YEAR 10 CURRICULUM SUMMARY

When?	Knowledge	Assessment
AUTUMN Term – FIRST Half **(7 Weeks)**	**Systems Architecture** • The Purpose of the CPU • Von Neumann architecture • MAR, MDR, Program Counter, Accumulator • Common CPU components and their function - **ALU, CU** & **Cache** • The function of the CPU as **fetch** and **execute** instructions stored in memory • How common characteristics of **CPU**s affect their **performance - clock speed, cache size** and number of **cores** • **Embedded systems - purpose** and **examples** • The difference between **RAM** and **ROM** • The **purpose of ROM** in a computer system • The **purpose of RAM** in a computer system • The **need** for **virtual memory** • **Flash memory** **Translators & Facilities** • Common tools and facilities available in an integrated development environment (IDE) • **Characteristics** and **purpose** of different **levels of programming language**, including low level languages • The **purpose of translators** • The **characteristics** of an **assembler**, a **compiler** and an **interpreter** • **Why data** is **represented** in computer systems **in binary form** • **Simple logic diagrams** using the operations AND, OR and NOT • **Truth tables** • **Combining Boolean operators** using AND, OR and NOT to two levels • **Computational thinking** – abstraction, decomposition & algorithmic thinking • **Standard searching algorithms** - binary & linear	**ProProfs Online Quizzes developed by GCS Computing Department** **01 Computer Systems QUIZ** **02 The CPU QUIZ** **03 Von Neumann Architecture QUIZ** **04 Fetch-Decode-Execute Cycle QUIZ** **05 CPU Performance QUIZ** **06 Memory QUIZ** **07 Secondary Storage QUIZ**

When?	Knowledge	Assessment
AUTUMN Term – SECOND Half **(7 Weeks)**	**Algorithms** • **Interpret**, **correct** or **complete algorithms** • **Standard sorting algorithms** – bubble, merge and insertion sort • **How** to **produce algorithms** using pseudocode and flow diagrams **Producing Robust Programs** • How to **identify syntax** and **logic errors** **Programming Techniques** • The use of **basic string manipulation** • The use of **arrays** (or equivalent) when solving problems, including both one and two dimensional arrays • How to use **sub programs** (functions and procedures) to produce structured code • The **use of data types** – integer, real, Boolean, character and string, casting • The **common arithmetic operators** • The **common Boolean operators** • The use of **variables**, **constants**, **operators**, **inputs**, **outputs** and **assignments** **Storage** • The need for **secondary storage** • Data **capacity** and calculation of data capacity requirements	**ProProfs Online Quizzes developed by GCS Computing Department** **Computational Thinking QUIZ** **Algorithmic Thinking QUIZ** **Programming Languages QUIZ** **Data Types QUIZ** **Decomposition QUIZ** **Strings QUIZ** **Secondary Storage QUIZ**

When?	Knowledge	Assessment

SPRING Term – FIRST Half
 	
(6 Weeks)
	Systems Software
	• The **purpose** and **functionality** of **systems software**
	• **Operating systems** - **user interface, memory management / multitasking, peripheral** management and **drivers, user management & file management**
	Wired & Wireless Networks
	• How to **identify syntax** and **logic errors**
	• Types of **networks** - **LAN** (Local Area Network) & **WAN** (Wide Area Network)
	• Factors that affect the **performance** of networks
	• The different **roles** of computers in a **client-server** and a **peer-to-peer** network
	• The **hardware** needed to connect stand-alone computers into a Local Area Network - **wireless access points, routers/switches, NIC** (Network Interface Controller/Card) and **transmission media**
	• The **internet** as a worldwide collection of computer networks: **DNS** (Domain Name Server)
	• The concept of **virtual networks - wireless access points, routers/switches, NIC** (Network Interface Controller/Card) **, transmission media,** the **internet** as a worldwide collection of computer networks - **DNS** (Domain Name Server), **hosting,** the **cloud** & the concept of **virtual networks**
	Programming Techniques
	• How to use **sub programs** (functions and procedures) to produce structured code
	Producing Robust Programs
	• **Defensive design** considerations
	• **Maintainability**
		ProProfs Online Quizzes developed by GCS Computing Department
		
