Programme of study for **Year 10 Computer Science**

OCR GCSE (9–1) Computer Science J277 – Component 1: Computer systems (J277/01)

Autumn (1st term) Topic	Autumn (2nd term) Topic	Spring (1st term) Topic	Spring (2nd Term) Topic	Summer (1st term) Topic	Summer (2nd term) Topic
Component 1: **1.1.1 Architecture of the CPU** Purpose of the CPU; fetch–execute cycle; ALU, CU, cache, registers; Von Neumann (MAR, MDR, program counter, accumulator) **1.1.2 CPU performance** Clock speed, cache size, number of cores **1.1.3 Embedded systems** Purpose, characteristics and examples **1.2.1 Primary storage (memory)** RAM, ROM, virtual memory, cache **1.2.2 Secondary storage** Optical, magnetic, solid state; choosing devices for a scenario (capacity, speed, portability, durability, reliability, cost)	**Component 1:** **1.2.3 Units of data storage** Bit to petabyte; capacity calculations; file-size calculations for text, images and sound (taught once each data type is understood) **1.2.4 Data storage** Numbers: denary, binary and hex conversion, binary addition and overflow, binary shifts. Characters: character sets, ASCII, Unicode. Images: pixels, colour depth, resolution, metadata. Sound: sampling, sample rate, bit depth, duration **1.2.5 Compression** Need for compression; lossy and lossless	**Component 1:** **1.3.1 Networks and topologies** LAN and WAN; performance factors; client-server and peer-to-peer; network hardware; the Internet, DNS, hosting, the Cloud; star and mesh topologies **1.3.2 Wired and wireless networks, protocols and layers** Ethernet, Wi-Fi, Bluetooth; encryption; IP and MAC addressing; standards; TCP/IP, HTTP, HTTPS, FTP, POP, IMAP, SMTP; layers	**Component 1:** **1.4.1 Threats to computer systems and networks** Malware; social engineering (phishing); brute-force; denial of service; data interception and theft; SQL injection (concept) **1.4.2 Identifying and preventing vulnerabilities** Penetration testing; anti-malware; firewalls; user access levels; passwords; encryption; physical security **1.5.1 Operating systems** User interface; memory management and multitasking; peripheral management and drivers; user management; file management **1.5.2 Utility software** Encryption, defragmentation, data compression	**Component 1:** **1.6.1 Ethical, legal, cultural and environmental impacts of digital technology** Ethical, legal, cultural, environmental and privacy issues; Data Protection Act 2018; Computer Misuse Act 1990; Copyright, Designs and Patents Act 1988; open source and proprietary licences **Component 1 retrieval** Extended-response practice linking 1.1–1.6; command words	**Component 1:** **Component 1 consolidation and exam preparation** Retrieval across 1.1–1.6, driven by assessment data; non-calculator practice (conversions, file sizes); scenario and extended-response technique **End of year assessment** Full J277/01-style paper
End of term 1 evidence to cover: J277/01-style assessment on 1.1 Systems architecture and 1.2 Memory and storage. Includes non-calculator binary, hex and file-size questions and a scenario question comparing storage devices.		**End of term 2 evidence to cover:** J277/01-style assessment on 1.3 Networks, 1.4 Network security and 1.5 Systems software, with retrieval questions from 1.1 and 1.2. Includes a recommend-and-justify question on a network or connection scenario.		**End of year evidence to cover:** Full J277/01-style paper (80 marks, 1 hour 30 minutes, non-calculator) covering 1.1–1.6, including extended-response questions. Results are used to set Year 11 retrieval priorities.	

