Computing long-term knowledge growth

Rationale for content sequencing

Grange Park Primary School

DL Digital Literacy and Online Safety

CT Computational Thinking

CH Computers and Hardware

Year N	Substantive computing content	Recurring themes, ideas and language	Contribution to wider computing knowledge and what later content this prepares for
	Children are introduced to the **Funtable** early in Nursery and with adult guidance, are shown a range of apps that support current learning while encouraging autonomy. The Funtable supports collaborative learning, while **iPads** are also introduced, allowing children to independently use technology in a controlled environment where staff ensure learning outcomes are being met.	Digital Literacy and Online Safety: With the support of adults, children are introduced to the basics of online safety, such as telling an adult if they see something they don't like. Computational Thinking: Children are taught to follow simple instructions through engaging activities and games, helping them understand how steps combine to solve a problem. They also begin to develop basic problem-solving skills to address simple issues with technology. Children are introduced to the concept of an algorithm through apps which enable them to develop their directional language and the idea of inputting a control. Computers and Hardware: The Funtable introduces young children to basic technology skills through interactive touchscreens, developing fine motor skills, executive function (e.g., planning and problem-solving during activities), and understanding of digital devices. Using child-friendly apps, children explore early algorithms, sorting, matching, and pre-writing exercises, supporting math and English learning goals. It fosters independence by allowing self-paced activity	

		choices and promotes collaboration as children take turns, practice self-regulation, and manage emotions during gameplay.	
Year R	**Substantive computing content**	**Recurring themes, ideas and language**	**Contribution to wider computing knowledge and what later content this prepares for**
Reception Autumn 1	Scan QR codes to listen to stories Take photographs of models/creations	Digital Literacy and Online Safety: Pupils are shown and modelled how to search for images safely online. With adult support pupils are introduced to the basics of online safety communication and what to do if they come across something that worries them or makes them feel uncomfortable. Pupils learn to log in and log out of a computer and use a simple online paint tool to create a piece of digital art Computational Thinking: Pupils learn to follow instructions as part of practical activities and games, identifying the importance of simple instructions to create a basic algorithm. As part of this, pupils begin to learn how to solve basic problems involving computers when things go wrong. Computers and Hardware: Pupils learn what a keyboard is and how to locate relevant keys, developing their basic mouse skills of moving a cursor and clicking. Using bee-bots pupils learn programming and how to give simple commands. Children recognise that a range of technology is used in places such as homes and schools, and use cameras or iPads to take photos, beginning to use relevant vocabulary to explain their understanding.	Pupils build on their understanding of Programming in **Year 1** when they use a BeeBot to plan and follow a precise set of instructions. They will build on their understanding of computing systems and networks in **Year 3 when they r**ecognise what a network is, how a website works and identify the role of packet data.
Reception Autumn 2	Computer systems and networks 2: Exploring hardware Tinkering and exploring with different computer hardware and learning to operate a camera Accessing apps on Ipad		
Reception Spring 1	Programming 2: Programming BeeBots Children learn about directions, experiment with programming a Bee-bot/Blue-bot and tinker with hardware		
Reception Spring 2	Programming BeeBots Children learn about directions, experiment with programming a Bee-bot/Blue-bot and tinker with hardware		
Reception Summer 1 and 2	Computing systems and networks: Using a computer Logging in and out Learning about the main parts of a computer and how to use the keyboard and mouse.		
Reception Summer 2	Data handling Children sort and categorise data and are introduced to branching databases and pictograms		
Year 1	**Substantive computing content**	**Recurring themes, ideas and language**	**Contribution to wider computing knowledge and what later content this prepares for**
Year 1 Autumn 1	Online safety Discuss what the internet is and how it can be used. Recognise that the internet may affect mood or emotions.	Digital Literacy and Online Safety: Pupils recognise common uses of IT through logging in and	Pupils develop their understanding of algorithms

	Recognise how internet use can affect and upset others. Identify which information is appropriate to share and post online and which is not. Getting Started Introducing children to logging in and using technology for a purpose	saving work in their account, understanding the importance of a password. Pupils also begin to use technology purposefully to create, organise, store and retrieve digital content. Pupils begin searching and downloading images from the internet safely. Through the introduction of online safety fundamentals pupils learn of knowing what to do if they have concerns or contact online, identifying situations that make them feel uncomfortable. Computational Thinking: Pupils learn how to explore different hardwares to find out how they work and function. By constructing a series of instructions the children develop an understanding of simple algorithms. Applying computing concepts of instructions to real world situations, breaking thinking problems into smaller parts to solve them. Pupils also use logical reasoning to predict simple programs, identifying that information needs to be presented in clear and simple ways. Computers and Hardware: Pupils learn what a keyboard is and how to locate relevant keys, developing their basic mouse skills of moving a cursor and clicking. Using cameras or tablets to take photos, the children use a basic range of tools within graphic editing software. Pupils understand how to create digital art using online paint tools, resizing and creating different effects from images.	and decomposition in **Year 4** where they unpick the four types of computational thinking (decomposition, pattern recognition, algorithm design and abstraction). Pupils will also build on their knowledge of digital imagery in Year 3 and 5 where they create video trailers (Year 3) and stop motion animations (Year 5). They will build on their understanding of taking photos and creating a sequence of pictures through using onion skimming, transitions, text and sound to their final compositions.
Year 1 Autumn 2	Computing systems and networks: Improving mouse skills To log in to a computer and access a website. To log in to a computer and access a website.		
Year 1 Spring 1	Algorithms Unplugged Understand what an algorithm is and follow instructions precisely. Explain what decomposition is. Know how to debug an algorithm.		
Year 1 Spring 2	Digital Imagery Understand and create a sequence of pictures. Edit photos. Search and import images.		
Year 1 Summer 1	Programming 2: Bee-Bot Explore a new device Plan and follow precise set of instructions Program new device Create a program that tells a story		
Year 1 Summer 2	Howdous digital skills Google Classroom- join a class, show assignments, write class comments Google Slides- create slide, add slide, add texbox, use explore tool Google Docs- name a doc, find and insert web image, share and set rights		
Year 2	**Substantive computing content**	**Recurring themes, ideas and language**	**Contribution to wider computing knowledge and what later content this prepares for**
Year 2 Autumn 1	What is a computer? To recognise parts of a computer, how technology is controlled and the role of computers.	Digital Literacy and Online Safety: Pupils use word processing software to type and reformat text, developing an understanding of basic touch typing	Pupils build on their understanding of what a computer is in **Year 3** when

		skills. Building upon the previous year, pupils continue to understand the importance of staying safe online and not disclosing personal information. Children continue to develop core skills of creating, organising, storing, retrieving and manipulating digital content purposefully. Through continued use of photography software, pupils learn to create and label images. Collecting and inputting data, pupils develop their understanding of interpreting data. Computational Thinking: Pupils learn about inputs and outputs and how they are used in algorithms. By creating and debugging simple programs, pupils use logical reasoning to predict and decode simple programs. They build upon their understanding of following basic algorithms, and how they implemented as programs on digital devices to execute precise instructions. Computers and Hardware: By revisiting and consolidating their understanding of what a computer is and the role of individual components, pupils develop confidence when using technology. Pupils use greater control when taking photos with ranging equipment, making better choices about images.	they learn about different inputs and outputs, the components inside a laptop and decompose a tablet/computer. Pupils build on their understanding of programming in **Year 3** where they include a loop in their algorithm. Their use of Google Sheets to input data for the International Space Station topic prepares them for their investigating weather topic **in Year 4** where they log data taken from online sources in Google Sheets.
Year 2 Autumn 2	Algorithms and debugging Decompose a game to predict algorithms used, understand computers use algorithms to make predictions, understand what abstractions are and what debugging is.		
Year 2 Spring 1	Programming Scratch Jnr Using the app 'ScratchJr' to create an animation, program a joke and plan and use code to create an algorithm.		
Year 2 Spring 2	International Space Station To locate features on an interactive map, to input data and retrieve information from a spreadsheet.		
Year 2 Summer 1			
Year 2 Summer 2	Stop Motion To tell a story, children explore how to create an animation use stop motion technology (**optional**)		
Year 3	**Substantive computing content**	**Recurring themes, ideas and language**	**Contribution to wider computing knowledge and what later content this prepares for**
Year 3 Autumn 1	Networks and the Internet To recognise what a network is, how a website works and identify the role of packet data.	Digital Literacy and Online Safety: Children continue to develop core skills of creating, organising, storing, retrieving and manipulating digital content purposefully. Children also begin to search for relevant information as well as images. Pupils begin to understand basic computing networks as well as the internet and how they provide and connect multiple services such as communication and collaboration. Building upon their understanding of internet safety, pupils learn	Pupils build on their digital literacy skills and ability to create media in **Year 5** when they create stop motion animations. They use what they have learnt from their video trailer unit and understanding of using still images to create an animation when they use
Year 3 Autumn 2	Journey inside a Computer Children recognise different inputs and outputs, the components inside a laptop and decompose a tablet/computer.		
Year 3 Spring 1	Creating media: video trailers Children plan a book trailer, take photos or videos to tell a story,		

