



Progression of Skills and Knowledge in Computing



KNOWLEDGE, SKILLS AND UNDERSTANDING

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<u>Programming</u>	Using programmable toys	Programming on screen	Programming an animation	Developing and Producing a simple game	Developing an interactive game	Making a text-based adventure game
	<p>Understand that toys can be controlled by entering a sequence of instructions</p> <p>Develop and record sequences of instructions as an algorithm</p> <p>Program a toy to follow an algorithm</p> <p>Predict how programs will work</p>	<p>Clear understanding of algorithms as sequences of instructions</p> <p>Convert simple algorithms to programs</p> <p>Predict what a simple program will do</p> <p>Spot and fix errors in their program</p>	<p>Create an algorithm for an animated scene in the form of a storyboard</p> <p>Write a program in scratch to create the animation</p> <p>Correct mistakes in their animation program</p>	<p>Develop an educational computer game using selection and repetition</p> <p>Understand and use variables</p> <p>Debug computer programs</p> <p>Recognise the importance of user interface design</p>	<p>Create original artwork and sound for a game</p> <p>Design and create a computer program for a computer game which uses sequence, selection, repetition and variables</p> <p>Use iterative development techniques to improve their game</p>	<p>Learn some of the syntax of a text-based programming language</p> <p>Use commands to display text on screen, accept typed user input, store and retrieve data using variables and select from a list</p> <p>Plan a text based adventure with multiple 'rooms' and user interaction</p> <p>Thoroughly debug the program</p>
<u>Computational Thinking</u>	Filming the steps of a recipe	Exploring how computer games work	Finding and correcting bugs in programs	Prototyping an interactive toy	Cracking codes	Mastering algorithms for searching, sorting and mathematics
	<p>Break down a process into simple steps as an algorithm</p> <p>Use different features of a video camera</p> <p>Use a video camera to capture moving images</p> <p>Develop collaborative skills</p> <p>Discuss work and think about how it can be improved</p>	<p>Describe what happens in computer games</p> <p>Use logical reasoning to make predictions on what a program will do</p> <p>Test predictions</p> <p>Think critically about a game</p> <p>Be aware of how to use games safely</p>	<p>Develop strategies for finding errors in programs</p> <p>Build up resilience and strategies for problem solving</p> <p>Increase knowledge and understanding of Scratch</p> <p>Recognise a number of common types of bug in software</p>	<p>Design and make an on screen prototype of a computer controlled toy</p> <p>Understand different forms of input and output</p> <p>Design, write and debug the control and monitoring program for their toy</p>	<p>Be familiar with semaphore and Morse Code</p> <p>Understand the need for private information to be encrypted</p> <p>Encrypt and decrypt messages in simple ciphers</p> <p>Appreciate the need to use complex passwords and to keep them secure</p> <p>Have some understanding of how encryption works on the web</p>	<p>Develop the ability to reason logically about algorithms</p> <p>Understand how some key algorithms can be expressed as programs</p> <p>Understand that some algorithms are more efficient than others for the same problem</p> <p>Understand common algorithms are more efficient than others of the same problems</p> <p>Understand common algorithms for sorting and searching</p> <p>Appreciate algorithmic approaches to problems in mathematics</p>

