



All Saints' Catholic High School

Luceat lux Vestra

Subject: Computer Science GCSE

Year: 11

11	Unit 8- Impact of Technology	Unit 9- Networks	Unit 1- Security	Unit 4 – Databases & SQL	Unit 5 – Programming Part 6 – Dictionaries and Data Files	Unit 6 -HTML
Aim of Unit	Determine the ethical, legal, environmental, and cultural impacts of technology.	Understand key network components. Explain connectivity and distinguish between the various types. Describe the four layers of the TCP/IP model. Protect a network from threats.	Understand the various ways that users and organisations can be affected by cyberattacks. Demonstrate how organisations can prevent cyberattacks.	Understand a database and list its key terms. Determine the difference between a flat file and a relational database. Use structured query language (SQL) to retrieve and update data in a database.	Define the term 'graphical user interface' (GUI). Perform string handling operations. Describe the differences between a list and an array. Manipulate a list. Work with 2D lists. Use a record and a dictionary data structure. Access and modify external data files. Complete a complex programming project. Essential programming theory is also interleaved into the practical elements of programming to provide tangible links	Create a website using HTML and CSS.

					between required knowledge and skills.	
<p>Composite Knowledge</p> <p><i>(a task that requires several building blocks or components)</i></p>	<p>This unit has been designed to enable students to gain knowledge and understanding of the impact of technology on individuals, organisations, and the planet. Through a range of real-world examples, they will learn how to identify the specific type of impact, i.e. legal, cultural, privacy, environmental, and ethical. They will then progress to identifying stakeholders who are impacted by technology, and learn how these impacts are experienced, negated, or adapted to. Throughout the unit, students will be encouraged to discuss their views and make use of sample long-form answers as either cloze or comprehension exercises, to further develop their rhetorical skills. Lastly, they will complete an assessment and identify which of the technologies that they have studied they</p>	<p>Computer networks have become an integral part of our daily lives. This unit allows students to explore how a computer network works from the hardware required to the protocols used for communication. It also allows them to explore simulations of networks using Packet Tracer software. Packet Tracer is free for schools to use and is used in universities to train network engineers.</p>	<p>This unit enables GCSE students to gain knowledge and understanding of the range of cybersecurity threats that impact the world, our organisations, and us as individuals. The students start by defining fundamental terms, such as cybersecurity and network security. They then progress to understanding different forms of attack, both non-automated and automated. Examining the different techniques used by social engineers (perpetrating non-automated attacks) enables the students to protect themselves against tactics such as blagging, phishing, and pharming. They also learn about automated cybercrime, including denial-of-service (DoS) attacks and SQL injection.</p>	<p>This unit introduces students to the world of databases and SQL. Students explore the key terms used in a database and learn why relational databases are used to eliminate the redundancy and inconsistencies that can occur in a flat file database. Next, they explore increasingly challenging SQL commands where they retrieve, update, and delete data in a relational database.</p>	<p>This extensive programming unit takes students from being novices in unit 1,2 & 3 to having the confidence to tackle more advanced programming challenges with the introduction of lists and dictionaries.</p>	<p>In this unit students will gain an understanding of how websites are displayed within a browser using HTML and CSS. Starting with an introduction to how websites are requested and delivered to our computer via the internet and the World Wide Web, students will go on to study how to create the structure of a website using HTML and change the styling using CSS.</p>

