

Computing Progression of disciplinary skills – Computer Science

Year Group	Hardware	Networks & data representation	Computational thinking	Programming
Rec	<p>Learning how to operate a camera to take photographs of meaningful creations or moments.</p> <p>Learning how to explore and tinker with hardware to develop familiarity and introduce relevant vocabulary.</p> <p>Recognising and identifying familiar letters and numbers on a keyboard.</p> <p>Developing basic mouse skills such as moving and clicking.</p>	N/A	Using logical reasoning to understand simple instructions and predict the outcome.	Following instructions as part of practical activities and games. Learning to give simple instructions. Experimenting with programming a Bee-bot/Blue- bot and learning how to give simple commands. Learning to debug instructions, with the help of an adult, when things go wrong.
Year 1	<p>Learning how to operate a camera or tablet to take photos and videos.</p> <p>Learning how to explore and tinker with hardware to find out how it works.</p> <p>Recognising that some devices are input devices and others are output devices.</p> <p>Learning where keys are located on the keyboard.</p>	N/A	<p>Learning that decomposition means breaking a problem down into smaller parts.</p> <p>Using decomposition to solve unplugged challenges.</p> <p>Using logical reasoning to predict the behaviour of simple programs.</p> <p>Developing the skills associated with sequencing in unplugged activities.</p> <p>Following a basic set of instructions. Assembling instructions into a simple algorithm.</p>	<p>Programming a Floor robot to follow a planned route.</p> <p>Learning to debug instructions when things go wrong.</p> <p>Using programming language to explain how a floor robot works. Learning to debug an algorithm in an unplugged scenario.</p>
Year 2	<p>Understanding what a computer is and that it's made up of different components. Recognising that buttons cause effects and that technology follows instructions. Learning how we know that technology is doing what we want it to do via its output. Using greater control when taking photos with cameras, tablets or computers.</p> <p>Developing confidence with the keyboard and the basics of touch typing.</p>	N/A	<p>Articulating what decomposition is.</p> <p>Decomposing a game to predict the algorithms used to create it.</p> <p>Learning that there are different levels of abstraction.</p> <p>Explaining what an algorithm is.</p> <p>Following an algorithm.</p> <p>Creating a clear and precise algorithm.</p> <p>Learning that programs execute by following precise instructions.</p> <p>Incorporating loops within algorithms.</p>	<p>Using logical thinking to explore software, predicting, testing and explaining what it does. Using an algorithm to write a basic computer program.</p> <p>Using loop blocks when programming to repeat an instruction more than once.</p>

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Year 3	<p>Understanding what the different components of a computer do and how they work together.</p> <p>Drawing comparisons across different types of computers. Learning about the purpose of routers.</p>	<p>Understanding the role of the key components of a network.</p> <p>Identifying the key components within a network, including whether they are wired or wireless.</p> <p>Understanding that websites and videos are files that are shared from one computer to another.</p> <p>Learning about the role of packets.</p> <p>Understanding how networks work and their purpose.</p> <p>Recognising links between networks and the internet.</p> <p>Learning how data is transferred.</p>	<p>Using decomposition to explain the parts of a laptop computer.</p> <p>Using decomposition to explore the code behind an animation.</p> <p>Using repetition in programs.</p> <p>Using logical reasoning to explain how simple algorithms work.</p> <p>Explaining the purpose of an algorithm. Forming algorithms independently</p>	<p>Using logical thinking to explore more complex software; predicting, testing and explaining what it does. Incorporating loops to make code more efficient.</p> <p>Continuing existing code.</p> <p>Making reasonable suggestions for how to debug their own and others' code.</p>
Year 4	<p>Using tablets or digital cameras to film a weather forecast.</p> <p>Understanding that weather stations use sensors to gather and record data which predicts the weather.</p>	<p>Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration.</p>	<p>Using decomposition to solve a problem by finding out what code was used.</p> <p>Using decomposition to understand the purpose of a script of code.</p> <p>Identifying patterns through unplugged activities. Using past experiences to help solve new problems.</p> <p>Using abstraction to identify the important parts when completing both plugged and unplugged activities.</p>	<p>Creating algorithms for a specific purpose.</p> <p>Coding a simple game.</p> <p>Using abstraction and pattern recognition to modify code.</p> <p>Incorporating variables to make code more efficient.</p>

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Year 5	<p>Learning that external devices can be programmed by a separate computer.</p> <p>Learning the difference between ROM and RAM.</p> <p>Recognising how the size of RAM affects the processing of data. Understanding the fetch, decode, execute cycle</p>	<p>Learning the vocabulary associated with data: data and transmit.</p> <p>Learning how the data for digital images can be compressed. Recognising that computers transfer data in binary and understanding simple binary addition.</p> <p>Relating binary signals (Boolean) to the simple character-based language, ASCII.</p> <p>Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations.</p> <p>Understanding how bit patterns represent images as pixels.</p>	<p>Decomposing animations into a series of images.</p> <p>Decomposing a program without support.</p> <p>Decomposing a story to be able to plan a program to tell a story.</p> <p>Predicting how software will work based on previous experience.</p> <p>Writing more complex algorithms for a purpose.</p>	<p>Programming an animation. Iterating and developing their programming as they work. Confidently using loops in their programming. Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected. Writing code to create a desired effect. Using a range of programming commands.</p>
Year 6	<p>Learning about the history of computers and how they have evolved over time.</p> <p>Using the understanding of historic computers to design a computer of the future.</p> <p>Understanding and identifying barcodes, QR codes and RFID. Identifying devices and applications that can scan or read barcodes, QR codes and RFID.</p> <p>Understanding how corruption can happen within data during transfer (for example when downloading, installing, copying and updating files).</p>	<p>Understanding that computer networks provide multiple services</p>	<p>Decomposing a program into an algorithm. Using past experiences to help solve new problems. Writing increasingly complex algorithms for a purpose.</p>	<p>Debugging quickly and effectively to make a program more efficient.</p> <p>Remixing existing code to explore a problem. Using and adapting nested loops. Programming using the language Python. Changing a program to personalise it.</p> <p>Evaluating code to understand its purpose. Predicting code and adapting it to a chosen purpose.</p>