Computing

Whole School Progression of Skills

	Autumn	Spring	Summer
Preschool	Shows an interest in technological toys and works them by pressing parts etc. to achieve effects.	Shows interest in technological toys, using knobs/pulleys and real objects such as cameras/touch screen devices such as tablets.	Knows how to operate simple equipment. For example, cd player/iPad.

EYFS

Autumn 1: Activity 10	**Computer Science: Computational Thinking**	
Steps to Success	**Key vocabulary**	**Key Skills**
We can understand instructions Session 1: recipes as instructions Session 2: follow given instructions Session 3: using recording hardware/software	Recipe Instruction Microwave Timer Microphone Record	Pupils learn to: • select the correct buttons to operate the microwave • respond to the instructions in the correct order • use recorded talk to clarify his/her thinking and recount the activity
Autumn 2: Activity 1	**Computer Science: Computational Thinking**	
Steps to Success	**Key vocabulary**	**Key Skills**
We are game players Session 1: introduction to digital games Session 2: understand digital games as a set of steps to follow Session 3: play digital games independently	Digital Game Character Instruction	Pupils learn to: • complete and control a digital game • interact with a game, taking turns as appropriate • consistently choose the correct icon/tools within an activity and open and close a game • talk about what he/she did and how he/she could improve
Spring 1 : Activity 3	**Information Technology: Media**	
Steps to Success	**Key vocabulary**	**Key Skills**
We are successful Session 1: introduction to presentations Session 2: take photographs of our achievements Session 3: create our own presentations using photos we have taken	Presentation Photograph Insert Image Text	Pupils learn to: • select and use the camera independently for a particular purpose • describe him/herself in positive terms and talk about his/her abilities • say why he/she likes some activities more than others
Spring 2: Activity 14	**Digital Literacy: Online safety**	
Steps to Success	**Key vocabulary**	**Key Skills**
We can email Session 1: introduction to email Session 2: logging into emails using a password Session 3: send and receive emails	Email Communicate Reply Send	Pupils learn to: • write simple sentences, which can be read by themselves and others • talk about how they, and others, show feelings • demonstrate an understanding when talking about what they have read • understand that we use email as a means of communication
Summer 1: Activity 16	**Computer Science: Coding**	
Steps to Success	**Key vocabulary**	**Key Skills**
We can count Session 1: design a route for a programmable toy Session 2: program a Blue-Bot to travel a planned route Session 3: correct errors in my program to complete the task	Program Route Blue-Bot Error	Pupils learn to: • count reliably with numbers from 1 to 20, placing them in order • say which number is one more or one less than a given number • program the programmable toy to move forwards and backwards along the street so it stops at the chosen building
Summer 2: Activity 22	**Information Technology: Creativity**	
Steps to Success	**Key vocabulary**	**Key Skills**
We are creative Session 1: introduction to digital pattern making Session 2: make shapes and patterns of different colours Session 3: creating an unusual digital animal	Pattern Digital Tree	Pupils learn to: • explore the art package tools and their effect on screen • choose and use the tools to achieve the planned image • adapt the image where necessary

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		Steps to Success	Prior Knowledge	Key vocabulary	Key Skills	NC Coverage: (Computing)
Year 1	Autumn 1: Unit 1.1 Computer Science: Coding	**We are treasure hunters** Session 1: take on the role of a robot, responding to instructions Session 2: take on the role of a robot-pirate to work out a sequence of instructions (an algorithm) Session 3: explore the Blue-Bot controls Session 4: follow, create and test sequences of instructions to solve problems with the Blue-Bot Session 5: predict what the Blue-Bot will do when given different sequences of instructions Session 6: correct mistakes in Blue-Bot programs.		algorithm bug computer debug input logical reasoning output instructions program robot	Pupils learn: • that a programmable robot can be controlled by inputting a sequence of instructions • to develop and record sequences of instructions as an algorithm • to program a robot to follow their algorithm • to debug programs • to predict how their programs will work.	• Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute them by following precise and unambiguous instructions. • Create and debug simple programs. • Use logical reasoning to predict the behaviour of simple programs.
	Autumn 2: Unit 1.2 Computer Science: Computational thinking	**We are TV chefs** Session 1: work out the steps for making a jam sandwich Session 2: watch you making a healthy snack and record the steps; they then work out and record the steps of another recipe Session 3: learn how to record video Session 4: film one another making the snack Session 5: add a commentary to their video Session 6: review each other's recordings and provide feedback.	Unit 1.1: We are treasure hunters	Abstraction Algorithm Audio Decomposition edit frame narration pattern storyboard video camera	Pupils learn to: • break down a process into simple, clear steps (an algorithm) • use different features of a video camera • use a video camera to capture moving images • edit a video to include an audio commentary • develop collaboration skills • discuss their work and think about how it could be improved.	• Understand what algorithms are. • Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Recognise common uses of information technology beyond school.

