



# Computing Progression

## Progression of Skills

Computer Science				
	Hardware	Networks and data representation	Computational thinking	Programming
<b>Year 1</b>	<ul style="list-style-type: none"> <li>Learning how to operate a camera or tablet to take photos and videos.</li> <li>Learning how to explore and tinker with hardware to find out how it works.</li> <li>Recognising that some devices are input devices and others are output devices.</li> <li>Learning where keys are located on the keyboard.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Learning that decomposition means breaking a problem down into smaller parts.</li> <li>Using decomposition to solve unplugged challenges.</li> <li>Using logical reasoning to predict the behaviour of simple programs.</li> <li>Developing the skills associated with sequencing in unplugged activities.</li> <li>Following a basic set of instructions.</li> <li>Assembling instructions into a simple algorithm.</li> </ul>	<ul style="list-style-type: none"> <li>Programming a Floor robot to follow a planned route.</li> <li>Learning to debug instructions when things go wrong.</li> <li>Using programming language to explain how a floor robot works.</li> <li>Learning to debug an algorithm in an unplugged scenario.</li> </ul>
<b>Year 2</b>	<ul style="list-style-type: none"> <li>Understanding what a computer is and that it's made up of different components.</li> <li>Recognising that buttons cause effects and that technology follows instructions.</li> <li>Learning how we know that technology is doing what we want it to do via its output.</li> <li>Using greater control when taking photos with cameras, tablets or computers.</li> <li>Developing confidence with the keyboard and the basics of touch typing.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Articulating what decomposition is.</li> <li>Decomposing a game to predict the algorithms used to create it.</li> <li>Learning that there are different levels of abstraction.</li> <li>Explaining what an algorithm is.</li> <li>Following an algorithm.</li> <li>Creating a clear and precise algorithm.</li> <li>Learning that programs execute by following precise instructions.</li> <li>Incorporating loops within algorithms.</li> </ul>	<ul style="list-style-type: none"> <li>Using logical thinking to explore software, predicting, testing and explaining what it does.</li> <li>Using an algorithm to write a basic computer program.</li> </ul>
<b>Year 3</b>	<ul style="list-style-type: none"> <li>Understanding what the different components of a computer do and how they work together.</li> <li>Drawing comparisons across different types of computers.</li> <li>Learning about the purpose of routers.</li> </ul>	<ul style="list-style-type: none"> <li>Understanding the role of the key components of a network.</li> <li>Identifying the key components within a network, including whether they are wired or wireless.</li> <li>Understanding that websites and videos are files that are shared from one computer to another.</li> <li>Learning about the role of packets.</li> <li>Understanding how networks work and their purpose.</li> <li>Recognising links between networks and the internet.</li> <li>Learning how data is transferred.</li> </ul>	<ul style="list-style-type: none"> <li>Using decomposition to explain the parts of a laptop computer.</li> <li>Using decomposition to explore the code behind an animation.</li> <li>Using repetition in programs.</li> <li>Using logical reasoning to explain how simple algorithms work.</li> <li>Explaining the purpose of an algorithm.</li> <li>Forming algorithms independently.</li> </ul>	<ul style="list-style-type: none"> <li>Using logical thinking to explore more complex software; predicting, testing and explaining what it does.</li> <li>Incorporating loops to make code more efficient.</li> <li>Continuing existing code.</li> <li>Making reasonable suggestions for how to debug their own and others' code.</li> </ul>



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<b>Year 4</b>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration.</li> </ul>	<ul style="list-style-type: none"> <li>Using decomposition to solve a problem by finding out what code was used.</li> <li>Using decomposition to understand the purpose of a script of code.</li> <li>Identifying patterns through unplugged activities.</li> <li>Using past experiences to help solve new problems.</li> <li>Using abstraction to identify the important parts when completing both plugged and unplugged activities.</li> </ul>	<ul style="list-style-type: none"> <li>Creating algorithms for a specific purpose.</li> <li>Coding a simple game.</li> <li>Using abstraction and pattern recognition to modify code.</li> <li>Incorporating variables to make code more efficient.</li> <li>Remixing existing code.</li> </ul>
<b>Year 5</b>	<ul style="list-style-type: none"> <li>Learning that external devices can be programmed by a separate computer.</li> <li>Recognising how the size of RAM affects the processing of data.</li> </ul>	<ul style="list-style-type: none"> <li>Learning the vocabulary associated with data: data and transmit.</li> <li>Recognising that computers transfer data in binary and understanding simple binary addition.</li> <li>Relating binary signals (Boolean) to the simple character-based language, ASCII.</li> <li>Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations.</li> </ul>	<ul style="list-style-type: none"> <li>Predicting how software will work based on previous experience.</li> <li>Writing more complex algorithms for a purpose.</li> </ul>	<ul style="list-style-type: none"> <li>Iterating and developing their programming as they work.</li> <li>Confidently using loops in their programming.</li> <li>Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected.</li> <li>Writing code to create a desired effect.</li> <li>Using a range of programming commands.</li> <li>Using repetition within a program.</li> <li>Amending code within a live scenario.</li> </ul>
<b>Year 6</b>	<ul style="list-style-type: none"> <li>Learning about the history of computers and how they have evolved over time.</li> <li>Using the understanding of historic computers to design a computer of the future.</li> <li>Understanding and identifying barcodes, QR codes and RFID.</li> <li>Identifying devices and applications that can scan or read barcodes, QR codes and RFID.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Decomposing a program into an algorithm.</li> <li>Using past experiences to help solve new problems.</li> <li>Writing increasingly complex algorithms for a purpose.</li> </ul>	<ul style="list-style-type: none"> <li>Debugging quickly and effectively to make a program more efficient.</li> <li>Remixing existing code to explore a problem.</li> <li>Using and adapting nested loops.</li> <li>Programming using the language Python.</li> <li>Changing a program to personalise it.</li> <li>Evaluating code to understand its purpose.</li> <li>Predicting code and adapting it to a chosen purpose.</li> </ul>



# Computing Progression

Information Technology				
	Using software	Using internet searches	Using data	Wider use of technology
<b>Year 1</b>	<ul style="list-style-type: none"> <li>Using a basic range of tools within graphic editing software.</li> <li>Taking and editing photographs.</li> <li>Developing control of the mouse through dragging, clicking and resizing of images to create different effects.</li> <li>Developing understanding of different software tools.</li> </ul>	<ul style="list-style-type: none"> <li>Recognising devices that are connected to the internet.</li> </ul>	<ul style="list-style-type: none"> <li>Understanding that technology can be used to represent data in different ways: pictograms, tables, pie charts, bar charts, block graphs etc.</li> <li>Using representations to answer questions about data.</li> <li>Using software to explore and create pictograms and branching databases.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<b>Year 2</b>	<ul style="list-style-type: none"> <li>Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts.</li> <li>Using word processing software to type and reformat text.</li> <li>Creating and labelling images.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Collecting and inputting data into a spreadsheet.</li> <li>Interpreting data from a spreadsheet.</li> </ul>	<ul style="list-style-type: none"> <li>Learning how computers are used in the wider world.</li> </ul>
<b>Year 3</b>	<ul style="list-style-type: none"> <li>Taking photographs and recording video to tell a story.</li> <li>Using software to edit and enhance their video adding music, sounds and text on screen with transitions.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<b>Year 4</b>	<ul style="list-style-type: none"> <li>Building a web page and creating content for it.</li> <li>Use online software for documents, presentations, forms and spreadsheets.</li> <li>Using software to work collaboratively with others.</li> </ul>	<ul style="list-style-type: none"> <li>Understanding that information found by searching the internet is not all grounded in fact.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Understanding that software can be used collaboratively online to work as a team.</li> </ul>
<b>Year 5</b>	<ul style="list-style-type: none"> <li>Using logical thinking to explore software more independently, making predictions based on their previous experience.</li> <li>Using software programme Sonic Pi/Scratch to create music.</li> <li>Identify ways to improve and edit programs, videos, images etc.</li> </ul>	<ul style="list-style-type: none"> <li>Developing searching skills to help find relevant information on the internet.</li> <li>Learning how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns.</li> </ul>	<ul style="list-style-type: none"> <li>Understanding how data is collected in remote or dangerous places.</li> <li>Understanding how data might be used to tell us about a location.</li> </ul>	<ul style="list-style-type: none"> <li>Learn about different forms of communication that have developed with the use of technology.</li> </ul>
<b>Year 6</b>	<ul style="list-style-type: none"> <li>Using logical thinking to explore software independently, iterating ideas and testing continuously.</li> <li>Using search and word processing skills to create a presentation.</li> <li>Creating and editing sound recordings for a specific purpose.</li> </ul>	<ul style="list-style-type: none"> <li>Understanding how search engines work.</li> </ul>	<ul style="list-style-type: none"> <li>Understanding how barcodes, QR codes and RFID work.</li> <li>Gathering and analysing data in real time.</li> <li>Creating formulas and sorting data within spreadsheets.</li> </ul>	<ul style="list-style-type: none"> <li>Learning how 'big data' can be used to solve a problem or improve efficiency.</li> </ul>



