COMPUTING KNOWLEDGE, SKILLS AND VOCABULARY PROGRESSION

Reception Pupils: (from EYFS Statutory framework) should be able to:	**Key stage 1 Pupils should be taught to:**	**Key stage 2 Pupils should be taught to:**
♣ Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. ♣ Explain the reasons for rules, know right from wrong and try to behave accordingly ♣ Know some differences and similarities between things in the past and now, drawing on their experiences.	♣ understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions ♣ create and debug simple programs ♣ use logical reasoning to predict the behaviour of simple programs ♣ 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.	♣ 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 ♣ 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 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

Year A Year B

Strand		Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computing Systems & Networks	Skills Progression	Technology Around Us To know there are machines that are technology and not alive.	Technology Around Us To To identify a computer and its main parts To use a mouse in different ways To use a keyboard to type on a computer To use the keyboard to edit text To create rules for using technology responsibly	IT Around Us To recognise the uses and features of information technology To identify the uses of information technology in the school To identify information technology beyond school To show how to use information technology safely	Connecting Computers To explain how digital devices function To identify input and output devices To explain a computer system accepts an input and processes it to produce an output. To identify network devise around me To explain how networks can be connected to other networks. To explore how digital devices can be connected To recognise the physical components of a network	The Internet To describe how networks physically connect to other networks To describe how content can be added and accessed on the World Wide Web (WWW) To evaluate the consequences of unreliable content	Systems and Searching To explain that computers can be connected together to form systems To identify how to use a search engine To describe the input and output of a search engine To describe how search engines select results To explain how search results are ranked To recognise why the order of results is important, and to whom To evaluate the results of search terms.	Communication and Collaboration To explain the importance of internet addresses To recognise how data is transferred across the internet To explain how sharing information online can help people to work together To choose and evaluate different ways of working together online To recognise how we communicate using technology To decide what you should and shouldn't share online To evaluate different methods of online communication
	Knowledge	To know technology can help us	There are different examples of technology There are different ways technology helps us There a are choices and rules around technology	There are different types of computers in school A computer is part of IT. There are different features and uses of IT. Information technology helps us	An input is the data or instructions that is entered. A process acts on inputs A computer network can be used to share information Information is passed through multiple connections	Websites can be shared via the World Wide Web (WWW) networked devices make up the internet Content of the WWW is created by people	A system is a set of interconnected parts which work together Computers can be connected together to form IT systems Data can be transferred between IT systems	Data is transferred across networks using agreed protocols Data is transferred in packets Connections between computers allow access to shared stored files. Computers connected to the internet allow people in different

					A switch connects devices to share information. Digital devices are made up of several parts		A search engine is an example of a large IT system Search engines create indices A web crawler has a role in creating an index Ranking orders make search results more useful Ranking is determined by different rules. Different search engines have different rules.	places to work together Technology offers communication and collaboration opportunities Communication a nd Collaboration can be public or private.
	<u>Vocabulary</u>	technolog y, computer , mouse,	trackpad, keyboard, screen, double-click, typing	Information technology (IT), computer, barcode, scanner/scan	digital device, input, process, output, program, digital, non-digital, connection, network, switch, server, wireless access point, cables, sockets	internet, network, router, security, switch, server, wireless access point (WAP), website, web page, web address, routing, web browser, World Wide Web, content, links, files, use, download, sharing, ownership, permission, information, accurate, honest, content, adverts	system, connection, digital, input, process, storage, output, search, search engine, refine, index, bot, ordering, links, algorithm, search engine optimisation (SEO), web crawler, content creator, selection, ranking.	communication, protocol, data, address, Internet Protocol (IP), Domain Name Server (DNS), packet, header, data payload, chat, explore, slide deck, reuse, remix, collaboration, internet, public, private, oneway, two-way, one-to-one, one-to-many
Creating Media	**Skills Progressio n**	To experime nt making marks with technolog y	<u>Digital Painting</u> To describe what different freehand tools do To use a range of paint colours	<u>Digital Photography</u> To use a digital device to take a photograph	<u>Stop-Frame Animation</u> To relate animated movement with a sequence of images	<u>Audio Production</u> To record sound using a computer To play recorded audio To import audio into a project	<u>Video Production</u> To explain what makes a video effective To use a digital device to record video	<u>Web Page Creation</u> To review an existing website and consider its structure To plan the features of a web page

