

Subject Progression Map

Subject: Computing

Year	Skills	Knowledge	Key Vocab
Reception	<p>Technology in Early Years can mean:</p> <ul style="list-style-type: none"> • Taking photographs. • Searching information on the internet. • Playing games on the interactive whiteboard. • Exploring an old technology or other mechanical toys, such as typewriters. • Using a Bee-bot. • Watching video clips. • Listening to music. • Turn a computer on or off. • Use technology safely and respectfully. 	<ul style="list-style-type: none"> • Listen attentively and respond with relevant questions, comments and actions. • Make comments about what they have heard and ask questions to clarify their understanding. • Offer explanations for why things might happen. • Make use of recently introduced vocabulary when appropriate. • Invent, adapt and recount narratives and stories. • Show resilience and perseverance in the face of a challenge. • Know and talk about the different factors that support their overall health and wellbeing: 'screen time'. 	<p><i>On</i> <i>Off</i> <i>Forward</i> <i>Backward</i> <i>Go</i> <i>Stop</i> <i>Photograph</i> <i>Computer</i> <i>Video</i></p>
Year 1	<p>Practical skills</p> <ul style="list-style-type: none"> • Begin to use a mouse and type letters on a keyboard. • Use log in details to log into a given software. <p>Using programmable toys</p> <ul style="list-style-type: none"> • Develop and record sequences of instructions as an algorithm. • Program toys to follow an algorithm. • Debug programs. • Predict how a program will work. <p>Filming steps of a recipe</p> <ul style="list-style-type: none"> • Break down a process into simple, clear steps, as in an algorithm. • Use different features of a video camera. • Use a video camera to capture moving images. • Develop collaboration skills. • Discuss their work and think about how it could be improved. 	<ul style="list-style-type: none"> • Understand what is meant by 'technology' • Identify technology outside of school. • Name different types of technology used in and out of school • Understand that a programmable toy can be controlled by inputting a sequence of instructions. • Use the web safely to find ideas for an illustration. • Know what to do if they encounter pictures that cause concern. 	<p><i>Internet</i> <i>Safe</i> <i>Unsafe</i> <i>Website</i> <i>App</i> <i>Online</i> <i>Private information</i> <i>Email</i> <i>Cyber-bullying</i> <i>Keyword searching</i></p>

	<p>Illustrating an eBook</p> <ul style="list-style-type: none"> • Select and use appropriate painting tools to create and change images on the computer. Understand how this use of ICT differs from using paint and paper. • Create an illustration for a particular purpose. Know how to save, retrieve and change their work. • Reflect on their work and act on feedback received. <p>Finding images and using the web</p> <ul style="list-style-type: none"> • Find and use pictures on the web. • Group images on the basis of a binary (yes/no) question. • Organise images into more than two groups according to clear rules. • Sort (order) images according to some criteria. Ask and answer binary (yes/no) questions about their images. <p>Producing a talking book</p> <ul style="list-style-type: none"> • Develop skills in saving and storing sounds on the computer. • Develop collaboration skills as they work together in a group. • Understand how a talking book differs from a paper-based book. • Talk about and reflect on their use of ICT. • Share recordings with an audience. <p>Creating a card digitally</p> <ul style="list-style-type: none"> • Develop basic keyboard skills, through typing and formatting text. • Develop basic mouse skills. • Develop skills in storing and retrieving files. • Develop skills in combining text and images. 	<ul style="list-style-type: none"> • Use the web to find and select images. • Discuss their work and think about whether it could be improved. • Use sound recording equipment to record sounds. 	
<p>Year 2</p>	<p>Practical Skills</p> <ul style="list-style-type: none"> • Navigate a qwerty keyboard, such as type a sentence, use cursor keys and back-space. • Use the double-click function. • Log onto different platforms / devices. <p>Programming on screen</p> <ul style="list-style-type: none"> • Convert simple algorithms to programs. • Predict what a simple program will do. • Debug errors in their programs. • Exploring how computer games work • Describe carefully what happens in computer games. • Use logical reasoning to make predictions of what a program will do. • Test these predictions. • Think critically about computer games and their use. <p>Taking better photos</p>	<ul style="list-style-type: none"> • Have a clear understanding of algorithms as sequences of instructions. • Understand how to use games safely and in balance with other activities. • Consider the technical and artistic merits of photographs. • Understand that email can be used to communicate. • Understand appropriate language in emails. • Aware of online safety issues when using email. 	<p><i>Algorithm</i> <i>Blog</i> <i>Debug</i> <i>Interface</i> <i>Platform</i> <i>Logical reasoning</i> <i>MP3</i> <i>Online safety</i> <i>Programmable toys</i> <i>Sequence</i> <i>Sprite</i></p>

