Computer Science and IT

ABOUT

Computer Science and IT is about much more than using computers. It is about understanding how technology works, developing creative solutions to problems and learning the skills needed to thrive in an increasingly digital world.

At Henry Beaufort School, students develop their digital literacy, computational thinking, problem-solving and programming skills. They explore how computers operate, how data is represented, how networks communicate and how software is designed.

Through practical activities and theoretical learning, we encourage students to become confident, responsible and creative users of technology.

Whether students are developing their programming skills, exploring cybersecurity or learning how technology influences society, Computing provides valuable skills for life and future careers.

STAFF

Mr Farrell
Curriculum Leader and Assistant Head of Year 9

KEY STAGE 3 – YEARS 7, 8 AND 9

Throughout Years 7, 8 and 9, students study Information Technology (IT) as part of their curriculum. These lessons provide a broad introduction to the digital world, developing students' understanding of technology and building the essential skills needed for life in an increasingly digital society.

Students explore a range of engaging topics, including:

- **E-Safety:** Understanding how to stay safe online, protect personal information and behave responsibly when using technology.
- **The Impact of Technology:** Exploring how technology influences individuals, society, businesses and the world around us.
- **Programming:** Developing computational thinking, problem-solving skills and an understanding of how computer programs are created.
- **What is a Computer?:** Understanding the components of a computer, how computers work and the roles of hardware and software.

Through a combination of practical activities, creative tasks and theoretical learning, students develop confidence in using technology, become more informed digital citizens and build a strong foundation for further study.

This Key Stage 3 experience also helps students make informed decisions when considering GCSE Computer Science as part of their options.

GCSE COMPUTER SCIENCE

GCSE Computer Science is an intellectually challenging and highly analytical subject. Students considering this course should enjoy problem-solving, logical thinking and tackling challenging questions.

The mathematical elements of the course are important, and students need to be confident applying mathematical skills to computational problems. To help ensure students are suitably prepared, their mathematics teacher will be consulted as part of the GCSE options process.

Computer Science enables students to apply their classroom knowledge and skills to real-world problems. It is important to understand that GCSE Computer Science is not simply a continuation of the Information Technology studied at Key Stage 3. Although there are some familiar topics and themes, Computer Science explores much more deeply how computers work, how data is processed and how software and computer systems are designed.

IS COMPUTER SCIENCE RIGHT FOR ME?

Computer Science is an exciting and challenging subject that is ideal for students who enjoy solving problems, thinking logically and understanding how things work.

You don't need to be an expert at programming before starting the course. What matters most is having an interest in technology, being willing to learn and enjoying a challenge.

You might enjoy Computer Science if you:

- **Enjoy solving problems:** You like tackling puzzles, working things out and finding solutions to challenging questions.
- **Think logically:** You enjoy looking at problems step by step and identifying patterns.
- **Are curious about technology:** You want to understand how computers, software, networks and digital systems work.
- **Enjoy being creative:** You like developing ideas and finding different ways to solve problems.
- **Are interested in programming:** You would like to learn how to write computer programs and develop your own solutions.

- **Are confident with mathematics:** Mathematics is an important part of Computer Science. You will use mathematical skills to work with binary numbers, data representation, algorithms and computational problems.
- **Are willing to persevere:** You understand that solving problems and writing programs sometimes involves making mistakes, testing ideas and trying again.

What skills will I develop?

By studying GCSE Computer Science, you will develop:

- Logical thinking and problem-solving.
- Computational thinking and analytical skills.
- Programming and coding skills.
- Mathematical reasoning and application.
- Independent learning and resilience.
- An understanding of the technology shaping our world.

OCR GCSE COMPUTER SCIENCE (J277)

The OCR GCSE Computer Science (J277) specification provides a comprehensive and stimulating introduction to the fundamental principles and practices of computing.

The course develops both theoretical knowledge and practical programming skills, equipping students with the ability to understand, analyse and solve problems using computational thinking.

The qualification is divided into two equally weighted components.

COMPONENT 1: COMPUTER SYSTEMS – 50%

This component focuses on the fundamental principles behind how computer systems function. Students explore:

- **Systems Architecture:** The Central Processing Unit (CPU), its components and how it operates.
- **Memory and Storage:** Primary and secondary storage, memory types and storage technologies.
- **Networks:** Network types, topologies, protocols and security.

- **Network Security:** Common threats, vulnerabilities and methods of protecting computer systems.
- **Systems Software:** Operating systems and utility software.
- **Ethical, Legal, Cultural and Environmental Issues:** The impact of digital technology on individuals, organisations and society.

Through this component, students develop a deeper understanding of the hardware and software that underpin modern computing, alongside the wider implications of technological development.

COMPONENT 2: COMPUTATIONAL THINKING, ALGORITHMS AND PROGRAMMING – 50%

This component develops the problem-solving, logical reasoning and programming skills at the heart of Computer Science.

Students learn how to analyse problems, design algorithms and write programs to develop effective computational solutions.

Topics include:

- **Algorithms:** Designing, interpreting and evaluating algorithms.
- **Computational Thinking:** Decomposition, abstraction and algorithmic thinking.
- **Programming Fundamentals:** Writing programs using a high-level programming language such as Python.
- **Programming Techniques:** Variables, data types, selection, iteration and data structures.
- **Producing Robust Programs:** Developing reliable, efficient and maintainable code.
- **Testing and Debugging:** Identifying errors, testing solutions and refining programs.

Students are encouraged to think creatively and critically, applying their knowledge to design, develop and improve computational solutions.

PRACTICAL PROGRAMMING EXPERIENCE

Although there is no formal non-examined assessment (NEA), students complete a practical programming project during the course. This provides valuable hands-on experience of designing, writing, testing and refining computer programs.

These activities develop essential programming skills and computational thinking, preparing students for the programming questions assessed in Component 2 of the OCR GCSE Computer Science examination.