand how they vary from plant to plant •To know the way in which water is transported within plants. •To know the importance of leaves for nutrition and flowers for reproduction. -to know about the work of past and present scientists: Past - Marie Clark Taylor Present - Julian Bayliss -asking relevant questions and using different types of scientific enquiries to answer them -after conclusions, raise further questions -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 and recording data -recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables - help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used -collect data from their own observations and measurements, using notes, simple tables and standard units -help to make decisions about how to record data -use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences

		-make simple predictions, of which some will be based on prior knowledge or experiences -setting up simple practical enquiries, comparative and fair tests -know what variables are and begin to suggest ways to control them - recognise when a simple fair test is necessary and help to decide how to set it up - learn how to use new equipment, such as data loggers, appropriately -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 and recording data -recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables - help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used -collect data from their own observations and measurements, using notes, simple tables and standard units -help to make decisions about how to record data				
Year 4	Acoustics •To know how sounds are made and understand that these create vibrations in the air. •To know that vibrations from sounds, travel through a medium to the ear. •To know how to find patterns between the pitch of a sound and features of the object that produced it.	Anatomy •To Know the simple functions of the basic parts of the digestive system in humans (mouth, tongue, teeth, oesophagus, stomach, small and large intestines). •To know the different types of teeth in humans and their simple functions.		Electrology •To know that common appliances that run on electricity •To know that a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers	Geology •To know how to compare and group materials together, according to whether they are solids, liquids or gases. •To know that some materials change state when they are heated or cooled, and measure or research the temperature at	Ecology •To know that living things can be grouped in a variety of ways. •To know the difference between vertebrates and invertebrates and to sort a range of creatures using this property. •To know how to use classification keys to help group, identify and name a variety of living things in their local and wider environment.

	•To know that there is a pattern between the volume of a sound and the strength of the vibrations that produced it. •To know that sounds get fainter as the distance from the sound source increases. -to know about the work of past and present scientists: Past - Heinrich Hertz and Ernst Mach Present - Jaap Haartsen - begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them -make simple predictions, of which some will be based on prior knowledge or experiences - learn how to use new equipment, such as data loggers, appropriately -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 and recording data -recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables -collect data from their own observations and measurements, using notes, simple tables and standard units -using results to draw simple conclusions, -using straightforward scientific evidence to answer questions or to support their findings. -with help, look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions -suggest improvements and raise further questions	•To know and interpret a variety of food chains, identifying producers, predators and prey. -to know about the work of past and present scientists: Past - Hesy-Ra Present - Zhaoming Liu -classifying and presenting data in a variety of ways to help in answering questions -identifying differences, similarities or changes related to simple scientific ideas and processes - talk about criteria for grouping, sorting and classifying; and use simple keys -use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences -Use specialist vocabulary e.g. speak like an archaeologist -Make precise language choices e.g. instead of describing a cake as 'nice' using 'delectable'		•To know whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery •To know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit •To know some common conductors and insulators, and associate metals with being good conductors. -to know about the work of past and present scientists: Past -Ibn Al-Haytham and Abbas Ibn Firnas Present - Esther Sans Takeuchi - talk about criteria for grouping, sorting and classifying; and use simple keys -asking relevant questions and using different types of scientific enquiries to answer them -setting up simple practical enquiries, comparative and fair tests -reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -using straightforward scientific evidence to answer questions or to support their findings. -using straightforward scientific evidence to answer questions or to support their findings.	which this happens in degrees Celsius (°C). •To know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with Temperature. -to know about the work of past and present scientists: Past - Anders Celsius Present - Yuan Daoxian -making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers -setting up simple practical enquiries, comparative and fair tests - start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions -reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -know what variables are and begin to suggest ways to control them - recognise when a simple fair test is necessary and help to decide how to set it up	•To know that environments can change and that this can sometimes pose dangers to living things. -to know about the work of past and present scientists: Past - Carl Linnaeus Present - Vanesa Nakate -classifying and presenting data in a variety of ways to help in answering questions -identifying differences, similarities or changes related to simple scientific ideas and processes - talk about criteria for grouping, sorting and classifying; and use simple keys -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 and recording data -recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables -recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations

				-with help, look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions		
Year 5	Taxonomy •To know and be able to describe the differences in the life cycles of a mammal, an amphibian, a reptile, an insect and a bird. •To know the life process of reproduction in some plants and animals -to know about the work of past and present scientists: Past - Maria Sibylla Merian Past - Jane Goodall -use and develop keys and other information records to identify, classify and describe - identify patterns that might be found in the natural environment -Use and innovate an increasingly sophisticated range of sentence stems with fluency and accuracy - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas	Astrophysics •To know the movement of the Earth, and other planets, relative to the Sun in the solar system. •To know and be able to describe the movement of the Moon relative to the Earth. •To know that the Sun, Earth and Moon are approximately spherical bodies. •To know how to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. -to know about the work of past and present scientists: Past - Galileo and Aristotle Present – Frank Drake -explore ideas and raise scientific questions -recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact - make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them - choose the most appropriate equipment to make measurements and explain how to use it accurately -reporting and presenting findings from enquiries, including	States, and changes, of Matter -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 -to know about the work of past and present scientists:		Astrophysics •To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. •To know the effects of air resistance, water resistance and friction, that act between moving surfaces. •To know how to explore up thrust and investigate how to sink a bottle. •To know how to investigate water resistance by creating different sized boats for hulls. •To know how to investigate how the size of a boat's hull affects the speed of its movement. -recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect -to know about the work of past and present scientists: Past –Isaac Newton Present –Hannah Smitz - recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why -taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate - make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them - choose the most appropriate equipment to make measurements and explain how to use it accurately - decide how to record data from a choice of familiar approaches -reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas

		conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas -identifying scientific evidence that has been used to support or refute ideas or arguments - should talk about how scientific ideas have developed over time -Deliberately varies tone of voice in order to convey meaning e.g. speaking authoritatively during an expert talk -Gestures become increasingly natural -Consider the words and phrases used to express their ideas and how this supports the purpose of talk -To be able to give supporting evidence e.g. citing a text, a previous example or a historical event	Past – John Dalton Present – Matthew Ponting -taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate - make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them -reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations -using test results, make predictions to set up further comparative and fair tests -planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - use their results to identify when further tests and observations might be needed -select and plan most appropriate type of scientific enquiry to answer scientific questions - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas		-identifying scientific evidence that has been used to support or refute ideas or arguments - use their results to identify when further tests and observations might be needed - should talk about how scientific ideas have developed over time -To be able to give supporting evidence e.g. citing a text, a previous example or a historical event	
Year 6	Human Biology & Taxonomy Human Biology • To know that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • To know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents		Human Biology • To know the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • To know the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • To know the ways in which nutrients and water are transported within animals, including humans			Electrology & Optics Electrology • To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • To compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches

	• To know how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Taxonomy -to know that living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals -To be able to give reasons for classifying plants and animals based on specific characteristics. -to know about the work of past and present scientists: Past – Charles Darwin Present –Tanisha Williams -use and develop keys and other information records to identify, classify and describe - identify patterns that might be found in the natural environment - look for different causal relationships in their data and identify evidence that refutes or supports their ideas -reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas -identifying scientific evidence that has been used to support or refute ideas or arguments - should talk about how scientific ideas have developed over time -To be able to give supporting evidence e.g. citing a text, a previous example or a historical event		-to know about the work of past and present scientists: Past –William Harvey Present –Donald Palmer - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas -planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - decide how to record data from a choice of familiar approaches - use their results to identify when further tests and observations might be needed -identifying scientific evidence that has been used to support or refute ideas or arguments - should talk about how scientific ideas have developed over time - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas			• To use recognised symbols when representing a simple circuit in a diagram Optics • To know that light appears to travel in straight lines. • To know how to usethe idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. • To know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • To know how to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. -to know about the work of past and present scientists: Past - Nikola Tesla Present - Rachel Oliver -explore ideas and raise scientific questions -make predictions based on prior knowledge or experiences and explain this -using test results, make predictions to set up further comparative and fair tests -select and plan most appropriate type of scientific enquiry to answer scientific questions - recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why -taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate -reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written

						forms such as displays and other presentations - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas

Substantive Knowledge						
Strand	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Biology						
Living things and their habitats		**Ecology** • To know that living creatures need habitats which give them the basic things they need to survive (water, food, air) • To know that animals and plants need each other to survive. • To know how animals obtain their food from plants and other animals. • To knowhow to identify a variety of plants and animals in their habitats, including micro-habitats. • To know the name of a variety of common wild and garden plants that can be found in the UK		**Ecology** • To know that living things can be grouped in a variety of ways. • To know the difference between vertebrates and invertebrates and to sort a range of creatures using this property. • To know how to use classification keys to help group, identify and name a variety of living things in their local and wider environment • To know that environments can change and that this can sometimes pose dangers to living things.	**Taxonomy** • To know the differences in the life cycles of a mammal, an amphibian, a reptile, an insect and a bird. • To know the life process of reproduction in some plants and animals	**Taxonomy** -to know that living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals -To be able to give reasons for classifying plants and animals based on specific characteristics.
Animals including humans	**Zoology** • To know a range of common animals, including fish, amphibians, reptiles, birds and mammals – use animals that children should have seen in zoos/museums. • To know the type of diet that animals have –	**Zoology** • To know how to classify and sort things into the categories of living, non-living and dead things. • To know how living creatures need habitats which give them the basic things they need to survive (water, food, air)	**Anatomy** • To know 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 • To know that humans and some other animals have skeletons and muscles for	**Anatomy** • To know the simple functions of the basic parts of the digestive system in humans (mouth, tongue, teeth, oesophagus, stomach, small and large intestines). • To know the different types of teeth in humans and their simple functions		**Human Biology** • To know the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • To know the impact of diet, exercise, drugs and lifestyle on the way their bodies function • To know the ways in which nutrients and water are

	herbivore, omnivore, carnivore. • Describe and compare the basic structure of a range of different animals (fish, amphibians, reptiles, mammals and birds).	• To know how animals and plants need each other to survive. • To know how animals obtain their food from plants and other animals. • To know a variety of plants and animals in their habitats, including micro-habitats. • To be able to name a variety of common wild and garden plants that can be found in the UK.	support, protection and movement.	• To know how to construct and interpret a variety of food chains, identifying producers, predators and prey.		transported within animals, including humans.
Plants	**Botany** • To know the basic structure of flowering plants and trees – stem/trunk, flower, blossom, petals, seeds, leaves, roots, branches. • To know different sources of food for animals. • To know how plants and trees change over time – leaves falling, blossom and flowers dying/changing colour. • To know a range of deciduous and evergreen trees	**Botany** • To know how seeds and bulbs grow into mature plants and how they need a suitable temperature, light and water. • To know how plants and trees change over time – leaves falling, blossom and flowers dying/changing colour. • To know a variety of flowering plants and trees. • To know the difference between evergreen and deciduous trees. • To know a range of deciduous and evergreen trees.	**Ecology** • To know, and be able to describe, the functions of different parts of trees and plants, including the stem/trunk, flower, blossom, petals, seeds, leaves, roots, branches. • To know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and understand how they vary from plant to plant • To know the way in which water is transported within plants. • To know the importance of leaves for nutrition and flowers for reproduction.			
Nutrition, Evolution and inheritance	**Nutrition** • To know the importance of eating the right amounts and types of food. -to know the important of exercise for humans • To know the importance of being hygienic around food and cooking methods. • To be able to name, draw and label the basic parts of the human body and identify parts used for senses. • To know the names of the main body parts (head, neck, arms, elbows, legs, knees, face, hair, teeth)					**Human Biology** • To know that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • To know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • To know how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Chemistry						
Everyday Materials and uses of everyday materials	**Engineering** • To know the difference between an object and a material from which it is made. • To know a variety of everyday material including wood, plastic, metal, glass, water and rock. • To know the simple physical properties of a range of everyday materials. • To know how to compare and group together a variety of everyday materials on the basis of their simple properties (hard/soft, absorbent/not absorbent, rough/smooth etc.). • To know how to identify and compare the suitability of everyday materials	**Engineering** • To know the suitability of a range of everyday materials including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses. -Understand that some solid objects can have different properties -find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching				
Rocks and States, and changes, of Matter			**Rocks** • To know how to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (e.g. metamorphic, igneous and sedimentary). • To know how to describe in simple terms how fossils are formed when things that have lived are trapped within rock • To know that soils are made from rocks and organic matter. •To understand how rocks, change over time.	**Geology** • To know how to compare and group materials together, according to whether they are solids, liquids or gases. • To know how to 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). • To know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Geology** -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	
Physics						
Seasonal Changes **Earth and Space**	**Meteorology** • To know how to observe changes in weather across the four seasons. • To know, and be able to describe, the weather associated with each season. • To know the length of day changes throughout the year. • To know how to identify other places around the world that have the same weather as the UK. • To know why it is important that we never look directly at the sun.				**Astrophysics** • To know the movement of the Earth, and other planets, relative to the Sun in the solar system. • To know, and be able to describe, the movement of the Moon relative to the Earth. • To know how to describe the Sun, Earth and Moon as approximately spherical bodies. • To know how to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	
Forces and Magnets			**Kinetics** • To know how to compare how objects move on different surfaces depending on the properties from which they are made. • To know what forces can do to an object • To know that some forces need contact between two objects, but magnetic forces can act at a distance. • To know how different magnets can have different strengths. • To know how magnets, attract or repel each other and attract some materials and not others. • To know how to compare and group together a variety of everyday materials on the basis		**Astrophysics** • To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • To know the effects of air resistance, water resistance and friction, that act between moving surfaces. • To know how to explore up thrust and investigate how to sink a bottle. • To know how to investigate water resistance by creating different sized boats for hulls. • To know how to investigate how the size of a boat's hull affects the speed of its movement. • To know how to design parachutes and explore how	