		To capture a moment with a camera	To use the fill tool To correct a mistake with the undo button To use the shape tool and the line tools for precision To make careful choices when painting a digital picture To explain why I chose the tools I used To use a computer and a range of software tools on my own to paint a picture	To make choices when taking a photograph - keeping still, lighting, zoom, To describe what makes a good photograph – keeping still, lighting, zoom, To decide how photographs can be improved To take photos in landscape and portrait formats To view photos on a digital device To use editing tools to change an image To improve a photo by retaking it.	To plan an animation using a storyboard To set up a work area with a view to what will be captured. To capture an image To use onion skinning tool to review subject position To move a subject between captures To review and improve an animation To add media to enhance an animation To evaluate the impact of adding other media to an animation	To delete a section of audio To change volumes of tracks in a project To consider results of the editing choices made.	To capture video using a range of techniques – camera angles, pan, tilt, zoon To create a storyboard To improve video through reshooting and editing including split, trim, crop. To determine which scenes will convey an idea To consider the impact of the choices made when making and sharing a video	To consider the ownership and use of images (copyright) To recognise the need to preview pages To outline the need for a navigation path To recognise the implications of linking to content owned by other people To set a style of text on a web page To add text to a web page To embed media in a web page To insert hyperlinks
	Knowledge	Computers can be used to create art	Tools can be adjusted to suit the user's needs Choices made impact the final product Painting with a computer is different to painting with brushes	Some digital devices can capture images using a camera Photographs can be saved and viewed later Photographs can be changed after they have been taken Some images are	animation is a sequence of drawings or photographs A capturing device needs a fixed position Smaller movements create smoother animation	Sounds can be recorded An input device is needed to record sound Output devices are needed to play audio Recorded audio can be stored on a computer	A video is a Visual media format A storyboard is a useful tool in video production Different techniques can produce different effects Video footage needs to be regularly reviewed	Web pages are written by people A website is a set of hyperlinked pages. There is a relationship between HTML and visual display Web pages can contain different media types A navigation path Is needed.

				not accurate	A consistency is needed when working Projects must be exporters to be shared.	Audio can be layered so that multiple sounds can be played at the same time	and may need reshooting or editing. There are limits on what a device is capable of. Videos can be edited using recording device or on a computer. Projects need to be exported to be shared.	Pages need to be previewed for different screens and devices.
	Vocabulary	Paint painting Computers pictures, program tool	paintbrush, erase, fill, undo, shape tools, line tool, fill tool, undo tool, colour, brush style, brush size,	camera, photograph, capture, image, digital, landscape, portrait, framing, subject, compose, light sources, flash, focus, background, editing, filter, format, framing, lighting,	animation, flip book, stop frame, frame, sequence, image, photograph, setting, character, events, onion skinning, consistency, evaluation, delete, media, import, transition	audio, microphone, speaker, headphones, input device, output device, sound, podcast, edit, trim, align, layer, import, record, playback, selection, load, save, export, MP3, evaluate, feedback.	video, audio, camera, talking head, panning, close up, video camera, microphone, lens, mid-range, long shot, moving subject, side by side, angle (high, low, normal), static, zoom, pan, tilt, storyboard, filming, review, import, split, trim, clip, edit, reshoot, delete, reorder, export, evaluate, share.	website, web page, browser, media, Hypertext Markup Language (HTML), logo, layout, header, media, purpose, copyright, fair use, home page, preview, evaluate, device, Google Sites, breadcrumb trail, navigation, hyperlink, subpage, evaluate, implication, external link, embed.
Programming A		<u>Moving a robot</u> To become familiar with buttons on a bee bot.	<u>Moving a robot</u> To explain what a given command will do To act out a given word To combine 'forwards' and 'backwards'	<u>Robot Algorithms</u> To choose a series of words that can be enacted as a sequence To explain what happens when we change the order of instructions	<u>Sequencing Sounds</u> To explore a new programming environment To identify that commands, have an outcome	<u>Repetition in Shapes</u> To create a program in a text-based language To identify a loop within a program	<u>Selection in Physical Computing</u> To control a simple circuit connected to a computer To write a program that includes	<u>Variables in Games</u> To identify and explain why a variable is used in a program To experiment with a value of an existing variable

