Computing – Knowledge – Skills – Vocabulary 2021-22

This document outlines the main learning across the year groups. This shows the build on knowledge and how they link to each other. This document allows the teachers to see where their year group / the term fits in the grand scale knowledge and learning.

We have selected the Early Learning Goals that link most closely to the Computing National Curriculum.

Level Expected at the End of EYFS	
Reception – PSED • Show resilience and perseverance in the face of a challenge. • Know and talk about the different factors that support their overall health and wellbeing: - sensible amounts of 'screen time'.	**ELG: PSED – Managing Self** • 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.
Reception – Physical Development • Develop their small motor skills so that they can use a range of tools competently, safely and confidently.	**ELG: Expressive Arts and Design – Creating with Materials** • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
Reception – Expressive Arts and Design • Explore, use and refine a variety of artistic effects to express their ideas and feelings.	

Key Stage 1 National Curriculum Expectations

Pupils should be taught 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.

Key Stage 2 National Curriculum Expectations

Pupils should be taught 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.

Computer Systems & Networks								
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Computer Science	Learning how to operate camera to take photographs of meaningful creations or moments Learning how to explore and tinker with hardware to develop familiarity and introduce relevant vocabulary Learning how to operate a camera Recognising that a range of technology is used in places such as homes and schools Learning what a keyboard is and how to locate relevant keys Learning what a mouse is and developing basic mouse skills such as moving and clicking		Learning about inputs and outputs and how they are used in algorithms.	Understanding that programs execute by following precise and unambiguous instructions.			Using programming software to understand hacking, relating this to computer cracking codes in WWII.
	Information Technology		Learning to locate where keys are on the keyboard. Developing basic mouse skills.	Understanding what a computer is and the role of individual components.	Identifying network components and understand how they are used to connect to the internet and how data is transferred. Understanding what different components of a computer do.			
	Digital Literacy		Recognising common uses of information technology. Logging in and saving work on their own account. Knowing what to do if they have concerns about content or contact online. Understanding of how to create digital art using an online paint tool.	Using word processing software to type and reformat text. Understanding the importance of staying safe online.	Understanding 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. Learn about cyberbullying and fake emails. Understanding the purpose of emails.	Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Understanding opportunities offered by the World Wide Web for communication and collaboration	Recognising that information on the internet might not be true or correct. Know how to use keywords to quickly find accurate information.	Understanding the importance of secure passwords and using searching and word processing skills to create a presentation.
Knowledge			• Keyboard skills – locating the letters of individual names. • Computer menus - file, open, save, close. • Using a mouse – click and drag, drag and drop, left/right click, mouse mat.	• Different types of technology – cameras, phones, torches, microwave, alarm clock, remote control. • Inputs e.g. keyboard, mouse. • Outputs e.g. monitor, speakers, printers. • Word processing – fonts, bold, italics, • underline, highlight. • Keyboard skills – delete, enter, spacebar. • E-books and e-documents.	• Network maps – house, router, ISP, smart phones, web server, cables. • Internet uses – communication, file sharing, websites, uploading/ downloading, streaming media, games. • Keyboard skills - @ symbol. • Email compose windows – addresses, subjects. • Be careful with unexpected emails. • Computer parts – CPU, GPU, RAM, HDD. • QR Codes and how to use them. • Other portable electronic devices.	• Collaborative online documents. • Presentation skills.	• Search Engines – search bar, company logo, hyperlink, keywords, fake news.	▪ Demographic and amount of workers, The Colossus, encrypted messages, date shift cypher, first electronic programmable computer.