			of whether they are attracted to a magnet, and identify some magnetic materials. • To know that magnets have two poles. •To be able to predict whether two magnets will attract or repel each other, depending on which poles are facing. • To know that magnets can be damaged if they are dropped.		shape can limit/extend the amount of drag. • To know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	
Light			**Optics** • To know that light is needed in order to see things and that dark is the absence of light. • To know that light is reflected from surfaces. • To know that light from the sun can be dangerous and that there are ways to protect their eyes. To recognise that shadows are formed when the light from a light source is blocked by an opaque object. • To know how to find patterns in the way that the size of shadows changes.			**Optics** • To know that light appears to travel in straight lines. • To know how to use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. • To know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • To know how to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Electricity				**Electrology** • To know common appliances that run on electricity • To know how to construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • To know whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • To know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • To know some common conductors and insulators, and		**Electrology** • To know how to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • To know how to compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • To know how to use recognised symbols when representing a simple circuit in a diagram

				associate metals with being good conductors.		
Sound				**Acoustics** • To know how sounds are made and understand that these create vibrations in the air. • To know that vibrations from sounds, travel through a medium to the ear. • To find patterns between the pitch of a sound and features of the object that produced it. • To know how to find patterns between the volume of a sound and the strength of the vibrations that produced it • To know that sounds, get fainter as the distance from the sound source increases.		

Disciplinary Knowledge – Think like a scientist…				
	EYFS	**Years 1 and 2**	**Year 3 and 4**	**Years 5 and 6**
Questioning	-showing curiosity and asking questions (UTW) -ask questions to find out more and to check they understand what has been said to them (C+L)	-asking simple questions and recognising that that they can be answered in different ways -explore the world around them and raise their own questions -ask people questions and use simple secondary sources to find answers	-asking relevant questions and using different types of scientific enquiries to answer them -after conclusions, raise further questions	-explore ideas and raise scientific questions
Predicting	Non-statutory -use 'I wonder…' sentence starter -use talk to help explain why things might happen (C+L)	Non-statutory -use 'I wonder…' sentence starter -use talk to discuss what they think will happen based on experience or simply a guess	-make simple predictions, of which some will be based on prior knowledge or experiences -after conclusions, make predictions for new values	-make predictions based on prior knowledge or experiences and explain this -using test results, make predictions to set up further comparative and fair tests
Planning	-use talk to help organise thoughts and activities (C+L) -use talk to help work out problems and organise thinking (C+L)	-performing simple explorative or comparative tests -experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions	-setting up simple practical enquiries, comparative and fair tests - start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions -know what variables are and begin to suggest ways to control them - recognise when a simple fair test is necessary and help to decide how to set it up - learn how to use new equipment, such as data loggers, appropriately	-planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary -select and plan most appropriate type of scientific enquiry to answer scientific questions - recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why -recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact
Gathering evidence	-make observations using their senses and simple equipment (UTW)	-observing closely, using simple equipment -gathering and recording data to help in answering questions	-making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a	-taking measurements, using a range of scientific equipment, with increasing accuracy and