		To know that pressing a button can produce an action but not always. To experiment with which buttons give the desired result.	commands to make a sequence To combine four direction commands to make sequences To plan a simple program To find more than one solution to a problem To run a program on a device	To use logical reasoning to predict the outcome of a program To explain that programming projects can have code and artwork To design an algorithm To create, run and debug a program that I have written	To explain that a program has a start To build a sequence of commands To combine commands in a program To order commands in a program To change the appearance of my project To create a sequence of commands to produce a given outcome	To identify patterns in a sequence To use and modify a count-controlled loop to produce a given outcome To decompose a task into small steps To plan and create a program that uses count-controlled loops to produce a given outcome To create two or more sequences that run at the same time	count-controlled loops To use a condition is an 'if…then' and 'if…then…else' statement to start an action to produce given outcomes To check whether a condition has been met To design a physical project that includes selection To create a program that controls a physical computing project	To choose a name that identifies the role of a variable To choose how to improve a game by using variables To design a project that builds on a given example To use a variable in conditional statement to control the flow of a program To use the same variable in more than one location in a program
	<u>Knowledge</u>	An instruction tells a person or computer what to do.	Words can be enacted A command can be for a given purpose A series of instructions needs issuing before they can be enacted	A series of instructions as a sequence Changing order of instructions can change outcome You can predict the outcome of a program	A sequence is an order in which instructions are processed A program includes a sequence of commands The sequence of a program is a process The order of commands can affect a programs output Different sequences can achieve the same or different output	Repeat means to execute a set of instructions multiple times Everyday tasks include repetition as part of a sequence A loop command is used to repeat instructions in a program Instruction order in a loop is important Accuracy in programming is important Not all tools enable more than one process to run at once	A condition can only be true or false Count controlled loops contain a condition A condition-controlled loop will stop when a condition is met When a condition is met, a loop will complete a cycle before it stops.	A 'variable' as something that is changeable An example of information that is variable is a football score during a match A variable can be used in program. A program variable is a placeholder in memory for a single value A variable has a name and a value The value of a variable can be used by a program Variables can hold numbers (integers) or letters (strings)