		Operating Systems QUIZ
		    Utilities QUIZ
		    Types of Network QUIZ
		Client-Server & Peer to Peer Networks QUIZ
		    Network Topologies QUIZ
		    Network Performance QUIZ
		    Network PROTOCOLS QUIZ
		    Programming Languages QUIZ Summative
		
		Tests

When?	Knowledge	Assessment
SPRING Term – SECOND Half **(6 Weeks)**	**NEA Programming Project** • **Formal Coding Assessment** **Programming Techniques** • How to use **sub programs** (functions and procedures) to produce structured code • The use of **basic string manipulation** • The use of **arrays** (or equivalent) when solving problems, including both one and two dimensional arrays • The **use of data types** – integer, real, Boolean, character and string, casting • The **common arithmetic operators** • The **common Boolean operators** • The use of **variables**, **constants**, **operators**, **inputs**, **outputs** and **assignments** **Producing Robust Programs** • How to **identify syntax** and **logic errors** • **Selecting** and **using suitable test data** • The **purpose of testing** • **Types of testing** - iterative and final/terminal	**ProProfs Online Quizzes developed by GCS Computing Department** **Computational Thinking QUIZ - EVALUATING SOLUTIONS** **Packet Switching QUIZ** **Preventing Network Vulnerabilities QUIZ** **File Handling QUIZ** **Virtual Networks QUIZ** **Data Types QUIZ** **Formal Coding Assessment based on NEA Programming Project**

When?	Knowledge	Assessment
SUMMER Term – FIRST Half **(6 Weeks)**	**Network Topologies, Protocols & Layers** • The **concept** of **layers** • **Packet switching** • **Ethernet** • The uses of **IP addressing**, **MAC addressing**, and **protocols** including - **TCP/IP** (Transmission Control Protocol/Internet Protocol), **HTTP** (Hyper Text Transfer Protocol), **HTTPS** (Hyper Text Transfer Protocol Secure), **FTP** (File Transfer Protocol), **POP** (Post Office Protocol), **IMAP** (Internet Message Access Protocol), **SMTP** (Simple Mail Transfer Protocol) • **Star** and **mesh** network topologies • **Wi-Fi** - **frequency** and **channels** & **encryption** **Data Representation** • Bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte, petabyte • How data needs to be **converted** into a **binary format** to be **processed** by a **computer**. • How to **convert positive denary whole numbers** (0–255) into **8 bit binary numbers** and vice versa • How to **add two 8 bit binary integers** and explain **overflow** errors which may occur • **Binary shifts** • How to **convert positive denary whole numbers** (0 – 255) into **2 digit hexadecimal numbers** and vice versa • How to convert from **binary** to **hexadecimal** equivalents and vice versa • Check digits.	**ProProfs Online Quizzes developed by GCS Computing Department** **Network Topologies QUIZ** **DNS & IP Addressing QUIZ** **Virtual Networks QUIZ** **Units QUIZ** **Binary Numbers QUIZ** **Hexadecimal Numbers QUIZ**

When?	Knowledge	Assessment
SUMMER Term – SECOND Half **(6 Weeks)**	**Data Representation** • The **use of binary codes** to represent characters • The term '**character-set**' • The **relationship** between the **number of bits per character** in a character set and the **number of characters** which can be represented (for example **ASCII**, extended ASCII and **Unicode**). • **How** an **image** is **represented** as a series of pixels represented **in binary** • **Metadata** included in the file • The **effect of colour depth** and **resolution** on the size of an image file. • **How sound can be sampled** and stored in digital form • How **sampling intervals** and other factors affect the size of a sound file and the quality of its playback - **sample size, bit rate, sampling frequency**. • **Need** for **compression** • **Types** of **compression** – **lossy & lossless** • The **use of records** to store data • The **use of SQL** to search for data **Programming Development** • **Programming Techniques** • **Variables** • **Data Types** • **Sequence** • **Selection** • **Iteration** • **Casting** • **Program Design** • **Defensive design** • **Maintainability** • **Robust Program Development**	**ProProfs Online Quizzes developed by GCS Computing Department** **Characters QUIZ** **Images QUIZ** **Sound QUIZ** **Compression QUIZ** **Databases & SQL QUIZ** **Programming Languages QUIZ** **Computational Thinking QUIZ - ABSTRACTION** **Formal Coding Assessment based on NEA** **Programming Project** **Summative Tests**