

Curriculum Map 2020-2021

Subject: Computing

		Term 1 (Aug-Oct)
Year 7	Unit title	Impact of technology
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Create a memorable and secure password for an account on the school network • Remember the rules of the computing lab • Find personal documents and common applications • Recognise a respectful email • Construct an effective email and send it to the correct recipients • Plan effective presentations for a given audience • Describe cyberbullying • Explain the effects of cyberbullying • Plan effective presentations for a given audience • Describe cyberbullying • Explain the effects of cyberbullying • Check who you are talking to online
	Further learning	
	Other information	
Year 8	Unit title	Representations
	Personalised Learning Checklist	<ul style="list-style-type: none"> • List examples of representations • Recall that representations are used to store, communicate, and process information • Provide examples of how different representations are appropriate for different tasks • Recall that characters can be represented as sequences of symbols and list examples of character coding schemes • Measure the length of a representation as the number of symbols that it contains • Provide examples of how symbols are carried on physical media • Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters • Measure the size or length of a sequence of bits as the number of binary digits that it contains • Describe how natural numbers are represented as sequences of binary digits • Convert a decimal number to binary and vice versa • Convert between different units and multiples of representation size • Provide examples of the different ways that binary digits are physically represented in digital devices
	Further learning	
	Other information	
Year 9	Unit title	Python programming

	Personalised Learning Checklist	<ul style="list-style-type: none"> •Write programs that display messages, receive keyboard input, and use simple arithmetic expressions in assignment statements •Use selection (if-elif-else statements) to control the flow of program execution •Locate and correct common syntax errors •Create lists and access individual list items •Perform common operations on lists or individual items •Use iteration (while statements) to control the flow of program execution •Perform common operations on lists or individual items •Perform common operations on strings or individual characters •Use iteration (for statements) to iterate over list items •Perform common operations on lists or strings •Use iteration (for loops) to iterate over lists and strings •Use variables to keep track of counts and sums •Combine key programming language features to develop solutions to meaningful problems
	Further learning	
	Other information	
Year 10 BTEC DIT	Unit title	Comp 1: LAA Investigating UIs
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Identify design principles used in two different types of user interfaces with an example for each interface. • Identify ways that the user interfaces meet user needs with one example for each interface. • Describe the design principles used in two different types of user interface with some examples for each interface. • Describe ways that the user interfaces meet user needs with some examples. • Explain how two different types of user interface meet design principles with some relevant examples. • Explain how the user interfaces meet user needs with some relevant examples. • Analyse how two different types of user interface meet the design principles and user needs with relevant detailed examples. • Assess how effectively two different types of user interface meet the design principles and user needs with justified examples.
	Further learning	
	Other information	Some content will need face-to-face teaching and software available in school, (can't guarantee students have access at home).
Year 11 BTEC DIT	Unit title	Comp 2: LAA Investigating use of data
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Identify data collection methods across two sectors. • Identify data that is used to make decisions across two different sectors. • Describe data collection methods across two sectors. • Describe data that is used to make decisions across two sectors.

		<ul style="list-style-type: none"> • Explain how data collection methods and their features affect the quality of data across two sectors, with relevant examples. • Explain how data is used to make decisions across two sectors, with relevant examples. • Discuss data collection methods and features used and how they affect the quality of data and decision making in two sectors, drawing justified conclusions. • Assess data collection methods and features used and how they affect the quality of data and decision making in two sectors, drawing detailed justified conclusions.
	Further learning	
	Other information	Some content will need face-to-face teaching and software available in school, (can't guarantee students have access at home).
Year 11 GCSE Compu ter Science	Unit title	P2 - Data representation
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Understand the following number bases: <ol style="list-style-type: none"> 1. decimal (base 10) 2. binary (base 2) 3. hexadecimal (base 16). • Understand that computers use binary to represent all data and instructions. • Explain why hexadecimal is often used in computer science. • Understand how binary can be used to represent whole numbers. • Understand how hexadecimal can be used to represent whole numbers. • Be able to convert in both directions between: <ol style="list-style-type: none"> 1. binary and decimal 2. binary and hexadecimal 3. decimal and hexadecimal. • Know that: <ol style="list-style-type: none"> 1. a bit is the fundamental unit of information 2. a byte is a group of 8 bits. • Know that quantities of bytes can be described using prefixes. • Know the names, symbols and corresponding values for the decimal prefixes: <ol style="list-style-type: none"> 1. kilo, 1 kB is 1,000 bytes 2. mega, 1 MB is 1,000 kilobytes 3. giga, 1 GB is 1,000 Megabytes 4. tera, 1 TB is 1,000 Gigabytes. • Be able to add together up to three binary numbers. • Be able to apply a binary shift to a binary number. • Describe situations where binary shifts can be used.

