Year 10 Computer Science	Unit	Substantive Knowledge	Disciplinary Aim	Cultural Capital
Term 1 HT 1	**Theory:** Wifi, Network protocols and Layers **Programming:** Lists	Theory: • Understand star and mesh network topologies • Know the meaning of Wi-Fi and the role of frequency and channels • Understand the need for encrypting data • Know the uses of IP addressing, MAC addressing, and protocols • Understand the concept of network layering • Understand packet switching Programming: • Know how to assign a list to a variable • Know how to append values to a list • Know how Loop through items within a list	Theory: • Compare star and mesh topologies • Discuss Wi-Fi frequency and channels and the need for Wi-Fi encryption • Explain packet switching • Describe IP and MAC addressing • Explain the purpose and difference of network protocols (TCP/IP, HTTP, HTTPS, FTP, POP IMAP, SMTP) • Identify the protocols within the four layer model	**Key words**: star, mesh, ring, bus, network, Wi-Fi, frequency, channels, Ethernet, protocol, ip, mac, tcp, http, https, ftp, pop, imap, smtp, layers, packet, packet switching. **Extra-curricular:** Can you find the IP and MAC addresses of the devices you have at home? How could you find them and what could you find out from them?
Term 1 HT 2	**Theory:** Ethical, Legal, Moral and Environmental Programming: File Writing	Theory: • Understand the involvement different stakeholders have in the use and creation of technology • Understand the environmental, ethical and cultural implications relating to computing technologies • Know the main principles of the Data Protection and the Computer Misuse Act • Understand copyright law and creative commons licensing Programming: • Know how to output data to a text file • Know how to open text files in different modes	Theory: • Investigate and discuss a range of Ethical, Legal, Cultural, Environmental and Privacy issues relating to computer use and the implications this has on stakeholders • State the differences, advantages and disadvantages between open source and proprietary software • Explain the Data Protection Act, the keys roles and the importance of organisations to follow the guidelines when storing personal data • Identify the main points of the Computer Misuse Act	**Key words:** Computer Misuse Act, Data Protection Act, Copyright, Creative Commons, Privacy, Environment, Legal, Cultural, Issues, Licensing, stakeholders. **Extra-curricular:** The BBC news website contains many real world stories relating to the legislation when learn about in this unit of work. Take some time to use this site and read about them!
Term 2 HT 1	Theory: Computational Logic Programming: File Reading	Theory: • Know why data is represented in computer systems in binary form • Know how to produce simple logic diagrams using the operations AND, OR and NOT • Understand Truth tables • Know how to combine Boolean operators using AND, OR and NOT to two levels.	Theory: • Construct a truth table for AND, OR and NOT gates • Explain why we use logic gates • Complete truth tables for logic circuits (2 inputs) • Create logic circuits from Logic Statements (3 inputs) • Predict outputs of logic circuits to the second level	**Key words:** Logic gate, transistor, bit, AND, OR, NOT. **Extra-curricular:** Have a go at the activities at csunplugged.org

		Programming: • Know how to read in data from a text file • Know how to read data into a list • Know how to manipulate the data in a list		
Term 2 HT 2	Theory: Translators & Facilities of Languages Programming: File Writing & Reading	Theory • Know the purpose of translators • Know the characteristics of high and low-level languages • Know the characteristics of an assembler, a compiler and an interpreter • Know the common tools and facilities available in an integrated development environment (IDE) Programming: • Know how to write data and read data from a text file using loops and string methods	Theory: • Describe the differences, advantages and disadvantages between Low Level and High Level Languages • Describe key features of Assemblers, Interpreters and Compilers • Describe the tools and facilities available in an IDE; editors, error diagnostics, run-time environment and translator	**Key words:** Low Level Language, High Level Language, Language Translator, Assembler, Machine Code, Assembly Language, Debug, Complier, Interpreter, Source code, Object code, IDE. **Extra-curricular:** Repl.it and Codecademy are excellent free online courses to revisit Python programming outside of lessons.
Term 3 HT 1	Theory: Data Representation Programming: Challenges	Theory: • Understand binary units • Know how to convert positive denary whole numbers (0-255) into 8 bit binary numbers and vice versa • Know how to convert denary to hexadecimal	Theory • Define the units bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte, petabyte.	**Key words:** Binary, Denary, Conversion, Transistor, Bit Binary, Denary, Conversion, Transistor, Bit, Nibble, Byte, Kilobyte, Megabyte, Gigabyte, Terabyte, Petabyte. **Extra-curricular:** Repl.it and Codecademy are excellent free online courses to revisit Python programming outside of lessons.
Term 3 HT 2	Theory: Data Representation Programming: Challenges	Theory: • Understand check digits • Understand characters sets (ASCII) • Understand how a digital image is made up and be able to recognise the affect changing the resolution has on an image • Know the difference between lossy and lossless compression	Theory: • Understand how a computer displays coloured images using binary and rgb values • Understand the factors that affect how sound is stored and how this affects the memory needed for storage. • explain the use of binary codes to represent characters • describe with examples (for example ASCII and Unicode) the relationship between the number of bits per character in a character set and the number of characters which can be represented • Understand and be able to explain why the factors affect memory storage and how this can be overcome through file compression	**Key words:** Character, Unicode, ASCII, Pixels, Pixel depth, Direct colour, Converted, Bit rate, Sample frequency, Sample size / bit depth, Compression, Lossy, Lossless, Compression, MPEG, JPEG, Attachment **Extra-curricular:** Looking at saved images on your computer, what can you tell from the file size and type of image?