								A variable can be set as a constant
	Vocabulary	Bee-Bot, forwards, backwards,	turn, clear, go, commands, instructions, directions, left, right, route, plan, algorithm, program.	instruction, sequence, clear, unambiguous, algorithm, program, order, prediction, artwork, design, route, mat, debugging, decomposition	Scratch, programming, blocks, commands, code, sprite, costume, stage, backdrop, motion, turn, point in direction, go to, glide, sequence, event, task, design, run the code, order, note, chord, algorithm, bug, debug, code.	Logo (programming environment), program, turtle, commands, code snippet, algorithm, design, debug, pattern, repeat, repetition, count-controlled loop, value, trace, decompose, procedure	microcontroller, USB, components, connection, infinite loop, output component, motor, repetition, count-controlled loop, Crumble controller, switch, LED, Sparkle, crocodile clips, connect, battery box, program, condition, Input, output, selection, action, debug, circuit, power, cell, buzzer	variable, change, name, value, set, design, event, algorithm, code, task, artwork, program, project, code, test, debug, improve, evaluate, share, assign, declare, integer, string, fixed value
Data & Information		Data To know data can be stored using technology To add to data on a simple pictogram by clicking an icon.	Grouping Data To identify some attributes of an object To describe objects in different ways To count objects with the same properties To group objects to answer questions To choose the attribute to group objects by To compare groups of objects	Pictograms To count and compare objects using tally charts To enter data onto a computer To describe people, animals and objects by attributes To view data in different formats To use and create a pictogram to answer single attribute questions To select objects by attribute and make comparisons	Branching Databases To create questions with yes/no answers To choose questions that will divide objects into evenly sized sub-groups To repeatedly create sub groups of objects To identify an object using a branching database To retrieve information from different levels of a	Data Logging To use a digital device to collect data automatically To choose an appropriate timeframe when collecting data automatically To recognise how a computer can help us analyse data To identify the data needed to answer questions	Flat-file Databases To choose different ways to view data To use a form to record information To ask questions that need more than one attribute to answer To compare paper and computer-based databases To choose multiple criteria to search data to answer a given question (AND and OR) To choose which attribute to sort data by	Introduction to Spreadsheets To create a data set in a spreadsheet To use functions to create new data To calculate data using a formula for each operation To build a data set in a spreadsheet To use existing cells within a formula To apply formulas to data To create a spreadsheet to plan an event To choose suitable ways to present data

			To answer questions about groups of objects To collect simple data		branching database To create a branching database To explain why it is helpful for a database to be well structured To plan the structure of a branching database To independently create an identification tool	To use data from sensors to answer questions To use a computer program to sort data by one attribute To export information in different formats	To outline how you can answer questions by grouping and then sorting data To select appropriate graphs to visually compare data To use a real-world database to answer questions	
	Knowledge	Information can be presented There can be more than one object	objects can be counted information can be presented in different ways	A tally chart can collect data Objects can be compared that have been grouped by attribute Tally charts and pictograms need appropriate headings Information can be presented using a computer Some information should not be shared such as personal information A computer program can present information in different ways	Questions can have yes/no answers Data can be structured using yes/no questions Attributes can separate objects into similarly sized groups A branching database is an identification tool A well-structured branching database will enable you to identify objects using fewer questions	Questions can be answered using a table of data Sensors are input devices and can be used for data collection A data logger collects 'data points' from sensors over time Data gathered over time can be used to answer questions	computer programs can be used to compare data visually we can present information to communicate a message tools can be used to select data to answer questions Operands can be used to filter data AND and OR can be used to refine data selection	Questions can be answered using spreadsheet data There are different software tools to work with data Data type determines how a spreadsheet can process data Formulas can eb used to produce calculated data Cells can be linked A cell's value automatically updates with a value in a linked cell is changed
	Vocabulary	Object, more	object, label, group, search,	more than, less than, most, least,	attribute, value, questions, table,	ata, table, layout, input device,	Operands database, data,	data, collecting, table, structure,

