

Computer Science



Year 10 Curriculum Map



Year 10 – Autumn Term OCR GCSE Computer Science


Prior Learning	<p>Pupils have previously studied cyber security and social media in the Autumn term of year 8. Network security builds on this prior knowledge, focusing on evaluative questioning techniques required for GCSE level. Prior learning is essential as this unit of work intends to interleave with the fundamentals of security threats studied in year 8, based on Malware, Security and preventative measures for online safety. In year 9, pupils discover the impacts that digital technology has in terms of culture, environment, legislation, ethics and morals have on a wider society. The Ethical, Legal, Environmental and Cultural Impacts unit draws on the skills, knowledge and understanding from key stage 3 and investigates deeper learning into the hidden and somewhat over-looked impacts the digital revolution has on our society as a whole.</p>
What will I learn?	<p>Threats to Computer Networks and Systems Pupils will develop an understanding of the possible threats to devices and computers such as define the meaning of blagging, shouldering, phishing and pharming, identify the key indicators and provide a solution on how to avoid. Pupils will need to be able to define the term 'malware', list different types and describe prevention techniques such as anti-malware software and Firewalls</p> <p>Ethical, Legal, Environmental and Cultural Impacts - Pupils will develop and understanding of key cultural issues of computer science, the impact of technology on our daily lives. Pupils will develop an understanding of the ethical issues of computing and the impact of computing on people, by discussing cultural and ethical issues surrounding the use of technology. Pupils will know the laws and principles of the Acts of Parliament based on computing and data such as Data Protection Act 2018, Computer Misuse Act 1990 and Copyright Designs and Patents Act 1988. They will understand issues related to privacy and computer technologies. Pupils will know the difference between open source and proprietary software and understand the implications of using them.</p>
How will I be assessed?	<p>Formal Assessments - Each unit of work is assessed with a written examination on completion.</p> <p>Formative Assessment - will take place as part of recall and retrieval practice, low stakes testing, self and peer assessment to identify gaps in knowledge, monitoring and tracking progress throughout.</p>
Next Steps	<p>Network Security offers real-life examples of how to identify, detect and prevent threats related to cyber security. Building on this unit of work and prior learning at key stage 3 when pupils are exposed to key terms such as social engineering and malware, they will have a better understanding of the threats that computer networks and systems face.</p> <p>Ethical, legal, environmental and cultural impacts of digital technology provide pupils with the essential skills, knowledge and understanding on the impacts of technology with essential real-world examples regarding censorship, the internet, ethical and moral practices and those policies that legislate the technological world.</p>
Opportunities for Independent Learning	<p>https://student.craigndave.org/videos/slr1-1-systems-architecture https://student.craigndave.org/videos/slr1-2-memory-and-storage https://student.craigndave.org/videos/slr1-3-computer-networks-connections-and-protocols https://student.craigndave.org/videos/slr1-4-network-security https://student.craigndave.org/videos/slr1-5-systems-software https://student.craigndave.org/videos/slr1-6-ethical-legal-cultural-and-environmental-concerns www.gcsepod.com – Preparing for Computer Science at KS4</p>

	<p>www.educake.co.uk – formal and informal testing for pupils. www.quizizz.com – interactive learning for pupils with a competitive edge. https://www.youtube.com/playlist?list=PLCiOXwirraUAehj4TUjMxYm4593B2dUPF – OCR GCSE Computer Science videos based on the J277 specification.</p>
<p>Personal Development and CEIAG</p>	<p>Whilst studying various aspects of computing pupils are asked to reflect on how different cultures are portrayed on the internet and why or who is portraying them in this way. Pupils are also challenged to think about how differing cultures access and use the internet and what implications this has on the individual and the culture. Jobs directly related to your degree include:</p> <ul style="list-style-type: none"> • Application analyst • Applications developer • Cyber security analyst • Data analyst • Forensic computer analyst • Game designer • Games developer • Machine learning engineer • Penetration tester • Software engineer • Systems analyst • UX designer • Web designer • Web developer <p>Jobs where your degree would be useful include:</p> <ul style="list-style-type: none"> • Business analyst • IT sales professional • IT trainer • Nanotechnologist • Network engineer • Telecommunications researcher <p>Further Career Research https://icould.com/explore/categories/subject/computing/</p>
<p>Enrichment Opportunities (Cultural Capital)</p>	<p>The Computer Science department have put together a list of enrichment opportunities available: Computer Science Club – Lunchtime activities to build coding skills. Arcade Gaming Centre, Bury – https://www.arcadecenter.co.uk/bury/ Belong Gaming Arenas, Nationwide - https://www.belong.gg/ The following movies and TV Shows will further enhance the knowledge and understanding of key topic areas:</p> <ul style="list-style-type: none"> • Steve Jobs (Digital Revolution)

