

Term/Focus	Unit 7.1 – How Computers Work	Unit 7.2 – Computational Thinking and the Micro:Bit
<p><b>Key knowledge and skills</b> – What core knowledge and key skills will be acquired and developed by students?</p>	<p><b>Foundation</b></p> <ul style="list-style-type: none"> <li>List the common pieces of equipment in a computer system</li> <li>Give some examples of what a computer is</li> <li>State what an embedded device is and give examples</li> <li>Give a few examples of when a computer would and would not be used</li> <li>Name a range of input and output devices</li> <li>Explain that binary is used by computers to process and store data</li> <li>List the main types of storage devices</li> <li>Give a range of examples of storage sizes</li> </ul>	<p><b>Foundation</b></p> <ul style="list-style-type: none"> <li>State some of the five main components of computational thinking</li> <li>Work in a group to create a prototype 'better' aeroplane</li> <li>Identify a few other subjects where computational thinking is used</li> <li>Help present prototype to the class</li> <li>Briefly explain what pseudocode is and what flowcharts are</li> <li>Use some pseudocode and some flowchart symbols in an algorithm</li> <li>Code a simple program, compile it and flash it onto the device.</li> <li>Code, compile and flash a simple digital dice program onto the Micro:Bit.</li> <li>Code, compile and flash a simple digital compass program onto the Micro:Bit</li> <li>Complete a Micro:Bit challenge according to target grade, with brief write-up</li> <li>Briefly explain what cryptography is</li> <li>Decode messages using different ciphers</li> <li>Make a Caesar Cipher Encryption/Decryption Wheel</li> <li>Encrypt and decrypt messages using the Keyword Cipher and the Caesar Cipher</li> <li>Identify some malware threats</li> <li>Describe cyber security</li> <li>Identify some solutions to potential problems online</li> </ul>
	<p><b>Developing</b></p> <ul style="list-style-type: none"> <li>List a range of the components that are found in a computer.</li> <li>Describe the steps that take place when you open a program</li> <li>State all of the components of the CPU</li> <li>Describe the fetch-decode-execute cycle in basic terms</li> <li>Correctly identify a range of hardware and software</li> <li>List some functions of an operating system</li> <li>List some utilities</li> </ul>	<p><b>Developing</b></p> <ul style="list-style-type: none"> <li>State the five main components of computational thinking</li> <li>Work in a group to create a prototype 'better' aeroplane</li> <li>Identify some other subjects where computational thinking is used</li> <li>Help present prototype to the class</li> <li>Briefly explain what pseudocode is and what flowcharts are</li> </ul>

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		<ul style="list-style-type: none"> <li>• Use some pseudocode and some flowchart symbols in an algorithm</li> <li>• Code a simple program, compile it and flash it onto the device.</li> <li>• Code, compile and flash a simple digital dice program onto the Micro:Bit.</li> <li>• Develop the code so that it generates a new random number each time the device is shaken.</li> <li>• To code, compile and flash a simple digital compass program onto the Micro:Bit</li> <li>• To develop the code in order to find solutions to some challenges</li> <li>• Complete a Micro:Bit challenge according to target grade, with brief write-up</li> <li>• Explain what cryptography is</li> <li>• Decode messages using different ciphers</li> <li>• Encrypt and decrypt messages using a range of techniques</li> <li>• Explain what malware is and identify some of them</li> <li>• Explain what cyber security is</li> <li>• Identify some solutions to potential problems online</li> </ul>
	<p><b>Good</b></p> <ul style="list-style-type: none"> <li>• Explain the common pieces of equipment in a computer system</li> <li>• List additional devices that can be connected to a computer</li> <li>• Give a wide range of examples of what a computer is</li> <li>• Provide a range of different examples of embedded and non-embedded devices, explaining what they do</li> <li>• Explain why computers would and would not be used</li> <li>• Explain the difference between input and output devices and name a range of each</li> <li>• Explain how some devices can be input and output</li> <li>• Explain how binary works in a computer</li> <li>• Explain how a range of storage devices work</li> <li>• Explain how the storage sizes are calculated</li> </ul>	<p><b>Good</b></p> <ul style="list-style-type: none"> <li>• Explain the five main components of computational thinking</li> <li>• Work in a group to create a prototype 'better' aeroplane</li> <li>• Identify a range of other subjects where computational thinking is used</li> <li>• Help present prototype to the class</li> <li>• Explain what pseudocode is and what flowcharts are and why they are used</li> <li>• Use a range pseudocode and some flowchart symbols in an algorithm</li> <li>• Develop the simple program into one which is unique.</li> <li>• Code, compile and flash a simple digital dice program onto the Micro:Bit.</li> <li>• Develop the code so that it generates a new random number each time the device is shaken.</li> </ul>

