Why is the study of KS3 Computer Science important?

Computer Science is about solving problems. It is the principle of making technology work for you, enabling you to find efficient and effective solutions. Throughout your study, you will apply computational thinking and the cornerstones of computer science to a variety of problems. Modern-day societies require people to work in an innovative way and computer science provides you with the foundation to build your learning journey upon. In Computer Science you will learn to further consolidate your skills in text-based programming languages, you will also get an opportunity to use block-based programming languages in a variety of different applications. Computer Science theory is also explored, looking 'under the bonnet' at the computer system that you use on a day-to-day basis. You will develop an excellent understanding of network security, hardware, representing data in computer systems and fundamentally you will become a responsible e-citizen. Within the computer science curriculum, we focus on digital literacy, to ensure that you have all the life skills that you require moving forward into the workplace or further education. Whilst computer science focuses on creating, ICT focuses on using. Throughout your study, you will learn valuable ICT skills, such as spreadsheets and document creation. Your computer science lessons will encourage you to think deeply and help you become a more effective and resilient problem solver that doesn't give up. Computer science provides a fantastic start to your understanding of the technological world in which we live, a great life skill that all universities and employers will appreciate.

What skills will the study of KS3 Computer Science teach you?

The skills you will learn through KS3 Computer Science include:

- Apply computational thinking techniques (abstraction, decomposition, pattern recognition, algorithms) in a range of scenarios to solve problems.
- Develop resilience by not being afraid of challenges when solving problems, but to break them down and keep trying.
- Be creative in a subject that may not be renowned for it – there is no limit to creativity when you create the solution.
- How to act responsibly online to ensure that you and others stay safe online.
- Identify the key programming constructs (sequence, selection, iteration) required to solve a problem.
- Apply the key programming constructs (sequence, selection, iteration) to any programming language.
- Work independently and as part of a team to solve complex problems.
- Construct reasoned arguments to ethical, social and moral problems that have arisen due to technology and communicate these in an effective way.

- Identify links between different elements of computer science
- Evaluate different methods of representing data and decide on the most suitable method for presentation/storage

You will know and understand:

- How to use computers safely and responsibly
- The key cornerstones of computer science and how to identify them
- How to program algorithms in a variety of programming languages
- Key systems hardware
- How data is represented in computer systems
- How to use a variety of applications software
- How to program hardware
- How devices can be networked
- The impact that technology can have on ethical and environmental factorsKey systems hardware

How does your study of KS3 Computer Science support your study in other subjects?

The study of any subject in our curriculum takes full advantage of links with other subject areas- we term these as interdisciplinary links and we make the most of them because we know that deep learning requires the transference of knowledge and skills from one topic to another. Once you can transfer your learning across topics and subject areas then you are really mastering what you know and how to apply your understanding and skills.

Computer Science touches on so many other subjects such as mathematics as you develop skills in problem-solving, including decomposition (breaking down problems), abstraction (removing unnecessary detail from a problem) and pattern recognition. All of these skills will support your Learning in Mathematics as these are very important in being able to solve mathematics problems in a range of contexts. There are also links with Science as binary logic can be applied to electrical circuits in Physics and much of the technology from Computer Science can be mapped back to core principles of Science. For example, how sensors are used to monitor motion, force and/or pressure. You will learn methods of thinking and research that are widely applicable to other subject areas helping your thinking in all subjects.

COMPUTER SCIENCE

How can you deepen your understanding of KS3 Computer Science?

Across Year 7 to 13, students engage in the Bebras Challenge. This is a national competition run by Oxford University that assesses Computational Thinking skills. Students have the opportunity to take part in this competition and if they are in the 10% nationally, they will be invited to Oxford University to take part in a new challenge.

Within each academy, the iDEA award is offered. The iDEA award stands for Inspiring Digital Enterprise Award and is an international programme that helps you develop digital, enterprise and employability skills.

This is introduced to years 7 & 8 during their Computer Science lessons and offered as an enrichment thereafter.

All other year groups will be introduced to the award through an assembly and be able to attend enrichment to complete. It is also possible to complete at home.