	<h2>Year 10 – Spring Term</h2>
<p>Prior Learning</p>	<p>Systems Architecture links back to year 8, where pupils explore the fundamentals of Systems Architecture, Memory and Storage. Pupils complete project-based learning based on the difference between Hardware and Software, Computer Components, Peripheral Devices and Storage. Memory and storage links back to the year 8 and year 9 programmes of study where pupils explore the basics of memory and storage in terms of Data Representation, Binary Digits, Binary Conversion and Hexadecimal. This unit of work also has strong cross-curricular links with Maths.</p>

<p>What will I learn?</p>	<p>Systems Architecture Pupils need to be able to explain the purpose of the CPU in terms of its role and operation, and its components and their function. Also, how common characteristics of CPUs affect their performance such as clock speed, cache size, number of cores. Pupils explore the purpose and examples of embedded systems and understand the difference between RAM and ROM and their purpose in a computer system. Pupils will discuss why virtual memory is required and the need for secondary storage.</p> <p>Memory and Storage Pupils need to explain why all data needs to be converted to binary before it can be processed and how to convert positive denary whole numbers (0-255) into 8-bit binary numbers and vice versa. Pupils can explain how to add two binary numbers and explain what overflow errors are, a check digit is and how to calculate one. Pupils will discover why hexadecimal numbers are used to represent binary data and how to convert between binary and hexadecimal.</p>
<p>How will I be assessed?</p>	<p>Formal Assessments - Each unit of work is assessed with a written examination on completion.</p> <p>Formative Assessment - will take place as part of recall and retrieval practice, low stakes testing, self and peer assessment to identify gaps in knowledge, monitoring and tracking progress throughout.</p>
<p>Next Steps</p>	<p>With Systems Architecture, pupils must be able to apply the practical knowledge gained in this unit to a practical programming scenario. Pupil will need to complete a 20-hour practical programming task over the two-year course. Elements of Systems Architecture links with Systems Software in terms of embedded systems and pupils having the opportunity to design create and develop a GUI.</p> <p>Memory and Storage is the basis for pupils developing an understanding of using units of data which is essential learning as binary, hexadecimal and units of data storage takes a holistic approach through the OCR GCSE Computer Science curriculum.</p>
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<p>Personal Development and CEIAG</p>	<p>Computing helps pupils to explore aspects of real and imaginary situations and enables them to reflect on the possible consequences of different actions and situations.</p> <p>Jobs directly related to your degree include:</p> <ul style="list-style-type: none"> • Application analyst • Applications developer • Cyber security analyst • Data analyst • Forensic computer analyst • Game designer • Games developer

	<ul style="list-style-type: none"> • Machine learning engineer • Penetration tester • Software engineer • Systems analyst • UX designer • Web designer • Web developer <p>Jobs where your degree would be useful include:</p> <ul style="list-style-type: none"> • Business analyst • IT sales professional • IT trainer • Nanotechnologist • Network engineer • Telecommunications researcher <p>Further Career Research - https://icould.com/explore/categories/subject/computing/</p>
<p>Enrichment Opportunities (Cultural Capital)</p>	<p>The Computer Science department have put together a list of enrichment opportunities available:</p> <p>Computer Science Club – Lunchtime activities to build coding skills. Arcade Gaming Centre, Bury – https://www.arcadecub.co.uk/bury/ Belong Gaming Arenas, Nationwide - https://www.belong.gg/</p> <p>The following movies and TV Shows will further enhance the knowledge and understanding of key topic areas:</p> <ul style="list-style-type: none"> • Interstellar (Binary)

