



St Nicholas Church of England First School

Progression of Essential Substantive Knowledge and Learning Language

Computing

(Disciplinary knowledge related to this subject are mapped out on a separate document to support the distinguishment between what we need children to know and what we expect children to do to gain new knowledge and what they do with that new knowledge. Our disciplinary knowledge is designed and centred around this subject as a discipline, where children acquire and apply these as if they were the subject expert; it is progressive and deepens in complexity, as children move through units of learning and throughout each key stage with the expectation that it can be applied across a range of key areas within this subject)

Substantive Concepts in Computing

Computer Science	The technical design. The design of new software, the solution to computing problems and the development of different ways to use technology.
Information Technology	The technical knowledge. The design, use and understanding of hardware and software; computers and electronic systems for storing and using information.
Digital Literacy	The technical skills. The ability to use information and communication technologies to find, create, evaluate, and communicate information.

Progression of Essential Substantive Knowledge and Learning Language Year 1 Computing

	Unit 1 Online Safety (Digital Literacy)	Unit 2 Grouping and Sorting (Computer Science)	Unit 3 Pictograms (Information Technology)	Unit 4 Lego Builders (Computer Science)	Unit 5 Maze Explorers (Computer Science)	Unit 6 Animated Story Books (Information Technology)	Unit 7 Coding (Computer Science)	Unit 8 Spreadsheets (Information Technology)	Unit 9 Technology Outside School (Digital Literacy)
Learning Focus									
Connected Prior Learning	- That apps and programs can be accessed through a desktop computer and an iPad (YR) - Give commands/instructions e.g. forward, backwards, go, stop, when using simple software/hardware (YR) - Make choices about the buttons/icons to press, touch or click on when using simple software/hardware (YR)								
New Essential, Sticky Knowledge	A username and password safely logs me in. Work is saved in an online folder. The search bar helps to find applications. Texts and images can help make my work more interesting. Work can be opened, saved and printed.	Items can be sorted using different criteria There are apps/software to help sort items	Data can be represented in a picture Record results on software to create a pictogram	Computers need complete instructions to carry out a task Follow and create simple instructions on a computer The order of instructions affects what will happen	The function of the direction keys Create and debug simple set algorithm Function of additional direction keys Change and extend the algorithm list	E-Books are books that can be read on a computer. Computer apps help us to create digital books. Animations can be added to an interactive story.	Algorithms can be read to predict what will happen. Plan and make a simple computer program, using an algorithm. Objects, actions and background	A spreadsheet has cells, rows and columns. What a spreadsheet program can help achieve. Data is entered into a cell. Lock cell, move cell, speak and count can help	Technology is a use of knowledge to invent new devices or tools. Throughout history, technology has Made people's lives easier.

	Logging out is important to protect my work.					Sound and recordings can be added to an e-book. Work can be shared online with others (collaboration and sharing).	are part of coding. An event is when code is run and can be used to control and object. How code is executed when a program is run.	protect and achieve different needs.	Technology is used within school and Outside of school. Examples of technology Both in and out of school.
Learning Language Development (New and Revisited)	Log In Username Avatar Log Out Save My Work Notification Password Tools	Sort Criteria Group	Pictogram Data Collate	Instruction Algorithm Computer Program Debug	Direction Rewind Left Turn Challenge Forward Debug Arrow Backwards Instruction Undo Right Turn Algorithm	Animation Font Sound Effect E-Book File	Action Code Event Algorithm Command Debug Background Execute Input Instruction Object Run Properties Scene Sound Output Scale	Arrow Key Cells Lock Tool Backspace Clipart Move Cell Cursor Count Tool Rows Speak Tool Columns Delete Image Spreadsheet	Technology Community Phone Laptop Desktop

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Progression of Essential Substantive Knowledge and Learning Language Year 2 Computing

Skills related to this subject are mapped out on a separate document to support the distinguishing between what we children know and what we expect children to do to gain new knowledge and what they do with that new knowledge. Our skills are designed and centred around this subject as a discipline, where children acquire and apply these as if they were the subject expert. The skills are progressive and deepen as children move through units of learning and throughout each key stage with the expectation that they can be applied to any type of knowledge across a range of key areas within this subject.