Other enrichments vary across academies and include RaspberryPi clubs, Minecraft clubs and also programming enrichments.

In addition to these enrichments, students are able to attend enrichment to receive additional support in Computer Science. - delete

How are you assessed in KS3 Computer Science?

There are a number of assessment opportunities across the KS3 computer science learning journey. Most units of work require students to undertake some form of assessment, both formative and summative. All of our assessments are mapped against our key stage 3 curriculum specification and against our age-related assessment descriptors.

Students will become experts in the use of Google classroom and teachers will use advanced marking techniques such as rubrics so that students know exactly what they need to do to improve. This can be an especially useful technique when assessment involves programming

tasks and problem-solving. Assessments are accessible and always build on skills that students have been taught and classwork will be assessed by your teacher frequently.

How can KS3 Computer Science support your future?
Studying Computer Science is the perfect gateway into either Cambridge Nationals in Creative iMedia, or into - deleteGCSE Computer Science. This then provides a platform for going on to studying A-level Computer Science, or Cambridge Technicals in IT, both of which are offered at Outwood Family of Schools post-16 centres
Looking further ahead, you could go on to study a range of academic courses, or take your new skills into apprenticeships and workplaces. Computer Science industries are growing rapidly, and there are few better qualifications to underpin your future.

Key Stage 3 Course Overview
E-Safety Computational Thinking (Computer Science)
Spreadsheets (ICT)
Micro:Bit (Computer Science)
Outwood Travels (Digital Literacy)
Computing Theory (Computer Science)
Small Basic (Computer Science)
Running for Prime Minister (Digital Literacy)
Programming in Python (Computer Science)
Events That Changed Our Time (Digital Literacy)
HTML Web Design (ICT/Computer Science)

OCR GCSE Computer Science (9-1)

Why is the study of GCSE Computer Science important?

Computer Science is the study of the principles and use of computers. You will study the four cornerstones of Computational Thinking, these are crucial as they can be applied to any computer science context and will provide firm foundations for other topics within the subject. From this, key programming constructs can be learnt, allowing you to develop programming skills in more than one environment, this will help you to understand key similarities between different programming environments and develop key skills in problem solving and debugging. These skills will be further consolidated and mastered in text-based programming languages throughout your study, applying the cornerstones of Computational Thinking in a wealth of scenarios to develop your problem-solving skills. Computer Science theory is also explored, looking 'under the bonnet' of the computer systems that you use on a day-to-day basis. Key systems hardware are investigated, including how networks are formed, the inherent security risks that networked devices produce and how to mitigate against these risks. Computer Security is currently one of the biggest risks to national security, is relevant, interesting, and provides you with the knowledge that can help you become a responsible e-citizen. Your study of Computer Science will encourage you to think deeply and help you more effectively to become a resilient problem solver that understands the technological world in which we live – a great life skill that all universities and employers will appreciate.

Across your study, you will explore fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation. You will analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs. Furthermore, the subject will teach you to think creatively, innovatively, analytically, logically and critically and understand the impacts of digital technology on the individual and to wider society. Lessons will provide a wide range of opportunities for practical application of key concepts through a chosen programming language as well as plentiful opportunities for you to investigate how computers work. In addition, there will be opportunities for an extended discussion about the ethical, moral and social implications of technology in society. Computer Science offers significant challenges, this is because it is a subject that encourages

technological progress and breaking new ground, but this is what makes it exciting! Can you apply the concepts, knowledge and skills you have learnt in a creative way that others haven't thought of before? Can you identify an area of computer science that provides further technological development? Seems challenging – but you are going to love it! Computer Science will expand your mind!

Big Questions will be explored such as are the developments in artificial intelligence affecting job prospects and opportunities? Is technology creating a digital divide that further disadvantaged people in developing countries? Can you create a program for a specific scenario to solve a problem? What opportunities and issues does the internet develop? All of these questions are key and can be explored by understanding key computer science concepts both through theory and practical application. I bet you can't wait to get started?

What skills will the study of GCSE Computer Science teach you?

