St Paul's Church of England Primary School
Science and Computing Curriculum 2023-2024
FAITH – HOPE – LOVE

Now Press Play experience links | Investigation type to be covered during the unit | Scientist study

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery: Understanding of the world:	-To notice and become familiar with new environments. -To ask questions and talk about where they live. -Have a sense of immediate family.	-Use all senses to describe natural materials. -Talk about materials and their similarities and differences. (houses)	-To explore how things, work. - To describe what they hear, feel and see outside. (emergency services)	- To learn about life cycles; butterfly (the hungry caterpillar) -To show care for living things.	-To know about different places including habitats and terrain. (sea creatures)	-To explore the world around them. -Begin to understand the need to respect and care for the natural environment and all living things.
Reception: Understanding of the world:	-Enjoys joining in with family customs and routines. -Have a sense of immediate family.	-Looks closely at similarities, differences, patterns and change -Notice details in their environment. -Operate mechanical toys.	-Describe what they see, hear and feel whilst outside. -Explore how things work.	-Children know about similarities and differences in relation to places, objects, materials and living things. -They talk about the feature of their own immediate environment and how environments might vary from one another. -Plant seeds and care for growing plants. -They make observations of animals and plants and explain why some things occur, and talk about changes.	-Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes -Explore collections of materials. -Talk about differences between materials and changes they notice.	-Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes -To use knowledge from observation, discussions and stories. -Know similarities and differences between the natural world and contrasting environments.

Year 1
 	
Science
 	
Computing
	Seasonal change Autumn
	
	Seasons
	  i) observe changes across the four seasons.
	  ii) observe and describe weather associated with the seasons and how day length varies.
	
	Scientist study: Inez Fung
	
	Animals, including humans (human body)
	
	Testing
		Everyday Materials
		
		Survey
		
		Everyday Materials
		
		i. distinguishes between an object and the material from which it is made
		
		ii. identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock
			Seasonal change Winter
			
			Observation over time
			
			Seasons
			  i) observe changes across the four seasons.
			  ii) observe and describe weather associated with the seasons and how day length varies.
				Seasonal change Spring
				
				Seasons
				  i) observe changes across the four seasons.
				  ii) observe and describe weather associated with the seasons and how day length varies.
				
				Animals, including humans (animals)
				
				Classification
				
				Animals
					Seasonal change Summer
					
					Seasons
					  i) observe changes across the four seasons.
					  ii) observe and describe weather associated with the seasons and how day length varies.
					
					Plants
					
					Secondary sources
					
					Plants
					i) identify and name a variety of common wild and garden
						Apply and consolidate -Working scientifically
						
						i) asking simple questions and recognising that they can be answered in different ways
						
						ii) observing closely, using simple equipment.
						
						iii) performing simple tests.
						
						iv) identifying and classifying
						
						v) using their observations and ideas to suggest answers to questions

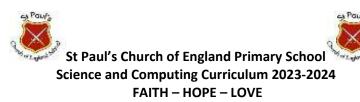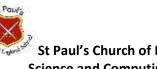|					
	Humans ilI) identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	iii. describe the simple physical properties of a variety of everyday materials iv. compare and group together a variety of everyday materials on the basis of their simple physical properties		i) identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals ii) identify and name a variety of common animals that are carnivores, herbivores and omnivores ii) describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) **Scientist study: Amy Vedder**	plants, including deciduous and evergreen trees. ii) identify and describe the basic structure of a variety of common flowering plants, including trees. **Scientist study: Marie Clark Taylor**
Possible Visits and Visitors	Local area walk			Vauxhall City Farm / Surrey Docks Farm	Pasley Park/ Walworth Garden Farm
	Computing systems and networks – Technology around us Learners will develop their understanding of technology and how it can help them in their everyday lives. They will start to become familiar with the different components of a computer by developing their keyboard and mouse skills. Learners will also consider how to use technology responsibly. Software or hardware for this unit – The laptops/computers and this website https://paintz.app/	**Creating Media – Digital painting** Learners will develop their understanding of a range of tools used for digital painting. They then use these tools to create their own digital paintings, while gaining inspiration from a range of artists' work. The unit concludes with learners considering their preferences when painting with and without the use of digital devices. Software or hardware for this unit – Microsoft Paint or similar	**Creating Media – Digital writing** Learners will develop their understanding of the various aspects of using a computer to create and manipulate text. They will become more familiar with using a keyboard and mouse to enter and remove text. Learners will also consider how to change the look of their text, and will be able to justify their reasoning in making these changes. Finally, learners will consider the differences between using a computer to create text, and writing text on paper. They will be able to explain which method	**Data and information – Grouping data** This unit introduces learners to data and information. Labelling, grouping, and searching are important aspects of data and information. Searching is a common operation in many applications, and requires an understanding that to search data, it must have labels. This unit of work focuses on assigning data (images) with different labels in order to demonstrate how computers are able to group and present data.	**Programming A – moving a robot (Beebots)** Learners will be introduced to early programming concepts. Learners will explore using individual commands, both with other learners and as part of a computer program. They will identify what each command for the floor robot does, and use that knowledge to start predicting the outcome of programs. The unit is paced to ensure time is spent on all aspects of programming, and builds knowledge in a structured manner. Learners are also introduced to the early stages of	**Programming B – Introduction to animation** Learners will be introduced to on-screen programming through ScratchJr. Learners will explore the way a project looks by investigating sprites and backgrounds. They will use programming blocks to use, modify, and create programs. Learners will also be introduced to the early stages of program design through the introduction of algorithms. Software or hardware for this unit – Scratch Jr