	<ul style="list-style-type: none"> • Use a digital camera or camera app. • Take digital photographs. • Review and reject or rate the images they take. • Edit and enhance their photographs. • Select their best images to include in a shared portfolio. <p>Researching a topic</p> <ul style="list-style-type: none"> • Develop collaboration skills through working as part of a group. • Develop research skills through searching for information on the internet. • Improve note-taking skills through the use of mind mapping. • Develop presentation skills through creating and delivering a short multimedia presentation. <p>Collecting clues</p> <ul style="list-style-type: none"> • Develop skills in opening, composing and sending emails. • Gain skills in opening and listening to audio files on the computer. • Develop skills in editing and formatting text in emails. <p>Collecting data about bugs</p> <ul style="list-style-type: none"> • Sort and classify a group of items by answering questions. • Collect data using tick charts or tally charts. • Use simple charting software to produce pictograms and other basic charts. • Take, edit and enhance photographs. • Record information on a digital map. 		
<p>Year 3</p>	<p>Practical skills</p> <ul style="list-style-type: none"> • Increased speed with a qwerty keyboard, e.g. can type several sentences in a lesson without struggling. • Highlight, drag, right-click and double-click. • Independently choose a platform and log on. <p>Programming an animation</p> <ul style="list-style-type: none"> • Create an algorithm for an animated scene in the form of a storyboard. • Write a program in Scratch to create the animation. • Correct mistakes in their animation programs. <p>Finding and correcting bugs in programs</p> <ul style="list-style-type: none"> • Develop a number of strategies for finding errors in programs. • Build up resilience and strategies for problem solving. <p>Videoing performance</p> <ul style="list-style-type: none"> • Gain skills in shooting live video, such as framing shots, holding the camera steady, and reviewing. 	<ul style="list-style-type: none"> • Increase their knowledge and understanding of Scratch. • Understand how to use a search engine to learn about a new topic. • Recognise a number of common types of bug in software. • Understand the qualities of effective video, such as the importance of narrative, consistency, perspective and scene length. • Develop understanding of how the internet, the web and search engines work. 	<p><i>Arithmetic bugs</i> <i>Computer network</i> <i>Conceptual bugs</i> <i>Input</i> <i>Output</i> <i>Mail</i> <i>Malware</i> <i>Multi-thread bugs</i> <i>Off-by-one bugs</i> <i>data</i> <i>Performance bugs</i> <i>Programs</i> <i>Sequence</i> <i>Spam</i> <i>Spoofed links</i> <i>Sprite</i> <i>Variables</i> <i>Web server</i> <i>World wide web</i></p>