You are a citizen in this world and you need to know how to solve problems using technology and the key concepts involved in the technology that we have become so dependent on. It will teach you to…

- Apply computational thinking techniques (abstraction, decomposition, pattern recognition, algorithms) in a range of scenarios to solve problems.
- Develop resilience by not being afraid of challenges when solving problems, but breaking them down and keep trying.
- Be creative in a subject that may not be renowned for it – there is no limit to creativity when you create the solution.
- How to act responsibly online to ensure that you and others stay safe online.
- Identify the key programming constructs (sequence, selection, iteration) required to solve a problem.
- Apply the key programming constructs (sequence, selection, iteration) to any programming language.
- Work independently and as part of a team to solve complex problems.
- Construct reasoned arguments to ethical, social and moral problems that have arisen due to technology and communicate these in an effective way.
- Identify links between different elements of computer science
- Evaluate different methods of representing data and decide on the most suitable method for presentation/storage

How does your study of GCSE Computer Science support your study in other subjects?

The study of any subject in our curriculum takes full advantage of links with other subject areas- we term these as interdisciplinary links and we make the most of them because we know that deep learning requires the transference of knowledge and skills from one topic to another. Once you can transfer your learning across topics and subject areas then you are really mastering what you know and how to apply your understanding and skills.

Computer Science touches on so many other subjects such as mathematics as you develop skills in problem-solving, including decomposition (breaking down problems), abstraction (removing unnecessary detail from a problem) and pattern recognition. All of these skills will support your teaching in Mathematics as these are very important in being able to solve mathematics problems in a range of contexts. There are also links with Science as binary logic can be applied to electrical circuits in Physics and much of the technology from Computer Science can be mapped back to core principles of Science. For example, how sensors are used to monitor motion, force and/or pressure. You will learn methods of thinking and research that are widely applicable to other subject areas helping your thinking in all subjects.

How can you deepen your understanding of GCSE Computer Science?

Across Year 7 to 13, students engage in the Bebras Challenge. This is a national competition run by Oxford University that assesses Computational Thinking skills. Students have the opportunity to take part in this competition and if they are in the 10% nationally, they will be invited to Oxford University to take part in a new challenge-delete.

How are you assessed in GCSE Computer Science?

Throughout the Computer Science course, you are assessed using the following assessment objectives which ensure that you can cumulatively build your subject understanding in preparation for future GCSE and A Level study. There are half termly assessment points each year that we term Praising Stars©. For younger years we base our assessment on our subject mapping of the age-related expectations across the curriculum, assessing students' performance at their current stage of study against expectation. At GCSE we make informed predictions informed by our

holistic assessment of their progress against the key assessment objectives and their aspirational GCSE targets. These are also the basis for any appropriate support and intervention.

Key Assessment Objectives

- AO1 - Demonstrate knowledge and understanding of the key concepts and principles of Computer Science.
- AO2 - Apply knowledge and understanding of key concepts and principles of Computer Science
- AO3 - Analyse problems in computational terms:
    - to make reasoned judgements
    - to design, program, evaluate and refine solutions

How can GCSE Computer Science support your future?

Computer Science is offered at most post 16 centres, colleges and prestigious universities either as single honours or a joint honours subject studied alongside other disciplines e.g. Computer Systems Engineering, Computer Games Design, Computer Science & Artificial Intelligence, Mathematics & Computer Science and Computer Forensics. The very fact that you have been able to study Computer Science e.g. computational thinking will help your future application be they for colleges, universities, apprenticeships or employment.

Careers that the study of Computer Science supports include:
- Database administrator
- Software Developer
- Web Application Developer
- Computer Systems Analyst
- Mobile App Developers
- Information Security Analyst
- Computer Network Architect
- Software Tester
- Network Manager

Curriculum Progression Pathway

COMPUTER SCIENCE

GCSE Computer Science Course Overview		
Term	Year 1	Year 2
Autumn 1	Algorithms and problem solving	Networks
Autumn 2	Representing data in computer systems	Networks 2
Spring 1	Programming fundamentals	System security
Spring 2	Producing robust solutions	Ethical, legal, cultural and environmental impacts of digital technology
Summer 1	Systems architecture	Knowledge retention and recall
Summer 2	Memory and Storage	Exam paper 1 and 2