PACA Computer Science Yr 7 Curriculum Map

	Autumn term	Spring term	Summer term
Unit of Work	Computer Literacy	Understanding Computers	E-Safety
Fertile Questions	How do you use a computer to save and find files?	How does a computer's hardware work with the software to function?	How do you keep yourself safe online?
Threshold Concepts	• Ensuring power outlets are on and checking computer light is on before trying power button to turn on computer • Using ctrl, alt and delete to get sign out option • Only turning off computers using the shutdown function on the computer • Using touch typing to efficiently use a keyboard • Using a computer's search bar to find software like PowerPoint • Use PowerPoint's Designer function to create professional looking PowerPoints • Opening file explorer, creating new folders and renaming folders • How to save a PowerPoint using ctrl S and save button • Naming files sensibly to understand what data is inside • How to share files • The internet is made up of devices connected together to share information, photos or videos on web browsers and applications • How to compose a professional email	• An embedded system is a simple computer system that does a limited number of tasks which is built inside a larger device • A general purpose computer allows users to perform multiple tasks • Hardware are the physical parts of a computer whereas software is what runs inside a computer • Software are the programs that a computer runs. • Basic computer hardware including the CPU, motherboard, RAM • Computers will take inputs (buttons being pressed, touch screens being pressed, keys being pressed), process that input and then produce an appropriate output (sound being made, display screen showing something different) • An operating system allows a computer and user to interact using an interface, file management and user management • Name typical software including word, PowerPoint and excel	• A social media account is a profile which showcases someone's posts they made which can be photos, videos or text • What different social media are available to children and adults • A public account can be viewed by anyone whereas a private account means that someone needs to approve the individual requesting to view their profile • All social medica accounts should be private to ensure safety even when people are over the age of 18. Nly business accounts should be made public. • Catfishing is when someone pretends to be someone they are not online • When using social media it is likely you may come across accounts you think are not genuine. You should report these accounts and block them if they are attempting to speak to you. • Misinformation is when someone spreads false or inaccurate information which is meant to deceive people. • The Computer Misuse Act (1990) makes it illegal for people to create or distribute malware • Phishing is when someone pretends to be a business/company online to gain information and potentially money from you. • Malware is malicious software designed to damage your device or gain information from your device. Anti-malware and firewalls can be used to help prevent malware from infecting your device. • Cyberbullying is when someone is bullied online.
Assessment	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock
Experiences	• Creating folders • Creating a PowerPoint about an individual interest • Sending emails to teacher • Sharing PowerPoints • Typing games	• Drawing computer hardware using pixels • Creating assistive technology to support someone with additional needs • Designing an operating system using Canva • Physically holding computer hardware	• Explore fake social media accounts to pick apart what mistakes the user has made • Create a PowerPoint animation about mistakes people can make on social media • Explore different careers in online safety • Use a malware simulator to understand how malware can infect a computer and what the impacts can be on the device • Create a phishing flyer on Canva to understand

			indicators to show you might be being scammed • Create an Escape Game in PowerPoint about what cyberbullying is and what to do if it happens
Skills	• Creating a PowerPoint with a balance of text and images, using transitions and PowerPoint's Designer • Finding files using folder structures on OneDrive	• How to create an account on Canva • How to use Canva to bring designs to life • Design a computer system using input, process, output method	• Critically assess posts made by people online so that students do not just believe everything they see online • Use PowerPoint to create an Escape Game and animation. Save these in folders and open later. • Use Canva to create a convincing phishing brochure • Understand privacy settings and what information to share on their social media accounts

PACA Computer Science Yr 8 Curriculum Map

	Autumn term	Spring term	Summer term
Unit of Work	**Computational Thinking**	**Computer Hardware**	**Game Design**
Fertile Questions	How to use decomposition, algorithmic thinking, abstraction and pattern recognition to solve problems	What parts are in a computer and how do they work?	How can I create an enjoyable engaging game that people want to play?