	<ul style="list-style-type: none"> Edit video, including adding narration and editing clips by setting in/out points. <p>Making and sharing a short screencast presentation</p> <ul style="list-style-type: none"> Plan, design and deliver an interesting and engaging presentation. Search for and evaluate online images. Create their own original images. Create a video slide cast of a narrated presentation. <p>Communicating safely on the internet</p> <ul style="list-style-type: none"> Gain skills in using email. Work collaboratively with a remote partner. Experience video conferencing. <p>Collecting and analysing data</p> <ul style="list-style-type: none"> Use the web to facilitate data collection. Gain skills in using charts to analyse data. Gain skills in interpreting results. 	<ul style="list-style-type: none"> Develop a basic understanding of how email works. Be aware of broader issues surrounding email, including 'netiquette' and online safety. Understand some elements of survey design. Understand some ethical and legal aspects of online data collection. 	
<p>Year 4</p>	<p>Practical skills</p> <ul style="list-style-type: none"> Use more than one finger to type letters, and both thumbs for the spacebar. Use a mouse to manipulate text, images and controls. <p>Developing a simple educational game</p> <ul style="list-style-type: none"> Develop an educational computer game using selection and repetition. Start to debug computer programs. <p>Prototyping an interactive toy</p> <ul style="list-style-type: none"> Design and make an on-screen prototype of a computer-controlled toy. Design, write and debug the control and monitoring program for their toy. <p>Producing digital music</p> <ul style="list-style-type: none"> Use one or more programs to edit music. Create and develop a musical composition, refining their ideas through reflection and discussion. Develop collaboration skills. <p>Editing and writing HTML</p> <ul style="list-style-type: none"> Use HTML tags for mark up. Use hyperlinks to connect sources. Code up simple web pages with useful content. <p>We are co-authors</p> <ul style="list-style-type: none"> Practise research skills. Write for an audience using a wiki tool. Develop collaboration skills. Develop proofreading skills. <p>Presenting the weather</p> <ul style="list-style-type: none"> Use computer-based data logging to automate the recording of some weather data. Use spreadsheets to create charts 	<ul style="list-style-type: none"> Recognise the importance of user interface design, including consideration of input and output. Understand different forms of input and output (such as sensors, switches, motors, lights and speakers). Understand and use variables. Develop an awareness of how their composition can enhance work in other media. Understand some technical aspects of how the internet makes the web possible. Understand some of the risks in using the web. Understand the conventions for collaborative online work, particularly in wikis. Be aware of their responsibilities when editing other people's work. Become familiar with Wikipedia, including potential problems associated with its use. 	<p><i>Anchor tag</i> <i>Computational</i> <i>Creative commons</i> <i>Decomposing</i> <i>Digital technology</i> <i>HTML</i> <i>Hyperlink</i> <i>HTTP:</i> <i>Interface</i> <i>Loop</i> <i>Micro blog</i> <i>Mix</i> <i>Pressure pad</i> <i>Protocol</i> <i>Prototype</i> <i>Proximity sensor</i> <i>Wiki</i> <i>Screencast</i> <i>Repetition</i></p>

	<ul style="list-style-type: none"> Analyse data, explore inconsistencies in data and make predictions Practise using presentation software and, optionally, video 	<ul style="list-style-type: none"> Understand different measurement techniques for weather, both analogue and digital. 	
Year 5	<p>Practical skills:</p> <ul style="list-style-type: none"> Start to position hands correctly, moving fingers rather than arms to type. Confident use of a mouse / touchpad / screen (or other inputs) <p>Developing an interactive game</p> <ul style="list-style-type: none"> Create original artwork and sound for a game. Design and create a computer program for a computer game, which uses sequence, selection, repetition and variables. Detect and correct errors in their computer game. Use iterative development techniques (making and testing a series of small changes) to improve their game. <p>Cracking codes</p> <ul style="list-style-type: none"> Encrypt and decrypt messages in simple ciphers. <p>Fusing geometry and art</p> <ul style="list-style-type: none"> Experiment with the tools available, refining and developing their work as they apply their own criteria to evaluate it and receive feedback from their peers. <p>Creating a website about cyber safety</p> <ul style="list-style-type: none"> Develop their research skills to decide what information is appropriate. Question the plausibility and quality of information. Develop and refine their ideas and text collaboratively. <p>Sharing experiences and options</p> <ul style="list-style-type: none"> Become familiar with blogs as a medium and a genre of writing. Create a sequence of blog posts on a theme. Incorporate additional media. Comment on the posts of others. <p>Creating a virtual space</p> <ul style="list-style-type: none"> Develop familiarity with a simple CAD (computer aided design) tool. Develop spatial awareness by exploring and experimenting with a 3D virtual environment. Develop greater aesthetic awareness. 	<ul style="list-style-type: none"> Be familiar with semaphore and Morse code. Understand the need for private information to be encrypted. Have some understanding of how encryption works on the web. Develop an appreciation of the links between geometry and art. Become familiar with the tools and techniques of a vector graphics package. Appreciate the need to use complex passwords and to keep them secure. Develop an understanding of turtle graphics. Develop some awareness of computer-generated art, in particular fractal-based landscapes. Understand some elements of how search engines select and rank results. Develop their understanding of online safety and responsible use of technology. Develop a critical, reflective view of a range of media, including text. Understand the work of architects, designers and engineers working in 3D. 	<i>Bitmap</i> <i>Buggy code</i> <i>Cipher</i> <i>CAD</i> <i>CSS</i> <i>Cryptanalysis</i> <i>Cryptography</i> <i>Decrypt</i> <i>Encrypt</i> <i>Firewall</i> <i>Fractal</i> <i>Hyperlinks</i> <i>Hypertext</i> <i>Iterative</i> <i>Morse code</i> <i>Page Rank</i> <i>Photorealistic</i> <i>Semaphore</i> <i>Tessellation</i> <i>Vector graphics</i> <i>Web server</i>
Year 6	<p>Practical skills</p> <ul style="list-style-type: none"> Type at 2 letters per second, using different fingers and minimising arm/wrist movement. Confident use of other inputs and add-on devices to support computing work <p>Making a text-based adventure game</p>	<ul style="list-style-type: none"> Understand how some key algorithms can be expressed as programs. Understand that some algorithms are more efficient than others for the same problem. 	<i>Binary search</i> <i>DNS</i> <i>DTP</i> <i>Export</i> <i>Final cut</i> <i>Geotagging</i> <i>GPS</i> <i>GPS tracker</i>