		<ul style="list-style-type: none"> • Understand what a character set is and be able to describe the following character encoding methods: <ol style="list-style-type: none"> 1. 7-bit ASCII 2. Unicode. • Understand that character codes are commonly grouped and run in sequence within encoding tables. • Describe the purpose of Unicode and the advantages of Unicode over ASCII. • Know that Unicode uses the same codes as ASCII up to 127. • Understand what a pixel is and be able to describe how pixels relate to an image and the way images are displayed. • Describe the following for bitmaps: <ol style="list-style-type: none"> 1. size in pixels 2. colour depth. • Know that the size of a bitmap image in pixels (width x height) is known as the image resolution. • Describe how a bitmap represents an image using pixels and colour depth. • Describe using examples how the number of pixels and colour depth can affect the file size of a bitmap image. • Calculate bitmap image file sizes based on the number of pixels and colour depth. • Convert binary data into a black and white image. • Convert a black and white image into binary data. • Understand that sound is analogue and that it must be converted to a digital form for storage and processing in a computer. • Understand that sound waves are sampled to create the digital version of sound. • Describe the digital representation of sound in terms of: <ol style="list-style-type: none"> 1. sampling rate 2. sample resolution. • Calculate sound file sizes based on the sampling rate and the sample resolution.
	Further learning	
	Other information	Some content will need face-to-face teaching and software available in school, (can't guarantee students have access at home). Also, They may have to do a supervised 20-hour project in school (though I can see this requirement being removed).

		Term 2 (Nov - Dec)
Year 7	Unit title	Modelling data using spreadsheets
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Identify columns, rows, cells, and cell references in spreadsheet software • Use formatting techniques in a spreadsheet • Use basic formulas with cell references to perform calculations in a spreadsheet (+, -, *, /) • Use the autofill tool to replicate cell data • Explain the difference between data and information • Explain the difference between primary and secondary sources of data • Collect data • Analyse data • Create appropriate charts in a spreadsheet • Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet • Analyse data • Use a spreadsheet to sort and filter data • Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet • Use conditional formatting in a spreadsheet • Apply all of the spreadsheet skills covered in this unit
	Further learning	
	Other information	
Year 8	Unit title	Introduction to Python
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Describe what algorithms and programs are and how they differ • Recall that a program written in a programming language needs to be translated in order to be executed by a machine • Write simple Python programs that display messages, assign values to variables, and receive keyboard input • Locate and correct common syntax errors • Describe the semantics of assignment statements • Use simple arithmetic expressions in assignment statements to calculate values • Receive input from the keyboard and convert it to a numerical value • Use relational operators to form logical expressions • Use binary selection (if, else statements) to control the flow of program execution • Generate and use random integers • Use multi-branch selection (if, elif, else statements) to control the flow of program execution • Describe how iteration (while statements) controls the flow of program execution • Use iteration (while loops) to control the flow of program execution • Use variables as counters in iterative programs