Programming								
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Computer Science	Following instructions as part of practical activities and games and learning to debug when things go wrong Learning to give simple instructions Learning that an algorithm is a set of instructions to carry out a task, in a specific order Experimenting with programming a Beebot/ Bluebot and learning how to give simple commands Learning to debug instructions, with the help of an adult, when things go wrong	Understanding how to create algorithms. Learning that computers need information to be presented in a simple and clear way. Understanding how to break a computational thinking problem into smaller parts in order to solve it. Learning how to explore and tinker with hardware to find out how it works. Constructing a series of instructions into a simple algorithm. Applying computing concepts to real world situation in an unplugged activity.	Creating and debugging simple programs. Using logical reasoning to predict the behaviour of simple programs. Understanding what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.	Using logical reasoning to explain how simple algorithms work. Designing, writing and debugging programs that accomplish specific goals, including controlling or simulating physical systems. Solving problems by decomposing them into smaller parts. Using sequence, selection, and repetition in programs. Working with variables and various forms of input and output.	Same as Y3. Understand what decomposition is and how it facilitates problem solving. Designing, writing and debugging programs that accomplish specific goals. Understand abstraction and patterns recognition.	Using programming language to create music, including use of loops. Using block coding to program a device. To explore variables and different forms of input.	Understanding that websites can be altered by exploring the code beneath the site. Designing, writing and debugging programs that accomplish specific goals. Solving problems by decomposing them into smaller parts.
	Information Technology						Understand how external devices can be programmed by a separate computer.	
	Digital Literacy			Using technology purposefully to create, organise, store, manipulate and retrieve digital content.			Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals.	
Knowledge			• Planning and execution of an algorithm/set of instructions for a simple activity. • Basic debugging concepts. • Decomposition – how to breakdown objects into separate parts and categorise them. • Bee-Bot – locating the buttons, battery compartment, on/off switch, wheels and speaker. • Understanding Bee-Bot instructions and button functions – move forwards/ backwards, turn left/right, clear, pause, go.	• Zooming in and out of maps on Planet Earth. • Unplugged algorithms and instructional writing. • Abstraction/key information. • Decomposition/smaller chunks. • Coding – Scratch Jr, code blocks, algorithms, sprites/speeds, repeat and loop control blocks, start/finish, direction. • Blocks – triggering, motion, looks, sound, end, control.	• Scratch – building games and animations. • Choosing sprites, painting sprites, surprise sprites, uploading sprites. • Key for Scratch colour coding blocks.	• Scratch coding blocks – motion, sound, looks, events, control, operators, sensing, variables, my blocks. • Scratch sprites. • Decomposition - data without any identification, order or sequence. • Sequencing and pattern recognition.	• Sonic Pi interface – play controls, editor controls, information and help controls, code editor, scope, log viewer Live loop, simple melody, selecting sounds. • BBC Micro:bit – front and back features that can be included as part of an algorithm. • Code blocks key – basic, input, music, LED, radio, loops, logic, variables, maths.	• Python code – indentation, variable, loop. • Teaches computers to think for themselves – AI. ▪ Algorithm – making a cup of tea.

Data Handling								
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Computer Science			Consider inputs and outputs to understand how sensors work.		Understanding the role of inputs and outputs in computerised devices.		
	Information Technology	Representing data through sorting and categorising objects in unplugged scenarios Representing data through pictograms Exploring branch databases through physical games	Recognising uses of technology beyond school.				Using search technologies effectively, appreciating how results are selected and ranked, and be discerning in evaluating digital content. Recognising that computers transfer data in binary and understand simple binary addition.	Understanding that computer networks provide multiple services Understanding how barcodes and QR codes work.
	Digital Literacy		Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Selecting software appropriately.	Using technology to create and label images and to put data into a spreadsheet.	Using technology purposefully to create, organise, store, manipulate and retrieve data.	Understanding why some sources are more trustworthy than others.	Understanding 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.	Understanding how learning can be applied to a real world context. Selecting, using and combining a variety of software to design and create a range of programs, systems and content to collect, analyse, evaluate and present data.
Knowledge			• How branching databases work. • Other ways of collecting data – tally chart, bar graph, line graph, pictogram.	• International Space Station – Node 1,2,3, Zvezda, Zarya, Destiny, Columbus, Kibo, survival items, growing plants in space.	• Identifying and reading databases. • Understanding bar graphs and pie charts.	• Weather station – sensors, anemometer, probes, data recording, solar panel, rain gauge. • Weather satellites – altimeter, GPS, solar array, data transmission. • Green screen – how a subject can placed • in a different background (Chroma key).	• Mars Rover – distance and time travelled • Binary numbers and equivalent decimal values.	• Infrared light, barcodes – how they work and their uses. • Wireless data transfer – barcodes, QR codes, NFC, Bluetooth, RFID. ▪ What 100MB looks like – real life examples (e.g. one 30 minute TV show).

