Year 9	Computer Systems / Hardware and software	Programming & Development	Algorithms	Information Technology/Digital Literacy	Data Representation	Communication/networking
Emerging	Understands the components of CPUs and their functions. Knows that computers collect data from various input devices, including sensors and application software.	Student can create programs that implement algorithms to achieve given goals. They can declare and assign variables.	Can design simple algorithms using loops, and selection i.e. if statements. Can use logical reasoning to predict outputs, showing an awareness of inputs.	Collects, organises and presents data and information in digital content. Creates digital content to achieve a given goal by combining software packages and internet services to communicate to a wider audience. They make appropriate improvements to solutions based on feedback received, and can comment on the success of the solution.	Student understands the difference between data and information. They know why sorting data in a flat file can improve searching for information. They are able to use filters or can perform single criteria searches for information.	Understands the difference between the internet and world wide web. Shows an awareness of and can use a range of internet services. Recognises what acceptable and unacceptable behaviour is when using technology and the internet
Developing	Understands the difference between hardware and application software, and their roles within a computer system. Knows the difference between physical,mobile and wireless networks	Understands the difference between if and if_ then and else statements. Can understand and use While loops effectively. Can read snippets of code and understand what the output would be.	Can design solutions (algorithms) that use repetition and two-way selection i.e. if, elif and else. Can use flow diagrams(flowcharts) to express solutions.	Student makes judgements about digital content when evaluating and repurposing it for a given audience. Recognises auidence when designing digital content. They use criteria to evaluate the quality of solutions, can identify improvements making some refinements to the solution, and future solutions.	Student performs more complex searches for information e.g. using Boolean and relational operators. They can analyse and evaluate data and information, and recognises that poor quality data leads to unreliable results, and inaccurate conclusions.	Understands how to effectively use search engines, and how search results are selected. Demonstates responsible use of technologies and online services.
Securing	Is able to explain the purpose and need for ROM and the purpose of RAM(computer memory). Understands the difference between RAM and ROM uses. Understands the use of virtual memory	Understands and use selection (both IF... and IF...ELSE...) effectively in coding challenges. Understand and use a range of comparison operators in both selection and iteration effectively. Able to use a procedure.	Student shows an awareness of tasks best completed by humans or computers. They can recognise that different solutions exist for the same problem. Designs solutions by decomposing a problem and creates sub-solution for each part.	Evaluates the appropriateness of digital content to achieve given goals. Evaluates usability of visual design features when creating products for a known audience. Designs criteria for users to evaluate the quality of solutions.	Student knows that digital computers use binary to represent all data. They know that computers transfer data in binary.	Understands data transmission between digital computers over networks e.g packet switching and IP addresses.
Advancing	Recognises and understands the function of the main internal parts of the computer. Knows there is a range of operating systems and application software for the same hardware.	Has practical experience of a high level programming language. Selects appropriate data types when writing code. Uses a variable and relational operators within a loop to govern termination. Understands when to use a function and can use appropriately.	Knows that iteration is the repetition of a process such as a loop. Can identify similarities and differences in situations and can use these to solve problems (pattern recognition).	Uses multiple digital devices, internet services and application software to achieve given goals. Recognises ethical issues surrounding application of information technology. Can use evaluation criteria to identify and implement improvements to a solution.	Understands the relationship between binary and file size. Can define data types: real numbers and boolean. Understands how numbers, images, sounds and character sets use the same bit patterns. Able to carry out simple operations using bit patterns such as binary addition.	Knows the names of hardware e.g. hubs, routers, switches. Uses technology and online services securely and how to identify and report inapporpriate content.
Mastering	Recognises the concept of the fetch-execute cycle. Has an understanding of how data is stored in memory.	Student is able to use nested selection statements and can appreciate the need for, and writes, custom functions including use of parameters. They know the difference between, and uses appropriately, procedures and functions. They understand and use negation with operators. They can use and manipulates one dimensional data structures and within programs can detect and correct syntactical errors.	They can recognise that some problems share the same characteristics and use the same algorithm to solve both. Able to make use of sub solutions effectively where there is a problem that requires the same solution to a problem.	They can evaluate the trustworthiness of digital content. Can assess the usability of visual design features when designing and creating digital products for a known audience. They can Identify and explain how the use of technology can impact on society. They are able to design criteria for users to evaluate the quality of solutions, uses the feedback from the users to identify improvements and can make appropriate refinements to the solution.	Understands the relationship between resolution and colour depth, including the effect on file size. They can distinguish between data used in a simple program (a variable) and the storage structure for that data. Understands the relationship between electrical circuits and binary e.g. Boolean logic.	Knows the names of protocols such as SMTP, IMAP, POP associated with networking computers. They know the purpose of these networking protocols. Understands that data on the interent needs careful protection of online identity and privacy.