KS4 Curriculum Overview

Computer Science
OCR J277

Curriculum Intent

To be engaging and practical, encouraging creativity and problem solving. To encourage students to develop their understanding and application of the core concepts in computer science. To encourage students to analyse problems in computational terms and devise creative solutions by designing, writing, testing and evaluating programs.

How does the KS4 curriculum build on that from KS3?

The KS4 curriculum develops depth and breadth upon the 5 KS3 foci of: Information and Communications Technology; Hardware and Processing; Data Representation; Algorithms and programming. All of these elements are encompassed within the J277/01 – Computer Systems and J277/02 – Computational Thinking elements of the course along with the Practical Programming Project.

What do students *do* with this knowledge or these skills?

- Understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation
- analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs
- think creatively, innovatively, analytically, logically and critically
- understand the components that make up digital systems, and how they communicate with one another and with other systems
- understand the impacts of digital technology to the individual and to wider society
- apply mathematical skills relevant to Computer Science.

How does the KS4 curriculum align to the National Curriculum?

Pupils have the opportunity to study Computer Science at sufficient depth to allow them to progress to higher levels of study or to a professional career.

All pupils are taught to:

- develop their capability, creativity and knowledge in computer science
- develop and apply their analytic, problem-solving, design, and computational thinking skills
- understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns

What new knowledge or skills are students taught?		
Term	**Year 10**	**Year 11**
Autumn	**Systems Architecture** Architecture of the CPU CPU Performance Memory Secondary Storage **Data Representation** Units and binary numbers Binary arithmetic and hexadecimal Characters Images Sound Compression **Networks** The Internet and WANs LANs Wireless Networking Client server and P2P Protocols and layers	**Practical Programming Project (20 hours)** **Logic and Languages** Logic diagrams and truth tables Defensive design Errors and testing Translators and facilities IDE's **Revision for October/Nov Mocks**

Spring	**Network Security and Systems Software** Network threats Preventing vulnerabilities Operating systems Utility Software **Digital Impacts of technology** Ethical and cultural issues Environmental issues Legislation and privacy	**Revision for Feb/March Mocks**
Summer	**Algorithms** Computational Thinking Searching Algorithms Sorting algorithms Flowcharts Pseudocode Interpreting algorithms **Revision for June Mock** Whole of Computer Systems content and Algorithms **Programming** Programming fundamentals Sequence and selection Iteration Arrays Procedures and functions Records and files SQL	**Computer Systems Revision** **Computational Thinking Revision** **Exam Technique** **Chalk and Talk Exam Papers**
Rationale for this sequencing	The sequence provides logical development of knowledge and skills that inform subsequent learning and practical application. This sequence means the majority of theoretical content can be covered in Year 10 therefore allowing the focus in year 11 to be on the Programming Project and revision, rather than studying high volumes of new content.	

Additional support at home	
Additional reading for enjoyment, enhancement and extension	• Fiction - Blood, Sweat, and Pixels: The Triumphant, Turbulent Stories Behind How Video Games Are Made by Jason Schreier • Online computing news
Online resources to practice, consolidate and revise	• Seneca Learning • Teach ICT • Youtube - Craig N Dave
Workbooks & revision guides to practice, consolidate and revise	• GCSE OCR Computer Science J277 Course textbook by PG Online • GCSE OCR Computer Science: Illustrated Revision and Practice (ClearRevise OCR Computer Science J277) • Python Programming Guide for GCSE Computer Science (CGP GCSE Computer Science 9-1 Revision)