Computing Whole School Progression of Skills

		Steps to Success	Prior Knowledge	Key vocabulary	Key Skills	NC Coverage: (Computing)
Year 1	Spring 1 : Unit 1.3 Information Technology: Creativity	**We are digital artists** Session 1: create work based on Rothko's work Session 2: create work based on Kandinsky's Squares with Concentric Circles Session 3: create work based on Picasso's Dove of Peace Session 4: create work based on Matisse's The Snail Session 5: create work based on Julian Opie's outline style Session 6: create work based on Mondrian's grid paintings		Analogue Bitmap Digital Effect Layer Pixel Stylus Transform Undo Zoom	• Pupils learn: • how to select and set brushes and colours • to create artwork in a range of styles on iPads • to use the undo function if they make mistakes, and to encourage experimentation • to use multiple layers in their art • to transform layers • to paint on top of photographs.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Recognise common uses of information technology beyond school.
	Spring 2: Unit 1.4 Digital Literacy: Online safety	**We are publishers** Session 1: plan their eBook, thinking carefully about the intended audience Session 2: select and import images for their eBook Session 3: add audio commentary to their eBook Session 4: add written text to their eBook Session 5: add images from the Internet to their eBook Session 6: review and revise their work.		Audio Clipart Creative commons eBook filter font images multimedia safe search speech synthesis voice dictation	Pupils learn to: • plan a small multimedia eBook • choose and import images • record audio commentary • add and format titles and other text • think carefully about protecting their privacy • respect other people's copyright • revise and improve their work.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies. • Recognise common uses of information technology beyond school.

Computing Whole School Progression of Skills

		Steps to Success	Prior Knowledge	Key vocabulary	Key Skills	NC Coverage: (Computing)
Year 1	Summer 1: Unit 1.5 Information Technology: Media	**We are rhythmic** Session 1: record and playback audio in ScratchJr Session 2: program sprites to playback recorded audio in ScratchJr Session 3: create a simple program to playback recorded audio in a rhythmic pattern in ScratchJr Session 4: record audio in GarageBand and experiment with audio effects Session 5: create a repeating percussion pattern in GarageBand Session 6: experiment with playing some of GarageBand's built-in instruments.	Unit 1.1: We are treasure hunters	audio digital message microphone MIDI Piano roll Repetition Sample Sequencer Speaker Sprite Track Virtual	Pupils learn to: • record audio on an iPad • program sprites to playback recorded audio in ScratchJr • program ScratchJr to create repeating rhythms using recorded audio • explore different effects that can be applied to audio • create a repeating percussion pattern using a virtual drum machine • experiment with a range of virtual instruments.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Recognise common uses of information technology beyond school. • Understand what algorithms are.
	Summer 2: Unit 1.6 Information Technology: Data	**We are detectives** Session 1: explore the dataset as printed cards Session 2: explore the dataset as virtual cards in Popplet Session 3: organise data into a tree, using questions to create subgroups Session 4: input data from the cards to an online form Session 5: create filters on a spreadsheet to identify subsets of the data Session 6: use the spreadsheet to solve clues about the pirates.		Database Datacast Field Filter Form Leaf Record Sort Table Tree	Pupils learn: • how data can be structured as records with fields for information • how data can be organised into groups and subgroups • how data can be structured as a tree • how data can be organised into a table • how data in a table can be filtered and searched.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies. • Recognise common uses of information technology beyond school.

