****

**Knowledge Rich Curriculum Plan**

Computer Science

Year 11



| **Unit 1:**  **Networks** |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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 Quiz  SSS Task  Retrieval Task  Worksheet |
| **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 Quiz  SSS Task  Retrieval Task  Worksheet |
| **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  Windows  Linux  Mac OS  Android | * ***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 Quiz  SSS Task  Retrieval Task  Worksheet |
| **Topic: Utility Software** | * Students will know that utility software is required to facilitate the effective operation of a computer system | Defragmentation  Anti-virus  Debugger  System monitor  Decompression  Backup | * ***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 Quiz  SSS Task  Retrieval Task  Worksheet |
| **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 Protection  Computer Misuse  Design, 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 Quiz  SSS Task  Retrieval Task  Worksheet |
| **Topic:**  **Defensive design** | * Students will recognise that programs need to be designed and tested correctly in order for that to function effectively. | Debug  Normal  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 Quiz  SSS Task  Retrieval Task  Worksheet |
| **Topic:**  **Testing** | * Students will recognise that software must be effectively tested in order for it to work effectively. | Debug  Normal  Extreme  Erroneous  Iterative testing  Terminal testing  Syntax error  Logic error  Test data | * ***Students will understand a range of concepts when testing software, including both systematic and discreet testing utilising a range of data.*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **Topic:**  **Languages** | * Students will know that computer systems can be programmed in a range of different languages | High level  Low level  Python  HTML  SQL  Assembly Language  Translators  Interpreters  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 Quiz  SSS Task  Retrieval Task  Worksheet |
| **Topic:**  **The integrated development environment (I.D.E)** | * Students will know that an iDE has features that assist them when creating code. | IDE  iDLE  editor  diagnostics  run-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 | Variables  Constants  Operators  Inputs/outputs  Sequence, selection & iteration Arithmetic  Integers  Boolean  Characters  String manipulation  Data types  Data casting | * **Students will have an understanding of basic programming techniques** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **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  Sort  Binary  Bubble  Merge  Insertion | * ***Students will know that data can be searched and sorted in a variety of ways*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **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  Sort  Binary  Bubble  Merge  Insertion | * ***Students will know that data can be searched and sorted in a variety of ways*** | Knowledge Check Quiz  SSS Task  Retrieval Task  Worksheet |
| **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*** |  |
| **Topic:**  **Practical Programming Skills Revision** | * Students will recap their programming skills using a range of practical assignments | Variables  Constants  Operators  Integers  Boolean  Characters  String manipulation  Data 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 Quiz  SSS Task  Retrieval Task  Worksheet |