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8
Learning Focus	Online Safety (Digital Literacy)	Coding (Computer Science)	Spreadsheets (Information Technology)	Questioning (Information Technology)	Effective Searching (Digital Literacy)	Creating Pictures (Information Technology)	Making Music (Information Technology)	Presenting Ideas (Information Technology)
Connected Prior Learning	Year 1 Unit 1 Safe logins; Concept of privacy; Concept of ownership; The need to logout Year 1 Unit 6 Developing ideas about the concept of technology that we are surrounded by and its purpose	Year 1 Unit 1 Block coding; objects and actions; events; executing a program; Design View Year 1 Unit 4 Algorithms; Logical decision making; Sequencing instructions ;Following instructions Year 1 Unit 5 Creating programs using sequencing and repeat; Visual use of the Logo programming language; Program logic and structure	Year 1 Unit 3 What is data?; Representing data Year 1 Unit 8 Spreadsheet navigation; Adding images	Year 1 Unit 2 Sorting data according to criteria Year 1 Unit 3 Collecting and presenting data in a picture format	Year 1 Unit 1 Safe logins Year 1 Unit 6 Developing ideas about the concept of technology that we are surrounded by and its purpose	Year 1 Unit 1 Paint Projects: use of the simple paint tools Year 1 Unit 6 Animating images using built in effects; Concept of background (static) and foreground (can move)	Year 1 Unit 6 Adding simple sound effects to stories	Year 1 Unit 6 Creating text and the use of illustrations
New Essential, Sticky Knowledge	Searches can be refined when searching digitally. Digitally created work can be shared, including more	Algorithm are a set of instructions that follow a sequence. Use a given design to create a program using an algorithm.	Use of image, cell lock and move, speak and count tools. Copy, cut and paste in spreadsheet software	There are other data handling tools that can give more information than pictograms.	The meaning of key internet and searching terms (domain, web address, network, web page, World Wide Web)	Purpose and benefits of painting software tools Use features to re-create specific techniques.	Make forms of music (digitally) Edit and combine sounds Refine composed music.	Digital content can be presented in many different forms Use presentational or interactive software and making

	globally on the internet. Email is a type of communication tool. Open and send simple emails. There is an appropriate way to Communicate with others in an online situation. Information put online leaves a digital Footprint. Some steps that can be taken to keep Personal data and hardware secure.	Collision detection is a type of event in coding. Design an algorithm that follows a timed sequence. Different objects Have different properties. Different events in coding and what some of these events are. Function of buttons in the coding Environment. Interpret and debug simple programs.	Totalling tools and how to use them. Performing calculations for a purpose, including the tools needed. Use data to create a graph.	Use yes/no questions to separate information. Construct a binary tree to identify items. Use a binary tree database to answer questions. Use a database to answer more complex search questions. Use a search feature at a basic level when trying to locate data within a database	Basic parts of a web search engine page. Navigate a web search results page. Search the Internet to some degree for answers. The principles of effective internet searching.	Use repeating patterns, manipulating patterns and adding multiple effects in painting software.	Upload/import and record sounds beyond the software environment.	improvements to it based on feedback. Data can be structured in tables to make it useful for an audience. Add images such as clipart and photos to presentational software. Collect, organise and present data and information in digital format.
Learning Language Development (New and Revisited)	Search Internet Sharing Email Attachment Digital Footprint	Action Button Design Mode Algorithm Collision Detection Event Background Debugging Key Pressed Nesting Object Predict Properties Run Scale Scale Sequence	Backspace Copy Paste Columns Cells Count Delete Equals Image Toolbox Tool Lock Move Rows Speak Spreadsheet	Pictogram Question Collate Binary Tree Avatar Database	Internet Search Search Engine	Impressionism Palette Pointillism Share Surrealism Template	Composition Digital Instrument Sound Effect Soundtrack Tempo Volume	Concept Map Node Animated Quiz Non-Fiction Presentation Narrative Audience

		Sound Test Text Timer When Clicked Swipe						
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Computing Progression of Knowledge and Learning Language Year 3