Computing Whole School Progression of Skills

		Steps to Success	Prior Knowledge	Key vocabulary	Key Skills	NC Coverage: (Computing)
Year 2	Autumn 1: Unit 2.1 Computer Science: Coding	**We are astronauts** Session 1: take part in playground activities, planning movement between 'planets' Session 2: are introduced to ScratchJr and program sprite movement Session 3: are introduced to output and use multiple sprites Session 4: are introduced to message passing and input Session 5: are introduced to repetition Session 6: create new 'costumes' for their sprites	Unit 1.1: We are treasure hunters Unit 1.5: We are rhythmic	Abstraction Algorithm Bug Code Debug Event Input Output Parallel processing Program Repetition Scratch Sprite	Pupils learn to: • plan a sequence of instructions to move sprites in ScratchJr • create, test and debug programs for sprites in ScratchJr • work with input and output in ScratchJr • use repetition in their programs • design costumes for sprites.	• Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute them by following precise and unambiguous instructions. • Create and debug simple programs. • Use logical reasoning to predict the behaviour of simple programs.
	Autumn 2: Unit 2.2 Computer Science: Computational thinking	**We are games testers** Session 1: work out the rules (algorithms) for a simple arithmetic game Session 2: work out the rules (algorithms) for a chase game Session 3: work out the rules (algorithms) for a two-player sports game Session 4: work out the rules (algorithms) used in a shooting game Session 5: play a professionally produced coding-based game Session 6: play a turn-based two-player game, working together to identify winning strategies.	Unit 2.1: We are astronauts	Abstraction Algorithm Computational thinking Input Output Parallel processing Pattern recognition Remix Repetition Scratch Source code Sprite	Pupils learn to: • observe and describe carefully what happens in computer games • use logical reasoning to make predictions of what a program will do and test these predictions • think critically about computer games and their use • create sequences of instructions for a virtual robot to solve a problem • work out strategies for playing a game well • be aware of how to use games safely and in balance with other activities.	• Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute them by following precise and unambiguous instructions. • Use logical reasoning to predict the behaviour of simple programs. • Recognise common uses of information technology beyond school. • Use technology safely and respectfully, keeping personal information private.

Computing Whole School Progression of Skills

		Steps to Success	Prior Knowledge	Key vocabulary	Key Skills	NC Coverage: (Computing)
Year 2	Spring 1: Unit 2.3 Information Technology: Media	**We are photographers** Session 1: browse some online collections of photographs to help them understand what makes a good photo Session 2: learn how to use a digital camera, and start to experiment with these Session 3: practise taking effective photos Session 4: review the photos they have taken, selecting their best for further work Session 5: edit and enhance their photographs Session 6: use selective editing tools.		Adjustment Camera roll Colour value Crop Filter iCloud JPEG Pixel Rule of thirds Sensor	Pupils learn to: • consider the technical and artistic merits of photographs • use the iPad camera app • take digital photographs • review, reject or pick the images they take • edit and enhance their photographs	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Recognise common uses of information technology beyond school. • Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies.
	Spring 2: Unit 2.4 Digital Literacy: Online safety	**We are safe researchers** Session 1: start to think about the topic they are going to research and structure their research questions in a mind mapping tool Session 2: draw on their research questions to conduct independent research, using a custom search engine Session 3: think about Internet safety and what they should do if they are concerned about any content on the Internet. Sessions 4 and 5: draw on their research to create a short presentation on their research Session 6: deliver the presentation to an audience and review the key online safety messages from the unit.	Unit 1.4: We are publishers Unit 1.6: We are detectives Unit 2.3: We are photographers	Bing Google Creative commons DuckDuckGo Filter Google custom search Mind map Presentation Safe search Search engine Wikipedia	Pupils learn to: • develop collaboration skills through working as part of a group • develop research skills through searching for information on the Internet • think through privacy implications of their use of search engines • be more discerning in evaluating online information • improve note-taking skills through the use of mind mapping • develop presentation skills through creating and delivering a short multimedia presentation.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Recognise common uses of information technology beyond school. • Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

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Year 2	Summer 1: Unit 2.5 Information Technology: Media	**We are Animators** Session 1: plan their animations Session 2: create original media to use in their animations Session 3: start filming their animations Session 4: continue to film their animations Session 5: add audio to their animations Session 6: watch one another's animations and provide feedback.	Unit 1.2: We are TV chefs Unit 2.3: We are photographers	Animation Background Character Flipbook animation Frame Media assets Onion-skinning Prop Soundtrack Stage Stop-motion Storyboard	Pupils learn to: • understand how animation works • use storyboards to plan an animation • create their own original characters, props and backgrounds for an animation • film, review and edit a stop-motion animation • record audio to accompany their animation • provide constructively critical feedback to their peers.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Recognise common uses of information technology beyond school. • Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.
	Summer 2: Unit 2.6 Information Technology: Data	**We are Zoologists** Session 1: are introduced to the objectives of the unit and how to use a classification key Session 2: use tick and tally charts to record how many invertebrates they find and they take photographs Session 3: edit and enhance the photos they have taken and add these to a shared document Session 4: create a chart from the data they collected and make choices about the most appropriate chart to use to display their data Session 5: are introduced to Google Maps; they add location markers for the bugs they found to a custom layer Session 6: summarise the information they have collected in a presentation, drawing on their photographs, charts and maps.	Unit 1.6: We are detectives	Binary Binary tree Branching database classification key data database geolocation data global positioning system (GPS) pixels tally chart	Pupils learn to: • sort and classify a group of items by answering questions • collect data using tick charts or tally charts • take, edit and enhance photographs • use Google Sheets or Microsoft Excel to produce basic charts • record information on a digital map • summarise what they have learned in a presentation.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content. • Recognise common uses of information technology beyond school. • Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies

