Computing Skills Coverage and Progression

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Nursery and Reception

By the end of EYFS, children should be able to:

- Recognising technology in and out of school and using it responsibly.
- Select and use technology for particular purposes.
- Use technology purposefully to create, organise, store, manipulate and retrieve digital content
- 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.

COMPUTING SYSTEMS & NETWORKS	CREATING MEDIA	DATA & INFORMATION	PROGRAMMING
• To recognise some ways in which the internet can be used to communicate. • To give examples of how I (might) use technology to communicate with people I know. • To talk about how I can use the internet to find things out. • To identify devices to use to access information on the internet. • To give simple examples of how to find information (e.g., search engine, voice activated searching).	**Word processing** • To play on a touch screen game and use computers/keyboards/mouse in role play. • To type letters with increasing confidence using a keyboard and tablet. • To dictate short, clear sentences into a digital device. **Ebooks** • To record my voice over a picture. • To create a simple digital collage. • To move and resize images with my fingers or mouse. **Animation** • To animate a simple image to speak in role. • To create a simple animation to tell a story including more than one character. **Video** • To know the difference between a photography and video. • To record a short film using the camera. • To record and play a film. • To watch films back. **Photography** • To take a photograph. • To take a photograph and use it in an app. • To use a painting app and explore the paint and brush tools. **Sounds** • To record sounds with different resources. • To find ways to change your voice (tube, tin can, shouting to create an echo).	• To identify a chart. • To sort physical objects, take a picture, and discuss what has been done. • To present simple data on a digital device.	**Computational Thinking** • To follow simple oral algorithms. • To spot simple patterns. • To sequence simple familiar tasks. **Programming** • To use a mouse, touch screen or appropriate access device to target and select options on screen. • To input a simple sequence of commands to control a digital device with support (BeeBot).

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	• To record sounds/voices in storytelling and explanations.		

Links to Characteristics of Effective Learning:

	Playing and Exploring	Active Learning	Creating and thinking critically
Tinkering	✓	✓	
Creating			✓
Collaboration			
Persevering	✓	✓	
Logic	✓		✓
Pattern	✓		✓
Abstraction	✓		✓
Algorithms and decomposition	✓		✓

Links to Prime Areas of Learning:

	Communication and Language		Personal, Social and Emotional Development			Physical Development	
	Listening, Attention and Understanding	Speaking	Self-Regulation	Managing Self	Building relationships	Gross Motor Skills	Fine Motor Skills
Tinkering						✓	✓
Creating						✓	✓
Collaboration	✓		✓	✓	✓		
Persevering	✓			✓			
Logic	✓	✓					
Pattern	✓	✓					
Abstraction	✓	✓					
Algorithms and decomposition	✓	✓					

	Literacy			Mathematics		Understanding the world			Expressive arts and design	
	Comprehension	Word Reading	Writing	Number	Numerical Patterns	Past and Present	People, Culture and communities	The Natural World	Creating with Materials	Being imaginative and Expressive
Tinkering									✓	✓
Creating								✓	✓	✓
Collaboration						✓	✓		✓	
Persevering										
Logic	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Pattern	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Abstraction	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Algorithms and decomposition	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Key vocabulary

Technology, computer, mouse, keyboard, iPad, phone, IWB, radio, CD Player, video player, MP3, traffic lights, robot, button, press, movement, internet, online, search, information, share, create, image/ picture, photo, animation, pattern, robot, instructions, record, paint, share, collect, sort, count, object, chart

Year 1 and 2

By the end of KS1, children should be able to:

- 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

	COMPUTING SYSTEMS & NETWORKS	CREATING MEDIA	DATA & INFORMATION	PROGRAMMING
Year1	**Technology around us** To identify technology To identify a computer and its main parts To use a mouse in different ways To use a keyboard to type To use the keyboard to edit text To create rules for using technology responsibly	**Digital painting** To describe what different freehand tools do To use the shape tool and the line tools To make careful choices when painting a digital picture To explain why I chose the tools I used To use a computer on my own to paint a picture To compare painting a picture on a computer and on paper **Digital writing** To use a computer to write To add and remove text on a computer To identify that the look of text can be changed on a computer To make careful choices when changing text To explain why I used the tools that I chose To compare writing on a computer with writing on paper	**Grouping data** To label objects To identify that objects can be counted To describe objects in different ways To count objects with the same properties To compare groups of objects To answer questions about groups of objects	**Moving a robot** To explain what a given command will do To act out a given word To combine forwards and backwards 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 **Introduction to animation** To choose a command for a given purpose 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
Year2	**Information technology around us** To recognise the uses and features of information technology To identify information technology in the	**Digital photography** To know what devices can be used to take photographs To use a digital device to take a photograph To describe what makes a good photograph	**Pictograms** To recognise that we can count and compare objects using tally charts	**Robot algorithms** To describe a series of instructions as a sequence To explain what happens when we