Threshold Concepts	• Flowcharts are a way to visually represent the flow of an algorithm
	• Flowcharts use specific symbols, oval for start/stop, parallelogram for inputs/outputs, rectangle for processes, diamond for decisions and arrows to show direction
	• How to make and save a PowerPoint
	• Import shapes and change colours in PowerPoint
	• Hyperlinks in PowerPoint
	• Computational thinking is the process of solving a problem like a computer
	• Decomposition is a computational thinking skill that involves breaking down a large problem into more manageable and solvable smaller problems
	• Abstraction is a computational thinking skill that involves ignoring additional irrelevant information and focusing on the key information
	• Algorithmic thinking is a computational thinking skill that involves thinking in logical ordered steps to solve a problem
	• Pattern recognition is a computational thinking skill that involves looking for patterns to solve a problem faster or more efficiently
		• Hardware are the physical parts of a computer whereas software is what runs inside a computer
		• Software are the programs that a computer runs.
		• The CPU is the central processing unit which is responsible for the calculations and decisions in a computer
		• The motherboard connects computer hardware together so they can communicate
		• RAM is random access memory which holds the current application running on the computer
		• Heat sink is a metal block that sits on the CPU to help move heat away
		• Fan helps to move heat away from the CPU
		• The GPU is the graphics processing unit which renders the images seen on a monitor
		• ROM is read only memory which holds the boot up sequence of a computer
		• Memory is temporary and will lose its data when power is lost
		• Storage is permanent and will retain its data when power is lost
		• Secondary storage allows users to save files permanently for later
		  ○ Magnetic is a secondary storage type which has the largest capacity, relatively cheap cost per gigabyte but can become corrupt
		  ○ Solid state is a secondary storage type which has a fast read/write speed but is more expensive per gigabyte
		  ○ Optical is a secondary storage type which is the cheapest, portable but has a very low capacity
			• Games are an interactive program that allow users to make choices altering the player's outcome
			• Games will keep track of a player's score or time which adds an element of pressure making players want to come back to beat a previous score
			• The gaming industry is an expanding career field both for game developers and gamers- creating engaging and innovative games can lead to a lucrative career
			• Variables are saved in the game and need to be checked throughout the game either to check if the time is up or if they have won

Assessment	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock
Experiences	• Create a flowchart to organise a personality quiz • Use a previously made flowchart to design a hyperlinked PowerPoint quiz	• Design a computer through selecting the individual hardware • Draw computer hardware parts using pixel art	• Students will design 6 individual games using arcade.makecode.com • At the beginning of the topic, students are given algorithms of how to make the game

	• Use decomposition and abstraction skills to solve hacking challenges	• Play 20 questions about hardware to review their function • Complete quick quiz questions to understand the difference between memory and storage • Navigate through a maze to find the missing computer hardware parts	and then later in the topic some of those steps are removed to promote their thinking and understanding of the game they are making
Skills	• How to save and open PowerPoints • How to create hyperlinks • Resilience when faced with difficult to solve hacking challenges • Computational thinking skills to solve problems using tools available to students	• Identify and draw computer hardware • Compare computer hardware parts to understand their value • Evaluate what part of a computer may be malfunctioning based on what's not working	• How to incorporate fun and engaging activities into learning • Resilience when faced with a game that isn't running correctly • How to use block coding to make a program • Creativity by designing the background and characters in games
Unit of Work	**Introduction to Python**	**Cyber Security**	**Graphic Design**
Fertile Questions	How can I create a 10-question quiz program written in the Python language that keeps the user's score and tells the user if they are correct or wrong.	How do I keep my data safe online?	How do I use layers in Photoshop to create a professional product?
Threshold Concepts	• There are three programming constructs: sequence, selection and iteration that are the building blocks of all programs • Sequence is the order in which instructions are given • Selection is when there are different paths in a program that depending on the values checked determine the path chosen • Iteration is the process of a section of code being repeated a number of times based on a condition or count • Python is a programming language used by programmers to provide a computer with instructions it can understand • Comments are used in Python using # which are not read by the computer but can be read by programmers to give additional information • Print() is a command in Python which will output a message inside the brackets to the user • Input() is a command in Python which will output a message inside the brackets to the user as well as wait for the user to press enter before moving on • Variables are data that can change when a program is run. • Identifiers are names of variables which are saved when a program is run and can be called upon later in the program • If, elif and else are used in Python to create different selection options in a program	• Data can be any personal information including bank details, age, name, email address, house address, passwords, school, etc. • Data Protection Act (2018) states that companies or individuals collecting data from a user have a legal responsibility to keep that data secure, state why data needs to be collected, collect only the data they need, keep the data only for the time needed and not share that data without your permission to other parties • Social engineering refers to people being the weak point in any system and can often be tricked into giving up data • There are tools to help prevent falling victim to data breaches including creating strong passwords, using 2FA, having private social media accounts, not sharing personal information online and blocking and reporting suspicious accounts • Malware is malicious software that intends to damage your computer • Anti-malware and firewalls can be used to help block and delete malware from damaging a computer • The Computer Misuse Act (1990) prevents people from making or distributing malware including hacking into someone's account or using someone's account that they've left logged in	• Pixels are individual picture element squares that can be only one colour • Voxels are 3D pixels • Photoshop is an editing tool that allows you to layer, crop and change images into something new • Using Photoshop introduces new editing tools including, magic wand eraser, removal of backgrounds, colour modification, blending and image resizing • The tools in Photoshop dictate that keyboard shortcuts need to be used which pushes students to learn and use keyboard shortcuts over their mouse • Using a combination of these tools allows students to create professional looking poster and images for books
Assessment	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock
	• Use DotTrace on pacacomputing.uk to review and	• Learn tools to prevent becoming a victim of hacking	• Use Photoshop to understand industry level