		<ul style="list-style-type: none"> • Combine iteration and selection to control the flow of program execution • Use Boolean variables as flags
	Further learning	
	Other information	
Year 9	Unit title	Audiovisual representations
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Describe how digital images are composed of individual elements • Recall that the colour of each picture element is represented using a sequence of binary digits • Define key terms such as ‘pixels’, ‘resolution’, and ‘colour depth’ • Describe how an image can be represented as a sequence of bits • Describe how colour can be represented as a mixture of red, green, and blue, with a sequence of bits representing each colour’s intensity • Compute the representation size of a digital image, by multiplying resolution (number of pixels) with colour depth (number of bits used to represent the colour of individual pixels) • Describe the trade-off between representation size and perceived quality for digital images • Perform basic image editing tasks using appropriate software and combine them in order to solve more complex problems requiring image manipulation • Explain how the manipulation of digital images amounts to arithmetic operations on their digital representation • Describe and assess the creative benefits and ethical drawbacks of digital manipulation (Education for a Connected World) • Recall that sound is a wave • Explain the function of microphones and speakers as components that capture and generate sound • Define key terms such as ‘sample’, ‘sampling frequency/rate’, ‘sample size’ • Describe how sounds are represented as sequences of bits • Calculate representation size for a given digital sound, given its attributes • Explain how attributes such as sampling frequency and sample size affect characteristics such as representation size and perceived quality, and the trade-offs involved • Perform basic sound editing tasks using appropriate software and combine them in order to solve more complex problems requiring sound manipulation • Recall that bitmap images and pulse code sound are not the only binary representations of images and sound available • Define ‘compression’, and describe why it is necessary
	Further learning	
	Other information	

Year 10 BTEC DIT	Unit title	Comp 1: LAB Use project planning techniques to plan and design a user interface
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Create a detailed initial design • Show how it meets most user requirements • Create an appropriate project plan for the design of a user interface which makes full and effective use of project planning techniques. • Create a comprehensive initial design that shows how it meets all user requirements
	Further learning	
	Other information	
Year 11 BTEC DIT	Unit title	Comp 2: LAB Create a dashboard using data manipulation tools
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Select and use relevant methods to effectively and accurately manipulate data • Produce an effective dashboard that clearly summarises data • Select and use methods to carry out some manipulation of data, which is largely accurate • Produce a dashboard that produces a limited summary of data, with some appropriate presentation methods
	Further learning	
	Other information	
Year 11 GCSE Computer Science	Unit title	P2 – Networks and algorithms
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Understand and explain the term algorithm. • Understand and explain the term decomposition. • Understand and explain the term abstraction. • Use a systematic approach to problem solving and algorithm creation representing those algorithms using pseudo-code and flowcharts. • Explain simple algorithms in terms of their inputs, processing and outputs. • Determine the purpose of simple algorithms. • Understand that more than one algorithm can be used to solve the same problem. • Compare the efficiency of algorithms explaining how some algorithms are more efficient than others in solving the same problem. • Understand and explain how the linear search algorithm works. • Understand and explain how the binary search algorithm works. • Compare and contrast linear and binary search algorithms. • Understand and explain how the merge sort algorithm works. • Understand and explain how the bubble sort algorithm works. • Compare and contrast merge sort and bubble sort algorithms. • Define what a computer network is. • Discuss the benefits and risks of computer networks. • Describe the main types of computer network including PAN, LAN and WAN • Understand that networks can be wired or wireless. • Discuss the benefits and risks of wireless networks as opposed to wired networks.

		<ul style="list-style-type: none">• Explain the common network topologies• Define the term 'network protocol'.• Explain the purpose and use of common network protocols• Understand the need for, and importance of, network security.• Explain the methods of network security• Describe the 4 layer TCP/IP model• Understand that the HTTP, HTTPS, SMTP, IMAP and FTP protocols operate at the application layer.• Understand that the TCP and UDP protocols operate at the transport layer.• Understand that the IP protocol operates at the internet layer.
	Further learning	
	Other information	

Term 3 (Jan - Feb)