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Year 3	Autumn 1: Unit 3.1 Computer Science: Coding	**We are programmers** Session 1: are introduced to Scratch, and explore its tools Session 2: determine key features of a good animation by looking at examples, and create a storyboard for their own Session 3: plan and program character/s and dialogue for their animation Session 4: begin to animate their character/s by planning and programming movement Session 5: plan and program switching costumes and backdrops for their animation Session 6: add sound to their animation before reviewing, debugging and improving it.	Unit 1.1: We are treasure hunters Unit 1.5: We are rhythmic Unit 2.1: We are astronauts Unit 2.2: We are games testers	Abstraction algorithm bug code debug decomposition event iterative development output parallel processing program repetition scratch sequence sprite storyboard	Pupils learn to: • plan and create an algorithm for an animated scene in the form of a storyboard • write a program in Scratch to create the animation, including characters, dialogue, costumes, backdrops and sound • review their animation programs and correct mistakes.	• Design, write and debug programs that accomplish specific goals; solve problems by decomposing them into smaller parts. • Use sequence in programs; work with variables and various forms of input and output. • Use logical reasoning to detect and correct errors in algorithms and programs.
	Autumn 2: Unit 3.2 Computer Science: Computational thinking	**We are bug fixers** Session 1: Spotting and correcting off-by-one bugs Session 2: Spotting and correcting performance bugs Session 3: Spotting and correcting multi-thread bugs Session 4: Spotting and correcting conceptual bugs Session 5: Spotting and correcting arithmetical bugs Session 6: Spotting and correcting resource bugs	Unit 1.1: We are treasure hunters. Unit 2:1: We are astronauts. Unit 3.1: We are programmers	Abstraction algorithm bug code debug event input logical reasoning output parallel processing program repetition scratch sequence sprite variable	Pupils learn to: • develop a number of strategies for finding errors in programs • build up resilience and strategies for problem solving • increase their knowledge and understanding of Scratch • recognise a number of common types of bugs in software.	• Debug programs that accomplish specific goals. • Use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

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		Steps to Success	Prior Knowledge	Key vocabulary	Key Skills	NC Coverage: (Computing)
Year 3	Spring 1: Unit 3.3 Information Technology: Media	**We are presenters** Session 1: research their topic Session 2: find images online to illustrate their talk Session 3: rehearse their presentations Session 4: record their presentations Session 5: edit their presentations Session 6: peer assess their presentations.	Unit 1.2: We are TV chefs Unit 2.4: We are researchers	Camera roll Colour value Creative commons Green screen 'Ken Burns' Pixel Resolution Rushes Search engine	Pupils learn to: • develop their web-based research skills • structure, prepare and deliver a talk about a given topic or subtopic studied in another curriculum area • record a piece to camera • edit a movie using static images and green screen footage • give constructive, critical feedback on recorded presentations.	• Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. • Use technology safely, respectfully and responsibly
	Spring 2: Unit 3.4 Digital Literacy: Online safety	**We are Who We Are** Session 1: write about their earliest memories Session 2: write about their interests and hobbies Session 3: create slides about an issue they feel strongly about Session 4: create a short presentation to camera about themselves Session 5: create a narration for the presentation created in Session 4 Session 6: consider carefully who it would be appropriate to share the content they have created with, and why.	Unit 1.2: We are TV chefs Unit 2.4: We are safe researchers Unit 3.3: We are presenters	Comments Creative Commons Data centre Outline Personal information	Pupils learn to: • create a number of structured presentations • narrate presentations • consider issues of trust and privacy when sharing information.	• Select, use and combine a variety of software to design and create content that accomplishes given goals, including presenting information. • Use technology safely, respectfully and responsibly

