

<b>Timeline</b>	<b>Topic</b>	<b>Key concepts and knowledge</b>	<b>Skills development</b>	<b>Rationale</b>
Autumn 1 – approx. 6 lessons	Unit 1 – Binary 2	<p>Students know:</p> <ul style="list-style-type: none"> <li>• How are numbers represented in binary?</li> <li>• Why are hexadecimal numbers used?</li> <li>• How does a binary shift impact on a binary number?</li> </ul> <p>Students know how to:</p> <ul style="list-style-type: none"> <li>• add in binary</li> <li>• convert binary and denary into hexadecimal numbers</li> <li>• multiply and divide in binary, using left and right binary shifts</li> </ul> <ul style="list-style-type: none"> <li>• National Curriculum coverage:</li> </ul>	<p>Numeracy skills</p> <p>Problem solving skills</p> <p>IT skills</p> <p>Investigation</p> <p>Self-management</p> <p>Oracy</p> <p>Communication</p> <p>Literacy</p> <p>Numeracy</p> <p>Creativity</p> <p>Problem solving</p> <p>Summarize</p> <p>Recall</p> <p>Career links:</p> <p>Computer programmer</p> <p>Data manager</p>	<p>Building on year 7 binary unit where students have previously learned how to convert into binary from denary and add binary numbers, this unit re-visits the concept of computers using binary to represent numbers. By learning this unit of work now it reminds learners how computers process data and allows them to reflect on this when progressing to the next Python programming unit and their digital imaging unit later in the year when learners consider how computers represent images.</p>

<p>Autumn 2 – approx. 9 lessons</p>	<p><b>Unit 2 – Python 2</b></p>	<p>Students know:</p> <ul style="list-style-type: none"> <li>• What are the 3 main programming constructs of sequencing, selection and iteration?</li> <li>• How can the 3 main programming constructs of sequencing, selection and iteration be used to develop complex and more efficient programs?</li> <li>• What are comparison operators?</li> </ul> <p>Students know how to:</p> <ul style="list-style-type: none"> <li>• program sequences of code using inputs, outputs and variables</li> <li>• program selection using IF statements</li> <li>• use the correct comparison operators</li> <li>• program iteration – both FOR and WHILE loops to solve a real-life problem</li> </ul> <p>National Curriculum Coverage:</p> <ul style="list-style-type: none"> <li>• use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions</li> </ul>	<p>Literacy skills                  Problem solving skills                  IT skills                  Investigation                  Self-management                  Oracy                  Communication                  Literacy                  Numeracy                  Creativity                  Problem solving                  Summarize                  Recall                  Programming skills</p> <p>Careers link: Discuss careers relating to programming including software developer, cyber security</p> <p>Extra-curricular: Use of micro:bits and Scratch to illustrate how the programming constructs are relevant to different programming languages</p>	<p>This unit developing core programming skills builds on the year 7 foundation knowledge of programming inputs, outputs and variables. Students develop an understanding of the core programming constructs of sequencing, selection and iteration which are fundamental to all programming languages. This unit will then allow learners to explore more complex programming techniques including lists, arrays and sub-routines in a future Python unit, as well as applying the concepts of sequencing and selection in the Game unit later this academic year.</p>
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<p>Spring 1 – approx. 7 lessons</p>	<p>Unit 3 – Computer Networks</p>	<p>Students know:</p> <ul style="list-style-type: none"> <li>• What is a computer network?</li> <li>• How do computers communicate?</li> <li>• What hardware and software components make up a computer system?</li> </ul> <p>Students know how to:</p> <ul style="list-style-type: none"> <li>• explain what a network and the benefits of using them</li> <li>• explain the difference between a LAN and WAN</li> <li>• explain the difference between network topologies</li> <li>• identify the hardware needed to connect to a LAN</li> <li>• explain how data is sent across a network.</li> </ul> <p>National Curriculum coverage:</p> <ul style="list-style-type: none"> <li>• understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems</li> </ul>	<p>Numeracy skills                  Problem solving skills                  IT skills                  Investigation                  Self-management                  Oracy                  Communication                  Literacy                  Numeracy                  Creativity                  Problem solving                  Summarize                  Recall                  Internet research skills</p> <p>Careers links: network managers in school – what do they do and how do they manage the school’s network, network architects</p>	<p>Learners have previously explored how computers store data which leads into introducing the concept of networks and how computers share data with each other. There are some abstract concepts including using packet data that students need to be able to explore which is why this unit appears later in the academic year.</p> <p>By understanding how computers communicate, this will help learners progress to how computers search and sort data and use logic gates to determine outcomes.</p>
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<p>Spring 2 into Summer 1 – approx. 6 lessons</p>	<p>Unit 4 – Game Design</p>	<p>Students know:</p> <ul style="list-style-type: none"> <li>• How can I plan and develop an inclusive game?</li> </ul> <p>Students know how to:</p> <ul style="list-style-type: none"> <li>• program Kodu characters and objects</li> <li>• develop an environment</li> <li>• plan and develop a game for a specific purpose and audience</li> <li>• evaluate and refine a game</li> </ul> <p>National Curriculum Coverage:</p> <ul style="list-style-type: none"> <li>• design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems</li> <li>• undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</li> </ul>	<p>Logical skills</p> <p>Digital literacy</p> <p>Sequencing and order</p> <p>Identifying control systems</p> <p>Literacy skills including writing and reading.</p> <p>Numeracy skills – use of time</p> <p>Computational thinking skills</p> <p>Careers links – game developer / Big Bang Digital event</p> <p>British Values – Tolerance: understanding how we can modify games to be inclusive of those with physical and/or mental disabilities</p> <p>Extra-curricular – coding club game design using Scratch</p>	<p>This unit re-visits some of the core programming concepts within the Kodu environments and having previously learned about inputs/outputs and variables for the Python programming units, students will have an opportunity to develop this within the Kodu environment and the use of WHEN and DO for selection and reinforces the importance of correct sequencing. It will also require learners to apply the computational thinking skills and creativity to develop a game for a specific purpose.</p>
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<p>Summer 1 into Summer 2 – approx. 8 lessons</p>	<p>Unit 5 – Digital Imaging</p>	<p>Students know:</p> <ul style="list-style-type: none"> <li>• How do computers represent images?</li> <li>• How do I create a digital image for a specific audience and purpose?</li> </ul> <p>Students know how to:</p> <ul style="list-style-type: none"> <li>• identify the needs of the client and the audience</li> <li>• plan, gather and edit digital assets and repurpose them for a specific audience</li> <li>• identify the legal and technical constraints when developing a digital image</li> <li>• use Photoshop to insert image and text layers and to edit them using crop, eraser and lasso tools.</li> </ul> <p>National Curriculum coverage:</p> <ul style="list-style-type: none"> <li>• undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</li> <li>• create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability</li> </ul>	<p>Numeracy skills                  Problem solving skills                  IT skills                  Investigation                  Self-management                  Oracy                  Communication                  Literacy                  Numeracy                  Creativity                  Problem solving                  Summarize                  Recall</p> <p>Career links:                  Media designer                  Graphics artist                  Graphics designer</p> <p>British Values: Rule of law – how copyright is a law and understanding the consequences of breaking this law both on an individual and on the copyright holder</p>	<p>This unit builds on the binary thread of learning where students have some understanding of how binary is used to represent numbers, this unit touches on binary representing images, but develops image editing software (Photoshop) skills. This unit develops literacy skills through the development of the digital image and the evaluation of how well it meets the client brief and provides a solid foundation of learning to progress through the Media pathway at KS4.</p>
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