	-record their observations by drawing, taking photographs, using sorting rings or boxes and on simple tick sheets (UTW) -begin to use one handed tools and equipment. (PD) -develop their fine motor skills so that they can use a range of tools competently (PD) -to observe and know how to talk about patterns and changes (UTW)	-observe changes over time -use simple measurements and equipment (for example, hand lenses, egg timers) to gather data - record simple data using drawings, taking photographs and simple tables	range of equipment, including thermometers and data loggers -gathering and recording data -recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables - help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used -collect data from their own observations and measurements, using notes, simple tables and standard units -help to make decisions about how to record data	precision, taking repeat readings when appropriate - make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them - choose the most appropriate equipment to make measurements and explain how to use it accurately - decide how to record data from a choice of familiar approaches
Analysing and interpreting	-make direct comparisons (UTW) -identify, sort and group (UTW)	-identify and classify - with guidance, begin to notice patterns and relationships -use simple features to compare objects, materials and living things -with help, decide how to sort and group objects, materials and living things	-classifying and presenting data in a variety of ways to help in answering questions -identifying differences, similarities or changes related to simple scientific ideas and processes - talk about criteria for grouping, sorting and classifying; and use simple keys - begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them - analyse data they have collected	-use and develop keys and other information records to identify, classify and describe - identify patterns that might be found in the natural environment - look for different causal relationships in their data and identify evidence that refutes or supports their ideas
Drawing conclusion	-talk about what they have done and found out (UTW) -Use their observations to help them to answer their questions (UTW)	-using their observations and ideas to suggest answers to questions - record and communicate their findings in a range of ways and begin to use simple scientific language -talk about what they have found out and how they found it out	-reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -using results to draw simple conclusions, -using straightforward scientific evidence to answer questions or to support their findings. -with help, look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions -use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences	-reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas
Evaluating			-suggest improvements and raise further questions -recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	-identifying scientific evidence that has been used to support or refute ideas or arguments - use their results to identify when further tests and observations might be needed - should talk about how scientific ideas have developed over time
Sharing	-Begin to use gestures to support delivery meaning e.g. pointing at parts of a plant -Use talk in play to practice new vocabulary: e.g: lighter, heavier.	-Use hand gestures to support delivery in presentational talk (pointing to something being discussed) and this becomes increasingly natural -Speak in sentences using joining phrases to link ideas	-Deliberately selects gestures that support the delivery of ideas e.g. gesturing towards someone if referencing their ideas -Be able to use specialist language to describe their own and others' talk	-Deliberately varies tone of voice in order to convey meaning e.g. speaking authoritatively during an expert talk -Gestures become increasingly natural

	-Begin to speak in sentences, joining phrases with words such as "if, because, so, could, but." -Use 'because' to develop their ideas	-Using vocabulary appropriately specific to the topic in hand e.g. lighter/heavier rather than bigger and smaller -Use conjunctions to organise and sequence ideas e.g. firstly, secondly, finally -Describe events that have happened to them in detail -Explain ideas and events in chronological order -Recite/deliver short pre-prepared material to an audience	-Use specialist vocabulary e.g. speak like an archaeologist -Make precise language choices e.g. instead of describing a cake as 'nice' using 'delectable' -Speak with confidence in front of an audience -Give supporting evidence e.g. citing a text (using sentence stems) a previous example or a historical event	-Consider the words and phrases used to express their ideas and how this supports the purpose of talk -To be able to give supporting evidence e.g. citing a text, a previous example or a historical event -Speak with flair and passion -Speak fluently in front of an audience. -Use and innovate an increasingly sophisticated range of sentence stems with fluency and accuracy