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Year 3	Summer 1: Unit 3.5 Information Technology: Media	**We are Co-authors** Session 1: plan their class wiki Session 2: use Wikipedia to find information Session 3: create their class wiki Session 4: edit the class wiki Session 5: edit Wikipedia Session 6: review their work.	Unit 2.4: We are safe researchers Unit 3.4: We are who we are	Algorithm Creative commons Debug Five pillars Hyperlink Hypertext mark-up language (HTML) Wiki Wikipedia	Pupils learn to: • understand the conventions for collaborative online work, particularly in wikis • be aware of their responsibilities when editing other people's work • become familiar with Wikipedia, including potential problems associated with its use • practise research skills • write for a target audience using a wiki tool • develop collaboration skills • develop proofreading skills	• • Understand computer networks, including the internet; how they can provide multiple services, such as the worldwide web; and the opportunities they offer for communication and collaboration. • Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact
	Summer 2: Unit 3.6 Information Technology: Data	**We are Opinion Pollsters** Session 1: plan their survey on a topic Session 2: develop questions for their survey Session 3: create their online survey Session 4: collect data online Session 5: analyse and evaluate the data collected Session 6: present the data.	Unit 1.6: We are detectives Unit 2.6: We are zoologists	chart data data centre data protection digital footprint filter (database) personal information survey	Pupils learn to: • understand some elements of survey design • understand some ethical and legal aspects of online data collection • use the Internet to facilitate data collection • use charts to analyse data • interpret results.	• • Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. • Understand computer networks, including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration

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		Steps to Success	Prior Knowledge	Key vocabulary	Key Skills	NC Coverage: (Computing)
Year 4	Autumn 1: Unit 4.1 Computer Science: Coding	**We are software developers** Session 1: analyse existing games and identify what makes them effective Session 2: create a working prototype of their game Session 3: develop the functionality of their game Session 4: improve the interface of their game Session 5: develop progression within their game Session 6: test and improve their game.	Unit 1.1: We are treasure hunters Unit 2.1: We are astronauts Unit 3.1: We are programmers	Algorithm Bug debug input output program repeat loop repetition scratch sequence sprite variable	Pupils learn to: • develop an educational computer game using selection and repetition • understand and use variables • start to debug computer programs • recognise the importance of user interface design, including consideration of input and output.	• Design, write and debug programs that accomplish specific goals. • Use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
	Autumn 2: Unit 4.2 Computer Science: Coding	**We are makers** Session 1: explore the MakeCode environment and learn about the BBC micro:bit Session 2: work out how a match-scoring program has been written Session 3: modify a rock-paper-scissors game to make a sorting hat game Session 4: modify their sorting hat game to make a dice game Session 5: plan their own micro:bit project Session 6: write and test their own micro:bit project.	Unit 3.1: We are programmers Unit 3.2: We are bug fixers Unit 4.1: We are software developers	Accelerometer Algorithm Bluetooth If/else if/else Javascript LED MakeCode Micro:bit Object code Runtime Simulator Source code Variable	Pupils learn: • about the input – process – output model of computation • about the inputs and outputs available on a BBC micro:bit • to program using the MakeCode block-based environment • to test and debug programs they write, using an on-screen simulator and the micro:bit • how to convert and transfer a program written on screen to the micro:bit.	• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems. • Use sequence, selection, and repetition in programs; work with various forms of input and output. • Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

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Year 4	Spring 1: Unit 4.3 Information Technology: Media	**We are musicians** Session 1: recall earlier work building a percussion sequence Session 2: explore the touch instruments Session 3: create music using the piano roll view Session 4: experiment with live loops Session 5: create their own multi-track composition Session 6: refine their composition and get feedback from their classmates.	Unit 1.5: We are rhythmic	Beat sequencer Live loop MIDI Piano roll Sample Stave Touch instrument Tracks Velocity Voice	Pupils learn to: • create a repeating percussion rhythm • play music using virtual instruments • compose or edit tunes using the piano roll (pitch and duration) tool • perform electronic music using pre-recorded loops, and create their own loops • create a multi-track composition or performance using multiple instruments • give feedback to others on their compositions and performances.	• Use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • Be discerning in evaluating digital content. • Select, use and combine a variety of software on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals. • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour.
	Spring 2: Unit 4.4 Digital Literacy: Online safety	**We are bloggers** Session 1: look at class blogs and identify features of good blogs Session 2: write and edit their own blog Session 3: comment on blogs Session 4: add images to blogs Session 5: add media to blogs Session 6: 'live blog' an event.	Unit 1.2: We are TV chefs Unit 1.4: We are publishers Unit 2.3: We are photographers Unit 2.4: We are safe researchers	Creative commons Hyperlink Hypertext mark-up language (HTML) Internet Uniform resource locator (URL) Web server	Pupils learn to: • become familiar with blogs as a medium and a genre of writing • create a sequence of blog posts on a theme • incorporate additional media • comment on the posts of others • develop a critical, reflective view of a range of media, including text.	• Understand computer networks including the Internet; how they can provide multiple services, such as the World Wide Web; and the opportunities they offer for communication and collaboration. • Use a variety of software (including Internet services) on a range of digital devices to design and create a range of content that accomplish given goals. • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour.

