

CURRICULUM AND ASSESSMENT PLAN

GCSE CS

YEAR 10



INTENT

Our faculty mission is to equip students with a robust understanding of computer science principles, practical programming skills, and the ability to apply computational thinking to solve real-world problems. We aim to develop students who are not only proficient users of technology but also creative thinkers and informed digital citizens. The curriculum is designed to challenge and **Develop Computational Thinking**: Teach students how to think logically, solve problems efficiently, and understand the principles of computer systems and networks, **Advance Programming Proficiency**: Introduce students to programming languages such as Python, ensuring they understand basic syntax, control structures, and algorithms. Mature **Digital Literacy skills**: Ensure students are competent and safe users of technology, understanding online safety, data privacy, and the ethical implications of technology.

	Prior learning	Understanding of computer science, digital literacy, and information technology. Pupils learn to design, write, and debug programs using various programming languages, understand how computer systems work—including hardware and software—and grasp key concepts like algorithms, data representation, and networks. They also use a range of software tools to collect, analyse, and present data effectively, while becoming responsible, competent, and safe users of digital technology.
	Conscious curriculum links	OCR Computer Science topics 1.1 to 1.5 link closely with other curriculum areas and support broader personal development. Students apply maths and physics when learning about systems architecture and memory, while exploring ethical, legal, and environmental issues in storage and cybersecurity. Topics like networking connect to geography and PSHE through global infrastructure and online safety. Systems software relates to business and technology, encouraging critical thinking about digital access and responsible use. Overall, these topics foster cross-curricular learning, digital responsibility, and global awareness.
	Extra-curricular	Bebbras Computing Challenge is an international competition that promotes computational thinking among students aged 6 to 18. Organized in over 80 countries.

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
TOPIC/KNOWLEDGE	<p>Storage and Memory</p> <p>To know how computers store data on a range of different types of storage medias.</p> <p>To be able to describe a range of storage characteristics when discussing storage devices.</p> <p>Understand the difference ROM only memory and random access memory</p> <p>Understand the difference between volatile and non-volatile</p> <p>Basics (Input, Print, Variables, Comments & Math) , Data Types</p>	<p>Units & Numbers</p> <p>How computers convert binary to denary and vice versa</p> <p>How computers convert binary-denary-hex and vice versa</p> <p>Understand how computers add binary and the effect of an overflow error</p> <p>Understand how binary can be shifted to multiply or divide</p> <p>Selection (If, Switch case & Nested)</p>	<p>System Architecture</p> <p>Understanding that computers are general purpose and one purpose devices are an embedded system.</p> <p>To know the factors that can limit or improve a computers performance.</p> <p>To understand the role of the different parts and registers in a CPU</p> <p>To understand the cycle that the CPU follows and repeats</p> <p>Iteration/Repetition/Loops (While, Do, For)</p>	<p>System Software</p> <p>To be able to explain the main functions of an OS providing a interface and managing Hardware & software</p> <p>Understand how the OS manages a computer through different types of management</p> <p>To explain the purpose of encryption and how plain text becomes cyphered text</p> <p>To know the use and need of lossy and lossless compression.</p> <p>To state how a hard drive becomes fragmented and how defragmentation works.</p> <p>To know the two different methods of backing up and the pros and cons to each.</p> <p>Arrays (list)</p> <p>2D Arrays (nested List)</p>	<p>Networking</p> <p>Understand the characteristics and describe the difference between a LAN and WAN network & client-server and peer-to-peer networks.</p> <p>To know the role of different network hardware.</p> <p>To understand and draw the different network layouts and state the pros and cons to each</p> <p>To know how networks are broken up in different organisations. Explain the need for DNS.</p> <p>To know the different protocols that are required for emails, file transfer and internet</p> <p>To put each protocols into the different network layers.</p> <p>Txt File Handling (Write, Read & Search)</p>	<p>System Security</p> <p>To know the differ types of malware and the effects they have on PCs</p> <p>Understand other threats like social engineering, DDOS, and brute force</p> <p>To explain method of network protection and how to overcome vulnerabilities.</p> <p>Understand how policy and network forensics can help protect a network.</p> <p>Subroutines (Procedures & Parameters)</p>
SKILLS	A comprehensive list of all GCSE Computer Science skills required can be found at: https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf					
ASSESSMENT	<p>Categorise storage devices into the following categories primary, secondary, tertiary.</p> <p>Categorise storage devices into the following categories volatile/ non-volatile.</p> <p>Debug basic python programs for syntax errors.</p> <p>End of Storage & Memory topic assessment</p>	<p>Low stakes testing – convert binary-denary and hex exam style questions.</p> <p>Binary addition & shift</p> <p>End of Data Representation topic assessment</p>	<p>The differences between embedded and general purpose machines.</p> <p>The parts of the CPU</p> <p>The need for different registers</p> <p>End of System architecture topic assessment</p>	<p>Decrypt an encrypted message</p> <p>Outline the differences between lossy & lossless compression</p> <p>Defrag data to but HDD sectors in sequential order</p> <p>End of System Software topic assessment</p>	<p>Identify different network hardware devices and state the role of each device.</p> <p>Draw the two main network topologies and discuss the advantages/disadvantages of each.</p> <p>Describe 5 different network protocols</p> <p>End of Networks topic assessment</p>	<p>Explain three different types of malware.</p> <p>State four different levels of protection</p> <p>End of System Security topic assessment</p>
VOCAB	<p>Key terminology:</p> <p>Hardware</p> <p>Secondary storage</p> <p>Optical</p> <p>Magnetic</p> <p>Solid state</p> <p>Storage</p> <p>Characteristic</p> <p>Estimate</p> <p>Overheads</p> <ul style="list-style-type: none">• RAM• ROM• Volatile• Non-Volatile• BIOS• Virtual	<p>Key terminology:</p> <p>Bit</p> <p>Nibble</p> <p>Byte</p> <p>Kilobyte</p> <p>Megabyte</p> <p>Gigabyte</p> <p>Terabyte</p> <p>Petabyte</p> <p>Binary</p> <p>Denary</p> <p>Conversion</p> <p>Transistor</p> <p>Bit Binary</p> <p>Denary</p>	<p>Key terminology: Processor, MHz, GHz, Hertz, Instruction, Execute, Embedded System, Clock Speed, Cache, Core</p>	<p>Key terminology:</p> <p>System Software, Operating System (OS), Virtual Machine, Utility Programs, Device Drivers, Multitasking, Time Slice, Processor Management, User Interface, Graphical User Interface, Command Line Interface, Peripheral Management, File Management, Utility Program, Operating System, Defragmentation, Compression, Lossy, Lossless, Encryption, Backup, Incremental, Full</p>	<p>Key terminology:</p> <p>Network</p> <p>LAN</p> <p>WAN</p> <p>Client-server</p> <p>Peer-to-peer</p> <p>LAN</p> <p>Packet</p> <p>Wireless access point (WAP)</p> <p>Router</p> <p>Switch</p> <p>interface card (NIC)</p> <p>Transmission media</p> <p>Network performance</p> <p>Internet</p> <p>DNS</p> <p>Hosting</p> <p>The cloud</p> <p>Virtual network</p> <p>VPN</p> <p>Network</p>	<p>Key terminology:</p> <p>Malware, Viruses, Worms, Trojan Horses, Phishing, Social Engineering, Data Interception, Network Policies, Brute force attacks, DDOS, Botnet, Exploit, SQL injection, Network forensics Viruses, Penetration testing, Network policies, Anti-malware software, Firewalls, Anti-virus, Legislation, Packet sniffing, User access levels , Passwords, Encryption, Cipher, Key</p>