Year 3 Spring 2	edit a video and add texts and transitions to a video.	about cyberbullying the purpose of emails, along with fake emails and trusted information online. This will support their learning of how to be a responsible digital citizen and recognise the importance of treating others respectfully. Computational Thinking: Building upon their understanding of decomposition and algorithms, pupils understand that programs execute by following precise and unambiguous instructions. This is developed by pupils designing, writing and debugging programs to accomplish specific goals. Their understanding of coding is developed by using sequence, selection and repetition in programmes, solving problems by decomposing them into smaller parts. Computers and Hardware: Pupils begin to draw comparisons across different types of computers and technology, learning what servers do and how hardware works together. They expand upon this by exploring how data is transferred through the internet and connected networks	frames in their stop motion animation and add transitions and text to their final composition. Their programming in Scratch and understanding of loops prepares them for their Intro to Python when they learn what nested loops are in **Year 6.**
Year 3 Summer 1 Year 3 Summer 2	Programming Scratch Using Scratch, with its block-based approach to coding, pupils tinker with the program, create a loop, program an animation and a story.		
Year 4	**Substantive computing content**	**Recurring themes, ideas and language**	**Contribution to wider computing knowledge and what later content this prepares for**
Year 4 Autumn 2	Collaborative Learning Pupils learn about how software can be used to work collaboratively, understand how to contribute to someone's work effectively, understand how to create and share Google Forms and understand how to use a shared spreadsheet to explore data.	Digital Literacy and Online Safety: Pupils select, use and combine a variety of software to design and create a range of programs, systems and content that accomplish given goals. Using Google online software, pupils understand that programmes can be used collaboratively with others, building and designing a webpage from given content. They will recognise what appropriate behaviour is when collaborating with others online, building upon their understanding of online safety and trustworthy information. Computational Thinking: Pupils continue to use logical reasoning to explain algorithms and solve problems by decomposing them into	Their understanding of using Google WorkSpace tools collaboratively is built on in **Year 6** when they collaborate on tools like Google Slides and Docs to present information about one computer that has changed the world and design a computer of the future in groups. Pupils develop their understanding of block based coding in Scratch as a
Year 4 Spring 2	Further Coding with Scratch Pupils understand how a Scratch game works by using decomposition, understand what a variable is and how to make one in Scratch.		
Year 4	Investigating Weather		

Spring 1	Children investigate the role of computers in forecasting and recording weather as well as how technology is used to present forecasts. They log data taken from online sources in Google Sheets, design an automated machine to respond to sensor data, understand how weather forecasts are made and present a weather forecast.	smaller parts. Children will begin to develop their understanding of abstraction and patterns in relation to designing, writing and debugging programs. By understanding the role of inputs and outputs in computerised devices, pupils develop their knowledge of networks and connected systems. Pupils continue to develop their understanding of code, programming an animation and remixing existing code to include variables and altered patterns. Computers and Hardware: Pupils consolidate their knowledge of the key components of a network, understanding that websites and media are shared between computers. Children also learn about the purpose of routers and how the WOrld Wide Web provides opportunities for communication and collaboration.	foundation for when they used block based coding to program micro:bits in **Year 5.** Pupils have the opportunity to build on their computational thinking skills in **Year 6's** Intro to Python unit through decomposing a code script in Python before remixing it.
Year 4 Spring 2	Computational Thinking Through developing their understanding of the four pillars of computational thinking (decomposition, pattern recognition, abstraction and algorithm design) and how to apply it to solve problems.		
Year 4 Summer 1 Year 4 Summer 2	Howdous Google Sites- how to share site with collaborators, make subpages an rename pages Google Sheets- freeze rows and columns, apply conditional formatting, create charts Google Drive- colour a folder, share a file, change share permissions, copy and move files, restore files		
Year 5	**Substantive computing content**	**Recurring themes, ideas and language**	**Contribution to wider computing knowledge and what later content this prepares for**
Year 5 Autumn 1	Search Engines Children develop their understanding of what a search engine is and how to use it, assess whether a source is trustworthy, learn how to search effectively and create an informative poster.	Digital Literacy and Online Safety: Pupils continue to consolidate their understanding of the importance of internet safety and recognising acceptable and unacceptable behaviour online, creating an animation about digital safety to highlight this. Pupils recognise that information on the internet may not be true and develop skills of recognising dangers online. Children develop their skills to use key words quickly to find information quickly, and combine this with a variety of software to design and create a range of content. Computational Thinking: Pupils develop their understanding of blocked coding by using programming language to create music using Sonic Pi and programme a device. They will explore variables and	Pupils build on their online safety knowledge in **Year 4** to ascertain which information online is accurate and trustworthy. Pupils develop their digital literacy skills and ability to create media from **Year 3's** video trailers topic. Their understanding of what makes an effective animation is built on in their micro:bit topic where they program an animation.
Year 5 Autumn 2	Mars Rover 1 Pupils explore how and why data is collected from space, to read and calculate numbers using binary code and use simple operations to calculate bit patterns.		
Year 5	Creating media: stopmotion animation Pupils use stop motion to create an animation, plan a video and		