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Year 4	Summer 1: Unit 4.5 Computer Science: Coding	**We are artists** Session 1: create simple tessellations using Inkscape Session 2: create more complex tessellations using Inkscape Session 3: create Islamic-style art using Scratch Session 4: create a repeating pattern using Scratch Session 5: create art, inspired by Bridget Riley's late works, using Inkscape Session 6: create art, inspired by Bridget Riley's early works, using Inkscape.	Unit 1.3: We are digital artists Unit 2.1: We are astronauts Unit 3.1: We are programmers Unit 4.1: We are software	Abstraction Bitmap Fractal Pixel Repetition Sprite Tessellation Transform Turtle Vector graphics	Pupils learn to: • develop an appreciation of the links between geometry and art • become familiar with the tools and techniques of a vector graphics package • develop an understanding of turtle graphics • experiment with the tools available, refining and developing their work as they apply their own criteria to evaluate it and receive feedback from their peers • develop some awareness of computer generated art.	• Use sequence, selection and repetition in programs; work with variables and various forms of output. • Select, use and combine a variety of software (including Internet services) on a range of digital devices to design and create a range of content that accomplish given goals.
	Summer 2: Unit 4.6 Information Technology: Data	**We are meteorologists** Session 1: discuss ways to measure the weather and explore equipment Session 2: record the weather over a period of time using a range of methods Session 3: analyse the weather data collected Session 4: analyse the photographs taken and link them to data Session 5: predict the weather and plan a weather forecast Session 6: deliver their TV-style weather forecast and reflect on learning.	Unit 1.6: We are detectives Unit 2.4: We are safe researchers Unit 3.6: We are opinion pollsters	Analogue Data Dataset Digital Field Filter (database) Form Input Interface Record Sensor Table	Pupils learn to: • understand different measurement techniques for weather – both analogue and digital • use computer-based data logging to automate the recording of some weather data • use spreadsheets to create charts • analyse data, explore inconsistencies in data and make predictions • practise using presentation and video software.	• Work with variables and various forms of input and output. • Use logical reasoning to explain how some simple algorithms work. • Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. • Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

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Year 5	Autumn 1: Unit 5.1 Computer Science: Coding	**We are game developers** Session 1: analyse games and plan their own Session 2: create and source assets Session 3: create a prototype of a Scratch game Session 4: debug the game script Session 5: test and improve their game Session 6: write game instructions and publish their games.	Unit 1.1: We are treasure hunters Unit 1.5: We are rhythmic Unit 2.1: We are astronauts Unit 2.2: We are games testers Unit 3.1: We are programmers Unit 4.1: We are software developers	Algorithm Background Bug Code Deubug Iterative development Logical reasoning Program Scratch Sprite	Pupils learn to: • create original artwork and sound for a game • design and create a computer program for a computer game, which uses sequence, selection, repetition and variables • detect and correct errors in their computer game • use iterative development techniques (making and testing a series of small changes) to improve their game.	• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. • Use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
	Autumn 2: Unit 5.2 Computer Science: Computational thinking	**We are cryptographers** Session 1: are introduced to semaphore and communicate information using it Session 2: are introduced to Morse code and communicate information using it Session 3: learn about ciphers and the Caesar cipher to crack codes Session 4: learn how to use frequency analysis, common words and substitution ciphers to crack codes Session 5: learn about the importance of password security Session 6: learn about encrypted websites and evaluate the unit of work.	Unit 1.5: We are rhythmic Unit 2.1: We are astronauts Unit 2.2: We are games testers Unit 3.1: We are programmers Unit 3.2: We are bug fixers Unit 4.1: We are software developers Unit 5.1: We are game developers	Cipher Codes Cryptanalysis Cryptography Decrypt Encode Encrypt Message Morse code Semaphore Transmit	Pupils learn to: • be familiar with semaphore and Morse code • understand the need for private information to be encrypted • encrypt and decrypt messages in simple ciphers • appreciate the need to use complex passwords and to keep them secure • have some understanding of how encryption works on the Internet.	• Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. • Understand computer networks including the internet; how they can provide multiple services, such as the worldwide web; and the opportunities they offer for communication and collaboration. • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Computing Whole School Progression of Skills