			they prefer and explain their reasoning for choosing this. Software or hardware for this unit – Google Docs or Microsoft Word	Software or hardware for this unit – Google Slides or Microsoft PowerPoint	program design through the introduction of algorithms. Software or hardware for this unit – Beebots	

Year 2
 	
Science
 	
Computing
	Animals including humans
	
	Survey
	
	Healthy Living
	
	i) notice that animals, including humans, have offspring which grow into adults
	
	ii) find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
	
	    iii) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene
	
	Scientist study: David Attenborough
		Uses of everyday materials
		
		Testing
		
		Everyday Materials
		
		i) identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
		
		ii) find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
			Review (revisit one or more areas from year 1 – Seasons and Animals Including Humans)
			
			Seasons
			
			Seasons (Yr1)
			  i) observe changes across the four seasons.
			  ii) observe and describe weather associated with the seasons and how day length varies.
			
			Animals, including humans (animals – Yr1)
			
			Classification
			
			Animals
			
			i) identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
			
			ii) identify and name a variety of common animals that are carnivores, herbivores and omnivores
			
			  i) describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets
				Plants
				
				Observation over time
				
				Plants
				
				  i) observe and describe how seeds and bulbs grow into mature plants.
				  ii) find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
				
				Scientist study: George Forrest
					Living things and their habitats
					
					Secondary Sources
					
					Habitats
					
					i) explore and compare the differences between things that are living, dead, and things that have never been alive
					
					ii) 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
					
					  iv) 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.
					  v) identify and name a variety of plants and animals in their habitats, including microhabitats.
					  vi) 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.
					
					Scientist study: Kate Humble
						Apply and consolidate-Working scientifically
						
						i) asking simple questions and recognising that they can be answered in different ways
						
						ii) observing closely, using simple equipment.
						
						iii) performing simple tests.
						