	believe to have had the most negative or positive effect on our society as a whole.					
<p>Component Knowledge</p> <p><i>(the building blocks that together, when known, allow successful performance of a complex task)</i></p>	<p>Apply the terms ‘privacy’, ‘legal’, ‘ethical’, ‘environmental’, and ‘cultural’.</p> <p>Explain data legislation, including an organisation’s obligation to protect and supply data.</p> <p>Explain the term ‘stakeholder’.</p> <p>Explain the right to be forgotten or privacy.</p> <p>Distinguish the differences between legitimate creative uses and clear infringement of material subject to copyright. Explain the Freedom of Information Act.</p> <p>Define ‘computer misuse’ and the associated offences.</p> <p>Identify situations that would be classified as an offence under the Act. Define ‘downtime’ and explain the associated impact on an organisation.</p>	<p>Define a computer network.</p> <p>Discuss the advantages and disadvantages of computer networks.</p> <p>Describe the role of a computer in a peer-to-peer network. Describe the role of a computer in a client–server network.</p> <p>Describe the purpose of a PAN, LAN, and a WAN. Describe the tasks performed by the network hardware: wireless access point, router, switch, hub, NIC, and bridge</p> <p>Define a MAC address.</p> <p>Draw and describe a star, bus, mesh, and ring topology.</p> <p>Describe the advantages and disadvantages of the star, bus, mesh, and ring topologies. Define a wired and a wireless network.</p> <p>Define transmission media.</p>	<p>Assess the impact of cybercrime on businesses and individuals.</p> <p>Analyse an attack on a company and identify what motivated the hackers.</p> <p>Define the terms cybersecurity and network security.</p> <p>Explain their importance, and distinguish between the two concepts.</p> <p>Describe the features of a network that make it vulnerable to attack.</p> <p>Identify and describe non-automated forms of cyberattacks, and learn how humans can be the weak links in an organisation.</p> <p>Demonstrate knowledge of social engineering through role playing activities and case studies.</p> <p>Describe automated forms of cyberattacks.</p>	<p>Describe a database</p> <p>Define database key terms (table, record, field, primary key, foreign key)</p> <p>Describe a flat file database. Describe a relational database.</p> <p>Describe the function of SQL. Use SQL to retrieve data from a table in a relational database.</p> <p>Use SQL to retrieve data from more than one table in a relational database. Describe the function of different data types.</p> <p>Use SQL to insert, update, and delete data in a relational database.</p> <p>Interrogate and update an existing database.</p>	<p>Define the term GUI.</p> <p>Import third-party libraries. Use ‘guizero’ to create an event-driven program that uses a GUI. Describe the function of string operators. Use string-handling techniques.</p> <p>Use ‘for’ loops with string operations. Use a substring in a program.</p> <p>Use the ‘in’ operator to check for a substring.</p> <p>Use chr() and ord() to perform ASCII conversions. Define a data structure.</p> <p>Define a list and an array. Describe the differences between lists and arrays.</p> <p>Use a list in a program. Append to a list.</p> <p>Traverse a list of elements. Use list methods. Create a function that returns a list. Import custom-built functions. Use lists to display output on a physical</p>	<p>Describe the purpose of HTML and tags when designing a website.</p> <p>Create a simple webpage using basic tags.</p> <p>Describe what is meant by the term ‘accessibility’.</p> <p>Extend an HTML page to include: Images Hyperlinks <a href>. Identify the common features of existing websites and the basics of what makes good web design.</p> <p>Design and create pages for a mini website.</p> <p>Create hyperlinks between pages stored locally within a folder.</p> <p>Insert images stored locally within a folder.</p> <p>Describe the purpose of CSS and why it is needed in addition to HTML. Experiment with CSS by changing the style of the tags learnt so far in this unit. Describe the purpose of DIV tags.</p>