Oracy – *'Talk like a …'* Scientist Progression

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Biology						
All living things and their habitats		Tier 2: living, features, move, feed, grow, senses, shelter, depend/survive, suitability, environment Tier 3: reproduce, habitat, microhabitat, source, nutrients, energy, food chain, producer, prey, predator *Disciplinary: answer, classify, communicate, compare, data, enquiry, equipment, gather, group, identify, measure, observe, pattern, practical activity, question, record, relationship, secondary source, sort, test*		**Tier 2:** group, category, key, flowering, non-flowering, environment, surroundings, conditions, natural, human-made, endangered, extinct, positive, negative, indifferent, protect, manage, impact **Tier 3**: classification, vertebrate, invertebrate, spores, dichotomous key, urbanisation, deforestation, pollution, climate change, population, fossil fuels, natural disaster, human impact, Venn diagram, conservation *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test, findings, gather, group, key, measurement, note, observe, pattern, predict, present, process, relationship, results, question, secondary source, similarity, sort, standard unit, systematic, table, thermometer, value*	**Tier 2**: lifecycle, natural world, expertise, observe, document, study **Tier 3:** stages of development, sexual, asexual, reproduction, larvae, embryo, metamorphosis, naturalist, sexual/asexual reproduction, pistil/carpel, stigma, style, ovary, stamen, anther, nectar, pollen, pollination, fertilisation, dispersal, tuber, bulb, runner, clone, vegetative propagation, sperm, egg, external/internal fertilisation *Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, enquiry, equipment, evidence to support/refute, fair test, graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results, secondary source, table, variable*	**Tier 2:** insects, algae, moss, fern, conifer, bacteria **Tier 3:** vertebrate/non-vertebrate, taxonomy, arachnids, crustaceans, millipedes, annelids, echinoderms, molluscs, coelenterates, dichotomous key, ginkgoes, angiosperms, microorganism, microbes, fungi, protists *Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, enquiry, evidence to support/refute, fair test, graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results, secondary source, table, variable*

Animals, including humans	Tier 2: head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth, tongue, feet, hands, torso, skin, senses, ears/hearing, hands/touch, nose/smell, eyes/sight, tongue/taste, birds, fish, feathers, scales, breathe, lay, young, diet Tier 3: characteristic, cold-/ warm-blooded, mammal, reptile, amphibian, carnivore, omnivore, herbivore *Disciplinary: question/answer, observe, identify, classify, test*	Tier 2: growth, human, child, toddler, teenager, adult, survive, shelter, exercise, muscles, heart, lungs, brain, meat, fruit, vegetables, dairy, fat, sugar, healthy, portion Tier 3: offspring, lifecycle, limbs, reproduce, energy, air (oxygen), temperature, hygiene, mental health *Disciplinary: answer, classify, communicate, compare, data, enquiry, equipment, gather, group, identify, measure, observe, pattern, practical activity, question, record, relationship, secondary source, sort, test*	Tier 2: growth, carbohydrate, fat, protein, dairy, domestic, pet, environment, diet, behaviour, company, health and welfare, skeleton, skull, ribcage, spine, muscle, relax, contract, Tier 3: nutrition, energy, calcium, joints, organs, triceps, bicep *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test, findings, gather, group, key, measurement, note, observe, pattern, predict, present, process, question, record, relationship, results, secondary source, similarity, sort, standard unit, systematic, table, thermometer, value*	**Tier 2**: teeth, digestive system, mouth, tongue, stomach, adaptation, energy, prey, predator **Tier 3:** incisor, canine, molar, premolar, carnivore, omnivore, herbivore, oesophagus, small and large intestine, food chain, producer, primary/ secondary/ tertiary consumer *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test, findings, gather, group, key, measurement, note, observe, pattern, predict, present, process, question, record, relationship, results, secondary source, similarity, sort, standard unit, systematic, table, thermometer, value*	Tier 2: toddler, stages, lifecycle, puberty, pubic hair, breasts, periods, womb, chemical, mass Tier 3: embryo, foetus, adolescent, hormones, genes, DNA, oestrogen, testosterone, pituitary gland, reproduction, menstruation, gestation period, viviparous, zygote *Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, equipment, evidence to support/refute, fair test, graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results, source, table, variable*	**Tier 2:** pump, heart, lifestyle, drugs, medicine, illegal, vitamins **Tier 3:** circulatory system, organ, blood vessels, arteries, veins, capillaries, living cells, oxygen, carbon dioxide, deoxygenated, oxygenated, platelets, plasma, red/white blood cells, antibodies, single/double circulatory system, nicotine, caffeine, proteins, stimulant, hallucinogen, depressant, nicotine, ethanol *Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, enquiry, equipment, evidence to support/refute, fair test, graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results, secondary source, table, variable*
Plants	Tier 2: plants, wild plants, garden plants, weeds, trees, seeds, root, shoot, soil, magnifying glass, flower, petal, stem, leaf/leaves, tree, trunk, bark, branch, blossom, acorn, Tier 3: local plant names, hand lens, common tree names, deciduous, evergreen *Disciplinary: answer, classify, communicate, compare, data, enquiry, equipment, gather, group, identify, measure, observe, pattern, practical activity, question, record, relationship, secondary source, sort, test*	Tier 2: seed, bulb, plant, protect, mature, roots, shoot, food supply, temperature Tier 3: seed coat, food store, seed leaves, germination, nutrients, absorb, energy, lifecycle, reproduce *Disciplinary: answer, classify, communicate, compare, data, enquiry, equipment, gather, group, identify, measure, observe, pattern, practical activity, question, record, relationship, secondary source, sort, test*	Tier 2: seed, parent plant, roots, stem, leaves, trunk/branches, flowers, transport, absorb, tubes, flower, pollen, nectar, attract Tier 3: dispersal, germination, root hair, function, nutrients, carbon dioxide, growth rate, nutrient, drought, climate, pollination, reproduce *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test, findings, gather, group, identify, key, measurement, note, observe, pattern, predict, present, process, question, record, relationship, results, secondary source, similarity, sort, standard unit,*			