						iv) identifying and classifying
						
						v) using their observations and ideas to suggest answers to questions

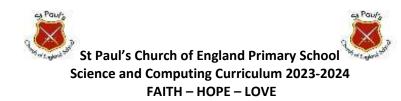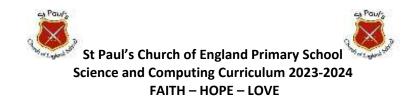| Possible Visits and Visitors	RSPCA volunteer visit	Southwark Recycling Centre	Vauxhall City Farm / Surrey Docks Farm	Walworth Garden	Soanes Centre	
	Computing systems and networks – IT around us Learners will develop their understanding of what information technology (IT) is and will begin to identify examples. They will discuss where they have seen IT in school and beyond, in settings such as shops, hospitals, and libraries. Learners will then investigate how IT improves our world, and they will learn about the importance of using IT responsibly. Software or hardware for this unit – Google Slides or Microsoft PowerPoint	**Creating media – Digital photography** Learners will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, they will use this knowledge to recognise that images they see may not be real. Software or hardware for this unit – Digital Camera	**Creating media – Making Music** In this unit, learners will be using a computer to create music. They will listen to a variety of pieces of music and consider how music can make them think and feel. Learners will compare creating music digitally and non-digitally. Learners will look at patterns and purposefully create music. Software or hardware for this unit – Chrome Music Lab https://musiclab.chromeexperiments.com/	**Data and information - Pictograms** Learners will begin to understand what the term data means and how data can be collected in the form of a tally chart. They will learn the term 'attribute' and use this to help them organise data. They will then progress onto presenting data in the form of pictograms and finally block diagrams. Learners will use the data presented to answer questions. Software or hardware for this unit – https://www.j2e.com/jit5#pictogram	**Programming A – Robot algorithms** This unit develops learners' understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Learners will use given commands in different orders to investigate how the order affects the outcome. They will also learn about design in programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them. Software or hardware for this unit – Beebots	**Programming B -An introduction to quizzes** This unit initially recaps on learning from the Year 1 ScratchJr unit 'Programming B – Programming animations'. Learners begin to understand that sequences of commands have an outcome, and make predictions based on their learning. They use and modify designs to create their own quiz questions in ScratchJr, and realise these designs in ScratchJr using blocks of code. Finally, learners evaluate their work and make improvements to their programming projects. Software or hardware for this unit – Scratch Jr
Year 3 Science Computing	**Forces and magnets** **Survey** **Forces and magnets** i. compare how things move on different surfaces i. notice that some forces need contact between two objects, but magnetic forces can act at a distance i. observe how magnets attract or repel each other and attract some materials and not others i. compare and group together a variety of everyday	**Animals including humans** **Secondary sources** I. 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 I. Identify that humans and some other animals have skeletons and muscles for support, protection and movement Scientist study: Jane Goodall	**Light** **Observation over time** I. recognise that they need light in order to see things and that dark is the absence of light II. notice that light is reflected from surfaces III. recognise that light from the sun can be dangerous and that there are ways to protect their eyes IV. recognise that shadows are formed when the light from a light source is	**Rocks** **Classification** **Rocks** i. compare and group together different kinds of rocks on the basis of their appearance and simple physical properties ii. describe in simple terms how fossils are formed when things that have lived are trapped within rock	**Plants** **Testing** **Plants** i. identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers ii. 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	**Apply and consolidate-Working Scientifically** i) asking relevant questions and using different types of scientific enquiries to answer them ii) setting up simple practical enquiries, comparative and fair tests iii) making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including

	materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials v. describe magnets as having two poles vi. predict whether two magnets will attract or repel each other, depending on which poles are facing		blocked by an opaque object V. find patterns in the way that the size of shadows change	iii. recognise that soils are made from rocks and organic matter **Scientist study: Mary Anning**	iii. investigate the way in which water is transported within plants iv. explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal **Scientist study: Danny Clarke / Ron Finley**	thermometers and data loggers iv) gathering, recording, classifying and presenting data in a variety of ways to help in answering questions v) recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables vi) reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions vii) using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions viii) identifying differences, similarities or changes related to simple scientific ideas and processes ix) using straightforward scientific evidence to answer questions or to support their findings
Possible Visits and Visitors	The Science Museum	London Zoo			Walworth Garden Farm/Kew Gardens	
	Computing systems and networks – Connecting computers Learners will develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. They will also compare digital and non-digital devices. Next, learners will be introduced to computer networks, including devices that make up a network's infrastructure, such as	**Creating media - Animation** Learners will use a range of techniques to create a stop-frame animation using tablets. Next, they will apply those skills to create a story-based animation. This unit will conclude with learners adding other types of media to their animation, such as music and text.	**Creating media – Desktop publishing** Learners will become familiar with the terms 'text' and 'images' and understand that they can be used to communicate messages. They will use desktop publishing software and consider careful choices of font size, colour and type to edit and improve premade documents. Learners will be introduced to the terms	**Data and information – branching databases** Learners will develop their understanding of what a branching database is and how to create one. They will use yes/no questions to gain an understanding of what attributes are and how to use them to sort groups of objects. Learners will create physical and on-screen branching databases. To conclude the unit, they will	**Programming A – Sequencing in music** This unit explores the concept of sequencing in programming through Scratch. It begins with an introduction to the programming environment, which will be new to most learners. They will be introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences.	**Programming B – Events and actions** This unit explores the links between events and actions, while consolidating prior learning relating to sequencing. Learners begin by moving a sprite in four directions (up, down, left, and right). They then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces

wireless access points and switches. Finally, learners will discover the benefits of connecting devices in a network. Software or hardware for this unit – Any painting program e.g. Microsoft Paint	Software or hardware for this unit – iMotion (ipad app)	'templates', 'orientation', and 'placeholders' and begin to understand how these can support them in making their own template for a magazine front cover. They will start to add text and images to create their own pieces of work using desktop publishing software. Learners will look at a range of page layouts thinking carefully about the purpose of these and evaluate how and why desktop publishing is used in the real world. Software or hardware for this unit – Adobe Spark	create an identification tool using a branching database, which they will test by using it. They will also consider real-world applications for branching databases. Software or hardware for this unit – j2data Branch and Pictogram https://www.j2e.com/j2data/	The final project is to make a representation of a piano. The unit is paced to focus on all aspects of sequences, and make sure that knowledge is built in a structured manner. Learners also apply stages of program design through this unit. Software or hardware for this unit – Scratch	programming extensions, through the use of **Pen** blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze-tracing program. Software or hardware for this unit – Scratch
Year 4 Science Computing	**States of matter** **Observation over time** **Materials & Changing State** i) compare and group materials together, according to whether they are solids, liquids or gases ii) 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) iii) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	**Sound** **Secondary sources** i) identify how sounds are made, associating some of them with something vibrating ii) recognise that vibrations from sounds travel through a medium to the ear iii) find patterns between the pitch of a sound and features of the object that produced it iv) find patterns between the volume of a sound and the strength of the vibrations that produced it v) recognise that sounds get fainter as the distance from the sound source increases **Scientist study: Ernst Mach**	**Electricity** **Testing** **Electricity** i) identify common appliances that run on electricity ii) construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers iii) 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 iv) recognise that a switch opens and closes a circuit and associate this with whether or not a lamp	**Animals including humans** **Classification** i) describe the simple functions of the basic parts of the digestive system in humans ii) identify the different types of teeth in humans and their simple functions iii) construct and interpret a variety of food chains, identifying producers, predators and prey	**Living things** **Survey** i) recognise that environments can change and that this can sometimes pose dangers to living things ii) recognise that living things can be grouped in a variety of ways iii) explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment iv) recognise that environments can change and that this can sometimes pose dangers to living things **Scientist study: Carl Linnaeus**	**Apply and consolidate -Working Scientifically** x) asking relevant questions and using different types of scientific enquiries to answer them xi) setting up simple practical enquiries, comparative and fair tests xii) making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers xiii) gathering, recording, classifying and presenting data in a variety of ways to help in answering questions xiv) recording findings using simple scientific language,

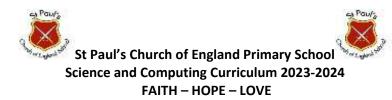|					
		lights in a simple series circuit v) recognise some common conductors and insulators, and associate metals with being good conductors **Scientist study: Garrett Morgan**			drawings, labelled diagrams, keys, bar charts, and tables xv) reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions xvi) using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions xvii) identifying differences, similarities or changes related to simple scientific ideas and processes xviii) using straightforward scientific evidence to answer questions or to support their findings
Possible Visits and Visitors		The Science Museum		London Zoo	Local environment / Paseley Park
	Computing systems and networks – The Internet Learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet, and will be given opportunities to explore the World Wide Web for themselves in order to learn about who owns content and what they can access, add, and create. Finally, they will evaluate online content to decide how honest, accurate,	**Creating media – Audio editing** Learners will identify the input device (microphone) and output devices (speaker or headphones) required to work with sound digitally. Learners will discuss the ownership of digital audio and the copyright implications of duplicating the work of others. In order to record audio themselves, learners will use Audacity to produce a podcast, which will include editing their work, adding multiple tracks, and opening and saving the audio files. Finally, learners	**Creating media – Photo editing** Learners will develop their understanding of how digital images can be changed and edited, and how they can then be resaved and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices. Software or hardware for this unit – paint.net	**Data and information – Data logging** In this unit, learners will consider how and why data is collected over time. Learners will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Learners will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Learners will spend time using a	**Programming A – Repetition in shapes** Learners will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language. Software or hardware for this unit – FMSLogo	**Programming B – Repetition in games** Learners will explore the concept of repetition in programming using the Scratch environment. The unit begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is