Creating Media								
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Computer Science		Using logical reasoning to predict the behaviour of simple programs.				Consider sequence and selection of frames when editing work.	
	Information Technology	Using a simple online paint tool to create digital art	Using cameras or tablets to take photos.	Understanding how to use tablets or computers to take photos.			Understanding how to use tablets or computers to take photos.	Learning about the history of computers and how they evolved over time.
	Digital Literacy		Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Knowing what to do if they have concerns about content or contact online.	Using technology purposefully to create, organise, store, manipulate and retrieve digital content.	Using technology purposefully to create, organise, store, manipulate and retrieve digital content, including searching for relevant information.	Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Understanding opportunities offered by the World Wide Web for communication and collaboration.	Using technology purposefully to create, organise, store, manipulate and retrieve digital content.	Editing sound recordings for specific purpose.
Knowledge			• How sequences work. • Camera types and basic photography techniques. • Tell a trusted adult about any online safety concerns.	• Animations – how still images become moving images. • Use of animation software. • Sketching and planning.	• Digital media – transitions, morph, cross zoom, peel off, dip to black, directional wipe. • Digital sound waves – viewing and editing.	• Websites – making a new site, building a new page, add text boxes, inserting files, changing themes, embedding links.	• How animations developed over time. • How still images become animations. • Use of animation or editing software. • How to take a good photo.	• Y Service locations – British wireless. • intercept stations. Operators tuning in to enemy messages. ▪ Memory sizes – KB, MB, GB, TB.

Online Safety								
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Information Technology	Participating in group image searches, led by the teacher					Understanding permissions required by apps to access personal information.	
	Digital Literacy		Understanding that they need to be kind on the internet, as they would in real life. Discovering which devices connect to the internet. Understanding some tips for staying safe and why this is important.	Identifying how to keep personal information private. Using technology respectfully by asking for permission before sharing about others online.	Learn to distinguish between facts, opinions and beliefs on the internet. Learn how to deal with upsetting online content. Learn about how to protect our personal information using privacy settings and how to be discerning about what information we share and who with.	Be discerning in evaluating content by learning about the techniques that companies use to advertise online. Use technology safely and responsibly by considering the risks of screen-time and technology. Using search technologies effectively, appreciating how results are selected and ranked.	Considering online judgements that people make and how they treat others online.	Learning about online reputations and how to go about creating a positive one. Being aware of the threats that face us online such as scammers and phishing emails and how to identify them.
Knowledge			• Know the meaning of 'sharing' and 'posting' in an online context. • Know the 4 top tips for staying safe online: 1. People you do not know are strangers 2. Be nice to people like you would be in the real world 3. Keep your personal information private 4. If you are unsure about anything, then tell an adult you trust	• The difference between 'online' and 'offline.' • How to create a strong password. • Tell a trusted adult about any online safety concerns.	• Know the steps to take when faced with upsetting online content. • Know the difference between fact, opinion and belief. • Know age restrictions for popular online platforms.	• Chat bots. • Advertising- snippets, pop-ups, influencers. • The difference between facts, opinions and beliefs online.	• Forms of online communication- memes, gifs, emojis. • The importance of creating strong passwords. • Online bullying- what it is and what to do about it.	• Know the steps to take if you witness online bullying. ▪ How to capture a screen grab on various devices.

Skills Showcase								
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Computer Science					Understanding that websites can be altered by exploring the code beneath the site. Designing, writing and debugging programs that accomplish specific goals. Solving problems by decomposing them into smaller parts.	Understanding how image data is transferred.	Demonstrating their computational thinking skills by designing and debugging programs, using different inputs and outputs.
	Information Technology							Understanding how search engines work and knowing how to use them safely and effectively.
	Digital Literacy		Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Selecting software appropriately.			Recognising that information on the internet might not be true or correct. Using technology safely, by recognising acceptable/ unacceptable behaviour. Knowing what to do when they have concerns about content or contact online.	Developing their CAD skills.	Showcasing their digital literacy skills.
Knowledge			• Computer files and formats – .jpegs, .txt, Folders. • Using a computer to make a list/drawing and saving the document to a folder. • How to make a bottle rocket.			• HTML code. • CSS code. • HTML tags – head, body, ordered lists, list items, image, line break.	• Digital Images – a series of programmed pixels. • RGB colour mode – produces a spectrum of colours.	▪ Extended vocabulary for this unit: adapt, advertisement, algorithm, bug, CAD, computer code, code (verb), design, edit, electronic components, image rights, image, input, information, invention, loop, output, photo, program, repetition, screenshot, selection (programming), sequence, variable, WWW