	<ul style="list-style-type: none"> • Learn some of the syntax of a text-based programming language. • Use commands to display text on screen, accept typed user input, store and retrieve data using variables and select from a list. • Plan a text-based adventure with multiple 'rooms' and user interaction. • Thoroughly debug the program. <p>Mastering algorithms for searching, sorting and mathematics</p> <ul style="list-style-type: none"> • Develop the ability to reason logically about algorithms. • Understand common algorithms for sorting and searching. <p>Creating a short television advert</p> <ul style="list-style-type: none"> • Storyboard an effective advert for a cause. • Work collaboratively to shoot suitable original footage and source additional content, acknowledging intellectual property rights. • Work collaboratively to edit the assembled content to make an effective advert. <p>Using media and mapping to document a trip</p> <ul style="list-style-type: none"> • Research a location online using a range of resources appropriately. • Capture images, audio and video while on location. • Showcase shared media content through a mapping layer. <p>Creating a yearbook or magazine</p> <ul style="list-style-type: none"> • Manage or contribute to large collaborative projects, facilitated using online tools. • Write and review content. • Source digital media while demonstrating safe, respectful and responsible use. • Design and produce a high-quality print document. <p>Binary</p> <ul style="list-style-type: none"> • Count up from 0 in binary • iMovie (Rising Stars) • Use search technologies and know how results are selected and ranked and be discerning in evaluating digital content 	<ul style="list-style-type: none"> • Understand common algorithms for sorting and searching. • Appreciate algorithmic approaches to problems in mathematics. • Think critically about how video is used to promote a cause. • Appreciate that computer networks transmit and receive information digitally. • Understand the basic hardware needed for computer networks to work. • Understand key features of internet communication protocols. • Develop a basic understanding of how domain names are converted to numerical IP addresses. • Understand the safe use of mobile technology, including GPS. • 	<p><i>HTML</i> <i>Ipconfig</i> <i>ISPs</i> <i>Library</i> <i>Linear search</i> <i>List</i> <i>Metadata</i> <i>Network switch</i> <i>nslookup</i> <i>Packets of data</i> <i>Page Rank</i> <ul style="list-style-type: none"> • <i>PDF</i> <i>Prime number</i> <i>Procedure</i> <i>Programs</i> <i>Pseudocode</i> <i>Quicksort</i> <i>Random search</i> <i>Rough cut</i> <i>'Rushes' of footage</i> <i>Syntax</i> <i>tracert</i> <i>Transmedia</i> <i>Variables</i></p>
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