

Computer Science

Statement of Intent

Students will be aware of the influence of computing technology (mobile phones, tablets, laptops, PCs) and recognise that computing has an impact on nearly every aspect of the world in which they live. They will realise that Computer Science is an ever-changing field and that new technologies (mobile phone apps, Artificial Intelligence, robotics, self-driven cars) continue to be developed.

Mathematics underpins the technological world around them which consist of mathematical algorithms written as computer programs. Computer Science endeavours to deepen students' understanding of key concepts by making links to transferable knowledge and understanding (skills) in Mathematics where appropriate and prior learning in Computer Science. Students will transfer knowledge and understanding acquired elsewhere (e.g. Maths, Science) to Computer Science and they will show their workings (process, steps, method) when solving problems.

There will be high expectations in Computer Science from all students and homework (SMH) will be completed on time and meet the minimum requirement of 60% score (or better). Students have 3 attempts to improve their score. Expectations will be shared with students' at the beginning of Year 7 and GCSE. Students will use the same exercise book in Year 7 and 8 to demonstrate progress, the linkage between Year 7 & 8, and to use the book as a reference.

Students will be supported to become independent learners through expert modelling, a range of teaching approaches and retrieval strategies. They will be equipped with the knowledge and understanding (skills) and qualifications needed to progress on to courses at 6th form and pursue careers in Computer Science.

Opportunities will be created where students will come in contact with the world outside the classroom. This could be educational visits, speakers and after school clubs, e.g. App Design to learn about the design process and networking with a career professional.

Core Computer Science Curriculum:

Theoretical

- Students will understand a range of number systems such as binary, denary and hexadecimal. They will understand how to convert between binary and denary, as well as hexadecimal and binary.
- Students will understand how to perform simple operations such as binary addition.
- Students will understand that data such as numbers, characters, images and sound can be represented in binary on a computer.
- Students will understand simple logic gates (AND, OR, NOT) in circuits, use truth tables and be able to write a logic statement for a given problem.
- Students will be able to identify input, output and storage devices. They will also develop an understanding of the different types of software used in a computer system.
- They will understand the stored program concept where data is stored temporarily in RAM and processed by the CPU.
- They will understand different network types such as LANs and WANs. This will include the physical layout of networks (bus, ring, star, mesh) and connectivity (wired, wireless).

Problem Solving

- Students must understand standard algorithms for sorting (bubble sort, merge sort) and searching (linear search, binary search).
- Students will use logical reasoning to compare the efficiency of different algorithms for the same problem.

Programming

- Students are expected to be familiar with, and understand how to use a range of data types (string, integer, float, Boolean) and data structures (string, array).
- Students will understand the purpose of programming constructs such as sequence, selection (decisions) and iteration (repeat).
- Students will understand how to use Boolean operators (AND, OR, NOT) in programming.

- Opportunities will be given where students can use more than one, text-based, programming language to explore simple computational abstractions that model real-world problems and physical systems. This will include solving a range of computational challenges that is fully working and meet user requirements.
- Students will understand the purpose of procedures and/or functions and use it in programming.
- Students will understand the environmental, ethical and legal impact of technology.