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	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
Learning Focus	Online Safety (Digital Literacy)	Coding (Computer Science)	Spreadsheets (Information Technology)	Touch Typing (Information Technology)	Email (Digital Literacy)	Branching Databases (Information Technology)	Simulations (Information Technology)	Graphing (Information Technology)	Presenting (Information Technology)
Connected Prior Learning	Year 1 Unit 1 Safe logins; Concept of privacy; Concept of ownership; The need to logout Year 1 Unit 6 Developing ideas about the concept of technology that we are surrounded by and its purpose Year 2 Unit 2 Share to a display board; Approval process; Sharing online; Email simulations; Emotional impact of communications; Digital footprint Year 2 Unit 5 Search engine;	Year 1 Unit 1 Introducing block coding; Objects and actions; Events (Click event, sound output); Executing a program; Design view: Planning Year 1 Unit 4 Algorithms ;Logical decision Making; Sequencing instructions; Following instructions Year 1 Unit 5 Creating programs using sequencing and repeat;	Year 1 Unit 3 What is data?; Representing data Year 1 Unit 8 Spreadsheet navigation; Adding images Year 2 Unit 3 Copying and pasting; Totalling tools; Addition; Table layout; Block graph Year 2 Unit 4 Ways to represent data; Pictograms; Binary trees; Databases	Year 1 Unit 1 Simple text entry Year 2 Unit 5 Efficient use of a search engine Year 2 Unit 8 Presenting ideas in a variety of styles including through typed text	Year 1 Unit 1 Safe logins; Concept of privacy; Concept of ownership Year 1 Unit 6 Developing ideas about the concept of technology that we are surrounded by and its purpose Year 2 Unit 2 Sharing online ; Email simulations ; Emotional impact of communications; Digital footprint Year 2 Unit 5 Exploration of what the Internet is ;Accessing the World Wide Web;	Year 1 Unit 2 Sorting data according to criteria Year 1 Unit 3 Collecting and presenting data in a picture format Year 2 Unit 3 Collect data and produce a graph Year 2 Unit 4 Enquiry into different data handling tools; Use of questioning to separate and group data	Year 1 Unit 7 Following instructions; Creating simple programs ;Computer simulation of real life events Year 1 Unit 9 Understanding the term 'technology' ; Recognising the use of technology around them Year 2 Unit 1 Algorithms ;Collision detection; Object types ;Debugging Year 3 Unit 1 Flowcharts; Timers and sequence;	Year 1 Unit 2 Sorting data according to criteria Year 1 Unit 3 Collecting and presenting data in a picture format Year 2 Unit 3 Use of 2Calculate to collect data and produce a graph Year 2 Unit 4 Enquiry into different data handling tools; Use of questioning to separate and group data Year 3 Unit 3 Collecting data; Producing a graph	Year 1 Unit 6 Creating text and the use of illustrations Year 2 Unit 6 Presenting ideas in art form; 2Paint a Picture: art effects, collage effects Year 2 Unit 8 Creating work for a variety of purposes and different genres; Presenting the same information in different styles Year 3 Unit 4 Keyboard skills; Typing fluency

	;Digital footprint ;Privacy	Visual use of the Logo programming language; Program logic and structure Year 2 Unit 1 Algorithms; Collision Detection; Timers; Object types; Buttons; Debugging Year 2 Unit 4 Logical decision processing; Forward planning to achieve a solution			Digital Footprint; Searching and sharing Year 3 Unit 2 Good passwords and password privacy; communication methods; Cyberbullying and reporting problems		Code, test, debug process	Year 3 Unit 6 Sorting and interrogating data	
New Essential, Sticky Knowledge	What makes a strong password is and how to keep it safe. The consequences of not keeping passwords safe. The main ways the internet helps people to communicate. A blog can be used to communicate with a wider audience. Contribute to a blog with clear, appropriate messages. Some information on websites may not be accurate or true.	What a flowchart is and how flowcharts are used in computer programming. Use a flowchart to create a computer program. There are different types of timers used in coding environments Select timer for a given purpose. What and how to use a repeat command Run, test and debug own programs. What nesting is and that this	Create tables of data within a Spreadsheet. Use a spreadsheet program to Automatically create charts and graphs from data. Use various features within a Spreadsheet to support solutions to calculations The process to locate specific cells	Typing terminology including names of Fingers. Home, top and bottom row sections on a Keyboard. The keys typed with left hand. The keys typed with right hand. The correct way to sit at a keyboard.	The strengths and weaknesses of different ways of communicating. Use an address book to write an email. The importance of the draft feature. Add attachments to an email. What cc means and how to use it.	Sort objects using just YES/NO. How YES/NO questions are structured and Answered. Complete a branching database. Edit and adapt a branching database. Create a branching database including Debugging it.	A computer simulation can represent real And imaginary situations. Advantages and problems of using Simulations. Use a simple simulation to try out different options and test predictions. Evaluate usefulness of simulations by Comparing with real simulations	Set up a graph with a given number of Fields using graphing software Enter data for a graph. Select and give reasons for the most appropriate chart type for data and explain reasoning. Sort data in graphing software to enable easier analysis.	What presentation is and how it can be used. Add pages/slides, text and shapes to Pages, and also format them. Add media such as images, audio and Videos. Use effects and features such as Animations and slide transitions. How timings can help when presenting Effectively present to an audience Using presentation software.

