



# STEPS TO SUCCESS FOR KEY STAGE 3..... COMPUTING



STEPS	STRAND 1 Computational Thinking, Algorithms & Programming	STRAND 2 Computer Systems	STRAND 3 Digital Literacy	EOKS4 Estimate
9	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can analyse and decompose a range of substantial problems.</li> <li>can confidently write efficient code using a range of programming techniques, data structures and recursion in two text-based languages.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can explain the Von Neumann Architecture in detail.</li> <li>can explain the features of system software and their use.</li> <li>can describe the OSI network layer model using examples.</li> <li>can give in depth advice on systems and network security.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can discuss the social, economical, political, legal, ethical and moral issues surrounding the application of current and emerging technology, giving real world examples.</li> </ul>	9
8	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>recognise that some problems are unsolvable by computers.</li> <li>can analyse and decompose a substantial problem.</li> <li>can write algorithms using a flowchart and pseudocode/ERL.</li> <li>can create an accurate algorithm without any help, that meets the requirements of the problem.</li> <li>can develop and refine efficient code using a range of programming techniques in two text-based languages.</li> <li>can systematically resolve errors and build robust programs.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can explain the need for and perform data compression.</li> <li>can identify what a relational database is and its benefits.</li> <li>can perform operations using bit patterns.</li> <li>can discuss performance issues of a computer system.</li> <li>can explain Moore's Law.</li> <li>can explain multitasking by computers.</li> <li>can identify and discuss network hardware.</li> <li>can discuss the vulnerabilities and ways to prevent attacks.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can understand the ethical issues surrounding the application of information technology.</li> <li>can understand the laws governing the application of information technology, e.g. DPA, CMA, ©, etc.</li> </ul>	8
7	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can evaluate the effectiveness of algorithms and models for similar problems.</li> <li>can recognise where abstraction can be used.</li> <li>can use logical reasoning to explain how an algorithm works.</li> <li>can analyse and decompose a complex problem.</li> <li>can create an accurate algorithm without any help.</li> <li>can use more than one text-based language.</li> <li>can apply a modular approach to error detection / correction.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can understand how and why data types are used.</li> <li>can describe what affects the performance of a computer.</li> <li>can briefly explain the different types of processor.</li> <li>can explain features of operating systems and utilities.</li> <li>can explain that web servers process / store data entered by users.</li> <li>can discuss how topologies affect performance / reliability.</li> <li>can explain the use of most network protocols.</li> <li>can explain layers, virtual networks and packet switching.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can effectively design and create digital products for a wider or remote audience.</li> <li>can explain and justify how the use of technology impacts on society, from the perspective of social, economical, political, legal, ethical and moral issues.</li> <li>can recognise that the persistence of data on the internet and its impact on online identity and privacy.</li> </ul>	7
6	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can represent algorithms using structured language.</li> <li>can analyse and decompose a more complex problem.</li> <li>can create mostly accurate algorithms with some assistance.</li> <li>can appreciate the effect local and global variables.</li> <li>can confidently use at least one text-based language.</li> <li>can use both pre-tested and post-tested loops.</li> <li>can use a range of systematic tests.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can explain how data representation affects data quality.</li> <li>can explain that processors have instruction sets.</li> <li>can explain the registers and different types of memory.</li> <li>can explain some features of utility programs.</li> <li>can understand the client-server model.</li> <li>can identify the hardware in wired and wireless networks.</li> <li>can discuss ways system security maybe breached.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can undertake creative projects that collect, analyse and evaluate data to meet the needs of a known user group.</li> <li>can consider the properties of media when importing them into digital products.</li> <li>can document user feedback, the improvements identified and the refinements made to the solution.</li> <li>can explain a range of laws and how they can be broken.</li> </ul>	6
5	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can analyse and decompose a simple problem.</li> <li>can create an algorithm meeting most of the requirements, with some help.</li> <li>can use procedures and functions appropriately.</li> <li>can write a program in a text-based language.</li> <li>can use and manipulate one-dimensional data structures.</li> <li>can use nested selection statements.</li> <li>can detect and correct syntax errors.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can explain how numbers, images, sounds and character sets use the same bit patterns.</li> <li>can understand the relationship between resolution and colour depth and file size.</li> <li>can distinguish between data used in a simple program and the storage structure for that data.</li> <li>can perform simple operations using bit patterns.</li> <li>can understand von Neumann architecture.</li> <li>can explain the hardware needed to setup a network.</li> <li>can identify protocols associated with networks.</li> <li>can discuss ways to keep a network secure.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can consider the usability of visual design features when designing and creating digital products for an audience.</li> <li>can evaluate the trustworthiness of digital content.</li> <li>can justify the choice of and independently combine multiple digital devices, internet services and application software to achieve given goals.</li> <li>can design criteria to evaluate the quality of solutions.</li> <li>can use feedback from the users of a solution.</li> <li>can explain how the use of tech can impact on society.</li> <li>can use technologies and online services securely.</li> <li>can identify and report inappropriate conduct.</li> </ul>	5
4	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can see that different algorithms exist for the same problem.</li> <li>can understand that iteration is the repetition of a process.</li> <li>can identify similarities and differences to solve problems.</li> <li>can show experience of a high-level text-based language.</li> <li>can select appropriate data types.</li> <li>can use a range of operators and expressions and apply them in the context of program control.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can explain that computers use binary to represent all data.</li> <li>can recognise different types of data: real, Boolean</li> <li>can explain how bit patterns represent numbers / images.</li> <li>can recognise the relationship between binary and file size.</li> <li>can understand the concepts behind the fetch-execute cycle.</li> <li>can list hardware needed to connect to a network.</li> <li>can understand data transmission between digital devices.</li> <li>can identify ways to keep a network secure.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can evaluate the appropriateness of digital devices, internet services and application software to achieve given goals.</li> <li>can design criteria to evaluate the quality of solutions.</li> <li>can use the criteria to identify improvements.</li> <li>can make appropriate refinements to the solution.</li> <li>can recognise ethical issues surrounding the application of information technology beyond school.</li> </ul>	4
3	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can see there may be multiple ways to solve a problem.</li> <li>can design solutions by decomposing a problem.</li> <li>can explain that a procedure can be used to hide detail.</li> <li>can write a program using block programming language.</li> <li>can design and write modular programs using procedures.</li> <li>can use a variable and relational operator within a loop to govern termination.</li> <li>can debug modular programs.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can analyse and evaluate data and information.</li> <li>can perform more complex searches for information.</li> <li>can recognise the consequences of poor-quality data.</li> <li>can explain how search results are selected.</li> <li>can understand the main functions of the operating system.</li> <li>can select, combine and use internet services.</li> <li>can identify the difference between physical, wireless and mobile networks.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can design and create content for a given audience.</li> <li>can evaluate and repurpose content for a given audience.</li> <li>can understand the potential of information technology for collaboration when computers are networked.</li> <li>can use criteria to evaluate the quality of solutions.</li> <li>can identify and make refinements to the solution.</li> <li>can demonstrate responsible use of tech and online services.</li> <li>can identify a range of ways to report concerns.</li> </ul>	3
2	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can use diagrams to express solutions.</li> <li>can use logical reasoning to predict outputs.</li> <li>can create an algorithm with help that meets some of the requirements of a problem.</li> <li>can declare and assign variables.</li> <li>can write a program with an input.</li> <li>can design algorithms that use repetition (post-tested) loops and two-way selection.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can recognise the difference between data and information.</li> <li>can understand why sorting can improve searches.</li> <li>can perform single criteria searches for information.</li> <li>can explain the difference between hardware and software.</li> <li>can explain that computers collect data from various inputs.</li> <li>can understand the difference between the internet and internet service.</li> <li>can show an awareness of / use a range of internet services.</li> </ul>	<p><b>All the below and ...</b></p> <ul style="list-style-type: none"> <li>can collect, organise and present digital content.</li> <li>can create content for a specific purpose / wider audience.</li> <li>can comment on the success of the solution.</li> <li>can make appropriate improvements, based on feedback.</li> <li>can recognise what is acceptable and unacceptable behaviour when using technologies and online services.</li> </ul>	2
1	<p><b>Can ...</b></p> <ul style="list-style-type: none"> <li>understand that algorithms are implemented as programs.</li> <li>design simple algorithms using loops and selection.</li> <li>use logical reasoning to predict outcomes and behaviour.</li> <li>use arithmetic operators, if statements and loops.</li> <li>detect and correct simple semantic errors in programs.</li> </ul>	<p><b>Can ...</b></p> <ul style="list-style-type: none"> <li>appreciate that programs work with different types of data.</li> <li>recognise different types of data: text, number.</li> <li>recognise that data can be structured in tables.</li> <li>recognise that computers can take different forms.</li> <li>recognise and use a range of input and output devices.</li> <li>navigate the web and can carry out simple searches.</li> </ul>	<p><b>Can ...</b></p> <ul style="list-style-type: none"> <li>use technology with increasing independence.</li> <li>use a variety of software to manipulate and present content.</li> <li>talk about and make improvements, based on feedback.</li> <li>share experiences of technology in and out of school.</li> <li>demonstrate the use of computers safely and responsibly.</li> <li>can identify ways to report unacceptable content / contact.</li> </ul>	1