Rationale for sequence:	**Rationale for sequence:**	**Rationale for sequence:**	**Rationale for sequence:**	**Rationale for sequence:**	**Rationale for sequence:**
Starts from the processor and moves outwards: CPU, then performance and embedded systems, then the memory the CPU reads from, then secondary storage where data is kept. This builds directly on Year 9 Systems Architecture, so students meet GCSE depth (fetch–execute cycle, registers) from a familiar starting point. Storage devices and capacity are introduced here so that data units make sense in the next half-term.	Follows secondary storage, so students already know why capacity and units matter. Number skills come first (binary, hex, addition, shifts) because characters, images and sound are all built on binary. File-size calculations come once images and sound are understood, and compression follows as the answer to "files are too big". Completes 1.2, so the end of term 1 assessment covers two whole sections of the specification.	Moves from a single computer to computers connected together. 1.3.1 (what a network is and the hardware it needs) comes before 1.3.2 (how data travels: connections, addressing, protocols, layers). Bandwidth, packets and file sizes link back to data units from term 1.	Security follows networks because most threats (interception, denial of service, phishing) happen across networks, and encryption is already met in 1.3.2. Builds on Year 9 Cybersecurity. Systems software follows because OS user management links to access levels and passwords, and utility encryption and compression link back to 1.4.2 and 1.2.5. Completes the content for the end of term 2 assessment.	The impacts of digital technology are taught after the technology itself, so students can discuss real examples. Legislation links to earlier content (Computer Misuse Act to hacking and malware; Data Protection Act to data theft and privacy). The discussion-based content builds extended writing, which the exam rewards.	All Component 1 content is now taught. This half-term is for retrieval, closing gaps found in assessment data and exam technique, so students enter Year 11 with a secure Component 1 base while Year 11 focuses on Component 2.
Home – Learning: Retrieval quizzes on the CPU and fetch–execute cycle; exam-style scenario question comparing storage devices.	Home – Learning: Binary, denary and hex conversion practice (non-calculator); file-size calculation sheet. Optional: write a Python converter or file-size calculator.	Home – Learning: Draw and label star and mesh networks for a scenario; protocol and layer flash cards; wired v wireless recommendation question.	Home – Learning: Research a recent cyber attack: classify the threat and suggest prevention methods; OS v utility software comparison table.	Home – Learning: Extended-response case study: choose a technology and discuss its ethical, legal, cultural, environmental and privacy impacts; legislation matching task.	Home – Learning: Personal revision plan built from assessment feedback; exam-style questions on weakest topics; knowledge-organiser retrieval across 1.1–1.6.

Reading / High Quality Text: Specification J277, section 2b: 1.1 Systems architecture and 1.2.1–1.2.2.	Reading / High Quality Text: Specification J277, section 2b: 1.2.3–1.2.5. https://www.teach-ict.com/gcse_computing/ocr/214_representing_data/number/miniweb/pg2.php https://www.teach-ict.com/gcse_computing/ocr/214_representing_data/sound/miniweb/pg3.php https://teach-ict.com/2016/GCSE_Computing/OCR_J276/2_6_data_representation/compression/miniweb/index.php	Reading / High Quality Text: Specification J277, section 2b: 1.3. https://www.teach-ict.com/gcse_new/networks/topologies/miniweb/index.htm https://www.teach-ict.com/2016/GCSE_Computing/OCR_J276/1_5_topologies_protocols_layers/protocols_addressing/miniweb/index.php	Reading / High Quality Text: Specification J277, section 2b: 1.4 and 1.5. https://teach-ict.com/2016/GCSE_Computing/OCR_J276/1_6_network_security/intro_network_security/miniweb/index.php	Reading / High Quality Text: Specification J277, section 2b: 1.6. Current news stories on data breaches, e-waste and AI.	Reading / High Quality Text: Specification J277, section 2b (1.1–1.6). Past papers and mark schemes on the OCR website.
Numeracy: Clock speed (GHz) and storage capacity comparisons (KB to TB); unit conversion.	Numeracy: Binary, denary and hex conversion; binary addition and shifts; powers of 2; file-size calculations.	Numeracy: Bandwidth and transfer time; IPv4 and IPv6 address formats; hex in MAC addresses.	Numeracy: Brute-force: number of possible passwords from character set size and length.	Numeracy: Interpreting data and statistics in case studies (e.g. energy use, e-waste).	Numeracy: Non-calculator exam practice: conversions, file sizes, units.
Enrichment / opportunities to develop cultural capital (including careers, WRL and SMSC): Careers (nationalcareers.service.gov.uk job profiles): hardware and embedded systems engineer (Autumn); network engineer (Spring 1); cyber security analyst (Spring 2); data protection officer (Summer 1). WRL: link hardware, networking and security content to local employers and apprenticeships. SMSC: ethical, cultural and environmental debates in 1.6.					