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**Knowledge Rich Curriculum Plan**

Computer Science

Year 11



| **Unit 1:** **Networks** |  |  |  |  |
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| **Topic/Learning Sequence**  | **Intended Knowledge:***Students will know that…* | **Tiered Vocabulary**  | **Prior Knowledge:***In order to know this students, need to already know that…* | **Assessment**  |
| **Topic:** **Threats to Computer Systems and Networks** | * Students will know that networks can be attacked by a number of different threats
* Students will know how these attacks differ from one another
 | * Malware
* Phishing
* Social engineering
* Brute force attacks
* Denial of service attacks
* Data interception and theft
* SQL injection
 | * ***Students need to already know that a network is a series of computers connected together***
* ***Students need to already know how networks are constructed and the hardware required to facilitate this***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Identifying and preventing vulnerabilities** | * Students will know that networks can be attacked in a number of ways
* Students will know how these attacks can be identified and prevented
 | * penetration testing
* anti-malware software
* firewalls
* user access levels
* passwords
* encryption
* physical security
 | * ***Students need to already know that networks can be vulnerable to a range of attacks***
* ***Students need to already know how use software features to identify problems***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Operating Systems** | * Students will recognise that all computer systems require an operating systems to be able to function
* Students will be able to identify a number of types of operating systems
 | Operating System WindowsLinuxMac OSAndroid  | * ***Students will be able to explain a variety of functions of an operating system and the role of these functions when a computer system is running.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic: Utility Software** | * Students will know that utility software is required to facilitate the effective operation of a computer system
 | Defragmentation Anti-virusDebuggerSystem monitorDecompressionBackup | * ***Students will be able to recognise a variety of types of utility software and will be able to explain their use in the effective and efficient running of a computer system***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Ethical, Legal, Cultural and Environmental impact of technology** | * Students will be aware of some ethical and legal issues when using technology and the positive and negative impact that technologic may have on the environment
 | Data ProtectionComputer MisuseDesign, Copyright and Patents  | * ***Students will have an understanding of several pieces of legislation that affect the use of technology***
* ***Students will be aware of several ethic impacts supporting the use of technology***
* ***Students will recognise that computer systems can have an impact on the environment, both in positive and negative ways.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Defensive design** | * Students will recognise that programs need to be designed and tested correctly in order for that to function effectively.
 | DebugNormal Extreme Erroneous  | * ***Students will have a sound understanding of the principles of defensive design including the need to implement protection against unexpected user inputs or actions.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Testing** | * Students will recognise that software must be effectively tested in order for it to work effectively.
 | DebugNormal Extreme ErroneousIterative testingTerminal testingSyntax errorLogic errorTest data  | * ***Students will understand a range of concepts when testing software, including both systematic and discreet testing utilising a range of data.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Languages** | * Students will know that computer systems can be programmed in a range of different languages
 | High level Low level PythonHTMLSQLAssembly LanguageTranslatorsInterpreters Compliers | * ***Students will recognise the differences between high and low level languages and the advantages and disadvantages when using each to program a computer system***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **The integrated development environment (I.D.E)** | * Students will know that an iDE has features that assist them when creating code.
 | IDEiDLEeditordiagnosticsrun-time environment translators  | * ***Students will know the different features of an IDE and how they may assist when writing a computer program***
 |  |
| **Topic:** **Practical Programming skills** | * Students will develop a good understanding and a range of programming techniques
 | VariablesConstantsOperatorsInputs/outputsSequence, selection & iteration ArithmeticIntegersBooleanCharactersString manipulationData types Data casting  | * **Students will have an understanding of basic programming techniques**
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Searching and Sorting Practical Programming skills** | * Students will be able to explain a range of searching and sorting techniques and be able to explain the benefits and drawbacks of each
 | Algorithm SortBinary BubbleMerge Insertion | * ***Students will know that data can be searched and sorted in a variety of ways***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Searching and sorting algorithms** | * Students will be able to explain a range of searching and sorting techniques and be able to explain the benefits and drawbacks of each
 | Algorithm SortBinary BubbleMerge Insertion | * ***Students will know that data can be searched and sorted in a variety of ways***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |
| **Topic:** **Theory Revision** | * Students will recap all previous topics to ensure that they have retained all the key information
 |  | * ***Students should have a solid knowledge base from the content of the previous topics***
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| **Topic:** **Practical Programming Skills Revision** | * Students will recap their programming skills using a range of practical assignments
 | VariablesConstantsOperatorsIntegersBooleanCharactersString manipulationData casting  | * ***Students should now have a solid understand of a range of programming techniques and be able to select from them to solve a range of problems.***
 | Knowledge Check QuizSSS TaskRetrieval TaskWorksheet |