KS3 Computing Assessment Grid June 2023/24

<table>
<tr><th></th><th colspan="2">Problem Solving</th><th>Calculations</th><th colspan="2">Recall and Application</th><th>Practical Skills (Organisation, Creation)</th></tr>
<tr><th></th><th>Algorithms</th><th>Programming & Development</th><th>Data & Data Representation</th><th>Hardware & Processing</th><th>Communication & Networks</th><th>Information Technology</th></tr>
<tr><td rowspan="5">Emerging</td><td>I know what an algorithm is and I can express simple algorithms using symbols.</td><td>I know that users can write their own programs.</td><td>I know that digital content can be represented in many forms.</td><td>I know that computers have no intelligence and that computers can do nothing unless a program is run.</td><td>I can find content from the world wide web using a web browser.</td><td>I can use software under the control of the teacher to create, store and edit digital content using appropriate file and folder names.</td></tr>
<tr><td>I know that computers need precise instructions.</td><td>I can create a simple program.</td><td rowspan="3">I know the difference between some of these digital forms and can explain the different ways that they communicate information.</td><td rowspan="3">I know that all software executed on digital devices is programmed.</td><td>I know the importance of communicating safely and respectfully online, and the need for keeping personal information private.</td><td>I know that people interact with computers.</td></tr>
<tr><td rowspan="2">I can show care and precision to avoid errors</td><td>I can run, check and change programs.</td><td rowspan="2">I know what to do when concerned about content or being contacted.</td><td>I can share my use of technology in school. I know common uses of information technology beyond the classroom.</td></tr>
<tr><td>I know that programs run by following precise instructions.</td><td>I can talk about my work and make changes to improve it.</td></tr>
<tr><td rowspan="3"></td><td>I know that algorithms are implemented on digital devices as programs.</td><td>I can use arithmetic operators, if statements, and loops, within programs.</td><td>I know different types of data: text, number.</td><td>I know that a range of digital devices can be considered a computer.</td><td>I can navigate the web and can carry out simple web searches to collect digital content.</td><td>I can use technology with increasing independence to purposefully organise digital content.</td></tr>
<tr><td>I can design simple algorithms using loops, and selection i.e. if statements.</td><td>I can use logical reasoning to predict the behaviour of programs.</td><td>I know that programs can work with different types of data.</td><td>I know and can use a range of input and output devices.</td><td rowspan="2"></td><td>I can show an awareness for the quality of digital content collected.</td></tr>
<tr><td>I can use logical reasoning to predict outcomes.</td><td></td><td></td><td></td><td>I can use a variety of software to manipulate and present digital content: and information.</td></tr>
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KS3 Computing Assessment Grid June 2023/24

	I can find and correct errors i.e. debugging, in algorithms.	I can find and correct simple semantic errors i.e. debugging, in programs.	I know that data can be structured in tables to make it useful.	I know how programs specify the function of a general purpose computer.	I can show use of computers safely and responsibly, knowing a range of ways to report unacceptable content and contact when online.	I can share my experiences of technology in school and beyond the classroom. I can talk about my work and make improvements to solutions based on feedback received.

Developing	I can design solutions (algorithms) that use repetition and two-way selection i.e. if, then and else.	I can create programs that implement algorithms to achieve given goals.	I know the difference between data and information.	I know that computers collect data from various input devices, including sensors and application software.	I know the difference between the internet and internet service e.g. world wide web.	I can collect, organise and present data and information in digital content.
	I can use diagrams to express solutions.	I can declare and assign variables.	I can use filters or can perform single criteria searches for information.	I know the difference between hardware and application software, and their roles within a computer system.	I can show an awareness of, and can use a range of internet services e.g. VOIP.	I can create digital content to achieve a given goal through combining software packages and internet services to communicate with a wider audience e.g. blogging.
	I can use logical reasoning to predict outputs, showing an awareness of inputs.	I can use post-tested loops e.g. 'until', and a sequence of selection statements in programs, including use of if…then… else statement.			I know what is acceptable and unacceptable behaviour when using technologies and online services.	I can make appropriate improvements to solutions based on feedback received, and can comment on the success the solution.
	I can show an awareness of tasks best completed by humans or computers.	I know the difference between, and appropriately I can use if and if, then and else statements.	I can perform more complex searches for information e.g. using Boolean and relational operators.	I know why and when computers are used.	I know how to effectively use search engines, and I know how search results are selected, including that search engines use 'web crawler programs'.	I can make judgements about digital content when evaluating and repurposing it for a given audience.
	I can design solutions by decomposing a problem and creates a sub-solution for each of these parts (decomposition).	I can use variable and relational operators within a oop to govern termination.		I know the main functions of the operating system.	Selects, combines and I can use internet services.	I know the audience when I am designing and creating digital content.

