



## *‘Learning the knowledge and skills for living in and contributing to our global digital world’*

Computer Science is a demand subject in a globally competitive world. Computer systems are embedded ubiquitously in everyday devices, smart phones, washing machines, heating systems and vehicles, as our world embraces “The Internet of Things”. This subject introduces the fundamental concepts of computational thinking and programming, which prepares you to solve the problems of tomorrow. IT focuses on how these products are used creatively, purposefully and correctly, balancing the pros and cons to build and legislate the digital world that we live in.

Our objective is to equip students with the skills necessary to succeed in a digital age. Computers are central to enabling people to access and interface with information systems, and bring both tremendous opportunities and significant pitfalls. Understanding the limitations and benefits of such systems will allow our students to make good decisions which will get the best out of the computers which permeate almost every aspect of their everyday life while avoiding the drawbacks.

In computer science we aspire to inculcate an ability to decompose problems and abstract the central elements in order to construct algorithms which will allow solutions to be reached. To understand that an unambiguous sequence of instructions is necessary for computers to function, and that the outcome of a computer program is the predictable product of the inputs and algorithm utilized, and is therefore only as reliable as the instructions and data allow it to be.

In IT we introduce a wide variety of computer applications not only to develop skills in using specific programs but also to appreciate the commonalities in interfaces which will enable them to rapidly learn to use a range of software which they will be exposed to at home and at work. In addition to understanding the management of IT projects in terms of the sequence of obtaining requirements, designing a solution, implementing the solution and then evaluating the solution against the requirements is a highly transferable skill which has applications well beyond IT.

## **KS3 Computer Science & ICT Curriculum Overview (Year 7 & 8)**

At KS3 pupils in the Computer Science and ICT department follow a balanced curriculum, which reflects the transition of computing in the new National Curriculum yet still encompasses the digital literacy skills required to succeed in a digital world.

The schemes of work are challenging whilst encouraging creativity and are complemented with homework activities which stretch and recall learning outside the classroom. At the core of the Computer Science pupils will be taught the principles of problem solving, learning how computer systems work, and how to put this knowledge to use through programming and problem solving.

They will build upon this knowledge and understanding where pupils will have access to a variety of different software and hardware to use information technology to create programs, to make the various digital systems work. The ability to program in a range of languages such as Python and HTML gives the pupils the different challenges and opportunities that the new technology will bring to them.



At KS3 level, our aim is to prepare students with the knowledge and skills in what we call (KS4 ready) so they can make the right choice when choosing their GCSE Options. This is why we also offer a Bletchley park trip in Year 8 so that the pupils can see how coding and the use of computers during war time was so important, this itself also links through a cross department focus with History and learning about the World Wars.

Computer Science has a more in-depth pedagogy and deals with data, the hardware of computers, networks, the internet and programming. Whereas Information Communication Technology has a more creative pedagogy approach, applying the system life cycle to develop software skills and knowledge to everyday scenarios.

## YEAR 7

	<b>Term 1</b> <b>IT SKILLS</b>	<b>Term 2</b> <b>IT SKILLS</b>	<b>Term 3</b> <b>ALGORITHMS</b>	<b>Term 4</b> <b>DATA REP</b>	<b>Term 5</b> <b>HARDWARE &amp; NETWORKING</b>	<b>Term 6</b> <b>PROGRAMMING</b>
<b>TOPIC</b>	Intro Esafety and Office Skills	Spreadsheets	Flowcharts and Scratch	Binary	Hardware	Micro Bits
<b>KEY CONCEPTS</b>	Login details Email address Google classroom and set up Internet safety Importance of Privacy settings Safety online behaviours	Spreadsheet interfaces Formulae and complex functions Replication Formatting and use of layout features Modelling using a spreadsheet Learn how to sort the data, link worksheets, make predictions using goal seek	Commands used and how to use Drag/Drop Use of variables Creation of multiple programs /scripts Create a program or game with a given purpose Sequencing, testing and evaluation of programs	Logic gates Basic of binary and this is the language computers use to talk to each other Converting denary to binary number Simple binary addition Binary imagery	Input devices Output devices Parts of a computer Location of these parts	Block programming language Development of this language Inputs, processes, outputs
<b>ASSESSMENT</b>	End of topic test Skills log sheet linked to the CS & ICT Steps	End of topic test Skills log sheet linked to the CS & ICT Steps	End of topic test Skills log sheet linked to the CS & ICT Steps	End of topic test Skills log sheet linked to the CS & ICT Steps	End of topic test Skills log sheet linked to the CS & ICT Steps	Year 7 Examination – full lesson on Yapacaca terms 1-6 content