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	home To identify information technology beyond school To explain how information technology benefits us To show how to use information technology safely To recognise that choices are made when using information technology	To decide how photographs can be improved To use tools to change an image To recognise that images can be changed **Making music** To say how music can make us feel To identify that there are patterns in music To describe how music can be used in different ways To show how music is made from a series of notes To create music for a purpose To review and refine our computer work	To recognise that objects can be represented as pictures To create a pictogram To select objects by attribute and make comparisons To recognise that people can be described by attributes To explain that we can present information using a computer	change the order of instructions To use logical reasoning to predict the outcome of a program (series of commands) To explain that programming projects can have code and artwork To design an algorithm To create and debug a program that I have written **Introduction to quizzes** To explain that a sequence of commands has a start To explain that a sequence of commands has an outcome To create a program using a given design To change a given design To create a program using my own design To decide how my project can be improved

Key vocabulary

Year1	trackpad double-click typing	paint program tool paintbrush erase fill undo shape/ line/ fill tools brush style/ size	word processor keyboard keys letters Microsoft Word numbers space backspace text cursor capital letters toolbar bold, italic, underline font mouse	object label group search image property colour, size, shape value data set more/less, most/ fewest/ the same	forwards backwards turn clear go commands instructions directions left right plan algorithm program route plan	ScratchJr bee-bot sprite compare programming block joining start block run background reset predict effect change value delete
Year2	information technology barcode scanner/ scan	device camera photograph capture image digital landscape portrait framing subject compose light sources flash focus background effects filter format	music feelings, emotions pattern rhythm pulse/ beat pitch tempo notes instrument create open edit	more than/ less than most/ least organise data object tally chart votes total program enter data compare count explain more common/ least common attribute group same/ different most/ least popular conclusion block diagram sharing	sequence clear unambiguous program sequence order prediction design route debugging	command outcome actions modify change build match features evaluation

Year 3 and 4

By the end of lower KS2, children should be beginning to:

- 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

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Year3	**Connecting computers** To explain how digital devices function To identify input and output devices To recognise how digital devices can change the way we work To explain how a computer network can be used to share information To explore how digital devices can be connected To recognise the physical components of a network	**Stop-frame animation** To explain that animation is a sequence of drawings or photographs To relate animated movement with a sequence of images To plan an animation To identify the need to work consistently and carefully To review and improve an animation To evaluate the impact of adding other media to an animation **Desktop publishing** To recognise how text and images convey information To recognise that text and layout can be edited To choose appropriate page settings To add content to a desktop publishing publication To consider how different layouts can suit different purposes To consider the benefits of desktop publishing	**Branching databases** To create questions with yes/no answers To identify the object attributes needed to collect relevant data To create a branching database To identify objects using a branching database To explain why it is helpful for a database to be well structured To compare the information shown in a pictogram with a branching database	**Sequence in music** To explore a new programming environment I can identify that each sprite is controlled by the commands I choose To explain that a program has a start To recognise that a sequence of commands can have an order To change the appearance of my project To create a project from a task description **Events and actions** To explain how a sprite moves in an existing project To create a program to move a sprite in four directions To adapt a program to a new context To develop my program by adding features To identify and fix bugs in a program To design and create a maze-based challenge
Year4	**The internet** To describe how networks physically connect to other networks To recognise how networked devices make up the internet To outline how websites can be shared via the World Wide Web To describe how content can be added and accessed on the World Wide Web To recognise how the content of the WWW is created by people To evaluate the consequences of unreliable content	**Audio editing** To identify that sound can be digitally recorded To use a digital device to record sound 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 **Photo editing** To explain that digital images can be changed To change the composition of an image To describe how images can be changed for different uses To make good choices when selecting different tools To recognise that not all images are real To evaluate how changes can improve an image	**Data logging** To explain that data gathered over time can be used to answer questions To use a digital device to collect data automatically To explain that a data logger collects 'data points' from sensors over time To use data collected over a long duration to find information To identify the data needed to answer questions To use collected data to answer questions	**Repetition in shapes** To identify that accuracy in programming is important To create a program in a text-based language To explain what 'repeat' means To modify a count-controlled loop to produce a given outcome To decompose a program into parts To create a program that uses count-controlled loops to produce a given outcome **Repetition in games** 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 which 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

Key vocabulary

Year3	digital device input output process digital device connection network network switch server Wireless Access Point (WAP)	animation flip book stop frame animation frame storyboard sequence image photograph setting character events onion skinning evaluation delete media import transition	text images advantages/ disadvantages communicate font style template orientation placeholder layout content desktop publishing copy paste purpose benefits	attribute value questions table branching database database equal, even, separate structure order organise selecting pictogram information decision tree	Scratch code costume stage backdrop motion turn point in direction go to glide event task run the code note chord bug debug	logic move resize extension block pen up set up pen event action errors setup test
Year4	internet router network security website web page web address routing route tracing browser world wide web content web page links files content download sharing ownership permission information accurate honest adverts	audio record playback microphone speaker headphones input output start pause stop podcast save file open edit selection mixing time shift export mp3 evaluate feedback	arrange digital crop undo save search copyright composition pixels crop rotate flip adjustments effects hue/saturation sepia version illustrator vignette retouch recolour magic wand adjust sharpen	data input device sensor data logger logging data point interval analyse data set import export collection conclusion	turtle commands code snippet logo (see commands) pattern repeat repetition count-controlled loop value repetition trace decompose procedure	loop value forever infinite loop costume animate duplicate modify design refine evaluate