	<h2>Year 10 – Summer Term</h2>
<p>Prior Learning</p>	<p>Computers Network, Connections and Protocols provides the opportunity for pupils to recall their learning from the year 7 programme of study where pupils explore the basics of using cloud-based technologies to work collaboratively with their peers. The year 7 programme of study provides the fundamental basis of using networks to achieve a common goal, building skills knowledge and understanding of local and wide area networks.</p> <p>System Software draws upon the skills, knowledge and understanding of creating a user-friendly graphical user interface in year 8, linking with the fundamentals of Peripherals and their uses. This unit also links back the year 9 programme of study, Boolean Logic and Hexadecimal, laying the foundation to improve their knowledge and understanding based on logic diagrams and truth tables.</p>
<p>What will I learn?</p>	<p>Computer Networks, Connections and Protocols</p> <p>Pupils will study types of networks: LAN (Local Area Network), WAN (Wide Area Network) and the factors that affect the performance of networks. They will look at the different roles of computers in a client-server and a peer-to-peer network along with the hardware needed to connect stand-alone computers into a Local Area Network: Wireless access points, Routers, Switches, NIC, Transmission media. Pupils will explore the Internet as a worldwide collection of computer networks: DNS (Domain Name Server), Hosting, The Cloud, Webservers and Clients. Pupils will be able to explain the different modes of connection: Wired - Ethernet, Wireless - Wi-Fi, Bluetooth along with encryption, IP addressing and MAC addressing. Pupils will be able to explain the common protocols including: TCP/IP (Transmission Control Protocol/Internet Protocol), HTTP (Hyper Text</p>

	<p>Transfer Protocol), HTTPS (Hyper Text Transfer Protocol Secure), FTP (File Transfer Protocol), POP (Post Office Protocol), IMAP (Internet Message Access Protocol), SMTP (Simple Mail Transfer Protocol)</p> <p>System Software Pupils will study about user interface, memory management and multitasking, peripheral management and drivers, user management and file management.</p> <p>Boolean Logic Pupils will study simple logic diagrams using the operations AND, OR and NO, Truth tables, combining Boolean operators using AND, OR and NOT and applying logical operators in truth tables to solve problems.</p>
<p>How will I be assessed?</p>	<p>Formal Assessments - Each unit of work is assessed with a written examination on completion.</p> <p>Formative Assessment - will take place as part of recall and retrieval practice, low stakes testing, self and peer assessment to identify gaps in knowledge, monitoring and tracking progress throughout.</p>
<p>Next Steps</p>	<p>The Networks unit provide pupils with the key terms such as standards, protocols, and offers pupils an insight into real world examples of setting up and maintaining computer networks. The Systems Software unit links heavily with Systems Architecture and provides pupils with the opportunity to study technical aspects of user interface and encryption techniques.</p>
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<p>Personal Development and CEIAG</p>	<p>Computing provides opportunities for reflection of awe and wonder about the achievements in ICT today and the possibilities for the future. Computer Science lets pupils have the opportunity to reflect on how computers can sometimes perform better in certain activities than people. To promote pupils’ spiritual development, their sense of self and their will to achieve, the computing department continually takes the opportunity to praise students for their contribution in lessons.</p> <p>Jobs directly related to your degree include:</p> <ul style="list-style-type: none"> • Application analyst • Applications developer • Cyber security analyst • Data analyst • Forensic computer analyst • Game designer • Games developer • Machine learning engineer • Penetration tester • Software engineer • Systems analyst • UX designer

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