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<u>Creativity</u>	Illustrating an eBook	Taking, selecting and editing digital images	Videoing performance	Producing digital music	Fusing geometry and art	Creating short television ads
	Use the web safety to find ideas for an illustration Select and use appropriate painting tools to create and change images on the computer Create an illustration for a particular purpose Know how to save and retrieve and change their work Reflect on work	Consider the technical and artistic merits of photographs Use a digital camera or camera app Take digital photographs Edit and enhance their photographs	Gain skills in shooting live video Edit video clips Understand the qualities of effective video	Use one or more program to edit music Create and develop a musical composition Develop an awareness of how music can enhance work in other media	Develop an appreciation of the links between geometry and art Become familiar with the tools and techniques of a vector graphics program Develop an understanding of turtle graphics Experiment with tools and refine and develop their work Develop awareness of computer generated art	Think critically about how video is used to promote a cause Storyboard an effective advert for a cause Work collaboratively to shoot audible original footage and source additional content, acknowledging intellectual property rights Work collaboratively to edit the assembled content to make an effective advert
<u>Computer Networks</u>	Finding images using the web	Researching a topic	Making and sharing a short screencast presentation	Editing and Writing HTML	Creating a web page	Exploring computer networks including the internet
	Find and use pictures on the web Know what to do if they find a picture that causes concern Group images based on binary (yes/no) Organise images into two groups Sort images according to a criteria Ask questions about images	Search the internet for information Improve note taking through mapping Develop presentation skills through creating and delivering a short multimedia presentation	Understand the physical hardware connections necessary for computer networks to work Understand some features of internet protocols Understand some diagnostic tools for investigating network connections Develop a basic understanding of how domain names are converted to IP addresses	Understand how the internet makes the web possible Use HTML tags for elementary mark up Use hyperlinks to connect ideas and sources Understand the risks of using the web	Develop research skills to know what information is appropriate Understand some elements of how search engines select and rank ideas Question the plausibility and quality of information Develop and refine ideas and text Show their understanding of safety and responsible use of technology	Appreciate that computer networks transmit and receive information digitally Understand the basic hardware needed for computer networks to work Understand key features of internet communications protocols Develop a basic understanding of how domain names are converted to numerical IP addresses

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<u>Communication & Collaboration</u>	Producing a talking book	Communication clues	Communicating safely on the internet	Producing a wiki	Sharing experiences and opinions	Create a Yearbook
	<p>Use sound recording to record sounds</p> <p>Develop skills in saving and storing sounds on the computer</p> <p>Understand how a talking book differs from a paper book</p> <p>Share recordings with an audience</p>	<p>Understand that email can be used to communicate</p> <p>Develop skills in opening, composing and sending emails</p> <p>Opening and listening to audio files</p> <p>Use appropriate language in emails</p> <p>Develop skills in editing and formatting text in emails</p> <p>Be aware of e-safety when using email</p>	<p>Develop a basic understand of how email works</p> <p>Gain skills in using email</p> <p>Be aware of issues surrounding emails, including 'netiquette' and safety</p> <p>Work with a remote partner</p> <p>Experience video conferencing</p>	<p>Understand the conventions for collaborative online work, particularly in wikis</p> <p>Become familiar with Wikipedia, including potential problems with its use</p> <p>Use a wiki too to write for a target audience</p>	<p>Become familiar with blogs as a medium and a genre of writing</p> <p>Create a sequence of blog posts on a theme</p> <p>Incorporate additional material in a blog</p> <p>Comment on the posts of others</p> <p>Develop a critical, reflective view of a range of media</p>	<p>Manage or contribute to large collaborative projects, facilitated using online tools</p> <p>Write and review content</p> <p>Source digital media while demonstrating safe, respectful and responsible use</p> <p>Design and produce a high quality a high-quality print document</p>
<u>Productivity</u>	Creating a card electronically	Recording Bug Hunt data	Collecting and analysing data	Presenting the weather	Creating a virtual space	Using media and mapping to document a trip
	<p>Develop basic keyboard skills through typing and formatting text</p> <p>Develop basic mouse skills</p> <p>Use the web to find and select images</p> <p>Develop skills in storing and retrieving files</p> <p>Develop skills in combining text and images</p>	<p>Sort and classify a group of items by answering questions</p> <p>Collect data using tick charts or tally charts</p> <p>Use simple charting software to produce pictograms and other basic charts</p> <p>Take, edit and enhance photographs</p> <p>Record information on a digital map</p>	<p>Understand some elements of survey design</p> <p>Understand some ethical and legal aspects of online data collection</p> <p>Use the web to facilitate data collection</p> <p>Gain skills in using charts to analyse data</p> <p>Gain skills in interpreting results</p>	<p>Understand different measurements techniques for weather both analogue and digital</p> <p>Use computer based data logging to automate the recording of some weather data</p> <p>Use spread sheets to create charts</p> <p>Analyse data, explore inconsistencies in data and make predictions</p> <p>Practise using presentation software</p>	<p>Understand the work of architects, designers and engineers working in 3D</p> <p>Develop familiarity with a simple CAD tool</p> <p>Develop spatial awareness by exploring and experimenting with a 3D virtual environment</p>	<p>Research a location online using a range of resources appropriately</p> <p>Understand the safe use of mobile technology, including GPS</p> <p>Capture images, audio and video while on location</p> <p>Showcase shared media content through a mapping layer</p>