KS3 Computing Assessment Grid June 2023/24

	I know that different solutions exist for the same problem.	I can design, write and debug modular programs using procedures. I know that a procedure can be used to hide the detail with subsolution (procedural abstraction).	Analyses and evaluates data and information, and I know that poor quality data leads to unreliable results, and inaccurate conclusions.	I know the difference between physical, wireless and mobile networks.	I can show responsible use of technologies and online services, and I know a range of ways to report concerns.	I know the potential of information technology for collaboration when computers are networked. I can use criteria to evaluate the quality of solutions and can identify improvements making some refinements to the solution, and future solutions.
Secure	I know that iteration is the repetition of a process such as a loop.	I know that programming bridges the gap between algorithmic solutions and computers.	I know that digital computers use binary to represent all data.	I know the function of the main internal parts of basic computer architecture.	I know how search engines rank search results.	I can evaluate the appropriateness of digital devices, internet services and application software to achieve given goals.
	I know that different algorithms exist for the same problem.	I have practical experience of a high-level textual language, including using standard libraries when programming.	I know how bit patterns represent numbers and images.	I know the concepts behind the fetchexecute cycle.	I know how to construct static web pages using HTML and CSS.	I can recognise ethical issues surrounding the application of information technology beyond school.
	I can represent solutions using a structured notation.	I can use a range of operators and expressions e.g. Boolean, and applies them in the context of program control.	I know that computers transfer data in binary.	I know that there is a range of operating systems and application software for the same hardware.	I know data transmission between digital computers over networks, including the internet i.e. IP addresses and packet switching.	I can design criteria to critically evaluate the quality of solutions, I can use the criteria to identify improvements and can make appropriate refinements to the solution.
	I can identify similarities and differences in situations and can use these to solve problems (pattern recognition).	I can select the appropriate data types.	I know the relationship between binary and file size (uncompressed). I can define data types: real numbers and Boolean. I can query data on one table using a typical query language.			I can identify and explain how the use of technology can impact on society.
	I know a recursive solution to a problem repeatedly applies the same solution to smaller instances of the problem.	I can use nested selection statements. I know the need for, and can write, custom functions including use of parameters.	I know how numbers, images, sounds and character sets use the same bit patterns.	I know the von Neumann architecture in relation to the fetch-execute cycle, including how data is stored in memory.	I know names of hardware e.g. hubs, routers, switches, and the names of protocols e.g. SMTP, iMAP, POP, FTP, TCP/IP, associated with networking systems.	I can justify the choice of and independently combine and I use multiple digital devices, internet services and application software to achieve given goals.

KS3 Computing Assessment Grid June 2023/24

	I know that for some problems I can share the same characteristics and use the same algorithm to solve both (generalisation).	I know the difference between, and I can use appropriately, procedures and functions. I know and I can use negation with operators.	I can perform simple operations using bit patterns e.g. binary addition. I know the relationship between resolution and colour depth, including the effect on file size.			I can evaluate the trustworthiness of digital content and consider the usability of visual design features when designing and creating digital artefacts for known audience.
	I know the notion of performance for algorithms and I know that some algorithms have different performance characteristics for the same task.	I can use and manipulate one dimensional data structures. I can find and corrects syntactical errors.	I can distinguish between data used in a simple program (a variable) and the storage structure for that data.	I know the basic function and operation of location addressable memory.	I can use technologies and online services securely, and I know how to identify and report inappropriate conduct.	I can design criteria for users to evaluate the quality of solutions, and can use the feedback from users to identify improvements and can make appropriate refinements to the solution.
Advanced	I know that the design of an algorithm is distinct from its expression in a programming language (which will depend on the programming constructs available).	I know the effect of the scope of a variable e.g. a local variable can't be accessed from outside its function.	I know the relationship between data representation and data quality.	I know that processors have instruction sets and that these relate to low-level instructions carried out by a computer.	I know the purpose of the hardware and protocols associated with networking computer systems.	I can undertake creative projects that collect, analyse, and evaluate data to meet the needs of a known user group.
	I can evaluate the effectiveness of algorithms and models for similar problems.	I know and apply parameter passing.	I know the relationship between binary and electrical circuits, including Boolean logic.		I know the client-server model including how dynamic web pages use server-side scripting and that web servers process and store data entered by users.	I can effectively design and create digital artefacts for a wider or remote audience.
	I know where information can be filtered out in generalizing problem solutions (abstraction).	I know the difference between, and I can use, both pre-tested e.g. 'while', and post-tested e.g. 'until' loops.	I know how and why values are data typed in many different languages when manipulated within programs.		I know that persistence of data on the internet requires careful protection of online identity and privacy.	I consider the properties of media when importing them into digital artefacts.
	I can use logical reasoning to explain how an algorithm works.	I can apply a modular approach to error detection and correction.				I can document user feedback, the improvements identified and the refinements made to the solution.
	I can represent algorithms using a structured language.					I can explain and justify how the use of technology impacts on society, from the perspective of social, economical, political legal, ethical and moral issues.

KS3 Computing Assessment Grid June 2023/24

	I can design a solution to a problem that depends on solutions to smaller instances of the same problem (recursion).	I can design and write nested modular programs that enforce reusability utilising sub- routines wherever possible.	I can perform operations using bit patterns e.g. conversion between binary and hexadecimal, binary subtraction etc.	I have practical experience of a small (hypothetical) low level programming language.	I know the hardware associated with networking computer systems, including WANs and LANs, I know their purpose and how they work, including MAC addresses.	I know the ethical issues surrounding the application of information technology, an existence of legal frameworks governing its use e.g. Data Protection Act, Computer Misuse Copyright etc.
	I know that some problems cannot be solved computationally.	I know the difference between 'While' loop and 'For' loop, which I can use a loop counter.	I know and can explain the need for data compression, and performs simple compression methods.	I know and can explain Moore's Law.		
		I know and I can use two dimensional data structures.	I know what a relational database is, and I know the benefits of storing data in multiple tables.	I know and can explain multitasking by computers.		