Cardinal Newman Catholic School – Department of Computer Science & iMedia

INTENT: Curriculum Overview Year 8

A learner in Year 8 will be able to explain the term 'network' and describe different network types and layouts. They will be able to discuss the hardware components required to setup a network and explain their functions. They will have a good understanding of network threats and how to prevent them. Students will be able to explain the integral parts within a systems architecture and their functions, and also explain how text, images and sound are represented in a digital format. Students will be able to demonstrate practical skills in website creation and image editing, and produce functional programs written in a text-based programming language.	**A learner in Year 8 will be able to**: describe what a network is and how they work whilst mentioning specific hardware. Create a multi-page website using HTML that has design features added using CSS. Students will be able to identify the internal parts of a computer system, explain the differences between memory and storage and describe how moder-day devices all use similar architecture. They will also be able to describe how all data is stored/transferred as binary and therefore explain how text, images and sound are represented in binary. Students will be able to interpret a problematic scenario and design and code a computer program to provide a solution. Student will be able to collect images from multiple sources and repurpose them using image editing software.

Term 1	**8.1 Computer Networks** This topic introduces students to the concept of computer networking. We all use networks daily within our homes, schools and in public places, but what is a network? How do they work? Students will be able to explain in detail how networks work and what hardware devices are required to create one. They will be able to define a LAN and a WAN and understand the difference between the Internet and the WWW.	**Assessment**
	Knowledge: **After studying this topic students will be able to:** ▫ Define the term 'network' ▫ Explain two types of network – LAN/WAN ▫ Describe the hardware required to setup a network and explain the specific functions ▫ Describe network topologies including relevant merits and drawbacks ▫ Describe a number of network threats and what measures can be put in place to protect networks ▫ Explain what is meant by 'The Internet of Everything' giving specific examples **Skills:** ▫ Design a local area network, labelling devices, the connection methods and topology ▫ Identify hardware components and explain functions ▫ Suggest the appropriate defence mechanism to a given network threat ▫ Design a personal area network to a given scenario using 'The Internet of Everything' **Formative Assessment:** Students will complete a pitstop assessment after this topic, it will consist of a series of multiple-choice questions to check the key knowledge covered. **National curriculum link:** Bullet point 5 of the KS3 NC: • *Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems*	**Knowledge coverage:** ▫ What is a network? ▫ Difference between LAN & WAN ▫ What hardware is required? ▫ Network topologies ▫ Network threats ▫ Network security **Assessment style/questions:** Multiple choice Assessment of this topic will also be included in the spring assessment and end of year summer assessment

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INTENT: Curriculum Overview Year 8

Term 1	**8.2 Creating websites using HTML & CSS** This topic teaches students to write code in both HTML and CSS, two languages that are used to produce webpages. The HTML code provides the structure to a page, the content and the links between multiple pages, whereas the CSS code will add design elements such as colour, text styles and borders.	**Assessment**
	Knowledge: **After studying this topic students will be able to:** ▫ Produce HTML code that create multiple webpages that link together ▫ Produce HTML code that formats text and the positioning of text on a page ▫ Produce HTML code that inserts an image on a webpage ▫ Produce CSS code to change the background style and colour of a webpage ▫ Produce CSS code to change the style and colour of text **Skills:** ▫ Create a functional multi-page website ▫ Add design elements to improve the appearance of a webpage	**Knowledge coverage:** ▫ Hyper-text markup language ▫ Cascading style sheets ▫ Knowledge of different HTML tags ○ <HEAD> ○ <TITLE> ○ <BODY> ○ <P> ○ <IMG> ○ <HREF> ▫ Knowledge of CSS tags ○ <STYLE> **Assessment style/questions**: Assessment of this topic will be included in the spring assessment and end of year summer assessment

Term 2	**8.3 Computational Thinking** This topic builds upon the knowledge covered in topic 7.2 – Computer Hardware. Students will define computational thinking terms such as abstraction & decomposition before diving into a more in-depth look at computing architecture.	**Assessment**
	Knowledge: **After studying this topic students will be able to:** ▫ Define the terms abstraction & decomposition ▫ Explain the function of the CPU describe the FDE cycle ▫ Describe the difference between memory & storage and the need for virtual memory, and advantages of using cloud storage. ▫ Explain the functions of RAM & ROM ▫ Describe how instructions are stored and processed by the CPU during the FDE cycle ▫ Explain what an embedded system is giving specific examples	Knowledge coverage: ▫ Function of the CPU ▫ FDE cycle ▫ Function of RAM & ROM ▫ Difference between memory & storage ▫ Virtual memory ▫ Cloud storage ▫ Embedded systems **Assessment style/questions**:

	Skills: ▫ Identify internal components of computer systems and describe how instructions are stored and processed ▫ Identify multiple devices that use the 'Input-Process-Output' model and are therefore recognised as computing devices ▫ Categorise devices as either general purpose computers or embedded systems **Formative Assessment:** Students will complete a pitstop assessment after this topic, it will consist of a series of multiple-choice questions to check the key knowledge covered. **National curriculum link:** Bullet point 5 of the KS3 NC: • *Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems* Bullet point 6 of the KS3 NC: • *Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits*	Multiple choice Assessment of this topic will also be included in the Spring assessment and end of year summer assessment
Term 2	**8.4 Python Programming** This topic introduces students to a textual programming language. The focus is on getting pupils to understand the process of developing programs, the importance of writing correct syntax, being able to formulate algorithms for simple programs and be able to debug their code.	**Assessment**
	Knowledge: **After studying this topic students will be able to:** ▫ Explain the term 'algorithm' and create algorithms for a given task ▫ Explain the different data types we use in Python, giving examples ▫ Explain the importance of program maintenance including 'commenting' ▫ Explain what is meant by syntax & logic errors **Skills:** ▫ Create programs in Python that: ○ Use 'print' statements ○ Include user input ○ Create variables of different data types ○ Use selection appropriately ○ Debug code to spot errors	Knowledge coverage: ▫ Variables ▫ Data types (integer, float, string, Boolean) ▫ Input & Output (print) ▫ Selection (IF statements) ▫ Commenting (#) ▫ Syntax & logic errors **Assessment style/questions:** Multiple choice and short answer questions (program lines of code)

	○ Comment code effectively **Formative Assessment**: Students will complete a pitstop assessment after this topic, it will consist of a series of multiple-choice questions to check the key knowledge covered. During this term students will also complete the Spring assessment which is part of the whole school assessment policy. **National curriculum link:** Bullet point 1 of the KS3 NC: • *Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems* Bullet point 2 of the KS3 NC: • *Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem* Bullet point 3 of the KS3 NC: • *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*	Assessment of this topic will also be included in the spring assessment and end of year summer assessment **Spring assessment** The spring assessment consists of a series of multiple choice and short-answer questions covering all content from topics taught this year.

Term 3	**8.5 Data Representation** In this topic students will continue building on their knowledge of how data is processed and represented within a computer system. We often use the term 'binary', here students will understand what it represents within a system, how to convert between the denary and binary number system, and how different file formats are represented within a system in binary format.	**Assessment**
	Knowledge: **After studying this topic students will be able to:** ▫ Represent denary values in a binary format ▫ Convert between denary and binary number systems ▫ Explain how images are represented in binary format (using key terms i.e. resolution, pixels & colour depth) ▫ Explain how sound is represented in binary format (using key terms i.e. sampling, bit rate) ▫ Explain how text is represented in binary format by using a character set (ASCII & Unicode) ▫ Describe the term compression **Skills:**	Knowledge coverage: ▫ Binary number system ▫ Denary number system ▫ Key term - Resolution ▫ Key term – Colour depth ▫ Key term – Sample rate ▫ Key term – Bit depth ▫ Compression techniques **Assessment style/questions:**

	▫ Convert denary numbers up to the value of 255 into binary ▫ Convert 8-bit binary numbers to denary ▫ Describe how images, sound and text are represented in binary ▫ Explain how resolution and colour depth affect file size ▫ Explain how sampling and bit rate affect file size ▫ Explain how compression aids storage and transmission **National curriculum link:** Bullet point 4 of the KS3 NC: • *Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal].* Bullet point 6 of the KS3 NC: • *Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits*	Assessment of this topic will be included in the end of year summer assessment
Term 3	**8.6 Multimedia – Digital Graphics** This topic focusses on using image software to repurpose, edit and manipulate digital graphics. It allows students to explore a professional standard software package and learn techniques used in industry to create high-quality images. It builds the foundation of skills used at key stage 4 in our creative iMedia course.	**Assessment**
	Knowledge: **After studying this topic students will be able to:** ▫ Demonstrate multiple techniques within image editing software to alter the appearance of images ▫ Organise and use multiple files within a piece of software ▫ Work solely on a project to produce a final product **Skills:** ▫ Use multiple layers to repurpose an image ▫ Use masks to edit the appearance of an image ▫ Use colour correction techniques to edit an image ▫ Use special effects within the software to improve the appearance of an image ▫ Use multiple skills to create a product in response to a given scenario **Formative Assessment:** Practical project work based on a given task. During this term students will also complete the Summer assessment which is part of the whole school assessment policy.	Knowledge coverage: ▫ Using layers & masks ▫ Using colour correction techniques ▫ Using specific tools (i.e. quick selection tool) ▫ Using software special effects **Assessment style/questions:** Students will create a product using techniques studied in this topic following a set scenario. We will assess their work in-line with the OCR iMedia coursework units we study at KS4. This will give students a 'working at grade'. **Summer assessment** The summer assessment consists of a series of multiple choice and short-answer questions

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	National curriculum link: Bullet point 7 of the KS3 NC: • *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.* Bullet point 8 of the KS3 NC: • Create, re-use, revise and re-purpose digital artifacts for a given audience, with attention to trustworthiness, design and usability	covering all content from topics taught this year.