		Steps to Success	Prior Knowledge	Key vocabulary	Key Skills	NC Coverage: (Computing)
Year 5	Spring 1: Unit 5.3 Information Technology: Media	**We are architects** Session 1: explore existing art galleries, before sketching ideas for their own Session 2: build their virtual gallery Session 3: create a 3-D sculpture for their virtual gallery Session 4: create furniture and fixtures for their virtual gallery Session 5: hang artwork in their virtual gallery space Session 6: create a virtual tour of their gallery.	Unit 1.3: We are digital artists Unit 2.3: We are photographers Unit 3.3: We are presenters Unit 4.5: We are artists	Computer aided design (CAD) Creative commons Photorealistic Render	Pupils learn to: • Understand the work of architects, designers and engineers working in 3D. • Develop familiarity with a simple CAD (computer aided design) tool. • Develop spatial awareness by exploring and experimenting with a 3D virtual environment. • Develop greater aesthetic awareness	• Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. • Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
	Spring 2: Unit 5.4 Digital Literacy: Online safety	**We are web developers** Session 1: learn about the school network and how it connects to the Internet Session 2: learn how messages are passed on the Internet Session 3: learn how web pages are built of HTML Session 4: plan an online safety website Session 5: write pages for their site Session 6: add links and media to their site.	Unit 1.4: We are publishers Unit 2.4: We are researchers Unit 3.5: We are co-authors Unit 4.4: We are bloggers Unit 5.2: We are cryptographers	Creative commons Hyperlink Hypertext mark-up language (HTML) Hypertext transfer protocol (HTTP) Internet Internet protocol (IP) address Network switch Packets of data Protocol Tag Uniform resource locator (URL) Web browser Web server World wide web	• Pupils learn: • the name and function of components making up the school's network • how information is passed between the components that make up the Internet • what the source code for a web page looks like, and how it can be edited • how a website can be structured • how to add content to a web page.	• Understand computer networks including the internet; how they can provide multiple services, such as the worldwide web; and the opportunities they offer for communication and collaboration. • Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. • Be discerning in evaluating digital content.

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Year 5	Summer 1: Unit 5.5 Information Technology: Media	**We are adventure gamers** Session 1: plan an interactive adventure game Session 2: write descriptions for their game Session 3: source images for their game Session 4: create links between slides Session 5: add audio narration to their game Session 6: test one another's games and give feedback.	Unit 2.4: We are safe researchers. Unit 3.3: We are presenters Unit 3.4: We are who we are Unit 4.3: We are musicians	Abstraction Colour value Creative commons Hyperlink MP3 Pixel Safe search	Pupils learn: • how to plan a non-linear presentation • to create text as part of a presentation • to add and edit images in a presentation • to use hyperlinks for navigation between the slides of a presentation • to record and add audio narration to a presentation • to use commenting tools to give feedback on a presentation.	• Use search technologies effectively. • Use a variety of software (including Internet services) on a range of digital devices to design and create content that accomplish given goals, including presenting information. • Use technology safely, respectfully and responsibly.
	Summer 2Unit 5.6 Information Technology: Media	**We are VR designers** Session 1: explore familiar and unfamiliar locations in VR using Google Street View Session 2: create a 360° photo and import it to Google Maps Session 3: record book reviews, and link them to books using QR codes Session 4: are introduced to CoSpaces Session 5: create a scene in CoSpaces Session 6: write a program to control a VR or AR object in CoSpaces.	Unit 4.3: We are musicians Unit 5.3: We are architects	Accelerometer Augmented reality (AR) Global positioning system (GPS) Google cardboard Photosphere QR code Share code Stereographic Virtual reality (VR)	Pupils learn to: • explore real-world and imagined locations in VR (if possible) • create 360° photosphere images • link physical objects to digital content using QR codes • create their own VR scene • program objects and interactions in VR.	• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. • Use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • Select, use and combine a variety of software (including Internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting information.

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Year 6	Autumn 1: Unit 6.1 Computer Science: Coding	**We are toy makers** Session 1: revisit micro:bit and MakeCode Session 2: research electronic toys Session 3: design their toy Session 4: program the micro:bit Session 5: prepare their toy for adding interactive components Session 6: connect the micro:bit to the toy.	Unit 1.1: We are treasure hunters Unit 4.2: We are makers	Accelerometer Bluetooth Controller Decomposition Edge connector Embedded system Input Interactive Light-emitting diode (LED) MakeCode micro:bit Microprocessor Output Simulator System	Pupils learn: • how computers use stored programs to connect input to output • how to generate and evaluate designs in response to a brief • to plan a complex project by decomposing it into smaller parts • to work with physical components of a system • how to design and write a program for an embedded system • to use criteria to provide others with feedback on their work.	• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems. • Use sequence, selection, and repetition in programs; work with various forms of input and output. • Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
	Autumn 2: Unit 6.2 Computer Science: Computational thinking	**We are computational thinkers** Session 1: find the shortest route between towns Session 2: find the smallest number of coins needed to make change Session 3: learn about random and linear search algorithms Session 4: learn about binary search algorithms Session 5: learn about selection sort algorithms Session 6: learn about quicksort algorithms.	Unit 1.2: We are TV chefs Unit 2.2: We are game testers Unit 3.2: We are bug fixers Unit 5.5: We are adventure gamers Unit 6.6: We are AI developers	Abstraction Algortithm Binary searcxh Decomposition Divide and conquer Graph Greedy algorithm Linear search Quicksort Search Search algorithm Selection sort Sort	Pupils learn to: • develop the ability to reason logically about algorithms • understand how some key algorithms can be expressed as programs • understand that some algorithms are more efficient than others for the same problem • understand common algorithms for searching and sorting a list.	• Design, write and debug programs that accomplish specific goals. • Use sequence, selection and repetition in programs; work with variables and various forms of input and output. • Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