Year 7	Unit title	Gaining support for a cause
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Select the most appropriate software to use to complete a task • Identify the key features of a word processor • Apply the key features of a word processor to format a document • Evaluate formatting techniques to understand why we format documents • Select appropriate images for a given context • Apply appropriate formatting techniques • Demonstrate an understanding of licensing issues involving online content by applying appropriate Creative Commons licences • Demonstrate the ability to credit the original source of an image • Critique digital content for credibility • Apply techniques in order to identify whether or not a source is credible • Apply referencing techniques and understand the concept of plagiarism • Evaluate online sources for use in own work • Apply referencing techniques and understand the concept of plagiarism • Evaluate online sources for use in own work • Apply referencing techniques and understand the concept of plagiarism • Evaluate online sources for use in own work
	Further learning	
	Other information	
Year 8	Unit title	Gaining support for a cause
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Select the most appropriate software to use to complete a task • Identify the key features of a word processor • Apply the key features of a word processor to format a document • Evaluate formatting techniques to understand why we format documents • Select appropriate images for a given context • Apply appropriate formatting techniques • Demonstrate an understanding of licensing issues involving online content by applying appropriate Creative Commons licences • Demonstrate the ability to credit the original source of an image • Critique digital content for credibility • Apply techniques in order to identify whether or not a source is credible • Apply referencing techniques and understand the concept of plagiarism • Evaluate online sources for use in own work • Apply referencing techniques and understand the concept of plagiarism

		<ul style="list-style-type: none"> • Evaluate online sources for use in own work • Apply referencing techniques and understand the concept of plagiarism • Evaluate online sources for use in own work •
	Further learning	
	Other information	
Year 9	Unit title	Cybersecurity
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Explain the difference between data and information • Critique online services in relation to data privacy • Identify what happens to data entered online • Explain the need for the Data Protection Act • Recognise how human errors pose security risks to data • Implement strategies to minimise the risk of data being compromised through human error • Define hacking in the context of cyber security • Explain how a DDoS attack can impact users of online services • Identify strategies to reduce the chance of a brute force attack being successful • Explain the need for the Computer Misuse Act • List the common malware threats • Examine how different types of malware causes problems for computer systems • Question how malicious bots can have an impact on societal issues • Compare security threats against probability and the potential impact to organisations • Explain how networks can be protected from common security threats • Identify the most effective methods to prevent cyberattacks
	Further learning	
	Other information	
Year 10 BTEC DIT	Unit title	Comp 1: LAB Use project planning techniques to plan and design a user interface
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Create a detailed initial design • Show how it meets most user requirements • Create an appropriate project plan for the design of a user interface which makes full and effective use of project planning techniques. • Create a comprehensive initial design that shows how it meets all user requirements
	Further learning	
	Other information	
Year 11 BTEC DIT	Unit title	Comp 2: LAB Create a dashboard using data manipulation tools

	Personalised Learning Checklist	<ul style="list-style-type: none"> • Select and use relevant methods to effectively and accurately manipulate data • Produce an effective dashboard that clearly summarises data • Select and use methods to carry out some manipulation of data, which is largely accurate • Produce a dashboard that produces a limited summary of data, with some appropriate presentation methods
	Further learning	
	Other information	
Year 11 GCSE Computer Science	Unit title	P2 – Cybersecurity
	Personalised Learning Checklist	<ul style="list-style-type: none"> • Be able to define the term cyber security and be able to describe the main purposes of cyber security. • Understand and be able to explain the following cyber security threats: <ul style="list-style-type: none"> o malicious code o weak and default passwords o misconfigured access rights o removable media o unpatched and/or outdated software. • Explain what penetration testing is and what it is used for. • Define the term social engineering. • Describe what social engineering is and how it can be protected against. • Explain the following forms of social engineering: <ul style="list-style-type: none"> o blagging (pretexting) o phishing o pharming o shouldering (or shoulder surfing). o Define the term 'malware'. • Describe what malware is and how it can be protected against. • Describe the following forms of malware: <ul style="list-style-type: none"> o computer virus o trojan o spyware o adware. o password systems o CAPTCHA (or similar) o using email confirmations to confirm a user's identity o automatic software updates.
	Further learning	
	Other information	

