

## The Sequence of Learning:



### Computing

Our curriculum equips pupils to use computational thinking and creativity to express themselves and develop their ideas as active participants in a digital world. Our pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use, evaluate and apply information and communication technology analytically to solve problems and to be responsible, competent, confident and curious users. Our curriculum encourages invention and resourcefulness. The principles and practice of Computing are applied to understanding real-world systems and creating purposeful products and this combination of principles, practice and invention excites our pupils, both viscerally and intellectually.

#### COMPUTING: AGE RELATED STATUTORY COVERAGE

Early Learning Goal	KEY STAGE ONE	KEY STAGE TWO
The Technology strand from the EYFS Curriculum has been removed.  Computing will still be accessed in EYFS through continuous provision with adult support.  Children will be accessing:  Using cameras  Using computers for drawing  Interactive whiteboards  Bee-bots  Record and speak devices  Walkie talkies  Ipads	<ul> <li>Pupils should be taught to:         <ul> <li>understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions</li> <li>create and debug simple programs</li> <li>use logical reasoning to predict the behaviour of simple programs</li> <li>use technology purposefully to create, organise, store, manipulate and retrieve digital content</li> <li>recognise common uses of information technology beyond school</li> <li>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.</li> </ul> </li> </ul>	<ul> <li>Pupils should be taught to:         <ul> <li>design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> <li>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</li> <li>use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>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</li> <li>use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul> </li> </ul>



## The Sequence of Learning:

# Computing



	Online Safety (Taught explicitly and incidentally)	Computer systems and networks	Programming	Data and Information	Creating Media
Foundation for growth EYFS	<ul> <li>Be kind to my friends.</li> <li>Be careful with technology devices.</li> <li>Ask an adult when I want to use the Internet.</li> <li>Talk about the amount of time I spend using a computer / tablet / game device.</li> <li>Tell an adult when something worrying or unexpected happens while I am using the Internet.</li> </ul>	<ul> <li>Talk about technology that is used at home and in school.</li> <li>Operate simple equipment.</li> <li>Use a safe part of the Internet to play and learn.</li> </ul>	<ul> <li>Make a floor robot move randomly.</li> <li>Use simple software to make something happen.</li> <li>Make choices/predictions about the buttons and icons I press, touch or click on, for example by thinking about how many times I need to press the forwards button to reach Teddy.</li> </ul>	Talk about different kinds of information such as pictures, video, text and sound.	<ul> <li>Move objects on a screen.</li> <li>Create shapes and text on a screen, for example by using an iPad application to draw a picture of a dog with different brushes and colours.</li> <li>Use technology to show my learning, for example by taking a photograph of a snail and labelling it with the caption 'a snail has a foot'.</li> </ul>
Seed Yr 1	<ul> <li>Say what personal information is.</li> <li>Keep my password private.</li> <li>Tell an adult when I see something unexpected or worrying online.</li> <li>Talk about why it's important to be kind and polite.</li> <li>Recognise an age appropriate website.</li> <li>Agree and follow sensible e-Safety rules.</li> </ul>	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 on a computer  -To use the keyboard to edit text  -To create rules for using technology responsibly	A moving 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  Programming animations	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	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

		-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		-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 typing on a computer to writing on paper
<ul> <li>Talk about why it is important to be kind and polite online and in real life.</li> <li>Explain why I need to keep my password and personal information private.</li> <li>Describe the things that happen online that I must tell an adult about.</li> <li>Talk about why I should go online for a short amount of time.</li> <li>Know that not everyone is who they say they are on the Internet.</li> </ul>	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 explain how information technology helps us  -To explain how to use information technology safely  -To recognise that choices are made when using information technology	Robot algorithms  -To describe a series of instructions as a sequence  -To explain what happens when we change the order of instructions  -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 and debug a program that I have written  Programming 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	Pictograms  -To recognise that we can count and compare objects using tally charts  -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	Digital photography  -To use a digital device to take a photograph  -To make choices when taking a photograph  -To describe what makes a good photograph  -To decide how photographs can be improved  -To use tools to change an image  -To recognise that photos can be changed  Digital music  -To say how music can make us feel  -To identify that there are patterns in music  -To experiment with sound using a computer  -To use a computer to create a musical pattern  -To create music for a purpose  -To review and refine our computer work