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Year 6	Spring 1: Unit 6.3 Information Technology: Media	**We are publishers** Session 1: plan their yearbook or magazine Session 2: plan a section of the yearbook or magazine and gather/commission content Session 3: use software to create a section of the yearbook or magazine Session 4: assemble the pages of the yearbook or magazine Session 5: assess and proofread the yearbook or magazine Session 6: review, edit and print the yearbook or magazine.	Unit 1.4: We are Publishers Unit 2.4: We are safe Researchers Unit 3.5: We are co-authors Unit 5.4 We are web developers	Creative commons Desktop publishing (DTP) eBook ePub Folder Image Portable document format (PDF) text	Pupils learn to: • manage or contribute to large collaborative projects, facilitated using online tools • write and review content • source digital media while demonstrating safe, respectful and responsible use • design and produce a high-quality print document.	• Understand computer networks including the Internet and the opportunities they offer for communication and collaboration. • Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. • Select, use and combine a variety of software (including Internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. • Use technology safely, respectfully and responsibly
	Spring 2: Unit 6.4 Digital Literacy: Online safety	**We are connected** Session 1: decide on guidelines to follow when debating a controversial topic Session 2: research the chosen topic, thinking carefully about how to decide whether information is reliable or not Session 3: argue their own perspective on the topic, backing up their views with relevant sources Session 4: show respect and tolerance as they respond to others' views Session 5: think about how reliable sources of information are Session 6: discuss online bullying and how they should respond to it.	Unit 2.4: We are safe researchers Unit 3.3: We are presenters Unit 4.4: We are bloggers	Anchor tag bias Blog Fake news Hyperlink Neutral point of view Online bullying (cyberlink) Plausible Reliable Social media Source	Pupils learn: • about appropriate rules or guidelines for a civil online discussion • how search results are selected and ranked • how to argue their point effectively, supporting their views with sources • how to counter someone else's argument while showing respect and tolerance • how to judge the reliability of an online source • some strategies for dealing with online bullying.	• Understand the opportunities computer networks offer for communication and collaboration. • Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content.

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Year 6	Summer 1: Unit 6.5 Information Technology: Media	**We are advertisers** Session 1: review existing adverts or promotional films Session 2: create a storyboard for an advert or promotional film Session 3: shoot original footage for an advert or promotional film Session 4: source other media and consider copyright Session 5: create a rough cut of an advert or promotional film Session 6: make improvements to create a final cut.	Unit 1.2: We are TV chefs Unit 2.5: We are animators Unit 3.3: We are presenters Unit 4.6: We are meteorologists	Creative commons Export Final cut Rough cut Rushes Storyboard	Pupils learn to: • think critically about how video is used to promote a cause • storyboard an effective advert for a cause • work collaboratively to shoot original footage and source additional content • acknowledge intellectual property rights • work collaboratively to edit the assembled content to make an effective advert.	• Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. • Select, use and combine a variety of software (including Internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information. • Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.
	Summer 2: Unit 6.6 Computer Science: Coding	**We are AI developers** Session 1: construct decision tree classifiers Session 2: use speech recognition Session 3: simulate a neural net Session 4: use image recognition Session 5: explore sentiment analysis Session 6: program a self-driving car and consider the ethics of AI.	Unit 2.6: We are Zoologists Unit 3.2: We are bug fixers Unit 6.2: We are computational thinkers Unit 6.3: We are publishers	Artificial intelligence Classifier Decision tree Image recognition Label Layer Machine learning Modern Natural language processing Neural network Node Sentiment analysis Spectrogram Speech recognition Test data Training data Watson	Pupils learn: • how decision trees can be trained automatically to classify data • how speech recognition works • how a neural net recognises images • to train a neural net to classify images • to train a machine learning system to identify sentiments • to consider some ethical principles in designing AI systems.	• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. • Use and combine a variety of software on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.