Experiences	understand programming constructs • Use CodeBuilder on pacacomputing.uk to review comments, print, input, variables and identifiers in Python • Use CodeBuilder on pacacomputing.uk to create a 10-question quiz about a chosen topic • Review programming constructs in TargetPractice game to select the correct construct	by solving hacking challenges • Explore fake social media accounts to understand what mistakes users have made • Explore different careers in cyber security to understand the need to learn about how to keep data safe • Participate in preventing attack relay race to best select the method to preventing a cyber attack	tools used to create and edit images • Understand 3D spaces by creating voxels • Create a professional poster for a movie • Create a Where's Wally image
Skills	• How to write comments, print and inputs in Python • How to sensibly name variables and call on them later in Python • How to create selection programming constructs using if, elif and else in Python	• How to keep their own social media accounts private and secure • How to create strong passwords and why 2FA should be used • How to install and update prevention methods to devices to keep data safe	• Spatial awareness through designing 3D voxels and 2D posters in Photoshop • How to save and find files on a computer

PACA Computer Science Yr 9 Curriculum Map

	Autumn term	Spring term	Summer term
Unit of Work	**Python**	**Networks**	**Binary**
Fertile Questions	How do I make a 10 question quiz written in Python and keep track of the user's score?	How does the internet work?	How can a computer understand what a user inputs into it?

Threshold Concepts	• Flowcharts are a way to visually represent the flow of an algorithm
	• Flowcharts use specific symbols, oval for start/stop, parallelogram for inputs/outputs, rectangle for processes, diamond for decisions and arrows to show direction
	• There are three programming constructs: sequence, selection and iteration that are the building blocks of all programs
	• Sequence is the order in which instructions are given
	• Selection is when there are different paths in a program that depending on the values checked determine the path chosen
	• Iteration is the process of a section of code being repeated a number of times based on a condition or count
	• Python is a programming language used by programmers to provide a computer with instructions it can understand
	• Comments are used in Python using # which are not read by the computer but can be read by programmers to give additional information
	• Print() is a command in Python which will output a message inside the brackets to the user
	• Input() is a command in Python which will output a message inside the brackets to the user as well as wait for the user to press enter before moving on
	• Variables are data that can change when a program is run.
	• Identifiers are names of variables which are saved when a program is run and can be called upon later in the program
	• If, elif and else are used in Python to create different selection options in a program
		• A network is when two or more devices are connected together
		• Devices must have a network card to be able to connect to another device as this provides their MAC address
		• A Local Area Network (LAN) is when devices are connected over a small geographical area
		• A Wide Area Network (WAN) is when devices are connected over a large geographical area
		• A switch connects devices on a LAN by reading, receiving and sending information to MAC addresses
		• Devices can be connected either wirelessly or with wires
		• Ethernet is the standard used to connect devices
		• To connect devices wirelessly, a Wireless Access Point (WAP) is needed
		• To connect multiple LAN's together to create a WAN, a router is needed
		• The internet is a WAN
		• A web browser is used to go to websites that people or companies have shared on the internet
		• A URL is used to name websites so that people have something memorable they can type in to find that information
		• Network speed refers to have fast data is being displayed from a website
		• Network speed can be affected by bandwidth, interference or wired vs wireless connection
			• Binary is number scheme which has only two states, 1 or 0
			• 1 is on and 0 is off
			• A bit is a single digit of 1 or 0
			• A computer can only understand 1's and 0's as it reads this information as power inputs
			• A byte is 8 bits e.g. 10101010
			• All information needs to be put into binary for a computer to understand it, including numbers, text, sound and images
			• Numbers can be converted from denary (our 10 base number system) to binary as each bit is worth double the previous one
			• Text can be converted to binary as each character has a designated binary code for it (e.g. A = 1010101)
			• ASCII and Unicode are character sets which hold the binary code for each character
			• Sound will have the sound wave's height measured thousands of times per second and converted into binary
			• Images will have a binary code for each colour and each pixel will be a colour
			• Logic gates are used to take 1 and 0 inputs and determine the correct output
			  ○ AND – both inputs need to be 1 for the output to be 1
			  ○ OR – one input must be 1 for the output to be 1
			  ○ NOT – takes one input and switches it to the opposite for the output