	Online Safety (Taught explicitly and incidentally)	Computer systems and networks	Programming	Data and Information	Creating Media
Sprout Yr 3	<ul> <li>Say what makes a secure password and why they are important.</li> <li>Protect my personal information when I do different things online.</li> <li>Recognise websites and games appropriate for my age.</li> <li>Use the safety features of websites as well as reporting concerns to an adult.</li> <li>Make good choices about how long I spend online.</li> <li>Know what is and isn't acceptable to write on a blog.</li> <li>Know why the new blog entry does not appear immediately.</li> </ul>	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	Sequencing sounds -To explore a new programming environment -To identify that commands have an outcome -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 in programs -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	Branching databases -To create questions with yes/no answers -To identify the attributes needed to collect data about an object -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	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
Sapling Yr 4	<ul> <li>Choose websites, apps and games that are appropriate for my age.</li> <li>Choose a secure password and screen name when I am using a website.</li> <li>Know that anything I share online can be seen by others.</li> <li>Talk about the ways I can protect myself and my friends from harm online.</li> </ul>	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 (WWW)  -To describe how content can be added and accessed	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 task into small steps	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 recognise how a computer can help us analyse data -To identify the data needed to answer questions	Audio production  -To identify that sound can be recorded  -To explain that audio recordings can be edited  -To recognise the different parts of creating a podcast project  -To apply audio editing skills independently  -To combine audio to enhance my podcast project  -To evaluate the effective use of audio

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	<ul> <li>Use the safety features of websites as well as reporting concerns to an adult.</li> <li>Think about the reliability of information I read on the World Wide Web.</li> <li>Help my friends make good choices about the time they spend online.</li> <li>Talk about why I need to ask a trusted adult before downloading files and games from the Internet.</li> </ul>	on the World Wide Web (WWW) -To recognise how the content of the WWW is created by people -To evaluate the consequences of unreliable content	-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 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 use data from sensors to answer questions	Photo editing -To explain that the composition of digital images can be changed -To explain that colours can be changed in digital images -To explain how cloning can be used in photo editing -To explain that images can be combined -To combine images for a purpose -To evaluate how changes can improve an image
Small tree Yr 5	<ul> <li>Choose a secure password and screen name.</li> <li>Protect a password and other personal information.</li> <li>Explain the importance of communicating kindly and respectfully.</li> <li>Discuss the importance of choosing an ageappropriate website, appor game.</li> <li>Explain why I need to protect myself and my friends and the best ways to do this, including reporting concerns to an adult.</li> <li>Know that anything I post online can be seen, used and may affect others.</li> <li>Talk about the dangers of spending too long online or playing a game.</li> </ul>	Systems and searching  -To explain that computers can be connected together to form systems  -To recognise the role of computer systems in our lives  -To experiment with search engines  -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	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 -To explain 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 program that controls a physical computing project  Selection in quizzes -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	Flat-file databases -To use a form to record information -To compare paper and computer-based databases -To outline how you can answer questions by grouping and then sorting data -To explain that tools can be used to select specific data -To explain that computer programs can be used to compare data visually -To use a real-world database to answer questions	Video production  -To explain what makes a video effective  -To identify digital devices that can record video  -To capture video using a range of techniques  -To create a storyboard  -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  Introduction to vector graphics  -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

	<ul> <li>Explain why I need to protect my computer.</li> <li>Find out who the information on a webpage belongs to.</li> <li>Know which resources on the Internet I can download and use.</li> <li>Describe the ways in which websites advertise their products to me.</li> </ul>		-To design a program which uses selection -To create a program which uses selection -To evaluate my program		-To group objects to make them easier to work with -To apply what I have learned about vector drawings
Mature tree with fruit Yr 6	<ul> <li>Explain the consequences to myself and others of not communicating kindly and respectfully.</li> <li>Protect my password and other personal information.</li> <li>Explain the consequences of sharing too much about myself online.</li> <li>Support my friends to protect themselves and make good choices online, including reporting concerns to an adult.</li> <li>Explain the consequences of spending too much time online or on a game.</li> <li>Protect my computer or device from harm on the Internet.</li> <li>Know that websites can use my data to make money and target their advertising.</li> <li>Take responsibility for encouraging my friends to tackle cyber bullying and consider the impact of viewing and sending</li> </ul>	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 evaluate different ways of working together online  -To recognise how we communicate using technology  -To evaluate different methods of online communication	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 movement -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	Introduction to Spreadsheets -To create a data set in a spreadsheet -To build a data set in a spreadsheet -To explain that formulas can be used to produce calculated data -To apply formulas to data -To create a spreadsheet to plan an event -To choose suitable ways to present data	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 identify that digital 3D objects can be modified -To recognise that objects can be combined in a 3D model -To create a 3D model for a given purpose -To plan my own 3D model -To create my own digital 3D model

inappropriate images, messages and videos.		





# The Blean Values:

# Computing

Curiosity	Resourcefulness	Responsibility	Resilience	Collaboration
Tinkering – Changing things	<b>Decomposition</b> – breaking	Logic – predicting and	Persevering – keeping	Team work – working
to see what happens	down into parts	analysing	going	together
Creating – designing and	Algorithms – making ordered	Evaluation – making	<b>Debugging</b> – finding and	Patterns – spotting and
making	steps and rules for solving a	judgements	fixing errors	using similarities
	problem or completing a task			
Simulation – representing	Abstraction – removing	Data Representation-	Transferring – solutions to	<b>Determining</b> – if a
processes, problems and	unnecessary detail to focus on	gathering information	new problems	computer can help solve
solutions using models	essential details	appropriately		

				the problem more efficiently
Imagination – look at things in unusual ways and consider the impossible	Parallelisation – using resources simultaneously to solve a problem	Modelling – teach my peers and they can teach me	Automation – using computational process to execute solutions to problems	Communication – talk together to solve a problem
Patience – a solution might	<b>Generalisation</b> – will this work	Understanding behaviour –	Making mistakes – enjoy	<b>Developing</b> – share ideas
come when thinking about	for other things	how the parts of the	things that go wrong and	and use other people's
something else		problem are connected	learn from them	ideas

Computing Key Vocabulary						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Beebot, direction, mouse, keyboard, monitor, ipad, record, play, pause, cameras, whiteboards, touchscreen.

technology, computer, mouse, trackpad, keyboard, screen, double-click, typing

tablet, printer, paint program, tool, paintbrush, erase, fill, undo, shape tools, line tool, fill tool, undo tool, colour, brush style, brush size, pictures, painting, computers

> 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

object, label, group, colour, size, shape, value, data set, more, the same

Bee-Bot, forwards, backwards, turn, clear, go, commands, instructions, directions, Information technology (IT), computer, barcode, scanner/scan

music, quiet, loud, feelings, emotions, pattern, rhythm, pulse, pitch, tempo, rhythm, notes, create, emotion, beat, instrument, open, edit

device, camera, photograph, capture, image, digital, landscape, portrait, framing, subject, compose, light sources, flash, focus, background, animation, flip book, editing, filter, format, framing, lighting

more than, less than, most, least, common, search, image, property, popular, organise, data, object, tally chart, votes, total, pictogram, enter, less, most, fewest, least, data, compare, objects, group, same different, conclusion, block diagram, sharing

instruction, sequence,

clear, unambiguous,

digital device, input, process, output, program, digital, nondigital, connection. network, switch, server, wireless access point, cables, sockets

text, images,

advantages, disadvantages, communicate, font, style, landscape, portrait, orientation, placeholder, template, layout, content, desktop linput device, output publishing, copy, paste, purpose, benefits

stopframe, frame, sequence, image, photograph, setting, character, events, onion skinning, consistency, evaluation, delete,

attribute, value, branching, database, objects, equal, even, separate, structure, compare, order, organise, selecting, information, decision tree

internet, network, router, system, connection, 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

audio, microphone, speaker, headphones, device, sound, podcast, edit, trim, align, layer, import, record, playback, selection, load, save, export, MP3, evaluate, feedback

image, edit, digital, crop, rotate, undo, save, adjustments, effects, media, import, transition colours, hue, saturation, sepia, vignette, image, retouch, clone, select, count, explain, attribute, questions, table, objects, combine, made up, real, composite, cut, copy, paste, alter, background, foreground, zoom, undo, font

> data, table, layout, input device, sensor, logger,

digital, input, process, storage, output, search, search engine, refine, index, bot, ordering, links, algorithm, search engine optimisation (SEO), web crawler, content creator, selection, ranking

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

video, audio, camera, talking head, panning, close up, video camera, microphone, lens, midsubject, side by side, angle (high, low, normal), static, zoom, pan, tilt, storyboard, filming, review, import, split, trim, clip, edit, reshoot, delete, reorder, placeholder, hollow, export, evaluate, share

database, data, information, record,

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, oneto-many.