	How to search the internet and think critically about the results returned. Reasons why there are age-restrictions on media and devices. Where to go for help if see inappropriate content or have inappropriate contact from others.	should be considered when debugging. How to change attributes/properties of any objects in a program.							
Learning Language Development (New and Revisited)	Password Internet Blog Concept Map Username Website Webpage Spoof Site PEGI Rating	Action Alert Algorithm Background Command Block Button Collision Detection Command Debugging Develop Event Execute Flowchart Nesting Object Output Plan Predict Procedure Properties	Greater Than Less Than Equals Advance Mode Copy and Paste Columns Cells Delete Move Rows Spin Spreadsheet	Posture Top Row Home Row Bottom Row Space Bar	Communication Email Compose Send Report Attachment Address Book Save Draft Password CC BCC Formatting	Branching Database Question Data	Simulation Program Evaluate Analyse	Graph Field Bar Chart Block Graph Line Graph Pie Chart Row Column	Animation Audio Design Theme Template Media Presentation Slide Slideshow Image Text Box Format Transition

		Repeat Sequence Scene Sound Test Timer Values							
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Computing Progression of Knowledge and Learning Language Year 4

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	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
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Learning Focus	Online Safety (Digital Literacy)	Coding (Computer Science)	Spreadsheets (Information Technology)	Writing for Different Audiences (Information Technology)	Logo (Information Technology)	Animation (Information Technology)	Effective Searching (Information Technology)	Hardware and artificial Intelligence (Digital Literacy)	Making Music (Information Technology)
Connected Prior Learning	Year 1 Unit 1 Safe logins; Concept of privacy; Concept of ownership; The need to logout Year 1 Unit 6 Developing ideas about the concept of technology that we are surrounded by and its purpose Year 2 Unit 2 Share to a display board; Approval process; Sharing online; Email simulations; emotional impact of communications ; digital footprint Year 2 Unit 5 Search engine ;Digital footprint; Privacy	Year 1 Unit 1 Objects and actions; Events (Click event, sound output); Executing a program; Design view: Planning Year 1 Unit 4 Algorithms; Logical decision making; Sequencing instructions; Following instructions Year 1 Unit 5 Creating programs using sequencing and repeat; Visual use of the Logo programming language; Program logic and structure Year 2 Unit 1 Algorithms; Collision detection; Timers; Object types; Buttons ;Debugging Year 2 Unit 4 Logical decision processing; Forward planning to achieve a solution	Year 1 Unit 3 What is data?; Representing data Year 1 Unit 8 Spreadsheet navigation; Adding images Year 2 Unit 3 Copying and pasting; Totalling tools; Addition; Table layout; Block graph Year 2 Unit 4 Ways to represent data; Pictograms ; Binary trees Year 3 Unit 3 Pie charts and Bar graphs; Boolean comparison tools (<=>); Spin tool; Advanced mode; Cell references Year 3 Unit 8 Data representation; Use software to investigate data	Year 1 Unit 1 Simple text entry Year 1 Unit 6 Creating text and the use of illustrations Year 2 Unit 8 Creating work for a variety of purposes; Presenting the same information in different styles; altering fonts; Share to a display board Year 3 Unit 4 Keyboard skills; Typing fluency Year 3 Unit 5 Considering communication Style; Email simulations Year 3 Unit 7 Use of Email simulations; Use of 2Simulate Year 3 Unit 9 Use of PowerPoint to learn about	Year 1 Unit 4 Logical decision making; Sequencing instructions ;Following instructions Year 1 Unit 5 Visual use of programming language; Program logic and structure Year 1 Unit 7/Year 2 Unit 1/Year 3 Unit 1 Familiarity with a code environment ;Logical planning of sequences; Debugging skills Year 2 Unit 4/Year 3 Unit 6 Logical decision Processing; Forward planning to achieve a solution	Year 1 Unit 6 What animation is; Animating images using built in effects ; Concept of background (static) and foreground (can move) Year 2 Unit 6 2Paint a Picture: art effects, collage effects	Year 1 Unit 1 Safe logins; Using Purple Mash search functionality Year 1 Unit 6 Developing ideas about the concept of technology that we are surrounded by and its purpose Year 2 Unit 2 Sharing to a display board; Sharing online; Digital footprint Year 2 Unit 5 Exploration of what the Internet is; Accessing the World Wide Web; Digital Footprint; Searching and sharing Year 3 Unit 2 Reliability of information and spoof websites; Appropriate ratings; Reporting problems Year 4 Unit 2	Year 1 Unit 9 Developing ideas about the concept of technology that we are surrounded by and its purpose; Understanding that many devices use computational technology Year 2 Unit 5 Exploration of what the Internet is and how devices allow connections to access functions and the World Wide Web; Searching and sharing Year 3 Unit 5 Using device functions for 2-way communication via the World Wide Web Year 4 Unit 7 Understanding of the 2-way communication technologies using algorithms that run of the hardware	Year 1 Unit 6 Adding simple sound effects Year 2 Unit 7 Digitally creating music and sound effects