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		brighten fake alter background foreground publication publication elements border layer		

Year 5 and 6

By the end of KS2, children should be able to:

- 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

	COMPUTING SYSTEMS & NETWORKS	CREATING MEDIA	DATA & INFORMATION	PROGRAMMING
Year5	**Sharing information** To explain that computers can be connected together to form systems To recognise the role of computer systems in our lives To recognise how information is transferred over the internet To explain how sharing information online lets people in different places work together To contribute to a shared project online To evaluate different ways of working together online	**Video editing** To recognise video as moving pictures, which can include audio To identify digital devices that can record video To capture video using a digital device To recognise the features of an effective video To identify that video can be improved through reshooting and editing To consider the impact of the choices made when making and sharing a video **Vector drawing** To identify that drawing tools can be used to produce different outcomes To create a vector drawing by combining shapes To use tools to achieve a desired effect To recognise that vector drawings consist of layers To group objects to make them easier to work with To evaluate my vector drawing	**Flat-file databases** To use a form to record information To compare paper and computer-based databases To outline how grouping and then sorting data allows us to answer questions To explain that tools can be used to select specific data To explain that computer programs can be used to compare data visually To apply my knowledge of a database to ask and answer real-world questions	**Selection in physical computing** To control a simple circuit connected to a computer To write a program that includes count-controlled loops To explain that a loop can stop when a condition is met, e.g., number of times To conclude that a loop can be used to repeatedly check whether a condition has been met To design a physical project that includes selection To create a controllable system that includes selection **Selection in games** To explain how selection is used in computer programs To relate that a conditional statement connects a condition to an outcome To explain how selection directs the flow of a program To design a program which uses selection To create a program which uses selection To evaluate my program
Year6	**Communication** To identify how to use a search engine To describe how search engines select results 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 recognise how we communicate using technology To evaluate different methods of online communication	**Web page creation** To review an existing website and consider its structure To plan the features of a web page 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 **3D modelling** To use a computer to create and manipulate three-dimensional (3D) digital objects To compare working digitally with 2D and 3D graphics To construct a digital 3D model of a physical object To identify that, physical objects can be broken down into a collection of 3D shapes To design a digital model by combining 3D objects To develop and improve a digital 3D model	**Spreadsheets** To identify questions which can be answered using data To explain that objects can be described using data To explain that formula can be used to produce calculated data To apply formulas to data, including duplicating To create a spreadsheet to plan an event To choose suitable ways to present data	**Variables in games** To define a 'variable' as something that is changeable To explain why a variable is used in a program To choose how to improve a game by using variables To design a project that builds on a given example To use my design to create a project To evaluate my project **Sensing** To create a program to run on a controllable device To explain that selection can control the flow of a program To update a variable with a user input To use a conditional statement to compare a variable to a value To design a project that uses inputs and outputs on a controllable device To develop a program to use inputs and outputs on a controllable device

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Key vocabulary

Year5	system connection digital input process protocol address packet chat explore slide deck reuse remix collaboration	vector drawing tools shapes objects icons toolbar move resize colour rotate duplicate/ copy organize zoom select rotate alignment grid handles modify layers front, back order ungroup vector drawing reuse manipulate objects improvement evaluate alternatives	audio recording script soundtrack dialogue capture storage tape AV (audiovisual) videographer, video techniques: zoom, pan, tilt, angle lighting youtuber audio/sound camera angle export Microsoft Movie Maker split trim/ clip titles end credits timeline transitions retake/ reshoot special effects title screen export constructive feedback Greenscreen	field sort order group search criteria graph chart axis compare filter presentation	microcontroller crumble controller components LED sparkle crocodile clips battery box repetition infinite loop output devices motor condition true/ false input	selection condition outcomes conditional statement implement
Year6	search engine Google/ Bing/ Yahoo!, Swisscows, DuckDuckGo refine index crawler bot ranking optimisation web crawlers content creator selection ranking communication public/ private one-way/ two-way one-to-one/ one-to-many SMS email WhatsApp blog Twitter	website web page browser media Hypertext Markup Language (HTML) logo layout header purpose copyright fair use home page preview google sites breadcrumb trail navigation hyperlink subpage implication external link embed navigation		spreadsheet data heading data set/ item cells columns rows application format common attribute formula calculation cell reference operation range duplicate sigma propose graph results software	variable change name value set event task project	micro: bit MakeCode process flashing USB condition if then else random sensing accelerometer compass direction navigation step counter