

Subject:

# Computer Science

Computer Science Intent:

The aim of this course is to help students to develop problem solving skills that support their success throughout the curriculum, to ensure each student has an understanding of different types of programming language and that they are able to program to the best of their ability, and to encourage students to understand how technology works.

Our Exam Board is: OCR

## The Big Questions...

Year 10	Year 11
<p><b>Computer networks, connections and protocols:</b></p> <ul style="list-style-type: none"><li>- What are the different types of computer network and topologies? What hardware is used on a network? How does the internet work? What are the benefits and drawbacks of wired versus wireless connections. What are the common protocols and why are they required?</li></ul> <p><b>Algorithms:</b></p> <ul style="list-style-type: none"><li>- How are abstraction, decomposition and algorithmic thinking used to define and refine problems? How do I create flowcharts and pseudocode to solve problems? What are the main steps of a binary or linear search? How do I sort data using a bubble sort, merge sort or insertion sort?</li></ul> <p><b>Data Storage and Boolean Logic:</b></p> <ul style="list-style-type: none"><li>- How do we convert between denary, binary and hexadecimal? How do we add, multiply and divide binary numbers. How are characters, images and sound stored in computers? What is compression? What are the logic diagrams and truth tables for AND, OR and NOT.</li></ul> <p><b>Ethical, legal, cultural and environmental (both years 10 &amp; 11):</b></p> <ul style="list-style-type: none"><li>- How do ethical, legal, cultural, environmental and privacy issues impact on wider society through the use of technology. What is the purpose of the Data Protection Act, Computer Misuse Act, Copyright Designs and Patents Act and software licences and what do they allow or prohibit?</li></ul> <p><b>Programming:</b></p> <ul style="list-style-type: none"><li>- How do I solve problems by programming? What do sequence, selection and iteration mean? What do data types mean? How do I use file handling operations. What are arrays? How do I solve a large problem and what documentation do I produce for the project lifecycle.</li></ul>	<p><b>Systems Architecture:</b></p> <ul style="list-style-type: none"><li>- What is the purpose of the CPU and what are the common components? How does the CPU carry out the fetch-execute cycle? What is the Von Neumann architecture and what is the role of the registers? How do common characteristics of CPUs affect their performance? What are embedded systems?</li></ul> <p><b>Memory and Primary/Secondary Storage:</b></p> <ul style="list-style-type: none"><li>- Why do computers have RAM and ROM? What are the different types of secondary storage? How do we know which are suitable for a given application? What are the characteristics of the different types of secondary storage?</li></ul> <p><b>Network Security:</b></p> <ul style="list-style-type: none"><li>- What threats are posed to systems and how can they be identified and prevented?</li></ul> <p><b>Systems Software:</b></p> <ul style="list-style-type: none"><li>- What is the purpose and functionality of operating systems? How does utility software perform housekeeping tasks?</li></ul> <p><b>Programming:</b></p> <ul style="list-style-type: none"><li>- What are 2D arrays? Why should I use procedures and functions? How do I use SQL to search for data? How do I design software to ensure it can deal with invalid data? What is the purpose of different types of testing? How do I programme using a low level programming language? What are the common tools and facilities available in an IDE?</li></ul>

### What skills will I develop?

- You will develop the logical thinking skills that enable the solving of more complex problems. You will be encouraged to break problems in to smaller steps and produce flowcharts and programs for your solutions.
- You will be encouraged to program in a number of different ways including Python, SQL and a low level programming language (Little Man Computing).
- You will develop an understanding of how computers work and how networks are so important for working together.

### What great resources can I use?

- <http://teach-ict.com/> contains teaching videos for every Computer Science topic with interactive quizzes, exam practice and flashcards.
- <https://student.craigndave.org/gcse-videos> - on-line teaching videos for each Computer Science topic
- <https://www.bbc.co.uk/bitesize/examspecs/zmtchbk> - revision, videos and tests for each topic in Computer Science
- <https://www.ocr.org.uk/qualifications/gcse/computer-science-j277-from-2020/> - exam board website with the full Computer Science GCSE specification.

### How will I be assessed?

Each week homework will be set, with details on SMHW, feedback will be given. A mini mock will be given in January y10. End of year exams will take place in Year 10, where you will sit two half GCSE papers and be graded using the OCR grade boundaries. In year 11 you will sit two full GCSE papers in the mocks and be graded using the OCR grade boundaries.

**Examination:** The end of the GCSE course is 100% exam-based and will involve two GCSE papers, taken at the end of Year 11. Both papers are 1hr 30mins long.

### Three ways that parents/carers can help...

1. Encourage your child to approach their Computer Science homework, with their revision book if necessary, as if they are sitting the exam so that they revise the topic and practice exam technique.
2. Help your child to learn the Computer Science keywords as this will improve their grade.
3. Discuss news stories on how technology affects society, this is particularly useful in the ethical, legal, cultural and environmental topic of the course.