Oldbury Wells

KS3 Progression Grid - Computing

	STRAND 1 Computational Thinking, Algorithms & Programming	STRAND 2 Computer Systems	STRAND 3 Digital Literacy
9	**All the below and …** • can analyse and decompose a range of substantial problems. • can confidently write efficient code using a range of programming techniques, data structures and recursion in two text-based languages.	**All the below and …** • can explain the Von Neumann Architecture in detail. • can explain the features of system software and their use. • can describe the OSI network layer model using examples. • can give in depth advice on systems and network security.	**All the below and …** • can discuss the social, economical, political, legal, ethical and moral issues surrounding the application of current and emerging technology, giving real world examples.
8	**All the below and …** • recognise that some problems are unsolvable by computers. • can analyse and decompose a substantial problem. • can write algorithms using a flowchart and pseudocode/ERL. • can create an accurate algorithm without any help, that meets the requirements of the problem. • can develop and refine efficient code using a range of programming techniques in two text-based languages. • can systematically resolve errors and build robust programs.	**All the below and …** • can explain the need for and perform data compression. • can identify what a relational database is and its benefits. • can perform operations using bit patterns. • can discuss performance issues of a computer system. • can explain Moore's Law. • can explain multitasking by computers. • can identify and discuss network hardware. • can discuss the vulnerabilities and ways to prevent attacks.	**All the below and …** • can understand the ethical issues surrounding the application of information technology. • can understand the laws governing the application of information technology, e.g. DPA, CMA, ©, etc.
7	**All the below and …** • can evaluate the effectiveness of algorithms and models for similar problems. • can recognise where abstraction can be used. • can use logical reasoning to explain how an algorithm works. • can analyse and decompose a complex problem. • can create an accurate algorithm without any help. • can use more than one text-based language. • can apply a modular approach to error detection / correction.	**All the below and …** • can understand how and why data types are used. • can describe what affects the performance of a computer. • can briefly explain the different types of processor. • can explain features of operating systems and utilities. • can explain that web servers process / store data entered by users. • can discuss how topologies affect performance / reliability. • can explain the use of most network protocols. • can explain layers, virtual networks and packet switching.	**All the below and …** • can effectively design and create digital products for a wider or remote audience. • can explain and justify how the use of technology impacts on society, from the perspective of social, economical, political, legal, ethical and moral issues. • can recognise that the persistence of data on the internet and its impact on online identity and privacy.
6	**All the below and …** • can represent algorithms using structured language. • can analyse and decompose a more complex problem. • can create mostly accurate algorithms with some assistance. • can appreciate the effect local and global variables. • can confidently use at least one text-based language. • can use both pre-tested and post-tested loops. • can use a range of systematic tests.	**All the below and …** • can explain how data representation affects data quality. • can explain that processors have instruction sets. • can explain the registers and different types of memory. • can explain some features of utility programs. • can understand the client-server model. • can identify the hardware in wired and wireless networks. • can discuss ways system security maybe breached.	**All the below and …** • can undertake creative projects that collect, analyse and evaluate data to meet the needs of a known user group. • can consider the properties of media when importing them into digital products. • can document user feedback, the improvements identified and the refinements made to the solution. • can explain a range of laws and how they can be broken.
5	**All the below and …** • can analyse and decompose a simple problem. • can create an algorithm meeting most of the requirements, with some help. • can use procedures and functions appropriately. • can write a program in a text-based language. • can use and manipulate one-dimensional data structures. • can use nested selection statements. • can detect and correct syntax errors.	**All the below and …** • can explain how numbers, images, sounds and character sets use the same bit patterns. • can understand the relationship between resolution and colour depth and file size. • can distinguish between data used in a simple program and the storage structure for that data. • can perform simple operations using bit patterns. • can understand von Neumann architecture. • can explain the hardware needed to setup a network. • can identify protocols associated with networks. • can discuss ways to keep a network secure.	**All the below and …** • can consider the usability of visual design features when designing and creating digital products for an audience. • can evaluate the trustworthiness of digital content. • can justify the choice of and independently combine multiple digital devices, internet services and application software to achieve given goals. • can design criteria to evaluate the quality of solutions. • can use feedback from the users of a solution. • can explain how the use of tech can impact on society. • can use technologies and online services securely. • can identify and report inappropriate conduct.

4	**All the below and …** • can see that different algorithms exist for the same problem. • can understand that iteration is the repetition of a process. • can identify similarities and differences to solve problems. • can show experience of a high-level text-based language. • can select appropriate data types. • can use a range of operators and expressions and apply them in the context of program control.	**All the below and …** • can explain that computers use binary to represent all data. • can recognise different types of data: real, Boolean • can explain how bit patterns represent numbers / images. • can recognise the relationship between binary and file size. • can understand the concepts behind the fetch-execute cycle. • can list hardware needed to connect to a network. • can understand data transmission between digital devices. • can identify ways to keep a network secure.	**All the below and …** • can evaluate the appropriateness of digital devices, internet services and application software to achieve given goals. • can design criteria to evaluate the quality of solutions. • can use the criteria to identify improvements. • can make appropriate refinements to the solution. • can recognise ethical issues surrounding the application of information technology beyond school.
3	**All the below and …** • can see there may be multiple ways to solve a problem. • can design solutions by decomposing a problem. • can explain that a procedure can be used to hide detail. • can write a program using block programming language. • can design and write modular programs using procedures. • can use a variable and relational operator within a loop to govern termination. • can debug modular programs.	**All the below and …** • can analyse and evaluate data and information. • can perform more complex searches for information. • can recognise the consequences of poor-quality data. • can explain how search results are selected. • can understand the main functions of the operating system. • can select, combine and use internet services. • can identify the difference between physical, wireless and mobile networks.	**All the below and …** • can design and create content for a given audience. • can evaluate and repurpose content for a given audience. • can understand the potential of information technology for collaboration when computers are networked. • can use criteria to evaluate the quality of solutions. • can identify and make refinements to the solution. • can demonstrate responsible use of tech and online services. • can identify a range of ways to report concerns.
2	**All the below and …** • can use diagrams to express solutions. • can use logical reasoning to predict outputs. • can create an algorithm with help that meets some of the requirements of a problem. • can declare and assign variables. • can write a program with an input. • can design algorithms that use repetition (post-tested) loops and two-way selection.	**All the below and …** • can recognise the difference between data and information. • can understand why sorting can improve searches. • can perform single criteria searches for information. • can explain the difference between hardware and software. • can explain that computers collect data from various inputs. • can understand the difference between the internet and internet service. • can show an awareness of / use a range of internet services.	**All the below and …** • can collect, organise and present digital content. • can create content for a specific purpose / wider audience. • can comment on the success of the solution. • can make appropriate improvements, based on feedback. • can recognise what is acceptable and unacceptable behaviour when using technologies and online services.
1	**Can …** • understand that algorithms are implemented as programs. • design simple algorithms using loops and selection. • use logical reasoning to predict outcomes and behaviour. • use arithmetic operators, if statements and loops. • detect and correct simple semantic errors in programs.	**Can …** • appreciate that programs work with different types of data. • recognise different types of data: text, number. • recognise that data can be structured in tables. • recognise that computers can take different forms. • recognise and use a range of input and output devices. • navigate the web and can carry out simple searches.	**Can …** • use technology with increasing independence. • use a variety of software to manipulate and present content. • talk about and make improvements, based on feedback. • share experiences of technology in and out of school. • demonstrate the use of computers safely and responsibly. • can identify ways to report unacceptable content / contact.