			image, property, colour, size, shape, value, data set, more, less, most, fewest, least, the same	common, popular, organise, data, object, tally chart, votes, total, pictogram, enter, data, compare, objects, count, explain, attribute, group, same, different, conclusion, block diagram, sharing	objects, branching, database, objects, equal, even, separate, structure, compare, order, organise, selecting, information, decision tree.	sensor, logger, logging, data point, interval, analyse, dataset, import, export, logged, collection, review, conclusion.	information, record, field, sort, order, group, search, value, criteria, graph, chart, axis, compare, filter, presentation.	spreadsheet, cell, cell reference, data item, format, formula, calculation, spreadsheet, input, output, operation, range, duplicate, sigma, propose, question, data set, organised, chart, evaluate, results, sum, comparison, software, tools.
Creating Media	Skills progression	Digital Music To press buttons to create music. To experiment changing music by pressing a certain combination of buttons.	Digital Writing To use a computer to write To use letter, number and space keys to enter text into a computer To use punctuation and special characters To select text To add and remove text on a computer using backspace key To identify that the look of text can be changed on a computer To position the cursor To use undo To make careful choices when changing text To explain why I used the tools that I chose	Digital Music To say how music can make us feel To experiment with sound and musical patterns using a computer To use a computer to create a musical pattern To use a computer to compose a rhythm and a melody on a given theme To use a computer to play the same music in different ways To evaluate and improve a musical compositions created on a computer	Desktop Publishing To choose appropriate page settings including page orientation To add content to a desktop publishing publication To add text to a placeholder To add, remove edit and organise text and images in a page layout and from place holders To move, resize and rotate images To choose fonts and apply effects to text	Photo Editing To use an application to change the whole of a digital image To use an application to change part of a digital image To flip and rotate, crop, adjust colours, apply filters, apply effects to change the composition of a digital image. To select part of a digital image To clone, copy and paste to change a digital image To add text to a digital image To combine images for a purpose	Introduction to Vector Graphics To add an object to a vector drawing To select one or multiple objects To move, delete, duplicate, modify, group, ungroup and reposition objects To create a vector drawing by combining shapes for a given purpose To use tools to achieve a desired effect	3D Modelling To position 3d shapes relative to one another To use digital tools to modify 3d objects To combine objects to crate a 3d digital artefact To use digital tools to accurately size 3d objects To create a 3D model for a given purpose To plan my own 3D model To create my own digital 3D model which reflects a real-world object

			To compare typing on a computer to writing on paper	To create music for a purpose	To review a document To consider the benefits of desktop publishing	To evaluate how changes can improve an image	To apply what I have learned about vector drawings	
	Knowledge	music can be produced using technology.	A keyboard is used to enter text into a computer The shift key changes the output of a key Text and the appearance of text can be changed Different choices produce different results	There are patterns in music The same pattern can be represented in different ways	text and images convey information text and layout can be edited different layouts can suit different purposes DTP pages can be structured with placeholders A DTP application has benefits including simplified publishing, easy to use, low cost, professional looking.	Digital images can be manipulated for different purposes Editing an image has an impact on image quality Editing images is done for different purposes including restoration, marketing, removing defects and so on.	drawing tools can be used to produce different outcomes vector drawings consist of layers Each object in a drawing is a layer Objects can be modified in groups Grouping objects makes them easier to work with	you can work in three dimensions on a computer objects can be combined in a 3D model placeholders can create holes for 3d objects artefacts can be broken down into a collection of 3d objects
	Vocabulary	Music Open Quiet loud feelings	word processor, keyboard, keys, letters, type, numbers, space, backspace, text cursor, capital letters, toolbar, bold, italic, underline, mouse, select, font, undo, redo, format, compare, typing, writing.,	emotions, pattern, rhythm, pulse, pitch, tempo, rhythm, notes, create, emotion, beat, instrument, open, edit. device	text, images, advantages, disadvantages, communicate, font, style, landscape, portrait, orientation, placeholder, template, layout, content, desktop publishing, copy, paste, purpose, benefits.	image, edit, digital, crop, rotate, undo, save, adjustments, effects, colours, hue, saturation, sepia, vignette, image, retouch, clone, select, combine, made up, real, composite, cut, copy, paste, alter, background, foreground, zoom, undo, font	vector, drawing tools, object, toolbar, vector drawing, move, resize, colour, rotate, duplicate/copy, zoom, select, align, modify, layers, order, copy, paste, group, ungroup, reuse, reflection	Tinker CAD, 2D, 3D, shapes, select, move, perspective, view, handles, resize, lift, lower, recolour, rotate, duplicate, group, cylinder, cube, cuboid, sphere, cone, prism, pyramid, placeholder, hollow, choose, combine, construct, evaluate, modify
Programming B	Skills Progression	Animations To click on an	Programming Animations To choose a command for a given purpose	Programming Quizzes To choose a series of words that can	Events & Actions in Programs To build a sequence of commands	Repetition in Games To list an everyday task as a set of instructions	Selection in Quizzes To choose a condition to use in a program	Sensing Movement To identify a variable in an existing program