Vocabulary						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Using a computer	Computing systems and networks: Improving mouse skills	Computing systems and networks 1: What is a computer?	Computing systems and networks 1: Networks and the internet	Computing systems and networks: Collaborative learning	Computing systems and networks: Search engines	Computing systems and networks: Search engines
arrow, click, computer, computer safety, computer tower, cursor, drag, drop, keyboard, left click, letters, lock, log in, log out, lowercase, monitor, mouse, mouse control, move, numbers, paint, password, personal, protect, right click, secure, security, stamp, type, uppercase	account, clipart, computer, log on, log off, mouse, password, resize, screen (monitor), software, tool, username	battery, buttons, computer, desktop, device, electricity, input, invention, keyboard, laptop, screen (monitor), mouse, output, technology, wires	desktop, device, DSL (digital subscriber line), file, internet, laptop, network, network map, network switch, router, server, submarine cables, The Cloud, WiFi, wired, wireless, wireless access points	collaborate, comment, e-document, edit, email, icon, insert (file), link, presentation, presentation software, reply, reviewing comments, share, spreadsheet, transition	algorithm, company logo, data leak, data privacy, fake news, inaccurate information, index, keywords (internet), network, online, page rank, search engine, web crawler, website, WWW (world wide web)	algorithm, company logo, data leak, data privacy, fake news, inaccurate information, index, keywords (internet), network, online, page rank, search engine, web crawler, website, WWW (world wide web)
All about instructions	Programming 1: Algorithms unplugged	Programming 1: Algorithms and debugging	Programming: Scratch	Programming 1: Further coding with Scratch	Programming 1: Music	Programming 1: Music
adjective, algorithm, bend down, blindfold, debug, describe, duck, first, follow, give, hop, instructions, last, left, next, order, predict, prediction, right, run, second, sequence, shuffle, skip, stand still, step over, stop, straight on, third, tiptoe, timer, turn, two-part instructions, under, walk around	algorithm, bug, computer, debug, decompose, device, input, instructions, output, solution	abstraction, algorithm, artificial intelligence, bug, correct, data, debug, decompose, error, key features, loop, predict, unnecessary	animation, application, code, code block, debug, decompose, interface, loop, predict, program, remixing code, repetition code, review, Scratch, sprite, tinker	computer code, code block, conditional statement, decompose, direction, feature, icon, orientation, position, program (verb), Scratch project, Scratch, Scratch script, sprite, Scratch stage, tinker, variable	basic commands, block (Scratch), bug, computer code, code (verb), debug, error, live loop (Sonic Pi), loop, pitch, program language (Sonic Pi), rhythm, soundtrack, tempo, timbre, tinker	basic commands, block (Scratch), bug, computer code, code (verb), debug, error, live loop (Sonic Pi), loop, pitch, program language (Sonic Pi), rhythm, soundtrack, tempo, timbre, tinker
Exploring hardware	Skills showcase: Rocket to the moon	Computing systems and networks 2: Word processing	Computing systems and networks 2: Emailing	Creating media: Website design	Data handling: Mars Rover 1	Data handling: Mars Rover 1
batteries, behind, blurred, blurry, buttons, camera, capture, clear, lick, computer, computer tower, crisp,digital camera, dial, digital clock, electricity, electric toothbrush, gallery, hard-drive, image, iPad, keyboard, keys, larger, lens, memory, mobile phones, monitor, motherboard, mouse, off, on, on top of, open, photograph, photographer, picture, point, power, pull, push, record, remote control, shoot, shut, smaller, speaker, still, system fan, tablets, technology, tinker, twist, under, USB stick, walkie-talkies	computer, computer program, create, data, digital content, e-document, folder, list, save, sequence, share, spreadsheet	backspace, bold, copy, copyright, cut, delete, highlight, image, import, italics, keyboard, keyboard character, paste, redo, space bar, touch typing, underline, undo, word processing	battery, buttons, computer, desktop, device, electricity, input, invention, keyboard, laptop, screen (monitor), mouse, output, technology, wires	collaboration, content, create, design, edit, embed, feature, header, hyperlinks, image, insert (file), online, plan, tab, web page, website, WWW (world wide web)	binary code, data, data transmission, discovery, distance, input, Mars Rover, moon, numerical data, output, planet, radio signal, research, scientist, sequence, signal, computer simulation, space (astronomy)	binary code, data, data transmission, discovery, distance, input, Mars Rover, moon, numerical data, output, planet, radio signal, research, scientist, sequence, signal, computer simulation, space (astronomy)
Programming Bee-Bots	Programming 2: Bee-Bots	Programming 2: Scratch Jr	Computing systems and networks 3: Journey inside a computer	Skills showcase: HTML	Programming 2: Micro:bit	Programming 2: Micro:bit
algorithm, arrow, back, backwards, Bee-Bot, circle, debug, direction, directions, forward, instructions, left, program, right, route, sequence, straight on, turn	algorithm, Bee-Bot, computing code, computer program, explain, explore, instructions, predict, tinker, video, virtual	algorithm, animation, bug, computer code, code (verb), debug, icon, imitate, instructions, loop, repeat, Scratch JR, sequence	algorithm, computer, computer program, CPU, (central processing unit) data, desktop, GPU (graphics processing unit), HDD (hard disk drive), QR code, RAM (random access memory), ROM (read only memory), tablet device, trackpad	code (verb), content, copyright, CSS (cascading style sheet), fake news, hacker, hex code, HTML (hypertext markup language), internet browser, permission, script, URL (uniform resource locator), web page	.hex file, .zip file, bluetooth, code block, decompose, emulator, feature, loop, Micro:bit, pedometer, predict, program, systematic, tinker, USB universal serial bus), variable	.hex file, .zip file, bluetooth, code block, decompose, emulator, feature, loop, Micro:bit, pedometer, predict, program, systematic, tinker, USB universal serial bus), variable