	Year 3 Unit 2 Good Passwords and password privacy; Communication methods; Shared blog Reliability of information and spoof websites ;appropriate ratings; emotional effects ;Cyberbullying ;reporting problems Year 3 Unit 5 Evaluating communications; email safety; sharing images – safety; not meeting; attachments	Year 3 Unit 1 Flowcharts; Timers; Repeat; Code, test, debug process Year 3 Unit 6 Logical decision processing; Modelling selection on a binary model		presentation content and delivery			Phishing; Digital footprint; Malware and viruses; Plagiarism		
New Essential, Sticky Knowledge	A digital footprint or trail can expand Ways to be protected from online identity theft Information put online by users could be used for identity theft.	What selection is in computer programming. How an if statement works. How to interpret an if statement Create a program that includes an if statement. Use co-ordinates in computer	What cell formatting is. How to format cells as currency, percentage, decimal or fraction. Use formula wizard tools. Combine spreadsheet tools to create a purposeful spreadsheet	Font size and style can affect the impact of a text.	The structure of the coding language of Logo. Input simple instructions in Logo language environment. The repeat function in Logo is and its usefulness. What procedures are and use this knowledge to build	How animations are created by hand. How animations are created using computers. What onion skinning is when referring to Animation. Animations can be enhanced using	How to find information from a search results page. How to search effectively to find out information. How to identify if an information source is true And reliable.	What each of the key part of a computer is called and the function of them.	Experiment digitally with rhythm and tempo. Computers can be used to create music compositions. Apply knowledge of music to create own composition using software.

	The main risks and benefits of installing Software and applications. Copying work of others and presenting it as their own is plagiarism. The consequences of plagiarism. Appropriate behaviour when participating or Contributing to collaborative online projects The main positive and negative Influences technology has on health and the Environment. The importance of balancing screen time with non-screen time.	Programming. What the 'repeat until' command is. How an if/else statement works. What a variable is in programming and use them within programs. How to create a playable game using a block coding environment.	Use a spreadsheet to model a real-life situation Add a formula to a cell to create automatic calculations		procedures in Logo.	Features in software such as background and Sounds. What 'stop motion' animation is			
Learning Language Development (New and Revisited)	Virus Cookies Copyright Digital Footprint Email	If/Else Nesting Number Variable Object Type Predict	Formula Move Cell Random Rows Spin Spreadsheet	Font Bold Italic Underline	LOGO BK FD RT LT Repeat	Animation Flipbook Frame Onion Skinning Background Play	Easter Egg Internet Browser Search Search Engine Spoof Site	Motherboard CPU RAM Graphics Card Network Card Monitor	Pitch Rhythm Pulse Tempo Dynamics Texture

	Identity Theft Malware Phishing Plagiarism Spam	Prompt Input Properties Repeat Repeat Until Selection Timer Variable Variable Value Action Alert Background Button Code Block Command Co-ordinates Debugging Execute Flowchart	Timer Average Advanced Mode Copy Paste Columns Cells Charts Equals		SETPC SETPS PU PO	SOUND Stop Motion Video Clip	Website	Speakers Keyboard Mouse	Melody Rippler House Music
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