Computer Science overview and intent

Computer Science underpins all aspects of our society. It surrounds us in our homes, places of work, schools, healthcare systems and travel. The study of how computer systems work and why they work is essential because although technology is changing constantly, the principles that future technologies are built on remain the same. The ability to think creatively to problem solve and to have the resilience not to give up is crucial both in school and in navigating an adult life in a world built on a foundation of technology. The intent of our curriculum is implemented through the delivery of a high-quality lessons which places developing the concepts of computing at the forefront of planning. Each scheme of work is underpinned by a deep understanding of these computational concepts and how they relate to the real world.

Key Stage 3

Students study Computing once a fortnight. In Year 7, students begin by developing their skills in basic IT working cross-platform with both Google and Microsoft. They are encouraged to use online tools to work collaboratively with their peers outside of lessons helping them understand how they can express themselves positively. Students mirror the GCSE in Computer Science learning about system architecture, memory and storage before moving onto the representation of data where they finish being able to read and write in binary. In Year 8 students continue to mirror the GCSE in Computer Science learning about computer networks and cyber crime. This fundamental knowledge is further developed with an introduction to databases, algorithms and programming using both block based code and Python. All lessons strive to strike a balance to test students' knowledge and understanding of systems while undertaking regular problem solving tasks ensuring the practice of lateral thinking is embedded throughout the subject.

Key Stage 4

In year 9 students have the opportunity to study Computer Science as an option subject. The GCSE in Computer Science gives students a balance of learning how computer systems work and how they can be programmed. The GCSE is split into two components which are both worth 50% of the final GCSE. The first component focus's on what has been taught at KS3 and has the time to delve deeper into many aspects of it because of early exposure at KS3. This unit includes system architecture, memory, storage, data representation, networking, networking security and software in addition to issues arising from the use of evolving technologies. The second component focus's on a knowledge of systems introducing students to the idea of a lifecycle where projects are planned, developed, tested, refined on an endless loop. Students learn how to program using Python and increase both problem solving skills and resilience as they tackle some very challenging programming problems and code.

KS3 five year model

* See spreadsheet data for individual lesson breakdown and mapping across specification (below)

Year 7	
Autumn term (6 lessons)	Getting set up on school systems 1.2.3 Units 1.1.1 Architecture of the CPU 1.1.2 CPU performance
Spring term (6 lessons)	1.2.1 Primary storage (memory) 1.2.2 Secondary storage 1.5.1 Operating systems 1.5.2 Utility software
Summer term (6 lessons)	1.2.3 Units 1.2.4 Data storage 1.2.5 Compression
Assessment	No discrete assessment completed due to reduced curriculum time In class quizzes can be used for reporting knowledge %
Year 8	
Autumn term (6 lessons)	1.3.1 Networks and topologies 1.3.2 Wired and wireless networks, protocols and layers
Spring term (6 lessons)	2.2.3 Additional programming techniques (the use of records to store data) 2.2.1 Programming fundamentals 2.1.3 Searching and sorting algorithms
Summer term (6 lessons)	1.4.1 Threats to computer systems and networks 1.4.2 Identifying and preventing vulnerabilities 2.1.1 Computational thinking 2.1.2 Designing, creating and refining algorithms 2.2.1 Programming fundamentals
Assessment	No discrete assessment completed due to reduced curriculum time In class quizzes can be used for reporting knowledge %

KS4 five year model

* See spreadsheet data for individual lesson breakdown and mapping across specification (below)

Year 9	
Autumn term	1.1.1 Architecture of the CPU 1.1.2 CPU performance 1.1.3 Embedded systems 1.2.1 Primary storage (memory) 1.2.2 Secondary storage 1.2.3 Units 1.2.4 Data Storage 1.2.5 Compression
Assessment	Y9:C1:L3 & Yr9:C1:L6: 30 mins mid cycle assessment + 30 mins whole class green pen (+teacher marked) Y9:C1:L11: 30mins learning + 90 mins end cycle assessment (+teacher marked with merged feedback) Y9:C1:L12: 60 mins green pen + 60 mins masterclass
Spring term	1.3.1 Networks and topologies 1.3.2 Wired and wireless networks protocols and layers 1.4.1 Threats to computer systems and networks 1.4.2 Identifying and preventing vulnerabilities 2.1.3 Searching and sorting algorithms
Assessment	Y9:C2:L6: 60 mins mid cycle assessment (+teacher marked with merged feedback) Y9:C2:L7: 60 mins green pen Y9:C2:L11: 90 mins end cycle assessment (+teacher marked with merged feedback) Y9:C2:L12: 60 mins green pen + 60 mins masterclass
Summer term	2.1.1 Computational thinking 2.1.2 Designing, creating and refining algorithms 2.2.1 Programming fundamentals 2.2.2 Data types 2.2.3 Additional programming techniques (basic string manipulation, random number generator) 2.3.1 Defensive design (Input validation) 2.3.2 Testing (syntax and logic errors)
Assessment	Y9:C3:L4: Assessment 1.1 - 1.9 (Quiz – self marking, Coding - teacher marked + merged feedback) Y9:C3:L5: Masterclass 1.1 - 1.9 Y9:C3:L6: Assessment 2.1 - 2.9 (Quiz – self marking, Coding - teacher marked + merged feedback) Y9:C3:L7: Masterclass 2.1 - 2.9 Y9:C3:L8: Assessment 3.1 - 3.9 (Quiz – self marking, Coding - teacher marked + merged feedback) Y9:C3:L9: Masterclass 3.1 - 3.9 Y9:C3:L11: Assessment 4.1 - 5.9 (Quiz – self marking, Coding - teacher marked + merged feedback) Y9:C3:L12: Masterclass 4.1 - 5.9

Year 10	
Autumn term	1.5.1 Operating systems 1.5.2 Utility software 1.6.1 Ethical, legal, cultural and environmental impact + **Refresh of year 9 content with emphasis on coding**
Assessment	Y10:C1:L5: 60 mins mid cycle assessment (+teacher marked with merged feedback) Y10:C1:L6: 60 mins green pen + 60 mins masterclass Y10:C1:L11: 90 mins end cycle assessment (+teacher marked with merged feedback) Y10:C1:L12: 60 mins green pen + 60 mins masterclass
Spring term	2.1.1 Computational thinking 2.1.2 Designing, creating and refining algorithms 2.2.1 Programming fundamentals 2.2.3 Additional programming techniques (basic string manipulation, random number generator) 2.3.1 Defensive design 2.3.2 Testing 2.5.1 Languages 2.5.2 Integrated Development Environment
Assessment	Y10:C2:L5: 60 mins mid cycle assessment (+teacher marked with merged feedback) Y10:C2:L6: 60 mins green pen + 60 mins masterclass Y10:C2:L11: 90 mins end cycle assessment (+teacher marked with merged feedback) Y10:C2:L12: 60 mins green pen + 60 mins masterclass
Summer term	2.2.3 Additional programming techniques (file handling, records, SQL, arrays, sub routines) 2.4.1 Boolean logic
Assessment	Y10:C3:L6: 60 mins mid cycle assessment (+teacher marked with merged feedback) Y10:C3:L7: 60 mins green pen + 60 mins masterclass Y10:C3:L11: 90 mins end cycle assessment (+teacher marked with merged feedback) Y10:C3:L12: 60 mins green pen + 60 mins masterclass