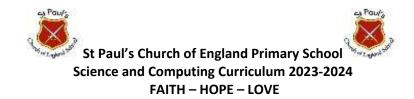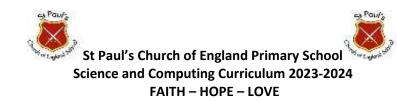|					
or reliable it is, and understand the consequences of false information. Software or hardware for this unit – Various websites	evaluate their work and give feedback to their peers. Software or hardware for this unit – Audacity (Audio editor)		computer to review and analyse data. Towards the end of the unit, learners will pose questions and then use data loggers to automatically collect the data needed to answer those questions. Software or hardware for this unit – Any Data logger		to design and create a game which uses repetition, applying stages of programming design throughout. Software or hardware for this unit – Scratch

Year 5
 	
Science
 	
Computing
	Animals including humans
	
	Survey
	  i. Describe the changes as humans develop from birth to old age.
		Earth and Space
		
		Secondary sources
		
		Mission to Mars
		
		  i. Describe the movement of the Earth, and other planets, relative to the Sun in the solar system
		 ii. Describe the movement of the Moon relative to the Earth
		iii. Describe the Sun, Earth and Moon as approximately spherical bodies
		iv. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
		
		Scientist study: Dorothy Vaughan / Mary Jackson / Katherine Johnson / Christine Darden (hidden figures)
			Properties and changes of materials
			
			Observation over time
			
			  i. 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
			 ii. Understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.
			iii. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
			iv. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
			 v. Demonstrate that dissolving, mixing and
				Living things and their habitats
				
				Classification
				  i. Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
				 ii. Describe the life process of reproduction in some plants and animals.
					Forces
					
					Testing
					
					Forces
					
					  i. Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
					iii. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
					iv. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
					
					Scientist study: Sir Isaac Newton (1642 – 1727)
						Apply and consolidate -Working scientifically
						
						i. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
						
						ii. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
						
						iii. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
						
						iv. using test results to make predictions to set up further comparative and fair tests
						
						v. 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

			changes of state are reversible changes. vi. 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 Scientist study: Marie Curie (1967-1934).			vi. identifying scientific evidence that has been used to support or refute ideas or arguments
Possible Visits and Visitors		Greenwich Royal Observatory		London Zoo		The Science Museum
	Computing systems and networks – Sharing information Learners develop their understanding of computer systems and how information is transferred between systems and devices. Learners consider small-scale systems as well as large-scale systems. They explain the input, output, and process aspects of a variety of different real-world systems. Learners discover how information is found on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines.	**Creating media – Vector drawing** In this unit, learners start to create vector drawings. They learn how to use different drawing tools to help them create images. Learners recognise that images in vector drawings are created using shapes and lines, and each individual element in the drawing is called an object. Learners layer their objects and begin grouping and duplicating them to support the creation of more complex pieces of work. Software or hardware for this unit – https://vectr.com/	**Creating media – Video editing** Learners will learn how to create short videos by working in pairs or groups. As they progress through this unit, they will be exposed to topic-based language and develop the skills of capturing, editing, and manipulating video. Learners are guided with step-by-step support to take their idea from conception to completion. At the conclusion of the unit, learners have the opportunity to reflect on and assess their progress in creating a video. Software or hardware for this unit – Microsoft Video editor	**Data and information – Flat – file databases** This unit looks at how a flat-file database can be used to organise data in records. Learners will use tools within a database to order and answer questions about data. They will create graphs and charts from their data to help solve problems. They will also use a real-life database to answer a question, and present their work to others. Software or hardware for this unit – https://www.j2e.com/database/	**Programming A – Selection in physical computing** In this unit, learners will use physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. Learners will be introduced to a microcontroller (Crumble controller) and learn how to connect and program it to control components (including output devices — LEDs and motors). Learners will be introduced to conditions as a means of controlling the flow of actions in a program. Learners will make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the 'if...then...' structure) and write	**Programming B – Selection in quizzes** Learners will develop their knowledge of 'selection' by revisiting how 'conditions' can be used in programming, and then learning how the 'if… then… else...' structure can be used to select different outcomes depending on whether a condition is 'true' or 'false'. They represent this understanding in algorithms, and then by constructing programs in the Scratch programming environment. They learn how to write programs that ask questions and use selection to control the outcomes based on the answers given. They use this knowledge to design a quiz in response to a