			systematic, table, thermometer, value			
Nutrition and Evolution and Inheritance						**Tier 2:** diversity, siblings, characteristics, traits, habitats, climate, extinction, crossbreed **Tier 3:** evolution, mould/body/trace/ cast fossil, fossil record, species, variation, inheritance, inherited/environmental variation, selective-breeding, natural selection, adaptation, organism, pollinators *Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, enquiry, equipment, evidence to support/refute, fair graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results, secondary source, table, variable*
Chemistry						
Everyday Materials and uses of everyday materials	Tier 2: object, wood, plastic, metal, rock, water; hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof Tier 3: properties, material, opaque/transparent absorbent/not absorbent *Disciplinary (non-statutory): answer, classify, communicate, compare, data, enquiry, equipment, gather, group, identify, measure, observe, pattern, practical activity, question, record, relationship, secondary source, sort, test*	Tier 2: wood, metal, plastic, glass, brick, rock, paper, cardboard, strong, waterproof, bounce, grip (sole), squash, bend, twist, stretch, stretchy/not stretchy, fabric, Tier 3: property, material, object, suitability, purpose, solid, fair test *Disciplinary (non-statutory): answer, classify, communicate, compare, data, enquiry, equipment, gather, group, identify, measure, observe, pattern, practical activity, question, record, relationship, secondary source, sort, test*				
Rocks and States, and changes, of Matter			Tier 2: rock, material, Earth, remains, heat, pressure, durable, preserve, decay, earthworm, leaves, soil	**Tier 2:** melt, temperature, freeze, melt **Tier 3:** states of matter, solid, liquid, gas, matter, mass,	**Tier 2:** material, mixture, burning, rust	

			Tier 3: mineral, crust, formation, physical properties, metamorphic, sedimentary, igneous, grains, molten, magma, lava, crystals, permeable, impermeable, sediment, fossil, palaeontologist, fossilisation, organic matter, erode *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test, findings, gather, group, identify, key, measurement, note, observe, pattern, predict, present, process, question, record, relationship, results, secondary source, similarity, sort, standard unit, systematic, table, thermometer, value*	volume, particles, properties, water vapour, melting point, freezing point, condensation, evaporation, water cycle, precipitation, water vapour *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test, findings, gather, group, identify, key, measurement, note, observe, pattern, predict, present, process, question, record, relationship, results, secondary source, similarity, sort, standard unit, systematic, table, thermometer, value*	**Tier 3:** thermal, conductor, insulator, transference, independent/dependent/ controlled variable, dissolve, solid, liquid, gas, states of matter, solution, filtration, sieving, evaporation, permeable, vapour, particles, irreversible, chemical changes, acid Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, enquiry, equipment, evidence to support/refute, fair test, graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results, secondary source, table, variable	
Physics						
Seasonal Changes **Earth and Space**	Tier 2: season, changes, autumn, winter, spring, summer, weather, sunrise, sunset Tier 3: temperature *Disciplinary: answer, classify, communicate, compare, data, equipment, identify, pattern, gather, measure, practical enquiry, group, observe, activity, question, record, relationship, secondary source, sort, test*				**Tier 2:** Earth, sun, moon, Planet (and the planet names), star, solar system, rotate, seasons, shadows, position, 24 hours, daytime, night-time **Tier 3**: orbit, atmosphere, scale, heliocentric, geocentric, planetary movement, axis	
Forces and Magnets			Tier 2: push, pull, surface, movement, magnet, attract, repel, north/south pole, metal, iron, steel, nickel Tier 3: contact/non-contact force, gravity, magnetic field, magnetism, horseshoe/bar/ring magnet *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test,*		**Tier 2**: simple machine, effort, load, float, sink, streamlined, **Tier 3:** friction, resistance, force meter, contact force, gravity, gravitational pull, mass, matter, air resistance, water resistance, drag, upthrust, displace, lever, pulley, gear, transmission, mesh, axle, fulcrum, pivot, mechanisms, redirecting force	