		avatar to move it across the screen. To know that an action can produce a result.	To show that a effect of changing a value To explain that each sprite has its own instructions To design the parts of a project To use my algorithm to create a program To run a program on a device	be enacted as a sequence Explain what happens when we change the order of instructions Choose a series of commands that can be run as a program To test a sequence to make a prediction To test a prediction by running a sequence To create and debug a program using a given design To run a program on a device To decide how my project can be improved	To combine commands in a program To order commands in a program To create a program to move a sprite in four directions To adapt a program to a new context To create a sequence of commands to produce a given outcome To develop my program by adding features To identify and fix bugs in a program To design and create a maze-based challenge	including repetition To develop the use of count-controlled loops in a different programming environment To develop a design that includes two or more loops which run at the same time To modify an infinite loop in a given program To design a project that includes repetition To create a project that includes repetition	To create a condition-controlled loop To create a program that uses selection To use a condition in an 'if... then…' statement to start an action To use selection to switch program flow To use 'if... then... else…' to switch program flow in one of two ways To evaluate my program	To experiment with the value of an existing variable To choose a name that identifies the role of a variable To describe where is a program to set a variable To update a variable with user input To use an event to update a variable in a program To use the same variable in more than one program
	<u>Knowledge</u>	a command is an instructio n	a command can be run by pressing a button A series of commands can be joined together A set of instructions can be issued before they are enacted	A series of instructions is a sequence Logical reasoning can predict the outcome of a program	A sequence is the order in which instruction occur and are processed A program includes sequences of commands A sequence of a program is a process The order of commands can affect a programs	Repeat means running lines of code multiple times Everyday tasks include repetition such as brushing teeth A loop command in used in a program to repeat instructions	selection is used in computer programs to control when and which code will run selection directs the flow of a program a conditional statement connects a	A variable is something that is changeable Examples include a football score A variable has a name and a value A variable can be used by a program The value of a variable can be updated, it can hold letters or numbers, it can be constant,

			a program is a set of commands a computer can run commands can be combined in a program		output – it can be the same or different	In programming there are indefinite loops and count controlled loops You can program a loop to stop after a specific number of times An indefinite loop will run until the program is stopped	condition to an outcome a loop can be used to repeatedly check whether a condition has been met instruction order is important in in 'if... then... else...' statements	It is important to set up a variable at the start of a program There is only one value for a variable at any one time, if you change a variable value, you cannot access the previous value. selection can control the flow of a program
	<u>Vocabulary</u>	2simple2animate Frame Run	ScratchJr, command, sprite, compare, programming, area, block, joining, start, run, program, background, delete, reset, algorithm, predict, effect, change, value, instructions, design	sequence, command, program, run, start, outcome, predict, blocks, design, actions, sprite, project, modify, change, algorithm, build, match, compare, debug, features, evaluate, decomposition, code	motion, event, sprite, algorithm, logic, move, resize, extension block, pen up, set up, pen, design, action, debugging, errors, setup, code, test, debug, actions.	Scratch, programming, sprite, blocks, code, loop, repeat, value, infinite loop, count-controlled loop, costume, repetition, forever, animate, event block, duplicate, modify, design, algorithm, debug, refine, evaluate.	Selection, condition, true, false, count-controlled loop, outcomes, conditional statement, algorithm, program, debug, question, answer, task, design, input, implement, test, run, setup, operator	Micro:bit, MakeCode, input, process, output, flashing, USB, trace, selection, condition, if then else, variable, random, sensing, accelerometer, value, compass, direction, navigation, design, task, algorithm, step counter, plan, create, code, test, debug