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| **Year 10** | **Topic:** 3.1 Fundamentals of algorithms and 3.2 Programming  **Period:** Autumn 1 |
| **Overview of topic:**  During the opening term for Computer Science students will firstly begin by looking at the fundamentals of Algorithms. Algorithms are the core to programming and the way a computer completes everyday tasks. Students will look at algorithms a computer uses to search and sort data, the structure of algorithms and the efficiency of algorithms. This will be done through general theory delivery and through practical programming activities. The basics of programming in Python will be learnt during this term. | |
| **Key** **knowledge:**  Understand the term algorithm, the structure of an algorithm, the purpose of algorithms and how to write simple algorithms to perform a particular task.  Understand the basics of the Python programming language and syntax. Input, outputs, variables, data types, selection.  **Key vocabulary:**   |  |  | | --- | --- | | **Tier 2** | **Tier 3** | | **Variable Declaration**  **Constant Declaration**  **Assignment**  **Selection**  **Operator**  **Boolean** |  | | **Key skills:**  ***Know how to…***   * Explain the term algorithm * Explain the terms decomposition and abstraction * Determine the purpose of simple algorithms written in Pseudocode. Python and represented as a Flow Chart. * Demonstrate how a linear and binary search algorithm works and evaluate the efficiency of them. * Demonstrate how a bubble and merge sort works and be able to compare and contrast them against each other. * Draw flow charts to represent algorithms * Interpret flowcharts to determine the purpose of algorithms. * Understand and use data types (integer, real, Boolean, character and string). * Declare and use constants and variables * Use input and output statements * Use arithmetic, relational and Boolean operators. * Use selection and nested selection statements. * Use iteration and nested iteration statements. * Use and write 1 and 2 dimensional arrays. * Import modules such as Random. |
| **Co-curricular opportunities: *(ASPIRE Day, Careers, clubs, competitions etc)***  Links to Minecraft club and similar clubs in school | **Wider Reading Opportunities/Links:**  Please see resources on Microsoft OneNote and on Microsoft Teams to access all classwork notes and revision materials.  Watch Craig n Dave AQA GCSE Computer Science videos on the topic via [www.youtube.com](http://www.youtube.com)  Clear Revise: AQA GCSE Computer Science 8525 (Python Edition) textbook.  PG Online: Computer Science AQA 8525 textbooks. |
| **How can I use this information at home?**   * Conversation starters with your children to discuss their learning * Support your child in carrying out independent research around the topic * Ask students to continue with their programming practice using [www.replit.com](http://www.replit.com) * Promote books/other texts that explore this topic (see reading section) * Help your child to learn the key vocabulary | |