St Mary's CE High School Curriculum Map 2022-23

Subject: IT & Computing
Year: 9

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
CONTENT *Declarative / core / powerful Knowledge – 'Know What'*	**Cyber Security:** this unit takes students on journey of discovery of the techniques that cybercriminals use to steal data, disrupt systems and infiltrate systems.	**Representations:** Students will focus on making digital media such as sound and images. They will discover how media is stored in binary code.	**Data Science:** Students will be introduced to data science. They will learn how data is used to investigate problems and how it makes changes to the world around them.	**Python Sequences:** This unit introduces students to how data can be represented and processed in sequences, such as lists and strings.	**Physical Computing:** this unit applies and enhances students programming skills, it uses micro:bits to show students what their code can do to physical devices	**DIT or Computer Science option** COMPUTER SCIENCE PATHWAY: Networking and the Internet DIT PATHWAY: User Interfaces
Skills *Procedural Knowledge – 'Know How'*	Explain the difference between data and information Identify what happens to data entered online Explain the need for the Data Protection Act Recognise how human error pose security risks to data Implement strategies to minimise the risk of data being compromised through human error Define hacking in the context of cybersecurity Identify strategies to reduce brute force attacks Explain how a DDOS attack can impact users of online services Explain the need for the Computer Misuse Act Identify the common malware threats Examine how different types of malware cause problems for computer systems Compare security threats against their probability and	Describe how digital images are composed out of individual elements Define key terms such as pixels, resolution and colour depth Describe how colour can be represented as a mixture of red, green and blue Describe how an image can be represented as a sequence of bits Calculate the size of a digital image Explain how the manipulation of digital images amounts to arithmetic operations Define compression and why it is necessary Describe the 'trade-off' between size and perceived quality for digital images Use software to perform basic image editing Explain the function of microphones and speakers Define key terms such as sample, sampling rate and sample size	Define what Data Science is Explain how visualising data can help identify patterns and trends Use software to visualise data sets and look for patterns or trends Recognise examples of where large data sets are used in daily life Select criteria and use data sets to investigate predictions Evaluate findings to support arguments for or against a prediction Define the terms correlation and outliers in relation to data trends Identify the steps of the investigative cycle Solve a problem by implementing the steps of the investigation cycle on a data set Use findings to support a recommendation	Describe what lists are Describe what strings are Trace through programs that manipulate lists Create lists and access individual elements Access individual string elements (characters) Perform common operations on lists Use variables to keep track of counts Use variables to keep track of sums Combine features to develop solutions to meaningful problems Trace through programs that iterate over sequences using *for* Use iteration (*for*) to iterate over strings	Describe what micro:bits are List the built-in components for output and input Select hardware components that are fit for purpose Use an IDE to write python programs for the micro:bit Write programs that use the micro:bits built-in output devices Write programs that use the micro:bits built-in input devices Write programs that use the GPIO pins for input and output Write programs that exchange messages wirelessly Test and debug programs for the micro:bit Combine components to solve meaningful problems Design a physical computing artifact purposefully	COMPUTER SCIENCE PATHWAY: To be able explain how data is sent across a network To be able to name basic hardware involved in networking How data is sent across a network The role of basic hardware involved in networking, such as switches The role of IP addresses, domain names and DNS A range of Internet services DIT PATHWAY: The different types of user interfaces, their uses and who might use them Different design aspects of the different user interfaces

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	potential impact on organisations Explain how networks can be protected from common security threats Identify the most effective methods to prevent cyberattacks	Describe how sound can be represented as a sequence of bits Calculate the size of a digital sound Explain how the manipulation of sounds amounts to arithmetic operations Describe the 'trade-off' between size and perceived quality for digital sound Use software to perform basic sound editing Describe and assess the creative benefits and ethical drawbacks of digital manipulation	Identify data needed to answer a question Create a data capture form Describe the need for data cleansing Apply data cleansing techniques to a data set Select data to visualise data set Analyse visualisation to identify patterns, trends and outliers Draw conclusions and report findings		Implement the design of a physical computing project Decompose the functions of a physical computing system Test, revise and refine the design of a project	
Key Questions	What is the difference between data and information? What happens to data entered online? What is the need for the Data Protection Act? What is human error? What is hacking? What is a brute force attack? What is the difference between a DOS attack and a DDOS attack? What is the need for the Computer Misuse Act? What are the different types of malware? How can we prevent cyber security attacks?	How are digital images composed? What is meant by the following terms: - Pixels - Resolution - Colour depth - Sample - Sampling rate - Sample size How can colour be represented? How do you calculate the size of a digital image? How do you calculate the size of a digital sound? What is compression? Why is compression necessary?	What is Data Science? How can visualising data help identify trends or patterns? Where are large data sets used in daily life? What is meant by correlation? What is meant by outlier? What are the steps of the investigative cycle? How can the investigative cycle be used on data sets? What is a data capture form? What is data cleansing? Why is data cleansing needed?	What are lists? What is the difference between a list and a string? How do you access individual elements of a string or list? How can you use variable to keep count?	What is a micro:bit? What are the built-in functions of a micro:bit? How can we write programs for a micro:bit? How can we combine components of a micro:bit? Why it is important to test and refine your project?	COMPUTER SCIENCE PATHWAY: How is data sent across a network? What is the basic hardware needed for a basic network? DIT PATHWAY: What are the different types of user interfaces? What are some of the design principles?

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Assessment	Interim assessment with action points to addresses any gaps End of Module assessment	Interim assessment with action points to addresses any gaps End of Module assessment	Interim assessment with action points to addresses any gaps End of Module assessment	Interim assessment with action points to addresses any gaps End of Module assessment	Interim assessment with action points to addresses any gaps End of Module assessment	Interim assessment with action points to addresses any gaps End of Module assessment