Term/Focus	Unit 7.1 – How Computers Work	Unit 7.2 – Computational Thinking and the Micro:Bit
		<ul style="list-style-type: none"> <li>• Further develop the code so that the dice outputs dots/pattern instead of the numerical value of the dice face.</li> <li>• To code, compile and flash a simple digital compass program onto the Micro:Bit</li> <li>• To develop the code in order to find solutions to some challenges</li> <li>• Complete a Micro:Bit challenge according to target grade, with detailed write-up</li> <li>• Explain what cryptography is and why it is used</li> <li>• Encode and decode messages using different ciphers</li> <li>• Encrypt and decrypt messages using a range of techniques</li> <li>• Explain what malware is and identify a range of them</li> <li>• Explain cyber security and why it is important</li> <li>• Identify a range of solutions to potential problems online</li> </ul>
	<p><b>Exceptional</b></p> <ul style="list-style-type: none"> <li>• List a range of components that are found in a computer and explain their function, including their importance as part of the system</li> <li>• Produce and annotate a diagram to show how the Input &amp; Output devices, CPU, RAM and Hard Drive work together</li> <li>• Explain the components of the CPU and their purpose</li> <li>• Explain the fetch-decode-execute cycle</li> <li>• Explain the Von Neumann Architecture</li> <li>• Explain Moore’s Law</li> <li>• Explain the range of software available for different hardware</li> <li>• Explain the difference between hardware and software</li> <li>• Explain a range of functions of an operating system</li> <li>• Explain how utilities help the computer to run efficiently</li> </ul>	<p><b>Exceptional</b></p> <ul style="list-style-type: none"> <li>• Explain the five main components of computational thinking</li> <li>• Explain how to use computational thinking in everyday problems</li> <li>• Work in a group to create a prototype ‘better’ aeroplane</li> <li>• Explain how computational thinking is used in a range of other subjects</li> <li>• Help present prototype to the class</li> <li>• Explain what pseudocode is and what flowcharts are and why they are used</li> <li>• Use a range pseudocode and some flowchart symbols in an algorithm and explain their meaning</li> <li>• Develop the simple program into one which is unique.</li> <li>• Explore the programming environment and share new programming ideas.</li> <li>• Code, compile and flash a simple digital dice program onto the Micro:Bit.</li> <li>• Develop the code so that it generates a new random number each time the device is shaken.</li> </ul>

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		<ul style="list-style-type: none"> <li>• Further develop the code so that the dice outputs dots/pattern instead of the numerical value of the dice face.</li> <li>• To code, compile and flash a simple digital compass program onto the Micro:Bit</li> <li>• To develop the code in order to find solutions to some challenges</li> <li>• Further develop the code in order to find solutions to a range of challenges</li> <li>• Complete two Micro:Bit challenges according to target grade, with detailed write-up</li> <li>• Explain what cryptography is and how it was used in WW2</li> <li>• Encode and decode messages using different ciphers</li> <li>• Encrypt and decrypt messages using a range of techniques</li> <li>• Explain why encryption is still important and what it is used for</li> <li>• Explain what malware is and explain how some of them work</li> <li>• Explain cyber security and why it is important, including ethical hacking</li> <li>• Identify a range of solutions to potential problems online</li> </ul>
<b>Links to GCSE</b>	1.1.1 Architecture of the CPU 1.1.2 CPU Performance 1.1.3 Embedded Systems 1.2.1 Primary Storage 1.2.2 Secondary Storage 1.2.3 Units	1.4.1 Network Threats 1.4.2 Identifying and Preventing Vulnerabilities 2.6.1 Computational Thinking 2.6.4 Developing Algorithms Using Flowcharts 2.6.5 Developing Algorithms Using Pseudocode 2.7.1 Programming Fundamentals
<b>Homework – Knowledge organiser created and on website?</b>	Yes H1 Biography of Tommy Flowers / Review of Computerphile video / Computer Survey H2 Input and Output Devices of a Computer System H3 Finish Writing Assessment from Lesson H4 Tick the Answer Task / Fill the Gaps Task H5 Write revision questions	Yes H6 Decomposition H7 Algorithms H8 Write Revision Questions H9 Keyword Cipher Encryption H10 Write revision questions

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<p><b>Responsive Teaching</b> – how do we assess and feed back to students in this subject (formative and summative)</p>	<p>Two weekly assessment of classwork to identify and correct misconceptions using Feedforward Book Look Record Sheet. Homework reviews to inform planning of next lesson. Lesson 6 Writing Assessment to highlight areas for improvement and inform future planning.</p>	<p>Two weekly assessment of classwork to identify and correct misconceptions using Feedforward Book Look Record Sheet. Homework reviews to inform planning of next lesson. Test in lesson 8/12.</p>
<p><b>Termly assessment content</b> – what content will be covered in your termly assessments (the two-week assessment window)?</p>	<p>End of Unit Test in Lesson 12 – all of the above.</p>	<p>End of Unit Test in Lesson 8/12 – all of the above.</p>