Reading Skills

Pupils develop critical reading skills by interpreting and understanding complex programming documentation. Pupils learn to extract relevant information, understand technical jargon, and comprehend detailed instructions. Computing emphasizes the importance of clear and precise writing. Pupils engage in writing code comments, documentation, and project reports, which require them to explain their thought processes and solutions in a coherent manner. This practice enhances their ability to articulate complex ideas. Digital literacy skills pupils will understand how to navigate and utilise various software tools, platforms, and online resources which is crucial in today's digital world. This competence supports their ability to research, learn independently, and engage with digital content critically and safely.

CAREERS LINKS

Software developer
Cyber security analyst
IT support
Data Analyst
Web Developer
Network Engineer
System analyst
Games Developer

CORE




In computing, these values support problem-solving, persistence in debugging, effective project management, and striving for high-quality work. The curriculum reinforces personal development, emotional wellbeing, and responsible online behaviour, helping pupils build resilience and strong character both digitally and personally.

SUPPORTING STUDENTS AT HOME

we support pupils' learning at home through a combination of structured homework tasks and knowledge organisers that reinforce key concepts. We provide revision guides, work-book and revision packs with a variety of extra revision resources throughout to continue to assess, improve and consolidate learning.

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	Prior learning	Understanding of computer science, digital literacy, and information technology. Pupils learn to design, write, and debug programs using various programming languages, understand how computer systems work—including hardware and software—and grasp key concepts like algorithms, data representation, and networks. They also use a range of software tools to collect, analyse, and present data effectively, while becoming responsible, competent, and safe users of digital technology.
 	Conscious curriculum links	Students strengthen logical thinking and problem-solving through algorithms and Boolean logic, with links to maths, science, and philosophy. They explore ethical and social issues in systems security and robust programming, learning the importance of writing safe, reliable code. Programming languages and development environments also promote creativity, global collaboration, and digital literacy. Together, these topics encourage responsibility, resilience, and a deeper understanding of the digital world.
	Extra-curricular	Bebras Computing Challenge is an international competition that promotes computational thinking among students aged 6 to 18. Organized in over 80 countries.