Assessment	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock
Experiences	• Use DotTrace on pacacomputing.uk to review and understand programming constructs • Write code in DotCode on pacacomputing.uk to	• Draw network hardware using pixel art • Test network speeds and diagnosis why they may be slow	• Use lights to visualise binary on and off • Binary drop game to match the correct value to the column

	create Python programs about programming constructs • Use CodeBuilder on pacacomputing.uk to review comments, print, input, variables and identifiers in Python • Use CodeBuilder on pacacomputing.uk to create a 10-question quiz about a chosen topic	• Complete quick quiz questions to understand the difference between network hardware • Navigate through a maze to find the missing network hardware parts	• Use ASCII to create different art images • Use excel sheets and conditional formatting to use binary colour codes to create an image • Use logic gates to escape from a maze
Skills	• How to write comments, print and inputs in Python • How to sensibly name variables and call on them later in Python • How to create selection programming constructs using if, elif and else in Python	• Identify and draw network hardware • Compare network hardware parts to understand their value • Evaluate what part of a network may be malfunctioning based on what's not working	• Appreciate how much work a computer does for each letter, number, image or sound that is produced • Develop creativity when using ASCII character sets to design images • Problem solve binary codes with their corresponding value
Unit of Work	**Python Advanced**	**Spreadsheets**	**Graphic Design**
Fertile Questions	How do I make a text-based adventure game written in Python?	How can data be organised and analysed in an efficient way?	How can I make engaging modified images?
Threshold Concepts	• Flowcharts are a way to visually represent the flow of an algorithm • Flowcharts use specific symbols, oval for start/stop, parallelogram for inputs/outputs, rectangle for processes, diamond for decisions and arrows to show direction • Modules can be imported in Python which are preexisting set of functions which can be used when making code • Import time allows the programmer to create pauses in their program giving a more realistic gaming experience • Integrated Development Environments (IDEs) provide a window to write code in and a testing window to see how the code would work.	• Excel is software that handles data in spreadsheets • A cell is a box in a grid in a spreadsheet • A formula is a mathematical operation used in excel to perform calculations on data • Formulas can be used to more efficiently analyse data • SUM is used to add the numbers in multiple cells together • AVERAGE is used to calculate the average (mean) from the selected cells • Conditional formatting can be used to turn cells certain colours based on the data that has been inputted	• Photoshop is an editing tool that allows you to layer, crop and change images into something new • Using Photoshop introduces new editing tools including, magic wand eraser, removal of backgrounds, colour modification, blending and image resizing • The tools in Photoshop dictate that keyboard shortcuts need to be used which pushes students to learn and use keyboard shortcuts over their mouse • Using a combination of these tools allows students to create realistically edited images
Assessment	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock	• Introduction quiz using unitTest multiple choice questions to assess what students know • End of topic assessment using miniMock
Experiences	• All students will participate in international Bebras competition earning a participation, distinction or merit certificates • Students will use the IDEs of CodeBuilder and IDLE	• Create Top Trump cards on Excel using SUM and AVERAGE formulas • Create a 2D map design that utilises conditional formatting • Create a battleship game using conditional formatting	• Create fake money • Create an augmented reality image • Smoothly remove objects as if they were never there • Create a spot the difference image
Skills	• How to problem solve using computational thinking skills in the Bebras Competition • How to write a text-based adventure game in Python using IDLE • How to use flowcharts to organise and support writing code in Python	• How to open and save files on a computer • How to edit an excel file • How to create an excel file using SUM and AVERAGE functions as well as conditional formating	• Develop creativity for designing using Photoshop • Increased used of keyboard shortcuts • How to open and save files