

# ***St Cuthbert Mayne School Curriculum Map 2023-2024***



**Year 11**

**Department: COMPUTING**

**Key Stage 4 Curriculum Summary**

**Exam Board: OCR**

**Course title: J277 Computer Science**

This GCSE consists of two papers, one focusing on computer systems and one with a focus on programming, computational thinking, and algorithms. Both papers have identical weighting and mark allocations. Computer Science will encourage students to understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation.

They will analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs.

## Autumn Term

Topic/Unit	Threats and preventions to computer systems and networks	Operating Systems and utility Software	Ethical, legal, cultural and environmental impact	Searching and Sorting Algorithms
Knowledge (Content covered)	<b>Forms of attack</b> <ul style="list-style-type: none"> <li>Malware</li> <li>Social engineering, e.g. phishing, people as the 'weak point'</li> <li>Brute-force attacks</li> <li>Denial of service attacks</li> <li>Data interception and theft</li> <li>The concept of SQL injection</li> </ul> <b>Common prevention methods:</b> <ul style="list-style-type: none"> <li>Penetration Testing</li> <li>Anti-malware software</li> <li>Firewalls</li> <li>User access levels</li> <li>Passwords</li> <li>Encryption</li> <li>Physical Security</li> </ul>	<b>The purpose and functionality of operating systems:</b> <ul style="list-style-type: none"> <li>User interface</li> <li>Memory management and multitasking</li> <li>Peripheral management and drivers</li> <li>User management</li> <li>File management</li> </ul> <b>The purpose and functionality of utility software</b> <b>Utility system software:</b> <ul style="list-style-type: none"> <li>Encryption software</li> <li>Defragmentation</li> <li>Data Compression</li> </ul>	Impacts of digital technology on wider society including: <ul style="list-style-type: none"> <li>Ethical issues</li> <li>Legal issues</li> <li>Cultural issues</li> <li>Environmental issues</li> <li>Privacy issues</li> </ul> Legislation relevant to Computer Science: <ul style="list-style-type: none"> <li>The Data Protection Act 2018</li> <li>Computer Misuse Act 1990</li> <li>Copyright Designs and Patents Act 1988</li> <li>Software licences (i.e. open source and proprietary)</li> </ul>	Standard searching algorithms: <ul style="list-style-type: none"> <li>Binary search</li> <li>Linear search</li> </ul> Standard sorting algorithms: <ul style="list-style-type: none"> <li>Bubble sort</li> <li>Merge sort</li> <li>Insertion sort</li> </ul>
Skills	Computer Science Problem solving			Programing Skills
Assessment	Lesson Review Quizzes (AFL) and Final Topic Assessment (Summative)			
Gatsby 4 (Linking curriculum learning to careers)	Data scientist. Software tester. Web developer. Systems analyst. Business analyst. Product manager. Network architect. Software engineer. Teacher			

## Spring Term

Topic/Unit	2.3 Robust Programs	2.5 Programming languages and Integrated Development Environments	Preparation for the examinations
<b>Knowledge (Content covered)</b>	<b>Defensive design considerations:</b> <ul style="list-style-type: none"> <li>Anticipating misuse</li> <li>Authentication</li> </ul> <b>Input validation</b> <b>Maintainability:</b> <ul style="list-style-type: none"> <li>Use of sub programs</li> <li>Naming conventions</li> <li>Indentation</li> <li>Commenting</li> </ul> <b>The purpose of testing</b> <b>Types of testing:</b> <ul style="list-style-type: none"> <li>Iterative</li> <li>Final/terminal</li> </ul> <b>Identify syntax and logic errors</b> <b>Selecting and using suitable test data:</b> <ul style="list-style-type: none"> <li>Normal</li> <li>Boundary</li> <li>Invalid</li> <li>Erroneous</li> </ul> <b>Refining algorithms</b>	<b>Characteristics and purpose of different levels of programming language:</b> <ul style="list-style-type: none"> <li>High-level languages</li> <li>Low-level languages</li> </ul> <b>The purpose of translators</b> <b>The characteristics of a compiler and an interpreter</b> <b>The integrated development environment</b> <b>Common tools and facilities available in an integrated development environment (IDE):</b> <ul style="list-style-type: none"> <li>Editors</li> <li>Error diagnostics</li> <li>Run-time environment</li> <li>Translators</li> </ul>	<b>Revision and preparation for the Summer examinations.</b>
<b>Skills</b>	Computer Science Problem solving		
<b>Assessment</b>	Lesson Review Quizzes (AfL) and Final Topic Assessment (Summative)		Past exam practice and programming
<b>Gatsby 4 (Linking curriculum learning to careers)</b>	Data scientist. Software tester. Web developer. Systems analyst. Business analyst. Product manager. Network architect. Software engineer. Teacher.		

