Cardinal Newman Catholic School
Department of Computer Science and Creative iMedia

INTENT: Curriculum Overview: **Year 10 Computer Science**

A learner in Year 10 will know: understand the components that make up computer systems and how they communicate with one another. They will learn about the different kinds of memory used within a computer system, software and the different types of software, the role of the OS, computer networks and the security issue associated with the use of computer networks. They will also learn about the current issues relating to the use of technology and the legislation that protects them.			**A learner in Year 10 will be able to**: understand and apply the fundamental principles and concepts of Computer Science, including algorithms, and data representation, analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs and understand the impacts of digital technology to the individual and to wider society.		
10.1 Topic 1.1 Computer System Architecture 1.2 Memory	**10.2 Topic** 1.3 Computer Networks	**10.3 Topic** 1.4 Network Security	**10.4 Topic** 1.5 Systems Software	**10.5 Topic** 1.6 Ethical, legal, cultural and environmental impacts of digital technology	**10.6 Topic** 2.4 Boolean Logic

Term 1	**10.1 Topic** 1.1 Systems architecture 1.2 Memory & Storage	**10.2 Topic** 1.3 Computer Networks	Assessment
	1.1 Systems architecture **Knowledge:** This unit will introduce students to the internal components of a computer systems architecture. Students will be able to identify each hardware component and explain its function. Students will have an understanding of how the CPUs performance can be affected and explain the factors taken into consideration. Students will also be able to identify where embedded systems are used and why they are effective for a given purpose. **Skills:** ▪ Identify the major components of the PC architecture; the CPU, Cache and Registers, their features/characteristics and functions within the computer system ▪ Explain how CPU performance can be affected ▪ Understand the purpose of embedded systems and be able to identify them **1.2 Memory & Storage** **Knowledge:** This unit introduces students into the terms 'memory' and 'storage'. These two terms are heavily used in day-to-day life but what do they actually mean? Students will be able to describe the difference between memory and storage and explain the different types of hardware used for these processes. Students will understand how data is stored whilst using terminology such as	**Knowledge:** Networks is a vital topic for students to understand. The concept of connecting devices together to cover the globe may seem far-fetched, but this topic allows students to grasp the knowledge to be able to explain how networks function. They will be able to describe different types of network including how they are setup, and describe the services they produce. Students will be able to define some of the key terms such as protocols, standards and topologies. **Skills:** ▪ Describe the difference between a LAN and a WAN ▪ Explain network topologies ▪ Identify the hardware components required to setup a network explaining the function of each ▪ Explain factors that affect the performance of a network ▪ Identify the advantages and disadvantages of different network models (client-server, peer-to-peer) ▪ Discuss the different connection methods available (wired vs. wireless) ▪ Describe why encryption is important ▪ Explain what a 'standard' is ▪ Explain a variety of network protocols ▪ Explain the importance of network layers	Knowledge coverage: ○ Purpose of the CPU ○ Components within a CPU (ALUL, CU, MAR, MDR, PC, ACC, Cache) ○ CPU performance (speed, cache size, cores) ○ Embedded systems ○ What is a network? ○ Types of networks (LAN/WAN) ○ Network models ○ Network topologies ○ Required hardware ○ The Internet and its services ○ Connection methods ○ Encryption ○ IP/MAC addressing ○ Standards ○ Protocols ○ Network layers **Assessment style/questions:** Exam style questions, combination of short written answers requiring students to state, explain, describe analyse and compare.

	bit, bytes and gigabytes to name a few. Students will be able to convert number systems, and understand how we store all document types in a binary format. **Skills:** ▪ Explain the need for primary memory & secondary storage in a computer system. ▪ Describe the function of RAM and ROM ▪ Describe the process of using virtual memory ▪ Calculate units of data ▪ Convert between the denary, binary and hexadecimal number systems ▪ Explain how test, images and sound are represented in binary ▪ Explain lossy and lossless compression and what document type they are used for **Formative Assessment:** At the end of this topic knowledge will be tested with a pitstop assessment	**Formative Assessment:** At the end of this topic knowledge will be tested with a pitstop assessment.	
Term 2	**10.3 Topic** 1.4 Network Security	**10.4 Topic** 1.5 Systems software	Assessment

	Knowledge:
	After learning about networks students will use this topic to understand all about network threats and what can be done to prevent them. Students will be able to categorise threats to either internal or external threats and discuss a variety of prevention methods.
	
	Skills:
	▪ Explain different forms of attack including:
	  ○ Malware (including definition of types)
	  ○ Brute-force attack
	  ○ DoS
	  ○ Hacking
	  ○ SQL injection
	▪ Describe different prevention methods including:
	  ○ Penetration testing
	  ○ Anti-malware software
	  ○ Firewalls
	  ○ User-access levels
	  ○ Passwords
		Knowledge:
		Students will learn the two types of systems software we use in our devices. They will understand and be able to describe the functions of an operating system and the need for utility software to keep our devices maintained and running smoothly.
		
		Skills:
		▪ Explain the purpose and functions of an operating system, to include:
		  ○ Provide a user interface
		  ○ Memory management & multitasking
		  ○ Peripheral management & drivers
		  ○ User management
		  ○ File management
		▪ Explain the functions of different types of utility software:
		  ○ Encryption software
		  ○ Defragmentation software
		  ○ Data compression software
		
		Formative Assessment:
			Knowledge coverage:
			○ Different types of malware
			○ Common prevention methods
			○ Purpose and roles of an operating system
			○ Different types of utility software and their functions
			
			Assessment style/questions:
			Exam style questions, combination of short written answers requiring students to state, explain, describe analyse and compare.

	○ Encryption ○ Physical security measures **Formative Assessment:** At the end of this topic knowledge will be tested with a pitstop assessment.	At the end of this topic knowledge will be tested with a pitstop assessment.	
Term 3	**10.5 Topic** 1.6 Ethical, legal, cultural and environmental impacts of digital technology	**10.6 Topic** 2.4 Boolean logic	Assessment
	Knowledge: In this topic students will be able to discuss in relation to a given scenario; ethical, legal, cultural, environmental and privacy issues. They will also gain an understanding of the current legislation that is relevant to computer science; The Data Protection Act (GDPR 2018), Computer Misuse Act (1990), Copyright, Designs and Patents Act 1988 and Software licences (i.e. open-source and proprietary). **Skills:** • Be able to formulate a response to a given scenario summarising their points of view whilst including relevant ethical, cultural, legal or environmental reasoning. • Explain the need for the following legislation: ○ The Data Protection Act ○ The Computer Misuse Act ○ The Copyright, Designs and Patents Act ○ Proprietary/Open-source software licenses **Formative Assessment:** At the end of this topic knowledge will be tested with a pitstop assessment.	**Knowledge:** In this topic students will learn the basics of Boolean logic. They will understand the 3 logic gates requires at GCSE, be able to represent them in a multi-gate diagram as well as drawing the diagram from a given expression. Students will be able to interpret truth tables. **Skills:** • Draw/label the AND, OR and NOT gate • Combine logic gates to form a diagram • Interpret truth tables, equations or scenarios to form a logic diagram **Formative Assessment**: At the end of this topic knowledge will be tested with a pitstop assessment.	Knowledge coverage: ○ Ethical, legal, cultural and environmental issues ○ Current legislation ○ AND, OR and NOT logic gates ○ Truth tables/logic expressions **Assessment style/questions:** Exam style questions, combination of short written answers requiring students to state, explain, describe analyse and compare.