COMPUTER SCIENCE

Why is the study of Computer Science important?

Computer Science is the study of the principles and use of computers. Its study will make you question how the systems that you use in a modern day society work and encourage you to explore the concepts behind the technology you use and develop skills to become a creator of technology yourself. From Year 7 you will have the exciting opportunity to develop and consolidate basic ICT skills that will allow you to access more complex Computer Science concepts. From there 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 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 and ICT, including abstraction, decomposition, logic, algorithms, data representation, word, excel and photoshop skills. 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 to 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 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 opportunity? Is technology creating a digital divide that further disadvantages 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?

Why is the Study of Level 1/2 Vocational Award ICT (Technical Award) important? (Year 11 matriculating in June 2024)

WJEC Level 1/2 Vocational Awards (Technical Awards) provide learners with opportunities to study vocational subjects alongside GCSEs and other general and vocational qualifications as part of a broad programme of study.   Students will learn a wide range of key ICT skills. Vocational ICT is a skills and knowledge based course which aims to give students the ICT foundation they will need in future life. During this course, students can expect to develop practical skills in office software and develop their understanding of information communication technology.

COMPUTER SCIENCE

What skills will the study of 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 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 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

What skills with the study of Level 1/2 Vocational Award ICT (Technical Award) teach you?

The skills you will learn and develop through Level 1/2 Vocational Award ICT (Technical Award) include:

- The wide use of Hardware in society.
- The use of application and specialist software.
- How information is used in a wide range of contexts including businesses, education and homes.
- Legal, moral and ethical implications of using ICT.
- Environmental impacts of using ICT.
- How data and information are transferred.
- Extensive spreadsheet knowledge and skills, including Formulas, Functions, Formatting, Conditional Formatting, Macros and More.
- Extensive knowledge of databases, including Queries, Table designs, Data Types and More.
- Knowledge of editing digital images.
- Understanding how to solve problems in a vocational setting.

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

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 of learning 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.

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How can you deepen your understanding of Computer Science?

The Computer Science department offers lots of great opportunities for you to really engage with this fabulous subject. In Year 7 & 8 we engage with an external program called iDEA (Inspiring Digital Enterprise Award). This is an online program that students can complete in addition to their lessons to develop digital and enterprise skills. It is an initiative from the Duke of York and is the digital equivalent of the Duke of Edinburgh programme. 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.

Why not continue the iDEA programme at home to complete your bronze award, see if you can complete all the badges, develop your digital literacy and enterprise skills and compete against other students in the trust. In VMG you complete Computational Thinking challenges, these are examples of the types of challenges you will have to complete individually in the Bebras challenge. Do you enjoy doing these? Do they provide mental stimulation and a challenge to you? If so, ask your teacher about how to enter the Bebras challenge.

Get involved! Become a Computer Scientist!

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How does your study of Level 1/2 Vocational Award ICT (Technical Award) support your study in other subjects? (Year 11 matriculating in June 2024)

The design principles and the skills you learn in Level 1/2 Vocational Award ICT (Technical Award) are directly transferable across all subjects in the curriculum. The design principles learnt when developing digital graphics may be used in a wide range of subjects and industries later in life. The extensive spreadsheet knowledge you will develop will provide key skills that can be utilised in many other subjects such as maths and science whilst also being of great benefit in future careers.

How are you assessed in 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 term 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. These are also the basis for any appropriate support and intervention.

How are you assessed in Level 1/2 Vocational Award ICT (Technical Award)? (Year 11 matriculating in June 2024)

Level 1/2 Vocational Award ICT (Technical Award) is assessed through 2 compulsory units.

- Unit1: ICT in society is a 1 hour 20 minute on screen examination. This is worth 40% of your overall grade.
- Unit 2: ICT in context is a controlled assessment coursework that is worth 60% of your grade.

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How can Computer Science support your future?

Computer Science is offered at most sixth form colleges and prestigious universities either as a 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 applications be they for colleges, universities, apprenticeships or employment.

Careers that the study of Computer Science supports include:

- Secondary School Teacher
- Database administrator
- Software Developer
- Web Application Developer
- Computer Systems Analyst
- Mobile App Developers
- Information Security Analyst
- Computer Network Architect
- Software Tester
- Network Manager

How can Level 1/2 Vocational Award ICT (Technical Award) support your future?

There are a wide range of ICT & media based courses offered post-GCSE students at colleges and sixth form providers including our own. Within Outwood we offer an ICT qualification that utilises the skills learnt in **Level 1/2 Vocational Award ICT (Technical Award)** and this is deliberate to ensure progression between stages of study. **Level 1/2 Vocational Award ICT (Technical Award)** being a wide ranging curriculum that allows for many avenues to be explored into higher and further education. There are a vast range of courses offered at university that target digital media, either through the production, design or publicising through this media.

Careers that the student of **Level 1/2 Vocational Award ICT (Technical Award)** supports include:

- Secondary School Teacher
- Web designer
- Graphics design
- Video production
- Social media publicist
- Media Marketing Director

Curriculum Progression Pathway

COMPUTER SCIENCE

CURRICULUM PROGRESSION PATHWAY FOR COMPUTER SCIENCE AT OUTWOOD ACADEMY Foxhills

	YEAR 7	YEAR 8	YEAR 9	YEAR 10 - Vocational ICT	YEAR 10 - Computer Science	YEAR 11 - Computer Science
Autumn 1	e-Safety ICT Project - Word processing, spreadsheets, presentations	e-Safety Computer Theory - Binary conversion, Hexadecimal coding	e-Safety ICT/CS Theory	Spreadsheets - Introduction, Functions and Formulas	Programming - Basic Programming Constructs	Theory - Data, Data Transfer, Data Capture
Autumn 2	ICT Project - Word processing, spreadsheets, presentations	Computing Theory - binary logic, types of software, storage devices	ICT/CS Theory	Spreadsheets - Assessment Based on scenario	Theory - Foundations of Computer Programming	Theory - Impact of Data loss, Risks of storing data., GDPR,
Spring 1	Micro:bit - Block based programming	IT Project - Running for PM	Data Science	Editing and Creating Digital images	Programming - Advanced Programming Constructs	Theory - Moral and Ethical issues. Legal Issues.

Spring 2	ICT Project - Word processing, spreadsheets, presentations Computational Thinking	Photoshop Skills Digital Literacy - Events the have changed our time	Python programming	Digital Images - Assessment Based on scenario	Theory - Units of Data	Theory - Environmental impact of using ICT. Cultural impact and net neutrality.
Summer 1	ICT/CS Theory	Python programming	Databases	Databases - Introduction, Queries, Data Types, Planning Databases	Theory - Computational Logic	Exam preparation and reconsolidation time.
Summer 2	Creating a game idea	Python programming	Databases	Databases - Assessment Based on scenario	Theory - Algorithms	Exam preparation and reconsolidation time.