

Year 8 Computer Science	Unit	Substantive Knowledge	Disciplinary Aim	Cultural Capital
Term 1 HT 1	Python Next Steps	<p>Know how to create flowcharts and pseudocode</p> <p>Know how to effectively use loops, IF, ELIF and ELSE</p> <p>Understand the use of loops</p> <p>Know how to write and call procedures</p>	<ul style="list-style-type: none"> <li>• Use IF, ELIF and ELSE to respond accordingly based on the conditions that has been met</li> <li>• Write, call and send values to procedures</li> <li>• Use a loop to repeat segments of code or until a condition has been met</li> <li>• Store data in lists, adding and removing as required.</li> </ul> <p><b>Assessment:</b> Students will be given 4 programming challenges that will allow them to showcase their ability to program the taught techniques.</p>	<p><b>Key words:</b> print, input, data type, string, integer, variable, assignment, selection, list, loop, for loop, while loop, procedure.</p> <p><b>Extra-curricular:</b> The Raspberry Pi website and code club website contain a number of python tutorials for students to extend their knowledge with independently.</p>
Term 1 HT 2	Understanding Computers	<p>Know the difference between hardware and software</p> <p>Understand the role of the central processing unit, random access memory and the need for secondary storage</p> <p>Know that data is stored as binary values and how to convert binary into denary numbers</p>	<ul style="list-style-type: none"> <li>• Investigate the hardware and software elements of our school computers</li> <li>• Explore and compare secondary storage devices</li> <li>• Using a diagram locate components on a computers motherboard</li> <li>• Convert binary to denary and denary to binary</li> <li>• Explore ASCII character sets</li> </ul> <p><b>Assessment:</b> Students will complete a quiz on the topics covered in this unit of work.</p>	<p><b>Key words:</b> hardware, software, input, process, output, computer system, cpu, ram, hard drive, hard disk, SSD, binary, denary, motherboard, ASCii, character set.</p> <p><b>Extra-curricular:</b> Explore online shopping sites like PC world to compare the RAM and CPU's of different devices.</p>
Term 2 HT 1	Control Systems	<p>Understand the uses of a flowchart</p> <p>Know how to produce a flowchart using the start/stop, output, process and decision symbols</p> <p>Know the characteristics of a control system</p>	<ul style="list-style-type: none"> <li>• Break a system down into smaller parts and represent in a flowchart</li> <li>• Produce flowcharts for on screen control systems and for third party implementation</li> <li>• Make use of subroutines</li> <li>• Use the decision symbol for multiple events in a flowchart</li> </ul> <p><b>Assessment:</b> Students will produce a flowchart for a given mimic to show the flow of data through a system using range of flowchart symbols.</p>	<p><b>Key words:</b> Control System, Mimic, Flowcharts, Input, Output, Process, Decision, Subroutine.</p> <p><b>Extra-curricular:</b> Grab a stopwatch and a pen to monitor a set of traffic lights in the community. Use the information you collect to produce your own flowchart of the traffic lights – perhaps ask a friend/relative to then test it!</p> <p><b>iDEA Bronze Award:</b> Colours (10)</p>

Term 2 HT 2	Microbit	<p>Understand the purpose of the Micro:bit and what it can do</p> <p>Understand the importance of breaking problems down (abstraction and decomposition)</p> <p>Know how to program the micro bit buttons and LED's using a range of programing concepts</p>	<ul style="list-style-type: none"> <li>• Use selection and loops in different programming languages</li> <li>• Create an image and display on the micro bit</li> <li>• Create a guess the number game</li> <li>• Explain an event handler</li> <li>• Use the micro bits accelerometer</li> </ul> <p><b>Assessment:</b> Students will be given 4 programming challenges that will allow them to showcase their ability to program the taught techniques.</p>	<p><b>Key words:</b> Selection, loop, IF ELSE IF, ELIF, forever, repeat, variable, assignment, pseudocode, event handler, emulator, repetition, computational thinking, abstraction, decomposition.</p> <p><b>Extra-curricular:</b> The micro bit website includes an online emulator and a range of step by step tutorials to build on the learning from class</p>
Term 3 HT 1	Game Design	<p>Know that computer games have backgrounds and objects</p> <p>Understand how to give game objects 'events and 'actions'</p> <p>Know how to add multiple actions to single events</p> <p>Know how to publish content to Google Play</p>	<ul style="list-style-type: none"> <li>• Use the events editor to add multiple actions</li> <li>• Add a scoring system to a game including a high score</li> <li>• Program a game to respond to conditions</li> <li>• Create multiple frames (levels) that link together</li> <li>• Use variables when working with brick health</li> </ul> <p><b>Assessment:</b> Students will produce a game and export and test on an Android device via Google Play</p>	<p><b>Key words:</b> Object, Action, Event, Variable, Repeat, Forever.</p> <p><b>Extra-curricular:</b> CTF 2.5 is a free piece of software limited to three frames and a number of tutorials for building games can be found on the CTF website and YouTube.</p>
Term 3 HT 2	Networks	<p>Understand the difference between a local area network and a wide area network</p> <p>Know the hardware used to network computers including topologies</p> <p>Know the need of IP addressing</p> <p>Understand the need for encryption</p>	<ul style="list-style-type: none"> <li>• List the main components of a school network</li> <li>• Explain the role of some network components</li> <li>• Identify three different network topologies</li> <li>• Describe the internet and how data is distributed through data packets</li> <li>• Explain how IP addresses are used to identify our location on the internet</li> <li>• Describe the significance of bandwidth and buffering</li> <li>• Explain why some of the data which should be kept secure and how data might be encrypted</li> <li>• Demonstrate applying a simple encryption</li> </ul> <p><b>Assessment:</b> Students will answer a series of exam questions based on the topics covered in this unit of work.</p>	<p><b>Key words:</b> Network, Local Area Network, Wide Area Network, internet, data packet, ip address, router, switch, desktop, wireless access point, encryption.</p> <p><b>Extra-curricular:</b> Using a free online tool compare the bandwidth of your internet connection to your friends and family. Does a fibre service make any difference to this?</p>