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1
TOPIC/KNOWLEDGE	<p><u>Translators and facilities of languages & Logic Gates</u></p> <p>To know the need for differ language levels and who makes use of each.</p> <p>To understand how to debug programs step by step and understand the process of converting programs to assembly code to run</p> <p>To understand the features to support programmers programming using IDE's</p> <p>Understand how the three logic gates AND OR, NOT work</p> <p>Represent logic diagrams into expressions and formulas and vice versa</p> <p>Show logic diagrams as truth tables and to draw logic circuits from them.</p>	<p><u>SQL Databases</u></p> <p>To know the difference between paper and digital databases</p> <p>Write a simple SQL statements to pull basic information from a table</p> <p>Write a simple SQL statements with multiple conditions to pull basic information from a table</p> <p>To pull more sophisticated data from a table using wild cards and multiple conditions.</p> <p><u>Images, Characters and Sound</u></p> <p>To understand the metadata stored on images and the role of pixels that make up bitmap images</p> <p>The purpose of character sets and when to use ASCII and Unicode</p> <p>To know how computers represent, record and store audio</p>	<p><u>Algorithms</u></p> <p>To know the searching algorithms that find data and the differences .</p> <p>Understand a sorting algorithm on how data is sorted the pros and cons of it</p> <p>Understand a sorting algorithm on how data is sorted the pros and cons of it</p> <p>To know the purpose of each computational thinking method.</p> <p>Be able to write pseudocode and flowcharts for basic and complex scenarios to develop skills in writing algorithms.</p> <p><u>Laws & Ethics</u></p> <p>To know who are involved in computer science the obvious and less obvious stakeholders.</p> <p>Understand the difference between the law and ethics</p> <p>To know the impact computer science has on different cultures and on the environment positives and negatives</p> <p>To know the laws protecting data from been copyrighted and distributed.</p> <p>To know how computes can be misused and the laws protecting people from misuse and how peoples data is protected.</p> <p>Skill building in answering 8 mark questions.</p>		
SKILLS	<p>A comprehensive list of all GCSE Computer Science skills required can be found at: https://www.ocr.org.uk/images/558027-specification-gcse-computer-science-j277.pdf</p> <p>Revisit the Y10 programming skills throughout Year 11 including Robust Programming</p>				
ASSESSMENT	<p>Identify Logic gate symbols – AND, OR & NOT Complete a truth table for a logic circuit that uses two gates.</p> <p>Identify three features of an IDE Explain the advantages of using an IDE</p> <p>End of IDE topic assessment</p>	<p>State the differences between paper and electronic databases</p> <p>Write a simple SQL statement Write a complex SQL statement</p> <p>End of SQL topic assessment.</p> <p>Create bitmap images that use 2,4 and 7 bits. Explain the need for ASCII and Unicode.</p> <p>State the differences between analogue and digital sound.</p> <p>End of img, char and sound topic assessment</p>	<p>Demonstrate how to perform a binary and linear search</p> <p>State the differences between a merge, binary and insertion sort and why computers use different sorting methods.</p> <p>End of Algorithms topic assessment</p> <p>Explain how computers can be misused and the dangers.</p> <p>MCQs Laws & ethics select items of each law.</p> <p>End of Law and Ethics topic assessment.</p>		
VOCAB	<p>Key terminology:</p> <p>Low Level Language</p> <p>High Level Language</p> <p>1st Generation Language</p> <p>Language Translator</p> <p>Assembler</p> <p>Machine Code</p> <p>Assembly Language</p> <p>2nd Generation Language</p> <p>3rd Generation Language</p> <p>Compiler</p> <p>Interpreter</p> <p>Device Driver</p> <p>Debug</p> <p>Logic Gate</p> <p>Transistor</p> <p>Bit (Binary)</p> <p>Digit)</p> <p>Logic Circuit</p>	<p>Key terminology:</p> <p>Wildcard</p> <p>Primary Key</p> <p>Binary</p> <p>Conversion</p> <p>Bit rate</p> <p>Sample frequency</p> <p>Sample size / bit depth</p> <p>ASCII</p> <p>Bit</p> <p>Conversion</p> <p>Binary</p> <p>Pixels</p> <p>Pixel depth</p> <p>Direct colour</p> <p>Converted</p>	<p>Key terminology: Ethical issues, Legal issues, Cultural issues, Environmental issues, Privacy issues, Stakeholder, Open source software, Proprietary software, Data Protection Act, Computer Misuse Act, Copyright Designs and Patents Act, Creative commons licensing, Freedom of Information Act</p> <p>Computational thinking</p> <p>Decomposition</p> <p>Pattern recognition, Abstraction, Bubble, Insertion and merge sort</p> <p>Binary and linear search</p>		

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