Vocabulary						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Creating media: Digital imagery	Creating media: Stop motion	Creating media: Video trailers	Programming 2: Computational thinking	Creating media: Stop motion	Creating media: Stop motion
	camera, collage, crop, delete, download, drag and drop, editing software, image, image filter, import, online, photo, resize, save as, search engine, sequence, storage space, visual effects	animation, animator, contraption, debugging, decompose, design, device, download, film review, filming, frame, import image, plan, onion skinning, sketch, software, stop motion, storyboard, upload	application, camera angle, clip, desktop, digital device, edit, film, film editing software, graphics, import (software), key events, laptop, music, photo, plan, recording (electronic), sound effects, storyboard, time code, trailer, video, voiceover	abstraction, algorithm design, computer code, code block, computational thinking, computer, decompose, pattern recognition, problem, Scratch, Scratch script, sequence, variable	animation, animator, background, decompose, duplicate, editing, flipbook, frame, illusion, onion skinning, stop motion, storyboard, thaumatrope, upload, zoetrope	animation, animator, background, decompose, duplicate, editing, flipbook, frame, illusion, onion skinning, stop motion, storyboard, thaumatrope, upload, zoetrope
	Data handling: Introduction to data	Data handling: International space station	Data handling: Comparison cards databases	Data handling: Investigating weather	Skills showcase: Mars Rover 2	Skills showcase: Mars Rover 2
	branching database, categorise, chart, computer, data, information, label, pictogram, record, sort, table	approximate, astronaut, data, digital content, experiment, interactive map, International space station (I.S.S), interpret, laboratory, monitor (verb), satellite, sensor, space, survival, thermometer	categorise, data, database, fields (data), filter (data), graphs and charts, information, record, sort, spreadsheet	algorithm, atmosphere, automated machine, calculate, climate, design, device, forecast, input, log data, online, predict, record, sensor, source, spreadsheet, units of measurement, weather, weather satellite	algorithm, binary image, bit, bit pattern, CAD (computer-aided design), compression file, CPU (central processing unit), data, digital image, encode, image, JPEG (joint photographic experts group), memory, operating system, pixels, RGB (red, green, blue)	algorithm, binary image, bit, bit pattern, CAD (computer-aided design), compression file, CPU (central processing unit), data, digital image, encode, image, JPEG (joint photographic experts group), memory, operating system, pixels, RGB (red, green, blue)
	Online safety	Online safety	Online safety	Online safety	Online safety	Online safety
	Camera, communicate, connect, console, devices, digital footprint, emotion, feelings, instructions, internet, internet safety, laptop, mood, online, personal information, phone, posting, predict, respect, sharing, smart device, smartphone, smart TV, smartwatch, strangers, tablet, trust, wired, wireless	accept, comment, consent, content, emojis, offline, online, password, permission, personal information, private information, share, terms and conditions, trusted adult	accurate, age restricted, autocomplete, beliefs, block, content, digital devices, fact, fake news, opinion, password, persuasive, privacy settings, reliable, report, requests, search engine, security questions, sharing, smart devices, social media platforms, social networking, wellbeing	advertisement, alter, bot, fact, fake, gaming, implication, in-app purchases, influencer, judgement, live streaming, opinion, pop-ups, screen time, search engine, social media, snippet, sponsored	anonymity, application, bill payer, bullying, communication, emoji, gif, hack, interpreted, judgement, meme, mental health, misinterpreted, passwords, permissions, private information, reliable, reputation, trusted adult, victim, wellbeing	anonymity, application, bill payer, bullying, communication, emoji, gif, hack, interpreted, judgement, meme, mental health, misinterpreted, passwords, permissions, private information, reliable, reputation, trusted adult, victim, wellbeing