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

range, long shot, moving TinkerCAD, 2D, 3D, shapes, select, move, perspective, view, handles, resize, lift, lower, recolour, rotate, duplicate, group, cylinder, cube, cuboid, sphere, cone, prism, pyramid, choose, combine, construct, evaluate, modify

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â	algorithm, program	oraci, prearectori,	Scratch, programming,			structure, spreadsheet,
	Savatah Iv. aa waxaa ah		blocks, commands, code,			cell, cell reference, data
	ScratchJr, command,	liliat, ucbuggilig,	sprite, costume, stage,			item, format, formula,
	sprite, compare,	laecomposition	1	conclusion	ľ	calculation, spreadsheet,
ľ	orogramming, area,		point in direction, go to,			input, output, operation,
k	olock, joining, start, run,	' '	glide, sequence, event,	0 0		range, duplicate, sigma,
F	orogram, background,	p. 00. a, . a, ota. e,	task, design, run the	,,, , ,		propose, question, data
c	delete, reset, algorithm,	outcome, predict,	code, order, note, chord,		connection, infinite loop,	
ļ,	oredict, effect, change,	blocks, design, actions,	algorithm, bug, debug,	snippet, algorithm, design,		evaluate, results, sum,
Ĺ	value, instructions,	SDATE, DIOTECL, MODILY.	code		motor, repetition, count-	
	design	change, algorithm, build, match, compare, debug.			controlled loop, Crumble	tools
	200.0.	match, compare, debug,	motion, event, sprite,	• • • • • • • • • • • • • • • • • • • •	controller, switch, LED,	
		features, evaluate,	algorithm, logic, move,	· · ·		variable, change, name,
				ľ	•	value, set, design, event,
			pen up, set up, pen,		,	algorithm, code, task,
			, , , , , ,			artwork, program, project,
						code, test, debug, improve,
			code, test, debug, action		l' '	evaluate, share, assign,
				loop, count-controlled		declare
				loop, costume, repetition,		
						Micro:bit, MakeCode,
				· · · · · · · · · · · · · · · · · · ·	•	input, process, output,
						flashing, USB, trace,
						selection, condition, if then
					, , ,	else, variable, random,
					question, answer, task,	sensing, accelerometer,
					design, input,	value, compass, direction,
					implement, test, run,	navigation, design, task,
					setup, operator	algorithm, step counter,
						plan, create, code, test,
						debug

Spiritual	Social
<ul> <li>are able to express their feelings and appreciation of ingenuity/innovation/beauty through different media</li> <li>reflect on their own and others' lives and the impact ICT has on this</li> <li>demonstrate they are reflecting on their experiences and learning from reflection</li> <li>respect the efforts and feedback of others and appreciate different ways in solving problem.</li> <li>accommodate the ideas of others and enable others to succeed.</li> <li>ask questions, offer ideas and make connections</li> <li>gain an appreciation of the innovations and achievements of past individuals</li> </ul>	<ul> <li>demonstrate personal qualities such as thoughtfulness, honesty, respect for difference, moral principles, independence, inter-dependence</li> <li>investigate what it means to socialise using ICT media – the benefits and the pitfalls to it</li> <li>discuss the impact of the use of digital devices on the way we interact with others</li> <li>look at security risks to our personal data and how to reduce these risks</li> <li>consider the social responsibilities for those using digital devices – responsible for social good</li> </ul>
<ul> <li>Children</li> <li>investigate the impact of digital inclusion, who is it available to, and the digital divide locally, nationally and globally</li> <li>consider accessibility issues when evaluating appropriateness of digital products</li> <li>develop their understanding of the development of online communities and its implications for an individual's learning, leisure and social interactions</li> <li>learn that the growth of social networking has potential risks as well as benefits</li> <li>use their knowledge of right and wrong in the media i.e. violence, bias, images and messages etc. model positive relationships and interactions, fairness, integrity, respect for people</li> <li>discover how to select their sources and decide on how much credence can be placed in them</li> </ul>	Children  • Learning about the wider world • Accessing information about the wider world through the internet • Exploring the sights and sounds of other cultures • Creating and sharing information about other cultures • Exploring how ICT connects us with and in different environments

#### Pupils are taught about:

- Online 'netiquette' how to engage in online communities positively and how to be a respectful digital citizen (appreciate the viewpoints of others)
- How to select information from online sources that reflect different viewpoints (engagement with democracy)
- The dangers of the internet are taught and what to do with any online uncomfortable behaviour or material they see (contribute positively to life in modern Britain)
- Cyber bullying and the legal implications