# Computing Progression

Digital Literacy	
<b>Year 1</b>	<ul style="list-style-type: none"> <li>Logging in and out and saving work on their own account.</li> </ul>
<b>Year 2</b>	<ul style="list-style-type: none"> <li>Learning how to create a strong password.</li> <li>Understanding how to stay safe when talking to people online and what to do if they see or hear something online that makes them feel upset or uncomfortable.</li> <li>Identifying whether information is safe or unsafe to be shared online.</li> <li>Learning to be respectful of others when sharing online and ask for their permission before sharing content.</li> <li>Learning strategies for checking if something they read online is true.</li> </ul>
<b>Year 3</b>	<ul style="list-style-type: none"> <li></li> </ul>
<b>Year 4</b>	<ul style="list-style-type: none"> <li>Recognising that information on the internet might not be true or correct and that some sources are more trustworthy than others.</li> <li>Learning to make judgements about the accuracy of online searches.</li> <li>Identifying forms of advertising online.</li> <li>Recognising what appropriate behaviour is when collaborating with others online.</li> <li>Reflecting on the positives and negatives of time spent online.</li> <li>Identifying respectful and disrespectful online behaviour.</li> </ul>
<b>Year 5</b>	<ul style="list-style-type: none"> <li>Identifying possible dangers online and learning how to stay safe.</li> <li>Evaluating the pros and cons of online communication.</li> <li>Recognising that information on the internet might not be true or correct and learning ways of checking validity.</li> <li>Learning what to do if they experience bullying online.</li> <li>Learning to use an online community safely.</li> </ul>
<b>Year 6</b>	<ul style="list-style-type: none"> <li>Understanding the importance of secure passwords and how to create them.</li> <li>Using search engines safely and effectively.</li> </ul>



# Computing Progression

## Progression of Knowledge

	Information Technology			
	Computing systems and networks	Programming	Creating media	Data Handling
<b>Year 1</b>	<ul style="list-style-type: none"> <li>To know that "log in and log out" means to begin and end a connection with a computer.</li> <li>To know that a computer and mouse can be used to click, drag, fill and select and also add backgrounds, text, layers, shapes and clip art.</li> <li>To know that passwords are important for security.</li> <li>To know that when we create something on a computer it can be more easily saved and shared than a paper version.</li> <li>To know some of the simple graphic design features of a piece of online software.</li> </ul>	<ul style="list-style-type: none"> <li>To understand that an algorithm is when instructions are put in an exact order.</li> <li>To know that input devices get information into a computer and that output devices get information out of a computer.</li> <li>To understand that decomposition means breaking a problem into manageable chunks and that it is important in computing.</li> <li>To know that we call errors in an algorithm 'bugs' and fixing these 'debugging'.</li> <li>To understand the basic functions of a Bee-Bot.</li> <li>To know that you can use a camera/tablet to make simple videos.</li> <li>To know that algorithms move a bee-bot accurately to a chosen destination.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>To know how that charts and pictograms can be created using a computer.</li> <li>To understand that a branching database is a way of classifying a group of objects.</li> <li>To know that computers understand different types of 'input'.</li> </ul>
<b>Year 2</b>	<ul style="list-style-type: none"> <li>To know the difference between a desktop and laptop computer.</li> <li>To know that people control technology.</li> <li>To know that buttons are a form of input that give a computer an instruction about what to do (output).</li> <li>To know that computers often work together.</li> </ul>	<ul style="list-style-type: none"> <li>To understand what machine learning is and how that enables computers to make predictions.</li> <li>To know that loops in programming are where you set a certain instruction (or instructions) to be repeated multiple times.</li> <li>To know that abstraction is the removing of unnecessary detail to help solve a problem.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>To understand that you can enter simple data into a spreadsheet.</li> <li>To understand what steps you need to take to create an algorithm.</li> <li>To know what data to use to answer certain questions.</li> <li>To know that computers can be used to monitor supplies.</li> </ul>
<b>Year 3</b>	<ul style="list-style-type: none"> <li>To know what a tablet is and how it is different from a laptop/desktop computer.</li> <li>To understand what a network is and how a school network might be organised.</li> <li>To know that a server is central to a network and responds to requests made.</li> <li>To know how the internet uses networks to share files.</li> <li>To know that a router connects us to the internet.</li> <li>To know what a packet is and why it is important for website data transfer.</li> <li>To know the roles that inputs and outputs play on computers.</li> <li>To know what some of the different components inside a computer are e.g. CPU, RAM, hard drive, and how they work together.</li> </ul>	<ul style="list-style-type: none"> <li>To know that Scratch is a programming language and some of its basic functions.</li> <li>To understand how to use loops to improve programming.</li> <li>To understand how decomposition is used in programming.</li> <li>To understand that you can remix and adapt existing code.</li> </ul>	<ul style="list-style-type: none"> <li>To know that different types of camera shots can make my photos or videos look more effective.</li> <li>To know that I can edit photos and videos using film editing software.</li> <li>To understand that I can add transitions and text to my video.</li> </ul>	<ul style="list-style-type: none"> <li>To know that a database is a collection of data stored in a logical, structured and orderly manner.</li> <li>To know that computer databases can be useful for sorting and filtering data.</li> <li>To know that different visual representations of data can be made on a computer.</li> </ul>