			findings, gather, group, identify, key, measurement, note, observe, pattern, predict, present, process, question, record, relationship, results, secondary source, similarity, sort, standard unit, systematic, table, thermometer, value		*Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, enquiry, equipment, evidence to support/refute, fair test, graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results, secondary source, table, variable*	
Light			Tier 2: light, reflect, visible, visibility, dark, shiny, bright, dull, matt, mirror, angle, shadows, position, direction, damage, protection, sunrise, sunset, rotation, compass direction Tier 3: light source, opaque, translucent, transparent, filters, UV rays, retina, pupil *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test, findings, gather, group, identify, key, measurement, note, observe, pattern, predict, present, process, question, record, relationship, results, secondary source, similarity, sort, standard unit, systematic, table, thermometer, value*			**Tier 2:** beam, ray, shadow, cast, object, reflect, light source **Tier 3:** energy, distortion, factor, incident ray, reflected ray, angle of incidence, angle of reflection, normal line, phenomenon, refraction, spectrum, prism *Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, equipment, enquiry, evidence to support/refute, fair test, graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results, source, table, variable*
Electricity				**Tier 2:** appliance, mains electricity, battery, generated, power station, electrical energy, pylon, plug, socket **Tier 3**: convert, series circuit, component, bulb (lamp), lamp holder, buzzer, cell, battery, wire, crocodile clip, electrical conductor, electrical insulator		**Tier 2:** symbol, device **Tier 3**: series circuit, cell, battery, component, voltage *Disciplinary: causal relationship, classification key, comparative test, conclusion, control, diagram, enquiry, equipment, evidence to support/refute, fair test, graph (scatter/bar/line), information- record, measurement, observation, pattern, prediction, repeat reading, research, results,*

						secondary source, table, variable
Sound				**Tier 2:** sound, vibrate/ vibrations, medium, volume, distance, decrease, insulation **Tier 3:** energy, sound wave, sound source, insulator, pitch *Disciplinary: analyse, bar change, chart, classify, comparative test, conclusion, data, data logger, diagram, display, enquiry, equipment, evidence, explain, fair test, findings, gather, group, identify, key, measurement, note, observe, pattern, predict, present, process, question, record, relationship, results, secondary source, similarity, sort, standard unit, systematic, thermometer, value*		

Overview of Scientists

EYFS / KS1	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year R			Isaac Newton David Attenborough	Neil Armstrong		Mary Anning
Year 1		Past -Anders Celsius/Daniel Fahrenheit Present - Laura Tobin	Past -Edward Jenner Present -Tom Howard or Prof Chris Whitty	Past -Steve Irwin Present - David Attenborough	Past -Charles Macintosh Present - Charlotte McCurdy	Past - David Douglas Present -Parent/grandparent of child or Alan Titchmarsh
Year 2	Past -George Forrest Present – Charlotte Taylor			Past – Florence Nightingale Present – Bear Grylls	Past - Wallace Carothers Present - Genevieve Dion	Past - Jacques Cousteau Present – Nik Mitchell (Get Wild parent)
Year 3	Past –Mary Anning Present - Dean Lomax	Past - Albert Einstein Present - Masato Sagawa	Past - Elsie Widdowson Present - Christiane Scheffler			Past - Marie Clark Taylor Present - Julian Bayliss
Year 4	Past - Heinrich Hertz and Ernst Mach Present - Jaap Haartsen	Past - Hesy-Ra Present - Zhaoming Liu		Past -Ibn Al-Haytham and Abbas Ibn Firnas Present - Esther Sans Takeuchi	Past - Anders Celsius Present - Yuan Daoxian	Past - Carl Linnaeus Present - Vanesa Nakate
Year 5	Past - Maria Sibylla Merian	Past - Galileo and Aristotle Present – Frank Drake	Past – John Dalton Present – Matthew Ponting		Past –Isaac Newton Present –Hannah Smitz	

	Past - Jane Goodall					
Year 6	Past – Charles Darwin Present –Tanisha Williams		Past –William Harvey Present –Donald Palmer			Past - Nikola Tesla Present - Rachel Oliver