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**Knowledge Rich Curriculum Plan**

Computer Science

Year 10



| **Unit 1:**  **Data Representation** |  |  |  |  |
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| **Lesson/Learning Sequence** | **Intended Knowledge:**  *Students will know that…* | **Tiered Vocabulary** | **Prior Knowledge:**  *In order to know this students, need to already know that…* | **Assessment** |
| **Lesson 1:**  **Boolean Logic** | * Students will know that logic diagrams and truth tables. Combine Boolean logical operators to solve problems. * Students will know how to create logic diagrams and truth tables. | DIV:  MOD and related terms: | * ***Students need to already know that logic diagrams can be used to solve a range of problems. Truth tables can be combined to resolve complex scenarios.*** * ***Students need to already know how mathematic operators can be used to solve problems and data can be represented in a number of forms. Problem solving skills and a good working knowledge of mathematical operators.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 2:**  **Data Representation** | * Students will know that binary digits can be used to represent other forms. How the binary number system can be used to represent a range of objects, such as: Numbers (in different forms), Characters, Sounds, Images * Students will know how to construct information using binary data | Bit  Nibble  Byte  KB - Kilobyte  MB – Megabyte  GB - Gigabyte  TB - Terabyte  PB - Petabyte | * ***Students need to already know that most computers use binary data only*** * ***Students need to already know how to count in a base 10 number system. Have a sound working knowledge of the denary number system*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 3:**  **Number Systems and conversions** | * Students will recognise different number systems including: Denary, Binary and Hexadecimal * Students will be able to convert (both ways) between each number system | Base 2  Base 10  Base 16 | * ***Students need to already know that data can be presented in a variety of ways*** * ***Students need to understand how the Base 10 number system works*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 4:**  **Data Storage** | * Students will recognise the need for both primary and secondary storage in a computer system and the properties, advantages/disadvantages of each type of media including magnetic, optical and solid state | Volatile  Non – Volatile  Optical  Magnetic  Solid State | * ***Students need to already know that data must be stored in order for it to be processed*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 5:**  **Algorithms** | * Students need to be able to recognise an overarching problem and decompose it into the various elements that need to be overcome to create a full solution. | Computational thinking  Decomposition  Abstraction | * ***Students need t already know that a sequence or instructions can be used to solve a given problem.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 6:**  **Programming Fundamentals** | * Students need to understand the key concepts including sequence, selection and iteration * Students need to be able to recognise both syntax and logic errors and use these to debug programs to make them run effectively | Sequence e  Selection  Iteration  Syntax  Logic | * ***Instructions must be run in a correct order to work effectively*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 7:**  **Practical Programming skills** | * Students should be able to write programs using a high level language (Python) | Python  IDE (iDLE)  High Level Language  Low Level Language | * ***Students should be able to use an IDE such as IDLE to write their code and use the compile function to test and debug their code*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 8:**  **Additional programming techniques** | * Students will learn more advanced programming techniques utilising 2D and 3D data structures such as Lists, Tuples and Dictionaries | Lists  Tuples  Dictionaries | * ***Students will know that data can be store as a variety of data types and the suitability of each*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 9:**  **Advanced programming techniques** | * Students will be able to search through data stored in Lists are any similar data structures to extract the required information in the most appropriate sequence. | Iteration  For  While | * ***Students will have a basic understanding of how data may be searched and sorted.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 10:**  **Advanced data storage** | * Students will be able to use complex data structures such as dictionaries to categorise information and locate specific details using a dictionary key | Dictionary  Key | * ***Students will have come understanding of how data may be stored and then accessed.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 11:**  **Architecture of the CPU** | * Students will know the features of the Von Neumann architecture and their role in the function of the processor | CPU  ALU  Control unit  Registers | * ***Students will know the role of the processor in the function of a computer system.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 12:**  **CPU Performance** | * Students will recognise the factor that effect the speed of the CPU, including: clock speed, number of cores and cache size | Clock Speed  Cores  Cache | * ***Students will know that CPUs can come in a variety of speeds*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 13:**  **Embedded Systems** | * Students will recognise the properties of an embedded system and identify a range of examples along with their uses. | Embedded System | * ***Students will know that some devices have an embedded system built into them.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 14:**  **Primary Storage** | * Students will know the purpose of Primary Storage and the role of both ROM and RAM as part of a computer system. | ROM  RAM  Volatile  Non- Volatile | * ***Students will know that computer systems require storage devices in order for them to function.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 15:**  **Secondary Storage** | * Students will know the purpose of secondary storage and why it is required as part of a computer system. | Magnetic  Optical  Solid State | * ***Students will know that computer systems require storage devices in order for them to function.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 16:**  **Networks and Topologies** | * Students will know what a computer network is and why networks are produced. | Network  Bus  Ring  Star  Mesh | * ***Students will be able to identify the advantages and disadvantages of computer networks.*** * ***Students will recognise several network topologies and the advantages and disadvantages of each topology.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 17:**  **Wired and Wireless networks, protocols and layers** | * Students will know that networks can be created using wired or wireless technologies | TCP  IP  Layers  Application  Transport  Network/Internet  Data Link  Physical | * ***Students will be able to identify the advantages and disadvantages of both wired and wireless connectivity methods.*** * ***Students will be able to successfully identify the name od purpose of each layer in the TCP/IP model*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Lesson 18:**  **Practical Programming skills revision** | * Students will be able to identify the core programming skills of Sequence, Selection and Iteration and apply these concepts when creating a program to solve a problem | Sequence  Selection  Iteration | * ***Students will be able to successfully apply Computation thinking to solve a problem, including the concepts of decomposition and abstraction*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |