Topic: Unit 2.1 Algorithms

Key vocabulary:	**Core knowledge questions**	**Powerful knowledge crucial to commit to long term memory**	**Links to previous and future topics**
Computational Thinking Abstraction Decomposition Algorithmic Thinking Algorithm Flowchart Process Pseudocode Dry Run Trace Table Linear Search Binary Search Bubble Sort Merge Sort List Insertion Sort Ordered List Unordered List	1. What are the three main principles of Computational Thinking? 2. Define Abstraction 3. Define Decomposition 4. Define Algorithmic Thinking 5. Be able to identify the inputs, processes, and outputs for a problem 6. Understand, decipher and create structure diagrams 7. Be able to create, interpret, correct, complete, and refine algorithms using: o Pseudocode o Flowcharts o Reference language/ high-level programming language 8. Identify common errors 9. Complete trace tables 10. Understand standard searching algorithms: o Binary search / Linear search 11. Understand standard sorting algorithms: o Bubble, Merge and Insertion sorts	• Understand the principles of Computational Thinking (Abstraction, Decomposition and Algorithmic Thinking) and how they are used to define and refine problems • Be able to produce simple diagrams to show: o The structure of a problem o Subsections and their links to other subsections • Complete, write or refine an algorithm using specified techniques • Identify syntax/logic errors in code and suggest fixes • Create and use trace tables to follow an algorithm • Understand the main steps of each algorithm • Understand any pre-requisites of an algorithm • Apply the algorithm to a data set • Identify an algorithm if given the code for it	• Algorithms are covered in Y7 and Y8 • Algorithms, including searching and sorting algorithms are fundamental to Computer Science and will be revisited throughout the course. • This topic links with programming, the algorithms are converted into a relevant programming language. Students will also recreate the key search and sort algorithms in Python.

We will develop these skills:

Impressive reading	**Impressive speaking**	**Impressive writing**	**Resilience**	**Numeracy via:**	**Digital Literacy via:**	**Employability via:**
Research using the Internet to find relevant and appropriate information about the topic of Algorithms	Discussion of research findings. Discussion in groups of Algorithms	Recording research findings appropriately. Writing definitions for each flowchart symbol and sort or search algorithm. Answering exam questions	Developing ability to consistently amend and refine work. Listen to others' opinions	Linear and Binary Search and Bubble, Merge and Insertion Sort	Use of the Internet Use of MS Office Suite	Teamwork – working in groups Flexibility – taking on opinions of others Problem Solving – creating and deciphering appropriate algorithms

SEND

- Graduated learning tasks (complexity of algorithms)
- Peer Support - Some students may be more aware of Algorithms – use these students as Lead Students
- Differentiated Activities and Tasks, choice of tasks for certain activities, support sheets
- Questioning
- Flipped Learning resources for students to study either prior to or after lesson
- Peer Assessment / Support on labelling tasks
- Provision of scaffolded diagrams and writing schemes to allow learners to complete appropriate and accurate algorithms