

**CURRICULUM INTENT**

**We aim to develop a sense of awe and wonder at the world around us and explore the way everything interconnects.**

The Computer Science curriculum at Avanti Fields provides students with the foundations for analysing problems in computational terms, understanding and applying the fundamental principles and concepts of Computer Science, and thinking creatively, innovatively and logically.

The curriculum also aims to foster deeply analytical attitudes towards the development and use of computer technology, and to encourage students to examine and appreciate how computing and technology affect their lives, the environment and the natural world.

**THE AVANTI WAY**

**EDUCATIONAL EXCELLENCE**



**CHARACTER FORMATION**



**SPIRITUAL INSIGHT**



Teachers and students are inspired, motivated and joyful. A challenging computer science curriculum with high academic standards and a culture of intellectual curiosity cultivates independently thoughtful and reflective students, working towards mastery in key principles and concepts and computational thinking skills.

A challenging and supportive learning environment in computer science allows students to embody the Avanti’s virtues of respect, self-discipline, courage, integrity, empathy and gratitude, and develop the key Avanti Fields learner skills and qualities. Students are encouraged to make conscientious choices and display a reverence for all life, nature and the earth’s resources.

Computer Science will build on students’ natural sense of wonder, curiosity, their intuition and inspiration to offer an experience of knowledge and wisdom through experiments, enquiry and evidence. Students will consider the power of technology to do good in the world and analyse the impacts of digital technology on wider society.

**PROGRAMME OF STUDY**

The GCSE Computer Science course encourages the development of knowledge and understanding in Computer Science through the study of programming, how computers work and opportunities for computational thinking. Students are assessed on these skills in their final written exams.

Students will be provided with opportunities to develop their programming skills, including designing, coding, testing and improving their computer programs. Students will also develop their numeracy and literacy skills, and analytical and evaluative skills.

**GCSE COMPUTER SCIENCE: YEAR 10 & YEAR 11**

Students start their GCSE work in the Autumn Term of Year 10, studying the OCR GCSE Computer Science J277 course, and continue through to the end of Year 11.

Students are taught THREE Computer Science lessons per week by a single specialist teacher. The final GCSE exams (2 in total) are 1 hour 30 minutes each and each exam contributes 50% to the overall GCSE qualification.

**PAPER 1: Computer Systems**

Unit	Title	Details
1.1	Systems Architecture	CPU: Architecture, Components, Performance and Purpose Von Neumann Architecture Embedded Systems
1.2	Memory and Storage	Primary Storage (RAM and ROM; Virtual Memory) Secondary Storage (Common Types; Advantages and Disadvantages) Units of Storage Data Representation Compression
1.3	Computer networks, connections and protocols	Networks and Topologies LAN vs WAN Factors affecting performance The Internet Modes of Connection Encryption Common Protocols
1.4	Network Security	Threats to Network Security Forms of Attack Identifying and Preventing Vulnerabilities
1.5	Systems Software	Operating Systems Utility Software
1.6	Ethical, Legal, Cultural and Environmental Impacts	Computers and the Law Ethical Issues Computers, the Environment and Sustainability Privacy Issues Licensing

**PAPER 2: Computational thinking, algorithms and programming**

Unit	Title	Details
2.1	Algorithms	Designing, creating and refining algorithms Pseudocode and flowcharts Computational thinking Searching and sorting algorithms
2.2	Programming Fundamentals	Sequence; Selection and Iteration Programming techniques Data types String manipulation SQL Procedures and Functions
2.3	Producing Robust Programs	Defensive Design Input Validation Program Maintenance Testing
2.4	Boolean Logic	AND , OR and NOT Boolean operators Truth Tables
2.5	Programming Languages and IDEs	High-level Languages Low-Level Languages Integrated Development Environments

In addition, students undertake the required Programming Project after they have developed sufficient skills to do so. The current project is a set of 3 tasks from a previous version of the OCR syllabus which proved particularly engaging for previous cohorts. This is based around the idea of programming dice-rolling simulations and gaming characters and is accessible to lower ability, middle ability and higher ability students with a range of ideas and programming techniques to suit all students.

## ASSESSMENT AND FEEDBACK

Students are assessed regularly in Computer Science through a combination of formative and summative assessments. Students receive timely written and verbal feedback after each assessment.

**FORMATIVE ASSESSMENT:** For each topic at KS4, knowledge and/or skills and/or understanding are assessed through low-stakes assessments, short tests and homework tasks. These tasks are structured directly around the OCR syllabus and aim to build students ability and confidence in analysing, evaluating and producing eloquent written answers, which will be required in the final exams. It is important that students attend all lessons and to make every effort to catch up with missed work in their own time and take advantage of the study support system on offer.

**SUMMATIVE ASSEMENT:** There are THREE summative assessments in Year 10 – one per term. These are cumulative in nature and the purpose is to confirm the track point of the student and to promote longer term recall by testing earlier topics and to meet the demands of a linear course. Aspects of both papers (1 & 2) will be tested in each assessment.

## EXAM BOARD AND OCR WEBSITE

**EXAM BOARD:** OCR

**SPECIFICATION:** COMPUTER SCIENCE (J277)

The OCR website has past papers from previous specifications, sample papers, mark schemes and the specification all free to download.

<https://www.ocr.org.uk/qualifications/gcse/computer-science-j277-from-2020/>

## SUPPORT AND GUIDANCE

1. Use the **OCR Computer Science Revision Guide** to learn the key facts on the knowledge organisers: READ – COVER – WRITE method → MASTER THE MINIMUM. These are available in school at the reduced price of £7.00. Copies for student loan have also been placed in the library along with copies of the GCSE course textbook.

2. **Apply** your understanding to **exam questions:** Use the **OCR Computer Science Revision Guide** to practise questions. Re-do assessment questions and questions completed in class to improve your responses.

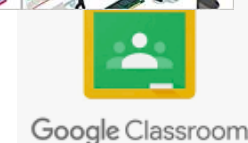
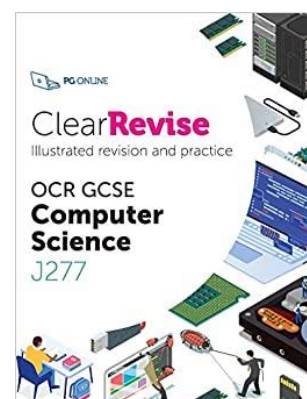
3. **Test yourself** regularly on the key facts and keywords: use **FLASHCARDS**.

4. Log onto **Google Classroom** regularly to access homework, additional resources to support you with your learning.

5. Use **OAK NATIONAL ACADEMY** lessons:

<https://teachers.thenational.academy/subjects/computing/key-stages/key-stage-4> to watch videos of lessons, complete the quizzes and the in-built questions and self-assess your answers using the answers provided.

6. Use **BBC BITESIZE:** <https://www.bbc.co.uk/bitesize/examspecs/zmtchbk> to learn the key concepts, try quizzes and watch video clips. This link is tailored to the OCR GCSE Computer Science course.



7. Attend **Computer Science study club** for support with classwork and homework. Check times with Mr Clampin.

Regular review of classwork and revision in small chunks is much more effective than leaving it to the last minute before assessments and final exams.

### EXTRA-CURRICULAR OPPORTUNITIES

**Computer Science Study Club:** Open to all students to gain further support with their homework, classwork or revision. Students will have access to the subject specific textbooks and laptops. It is hoped to install Minecraft Education Edition to run in the Spring Term Computer Science Study Club.

Throughout the year, students will have the opportunity to engage in events, trips and competitions such as the *Cybersecurity Challenge*. Students and parents will be informed of all opportunities as and when they are organised.

