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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 QuizSSS TaskRetrieval TaskWorksheet |
| **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 NibbleByteKB - KilobyteMB – MegabyteGB - GigabyteTB - TerabytePB - 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 QuizSSS TaskRetrieval TaskWorksheet |
| **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 2Base 10Base 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 QuizSSS TaskRetrieval TaskWorksheet |
| **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 – VolatileOptical Magnetic Solid State  | * ***Students need to already know that data must be stored in order for it to be processed***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **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 thinkingDecomposition Abstraction  | * ***Students need t already know that a sequence or instructions can be used to solve a given problem.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **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 eSelectionIterationSyntaxLogic | * ***Instructions must be run in a correct order to work effectively***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Lesson 7:** **Practical Programming skills** | * Students should be able to write programs using a high level language (Python)
 | PythonIDE (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 QuizSSS TaskRetrieval TaskWorksheet |
| **Lesson 8:** **Additional programming techniques** | * Students will learn more advanced programming techniques utilising 2D and 3D data structures such as Lists, Tuples and Dictionaries
 | ListsTuplesDictionaries | * ***Students will know that data can be store as a variety of data types and the suitability of each***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **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 QuizSSS TaskRetrieval TaskWorksheet |
| **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 QuizSSS TaskRetrieval TaskWorksheet |
| **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
 | CPUALUControl unitRegisters | * ***Students will know the role of the processor in the function of a computer system.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **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 SpeedCoresCache | * ***Students will know that CPUs can come in a variety of speeds***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **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 QuizSSS TaskRetrieval TaskWorksheet |
| **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.
 | ROMRAMVolatile Non- Volatile | * ***Students will know that computer systems require storage devices in order for them to function.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Lesson 15:** **Secondary Storage** | * Students will know the purpose of secondary storage and why it is required as part of a computer system.
 | MagneticOptical Solid State | * ***Students will know that computer systems require storage devices in order for them to function.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Lesson 16:** **Networks and Topologies** | * Students will know what a computer network is and why networks are produced.
 | Network BusRingStarMesh | * ***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 QuizSSS TaskRetrieval TaskWorksheet |
| **Lesson 17:** **Wired and Wireless networks, protocols and layers** | * Students will know that networks can be created using wired or wireless technologies
 | TCPIPLayersApplicationTransportNetwork/InternetData LinkPhysical | * ***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 QuizSSS TaskRetrieval TaskWorksheet |
| **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
 | SequenceSelectionIteration | * ***Students will be able to successfully apply Computation thinking to solve a problem, including the concepts of decomposition and abstraction***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |