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St Columb Minor Academy – Computing Substantive knowledge progression EYFS/KS1/KS2						
EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Composite: Computer Science. Programming						
On Off Switch Backwards Forward Instruction Sound Moving	Instruction, algorithm, program, debug, direction, arrow, undo, forward, backwards, right turn, left turn, Animation, sound-effect, command, sprite, compare, programming, block, joining, run, background, reset, predict, effect, change, value, design, turn, go, plan, route	Digitally Action, bug, character, codeblock, command, input, object, properties, repeat, sequence, unambiguous, order, prediction, decomposition, modify, evaluate, code	code design, design mode, event, If, object, properties, timer, computer simulation, selection, variable, scratch, costume, stage, motion, point in direction, glide, task, design, resize, extension block, pen-up, set-up, test	Virus, cookies, copyright, footprint, email, identity, theft, malware, phishing, plagiarism, spam, motherboard, CPU, RAM, Graphics Card, Network, Card, monitor, speakers, Logo, BK, FD, RT, LT, REPEAT, SETPC, SETPS, PU, PD Action, alert, code design, control, command, debug/ debugging, event, flowchart bug, get input, selection, computer simulation, simulation, timer, turtle, code snippet, count controlled loop, procedure, infinite loop, animate, duplicate, refine	Circuit, microcontroller, LED, condition, conditional loop, if-then, flow, detailed, project, selection, intended outcome, model, if-then-else, program flow,	implement, share, extend, setup code, improvement, environment, controllable, emulator, transfer, operand, approaches

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To become familiar with programmable toys (EG Beebots) To become familiar with a touch screen and other appropriate devices	I can predict the outcome of a command on a device I can match a command to an outcome I can recall words that can be acted out I can compare forwards and backwards movements I can start a sequence from the same place I can predict the outcome of a sequence involving forwards and backwards commands I can compare left and right turns I can experiment with turn and move commands to move a robot I can predict the outcome of a	I can show the difference in outcomes between two sequences that consist of the same commands I can follow a sequence I can predict the outcome of a sequence I can compare my prediction to the program outcome I can explain the choices I made for my mat design I can identify different routes around my mat I can test my mat to make sure that it is usable I can explain what my algorithm should achieve I can create an algorithm to meet my goal I can use my	Understand how event blocks can be used to start a project in a variety of different ways. Learn how to create sequence of commands Understand how to programme movement (NC)Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. (NC)Use sequence, selection and repetition in programs; work with variables and	To identify that accuracy in programming is important To explain what 'repeat' means To decompose a program into parts To develop the use of count-controlled loops in a different programming environment To explain that in programming there are infinite loops and count-controlled loops 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 explain that a loop can stop when a condition is met, eg number of times To conclude that a loop can be used to repeatedly check whether a condition has been met (NC) 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. (NC) select, use and combine a variety of software (including internet services) on a range of digital devices to	To construct a digital 3D model of a physical object design a digital model by combining 3D objects To develop and improve a digital 3D model To plan the features of a web page To define a 'variable' as something that is changeable To create a program to run on a controllable device (NC) use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

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	sequence involving up to four commands I can explain what my program should do I can choose the order of commands in a sequence I can debug my program I can compare different programming tools To show that a series of commands can be joined together To identify the 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 (NC) Understand what algorithms are; how they are	algorithm to create a program (NC) Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions. (NC) Create and debug simple programs (NC) Use logical reasoning to predict the behaviour of simple programs.	various forms of input and output. (NC)Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs (NC) 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.	(NC) Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts (NC) Use sequence, selection and repetition in programs; work with variables and various forms of input and output. (NC) Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and program (NC) Understand computer networks, including the Internet; how	design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information	

	implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions. (NC) Create and debug simple programs (NC) Use logical reasoning to predict the behaviour of simple programs.			they can provide multiple services, such as the World Wide Web; and the opportunities they offer for communication and collaboration.		
Composites: Information Technology						
Buttons Collect Command Computer Count Equipment Keyboard Keys Monitor Mouse Movement Organise Phone Camera Remote Set of photos Type	technology, computer, laptop, desktop, keyboard, screen, click, drag, mouse, program, type, save, edit, file, cursor, delete, text, Log in, username, password, log out, notification, save, keys, double-click, word-processor,	IT, barcode, scanner, scan	Password, internet, blog, username, website, webpage, spoof, PEGI rating, animation, audio, design templates, entrance animation, font, media, presentation, slide, slideshow, stock image, text box, text formatting,	Animation, background, frame, flipbook, onion skinning, stop motion, play, sound, video clip, router, security, WAP, web address, WWW, links, files, download, sharing, ownership, permission,	System features, parts, composed, elements, search engine, refine, web crawlers, index, search term, rank, results, order, influenced,	Packets, data, packet, shared file, collaboration, public, private