Spring 1	create their own stop motion video.	different forms of input, predicting what software will work based on previous experience and creating more complex algorithms. By creating and editing videos, adding multiple elements, music, sound and transitions pupils continue to develop their knowledge of CAD programmes. Computers and Hardware: Pupils learn that external devices can be programmed by a seperate computer, identifying the difference between ROM and RAM in the processing of data. Building on the previous years understanding of recognising how computers transfer data, pupils begin to look at simple binary and how digital data can be compressed and represented as pixels and code.	
Year 5 Spring 2	Micro:bit Pupils programme a small computer called a micro:bit to create simple animations or messages on its simple LED display using block coding. Pupils create a program for a specific task (pedometer).		
Year 5 Summer 1	Programming music: Scratch Pupils tinker with Scratch music elements, create a program that plays themed music, plan and create a soundtrack.		
Year 5 Summer 2			
Year 6	**Substantive computing content**	**Recurring themes, ideas and language**	**Contribution to wider computing knowledge and what later content this prepares for**
Year 6 Autumn 1	Big Data1 Children learn how data is collected and stored by exploring barcodes, QR codes and RFID chips, and investigate how collecting big data can be used to help people in a variety of different scenarios	Digital Literacy and Online Safety: Pupils showcase their learnt digital literacy skills, selecting, using and combining a variety of software to design and create a range of programs. Analysing, evaluating and presenting data, pupils learn how digital learning can be applied to a real world context. Consolidating their understanding of the importance of safety online, pupils recognise the importance of secure passwords, using search engines safely and how to prevent data sharing within the online community. Computational Thinking: Pupils use programming software to understand hacking and relating it to computational codes. By exploring websites and the code beneath the site, pupils demonstrate their computational thinking skills by using Python programming software to evaluate algorithms. Computers and Hardware: Pupils consolidate their understanding of computing,	The introduction to Python prepares pupils for more advanced coding in Python in KS3 where they code geometric shapes and learn what sequencing, iteration and debugging is . (Highlands IT curriculum). Pupils understanding of how to use spreadsheets to apply conditional formatting, create charts and sort data which is developed through their home learning (level 3 Google Sheets Howdou) is built on in **Year 7** where they use spreadsheets to model, plan for and help manage real-life scenarios such as quizzes/tests and event
Year 6 Autumn 2	Bletchley Park and the history of computers Children learn about the importance of different types of secret codes in WW2, the importance of brute force hacking and use their digital literacy skills to create a presentation on the importance of the history of computers.		
Year 6 Spring 1	Exploring AI Pupils explore what AI is and how it generates text, images and code. They learn about creating and refining prompts to improve AI responses while also considering the ethical implications of AI and its potential to replace human roles.		
Year 6 Spring 2	Intro to Python Building on their knowledge of coding from previous years, children are introduced to the text-based programming language Python, which is the language behind many apps and programs, such as Dropbox. Pupils tinker with Logo and Tinker, they create nested loops within these programs and develop their understanding of		

	basic commands in Python.	learning about the history of computers and how they have evolved over time. Focussing on data transfer and building from the previous year, pupils understand and identify barcodes, QR codes and RFID, as well devices that scan specific data. Pupils consolidate their understanding of how search engines work and knowing how to use them safely and effectively.	planning. Their history of computers topic develops pupils' understanding of how computers will change in the future and the role that artificial intelligence will play.
Year 6 Summer 1	SATS		
Year 6 Summer 2			