YEAR 9	Autumn Term (Cycle 1)	Spring Term (Cycle 2)	Summer Term (Cycle 3)
Students will know and remember …	**Physical Computing:** How to describe what a micro:bit is and list its input and output devices How to use a development environment to write, execute and debug a Python program for the micro:bit How to write programs that use the micro:bit's built in input and output devices How to write programs that use GPIO pins to generate output and receive input How to write programs communicate with other devices by sending and receiving messages wirelessly How to design a physical computing artifact purposefully, keeping in mind the problem at hand, the needs of the audience involved and the available resources How to decompose the functionality of a physical computing system into simpler features How to implement a physical computing project, while following revising, and refining the project plan	**Python Programming:** How to write programs that display messages, receive keyboard input and use simple arithmetic expressions in assignment statements How to use selection (**if, elif, else** statements) to control the flow of program execution How to perform common operations on lists and individual items How to use iteration (**while** statements) to control the flow of program execution How to perform common operations on strings or individual characters How to use iteration (**for** statements) to iterate over list items How to use iteration (**for** loops) to iterate over lists and strings How to use variables to keep track of counts and sums How to combine key programming language features to develop solutions to meaningful problems	**Representations: Going audio visual:** How to describe how digital images are composed of individual elements How to recall that the colour of each picture element is represented using a sequence of binary digits How to define key terms such as 'pixels', 'resolution' and 'colour depth' How to describe how an image can be represented as a sequence of bits How to describe how colour can be represented as a mixture of red, green and blue with a sequence of bits representing each colour's intensity How to 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) How to describe the trade-off between representation size and perceived quality for digital images How to perform basic image editing tasks using appropriate software and combine them in order to solve more complex problems requiring image manipulation How the manipulation of digital images amounts to arithmetic operations on their digital representation How to describe and assess the creative benefits and ethical

			drawbacks of digital manipulation How to explain the function of microphones and speakers as components that capture and generate sound Key terms, such as ‘sample’, ‘sampling frequency/rate’ and ‘sample size’ How to describe how sounds are represented as sequences bits How to calculate representation size for a given digital sound, given its attributes How to explain how attributes such as sampling frequency and sample size affect characteristics such as representation size and perceived quality and the trade-offs involved How to perform basic sound editing tasks using appropriate software and combine them in order to solve more complex problems requiring sound manipulation

So that they can…	**Physical Computing:** Understand the micro:bit, becoming acquainted with its hardware components so that they can develop an awareness of its capabilities Familiarise themselves with the development environment and some simple coding patterns Focus on the code and the patterns that often arise in physical computing applications through the writing of their own programs Connect micro:bits to external hardware components, such as speakers, switches and LEDs Build their own physical computing project, understanding the functionality of of a physical computing system	**Python Programming:** Solidify their knowledge of Python programming through reading and creating simple programs that use selection and lists Understand the operations performed on lists: adding, removing or modifying items; locating or counting occurrences of particular items etc Understand the problems where lists might be useful and become accustomed to using dot notation for list methods Use list operations in iterative contexts Apply string operations in an iterative context Use **for** loops to iterate over list items and familiarise themselves with syntax, use and mechanics Iterate over lists of real-world textual and numerical data Use **for** to iterate over the characters of a string	**Representations: Going audio visual:** Form an understanding of how the images they encounter daily in their digital devices translate to nothing more than long strings of bits Explore the common representation of colour as a mixture of red, green and blue and how those colours are represented using an 8-bit sequence Use appropriate software to perform a range of image manipulation functions and complete specific tasks and challenges Familiarise themselves with the basic concepts necessary for understanding any analogue to digital conversion: samples, sampling rate and sample size Understanding how sound is captured, digitised, manipulated and reproduced in digital devices Understand how the sampling rate and the sample size affect the size and quality of the representation