	keys, letters, numbers, space, back-space, capital letters, toolbar, bold, italic, underline, select		transition, device, process, non-digital, connection, network, switch, server, wireless access point, cables, sockets, images, advantages, disadvantages, communicate, orientation, place holder, desktop publishing, content, copy, paste, purpose, benefits	accurate, honest, adverts, content		
To name some sources of IT/devices from home and school.	Identify IT in the home and beyond school. Explain how IT benefits us. Recognise how IT can change the way we work. Understand that some digital software can create art. Explain reasoning behind text choices e.g. colour, size and font	I can identify examples of computers I can describe some uses of computers I can identify that a computer is a part of information technology I can explain the purpose of information technology in the home I can talk about uses of information technology	To understand how a digital device works and what parts make up a digital device. Understanding how digital devices help us and how computers are connected. (NC) Use search technologies effectively, appreciate how	To make good choices when selecting different tools (NC) Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.	To identify that drawing tools can be used to produce different outcomes To recognise that vector drawings consist of layers To explain that computers can be connected together to form systems To recognise the role of computer systems in our lives To recognise how	To explain how search results are ranked To compare working digitally with 2D and 3D graphics To identify that physical objects can be broken down into a collection of 3D shapes To review an existing website and consider its structure To

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	I can explain what the keys that I have learnt about already do I can say what tool I used to change the text I can compare using a computer with using a pencil and paper (NC) Use technology purposefully to create, organise, store, manipulate and retrieve digital content	I can compare types of information technology I can list different uses of information technology I can recognise how to use information technology responsibly I can say how those rules/guides can help me I can identify the choices that I make when using information technology I can explain simple guidance for using information technology in different environments and settings (NC) Use technology purposefully to create, organise, store, manipulate	results are selected and ranked, and be discerning in evaluating digital content. (NC) 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.	(NC) 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.	information is transferred over the internet To explain how selection is used in computer programs (NC) 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	explain that objects can be described using data To explain why a variable is used in a program To explain that selection can control the flow of a program (NC) 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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		and retrieve digital content				
Composite: Data Handling						
Identify chart, physically sort objects and photo evidence.	Sort, criteria, data, collate, object, label, group, image, search, property, colour, size, shape, value, data set, more, less, most, fewest, the same, equal	Pictogram, data, collate, more than, less than, common, popular, tally chart, votes, total, enter, count, explain, attribute, different, conclusion, sharing	Questioning, database, construct, contribute, recording, data logger, present data, branching, organise, decision-tree,	Average, copy and paste, columns, cells, charts, equals tool, formula, formula wizard, move cell tool, random tool, rows, spin tool, spreadsheet, timer, table, sensor, logger, logging, data point, interval, dataset, import, export, review, conclusion	Form, recorded, sort, data-cards, field, flat-file, navigate, criteria, multiple, filter, visual,	Structure, cell, construct, calculated data, formula, operations, spreadsheet produce, present,
Identify chart, physically sort objects and photo evidence.	I can describe objects using labels I can describe an object I can describe a property of an object I can find objects with similar properties		Understand what a branching database is	To explain that data gathered over time can be used to answer questions To explain that a data logger collects 'data points' from sensors over time To identify the data needed to answer questions To explain that data gathered over		

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	I can describe groups of objects I can record how many objects are in a group I can decide how to group objects to answer a question I can compare groups of objects I can choose how to group objects			time can be used to answer questions		
Composite: Digital Creativity						
	tools, line, shape, fill, undo, erase, brush, paint program, style, brush size, painting	Device, camera, photograph, capture, image, digital, landscape, portrait, framing, subject, compose, light sources, flash, focus, background, editing, filter, format, lighting, feelings, emotions, pattern, rhythm, pulse, pitch, tempo, instrument	Communicate, place holder, layout, animation, flip-book, stop-frame, frame, sequence, onion-skinning, import, transition	Pitch, rhythm, pulse, tempo, dynamics, melody, rippler, texture, audio, microphone, speaker, headphones, input device, output device, podcast, trim, align, layer, playback, record, load, MP3, feedback, crop, rotate, undo, adjustments, hue, colours, saturation, sepia, vignette, retouch, clone, combine,	Vector, experiment, produce, rotate, alignment grids, resize handles, consistency, detail, layers, apply, freehand, effective, video, visual media, format, techniques, capture, decide, scene, storyboard, reshooting, store, retrieve, impact	3D shape, 3 dimensions, perspectives, modified, HTML, features, copyright, fair use, preview, navigation, navigation path, hyperlinks, user experience, implication

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				composite, cut, alter, zoom		
To know that digital devices can be used to create pictures. To take a photograph independently. To record a short film on camera. To scan a QR code. To explore a 360 image.		I can enjoy a variety of activities Digital Photography I can sort devices into old and new I can talk about how to take a photograph I can explain the process of taking a good photograph I can identify what is wrong with a photograph I can discuss how to take a good photograph I can improve a photograph by retaking it I can explore the effect that light has on a photo I can experiment with different light sources I can recognise that images can be changed I can use a tool to		To identify that sound can be digitally recorded To explain that a digital recording is stored as a file To explain that audio can be changed through editing To show that different types of audio can be combined and played together To evaluate editing choices made To describe how images can be changed for different uses To evaluate how changes can improve an image	To recognise video as moving pictures, which can include audio To identify digital devices that can record video To recognise the features of an effective video To identify that video can be improved through reshooting and editing	

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		achieve a desired effect I can explain my choices Making Music I can connect images with sounds I can relate an idea to a piece of music I can identify that music is a sequence of notes I can use a computer to create a musical pattern using three notes I can refine my musical pattern on a computer				