	<p>Explain what is meant by the ‘digital divide’ and measures to mitigate its effect. Identify positive and negative aspects of the use of mobile technology. Identify the implications of having personal data online. Explain the social and environmental impacts of social media. Explain the positive and negative effects of online content. Explain the environmental effects of the use of technology. Explain the ethical issues surrounding the use of AI in society. Explain the ethical impact of using algorithms to make decisions.</p>	<p>Describe the attributes of fibre optic and copper cables used in wired networks. Describe Bluetooth as a mode of connection. Discuss the advantages and disadvantages of wireless networks compared to wired networks. Describe the factors that affect network performance (bandwidth, range, latency, number of devices). Determine how network speeds are measured and construct expressions involving file size, transmission rate, and time. Determine methods of routing traffic on a network and calculation of routing costs. Describe the internet as a network of computer networks. Describe the function of an IP address. Describe a DNS and its role in the conversion of a URL to an IP address. Describe how servers are used for hosting services across the internet.</p>	<p>Analyse a real cyberattack and identify the network or software weaknesses that enabled it to happen. Explain the need for, and the importance of, network security. Explain several methods of achieving network security. Describe different methods of identifying cybersecurity vulnerabilities, such as: Penetration testing, Ethical hacking, Network forensics, Commercial analysis tools, review of network and user policies. Evaluate the potential for cybersecurity careers.</p>		<p>computing device. Use randomisation to append items to a list. Define a 2D array and a list. Use a 2D list in a program. Describe the record data structure. Use a dictionary to represent a record in a program. Use a dictionary with a list to represent records in a database. Describe the dictionary data structure and determine the purpose of external data files. Read data from an external text file; write to text files; append to text files; describe a CSV file; read from a CSV file. Use the split() method and select data from a collection of values. Write data from a 1D list to a CSV file and write data from a 2D list to a CSV file.</p>	<p>Apply knowledge of CSS to DIVs within webpages using classes. Construct a three-page website to showcase the skills learnt throughout this unit of study. Self/peer evaluate the produced webpage using a rubric.</p>
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		<p>Describe that the IP protocol operates at the internet layer.</p> <p>Describe the typical contents of a TCP/IP packet and packet switching. Describe the purpose of each layer in the seven-layer Open Systems Interconnection model (OSI model).</p> <p>Describe the use of contemporary networking protocols in the seven-layer OSI model.</p>				
<p>Rationale (why?): Links to prior & future learning</p>	<p>Develop their capability, creativity and knowledge in computer science, digital media and information technology. Understand key aspects of the law governing data use (e.g. DPA, GDPR) and can give examples of those laws and the impact they have on a person's data rights (e.g. RTBF, data breaches). They can contribute to an</p>	<p>Develop and apply their analytic, problem-solving, design, and computational thinking skills learnt in earlier units. Links with unit 8 and the impact of technology. With unit 9 & 10 we go deep into the need for security and networks. Good foundation to support a potential career in cyber security.</p>	<p>Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns. This unit progresses learners' knowledge and understanding of the dangers that threaten IT systems, as well as methods of protection against such threats. It enables students to gain knowledge and understanding of the</p>	<p>This unit introduces students to the world of databases and SQL. Students explore the key terms used in a database and learn why relational databases are used to eliminate redundancy and inconsistencies that can occur in a flat file database. They explore increasingly challenging SQL commands where they retrieve, update and delete data in a relational database.</p>	<p>This creates thinking and programming skills that are extremely attractive in the modern workplace. It builds on the programming concepts from KS2 & KS3: sequence, selection and iteration. The language is a Text one ie Python (used in KS3). An interpreter is necessary in order to translate and execute any Python program. An elementary</p>	<p>This unit is designed to develop their capability, creativity, and knowledge in computer science, digital media, and information technology. In this unit students will gain an understanding of how websites are displayed within a browser using HTML and CSS; starting with an introduction to how websites are requested and delivered to our computer via the internet and the World Wide Web.</p>

	informed debate concerning the balance between national security and safeguarding as against personal privacy.		range of cybersecurity threats impacting the world, our organisations, as well as us as individuals. Students will explore security measures that can be put in place to protect networks and your data against different forms of automated and non-automated forms of attack. Once they have understood the impact of cybercrime, they will be inspired to be part of the solution; pupils learn about the potential for lucrative and fulfilling careers in cybersecurity.		conceptual understanding of what happens when the interpreter is invoked is necessary for learners.	
Assessment Task	A series of individual exam questions on each building block of the unit with a final summative assessment to be used at the end of the unit.	A series of individual exam questions on each building block of the unit with a final summative assessment to be used at the end of the unit.	A series of individual exam questions on each building block of the unit with a final summative assessment to be used at the end of the unit.	A series of individual exam questions on each building block of the unit with a final summative assessment to be used at the end of the unit.	A series of individual exam questions on each building block of the unit with a final summative assessment to be used at the end of the unit. Battle boats scenario used with an assessment rubric.	A series of individual exam questions on each building block of the unit with a final summative assessment to be used at the end of the unit.
Enrichment	Debating competition on the balance between national security and privacy.	Explore simulations of networks using Packet Tracer software. Packet Tracer is free to use and is used in	Outside speaker on careers in cybersecurity. National competition organised	Hack into a on-line database using SQL injection. Explore the role of ethical hackers.	Sign up to a python programming course with an industry recognised qualification.	Build a functioning website.

		universities to train network engineers.	by GCHQ on code breaking.			
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