					algorithms and programs that utilise this concept. To conclude the unit, learners will design and make a working model of a fairground carousel that will demonstrate their understanding of how the microcontroller and its components are connected, and how selection can be used to control the operation of the model. Throughout this unit, learners will apply the stages of programming design. Software or hardware for this unit – Crumble controller + starter kit + motor	given task and implement it as a program. To conclude the unit, learners evaluate their program by identifying how it meets the requirements of the task, the ways they have improved it, and further ways it could be improved. Software or hardware for this unit – Scratch
	Software or hardware for this unit – Google Slides					
Year 6 Science Computing	**Animals including humans** **Survey** • 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 **Scientist study: William Harvey**	**Living things and their habitats** **Classification** • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics **Scientist study: Evelyn Cheeseman** •	**Light** **Observation over time** i. Recognise that light appears to travel in straight lines ii. 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 iii. 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 iv. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	**Electricity** **Testing** **Forces** • 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	**Evolution and Inheritance** **Secondary Sources** • 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 **Scientist study: Charles Darwin**	**Apply and consolidate -Working scientifically** i. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ii. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate ii. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

					iv. using test results to make predictions to set up further comparative and fair tests v. 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 vi. identifying scientific evidence that has been used to support or refute ideas or arguments
Possible Visits and Visitors	Visit from NHS health	Horniman Museum and Gardens		The Science Museum	
	Computing systems and networks – Communication In this unit learners explore how data is transferred over the internet. Learners initially focus on addressing, before they move on to the makeup and structure of data packets. Learners then look at how the internet facilitates online communication and collaboration; they complete shared projects online and evaluate different methods of communication. Finally, they learn how to communicate responsibly by considering what should and should not be shared on the internet. Software or hardware for this unit – Google Slides	**Creating media – 3D Modelling** Learners will develop their knowledge and understanding of using a computer to produce 3D models. Learners will initially familiarise themselves with working in a 3D space, moving, resizing, and duplicating objects. They will then create hollow objects using placeholders and combine multiple objects to create a model of a desk tidy. Finally, learners will examine the benefits of grouping and ungrouping 3D objects, then go on to plan, develop, and evaluate their own 3D model of a building.	**Creating media – Web page creation** Learners will be introduced to creating websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process, learners pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths. Software or hardware for this unit –Google Sites https://workspace.google.com/products/sites/	**Data and information – Spreadsheets** This unit introduces the learners to spreadsheets. They will be supported in organising data into columns and rows to create their own data set. Learners will be taught the importance of formatting data to support calculations, while also being introduced to formulas and will begin to understand how they can be used to produce calculated data. Learners will be taught how to apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. Learners will use spreadsheets to plan an event and answer questions. Finally, learners will create	**Programming A – Variables in games** This unit explores the concept of variables in programming through games in Scratch. First, learners find out what variables are and relate them to real-world examples of values that can be set and changed. Then they use variables to create a simulation of a scoreboard. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, learners experiment with variables in an existing project, then modify them, before they create their own project. In Lesson 4, learners focus on design. Finally, in Lesson 6, learners apply their knowledge of variables and design to improve their games in Scratch.	**Programming B – Sensing** This unit is the final KS2 programming unit and brings together elements of all the four programming constructs: sequence from Year 3, repetition from Year 4, selection from Year 5, and variables (introduced in Year 6 – 'Programming A'. It offers pupils the opportunity to use all of these constructs in a different, but still familiar environment, while also utilising a physical device — the micro:bit. The unit begins with a simple program for pupils to build in and test within the new programming environment, before transferring it to their micro:bit. Pupils then take on three new projects in Lessons 2,

		Software or hardware for this unit – Tinkercad https://www.tinkercad.com/ You will need to sign up but it's free!	You will need a google login to use.	charts, and evaluate their results in comparison to questions asked. Software or hardware for this unit – Microsoft Excel	Software or hardware for this unit – Scratch	3, and 4, with each lesson adding more depth. Software or hardware for this unit – https://makecode.microbit.org/