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Information Technology				
	Computing systems and networks	Programming	Creating media	Data Handling
<b>Year 4</b>	<ul style="list-style-type: none"> <li>To understand that software can be used collaboratively online to work as a team.</li> <li>To know what type of comments and suggestions on a collaborative document can be helpful.</li> <li>To know that you can use images, text, transitions and animation in presentation slides.</li> </ul>	<ul style="list-style-type: none"> <li>To understand that a variable is a value that can change (depending on conditions) and know that you can create them in Scratch.</li> <li>To know what a conditional statement is in programming.</li> <li>To understand that variables can help you to create a quiz on Scratch.</li> <li>To know that combining computational thinking skills (sequence, abstraction, decomposition etc.) can help you to solve a problem.</li> <li>To understand that pattern recognition means identifying patterns to help them work out how the code works.</li> <li>To understand that algorithms can be used for a number of purposes e.g. animation, games design etc.</li> </ul>	<ul style="list-style-type: none"> <li>To know some of the features of web design software.</li> <li>To know that a website is a collection of pages that are all connected.</li> <li>To know that websites usually have a homepage and subpages as well as clickable links to new pages, called hyperlinks.</li> <li>To know that websites should be informative and interactive.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<b>Year 5</b>	<ul style="list-style-type: none"> <li>To know how search engines work.</li> <li>To understand that anyone can create a website and therefore we should take steps to check the validity of websites.</li> <li>To know that web crawlers are computer programs that crawl through the internet.</li> <li>To understand what copyright is.</li> <li>To know the difference between ROM and RAM.</li> </ul>	<ul style="list-style-type: none"> <li>To know that a soundtrack is music for a film/video and that one way of composing these is on programming software.</li> <li>To understand that using loops can make the process of writing music simpler and more effective.</li> <li>To know how to adapt their code while performing their music.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>To know that Mars Rover is a motor vehicle that collects data from space by taking photos and examining samples of rock.</li> <li>To know what numbers using binary code look like and be able to identify how messages can be sent in this format.</li> <li>To understand that RAM is Random Access Memory and acts as the computer's working memory.</li> <li>To know what simple operations can be used to calculate bit patterns.</li> </ul>
<b>Year 6</b>	<ul style="list-style-type: none"> <li>To understand the importance of having a secure password and what "brute force hacking" is.</li> <li>To know that the first computers were created at Bletchley Park to crack the Enigma code to help the war effort in World War 2.</li> <li>To know about some of the historical figures that contributed to technological advances in computing.</li> <li>To understand what techniques are required to create a presentation using appropriate software.</li> </ul>	<ul style="list-style-type: none"> <li>To know that there are text-based programming languages such as Logo and Python.</li> <li>To know that nested loops are loops inside of loops.</li> <li>To understand the use of random numbers and remix Python code.</li> </ul>	<ul style="list-style-type: none"> <li>To know that radio plays are plays where the audience can only hear the action so sound effects are important.</li> <li>To know that sound clips can be recorded using sound recording software.</li> <li>To know that sound clips can be edited and trimmed.</li> </ul>	<ul style="list-style-type: none"> <li>To know that data contained within barcodes and QR codes can be used by computers.</li> <li>To know that infrared waves are a way of transmitting data.</li> <li>To know that Radio Frequency Identification (RFID) is a more private way of transmitting data.</li> <li>To know that data is often encrypted so that even if it is stolen it is not useful to the thief.</li> </ul>