## YEAR 8

	Term 1 IT SKILLS	Term 2 IT SKILLS	Term 3 ALGORITHMS	Term 4 DATA REP	Term 5 HARDWARE & NETWORKING	Term 6 PROGRAMMING
SOW	Photoshop Picture manipulation	Animation/ website?	Flowol /Flowgorithm ardunios	Binary Images	Networks	Python
KEY CONCEPTS	<p>Use of software (usually Adobe Photoshop)</p> <p>Use of the program to alter /amend /otherwise change pictures</p> <p>Moving between images to create composites</p> <p>Formatting and use of layout features</p> <p>Creation of a story</p> <p>Researching using the internet for sources</p>	Looking towards website HTML	<p>Commands used and how to use them</p> <p>Use of flowcharts in Flowol</p> <p>Variables and how to use them</p> <p>Use of micro-computers and creating circuits</p> <p>Create a program with a given purpose using the equipment</p> <p>Sequencing, testing and evaluation of programs</p>	<p>Use of binary in text, images and sound</p> <p>Boolean logic and use of logic gates</p>	<p>Communication between networks</p> <p>Difference between a WAN and LAN</p> <p>Wired and wireless networks</p> <p>Network security</p>	<p>Use of some basic commands, e.g. print, for, if-else, while</p> <p>Use of functions /iterations</p> <p>Creation of programs using Python</p> <p>Testing and evaluation of programs created</p>
ASSESSMENT	<p>End of topic test</p> <p>Skills log sheet linked to the CS &amp; ICT Steps</p>	<p>End of topic test</p> <p>Skills log sheet linked to the CS &amp; ICT Steps</p>	<p>End of topic test</p> <p>Skills log sheet linked to the CS &amp; ICT Steps</p>	<p>End of topic test</p> <p>Skills log sheet linked to the CS &amp; ICT Steps</p>	<p>End of topic test</p> <p>Skills log sheet linked to the CS &amp; ICT Steps</p>	<p>Year 8 Examination – full lesson on Yapacaca terms 1-6 content</p>



## KS4 Computer Science & ICT Curriculum Overview (Year 9, 10 & 11)

We offer two subjects at KS4 in the Computing Department. Both of our GCSE/L2 options offer our students a variety of skills both in digital literacy and other skills that will help in the world beyond school. They are however very different in terms of the approach, the assessments and the types of skills that will be learned. Students are not limited to only choosing one of these subjects.

iMedia is a creative L2 subject. Students will primarily be learning how to complete creative projects in digital media. The intention of this course is to offer students an excellent place to learn a variety of skills and become better at working independently on a project. This includes actually making the project, but also gaining skills in planning and preparing to create the project, as well as reviewing and evaluating the finished product once complete. Along the way, a number of different computer based applications are used, from the more well known such as PowerPoint, Word and Excel (which provides an excellent way to step further from our work at KS3) to more specialist and less common applications such as Adobe PhotoShop. Our students not only gain a valuable outlet for creative thinking, but also to couple it with a number of highly useful planning and preparation skills, such as time management and asset management as well. There are obviously additional benefits in digital literacy here as well as students begin to use computers for a variety of tasks which allows us to explore the varieties and possibilities of technology. Students will be able to learn these skills whilst learning to create a digital image, a website and a comic strip.

Computer Science is a more traditional GCSE. Our Computer Science GCSE intends to explore the workings of and science behind computer systems. The course aims to help students improve their logic skills and scientific thinking. We will do this by analysing problems through practical examples of problem solving. This will include designing, writing and debugging programs. Through creating programs there is also an element of creativity in this scheme of work too as students will endeavour to come up with ideas for useful programs that they can write in Python. Along with this, the students will also aim to learn about the different components that make up a single computer system and the hardware and software that is necessary to have computer systems network and interact with each other as well as learning about the impact both ethically and socially that technology has on the world. Because of the subject content, there are many learning opportunities in Computer Science that are both literacy and numeracy based as well.

	Term 1	Term 2	Term 3
OCR Cambridge National Creative iMedia	<b>YEAR 9</b> <b>R081 - Planning and Pre-production</b> How to plan for a creative project and manage time	<b>Digital images</b> Skills and project work	<b>Websites</b> Skills and project work  <b>Comic Strips</b> Skills and project work
	<b>YEAR 10</b> <b>R081 - Planning and Pre-production</b> Revise before formal coursework starts	<b>Digital images</b> Creating a digital image product from a client brief  Coursework	<b>Websites</b> Creating a website from a client brief  <b>Comic Strips</b> Creating a comic strip from a client brief  Coursework
	<b>YEAR 11</b> REVISION <b>R081 - Planning and Pre-production exam practise</b>  Complete Coursework	Complete Coursework and revise  REVISION - R081 - Planning and Pre-production	REVISION <b>R081 - Planning and Pre-production exam practise</b>



## Assessment information

- 3 projects are undertaken during Y10 and Y11 worth 25% each
- 1 Written exam on pre-production methods is taken in Y11 which is worth 25%
- Grades L1/L2 Pass, Merit, Distinction (L2 D\*) are awarded

Link to specification

<https://www.ocr.org.uk/qualifications/cambridge-nationals/creative-imedia-level-1-2-award-certificate-j807-j817/>

		Term 1	Term 2	Term 3
OCR GCSE Computer Science	YEAR 9	Data Representation Systems Architecture	Memory and Storage Networking and Security	Programming fundamentals
	YEAR 10	Programming project	Boolean Logic System software and IDEs	Algorithms and computational thinking
	YEAR 11	Ethical, legal, cultural and environmental impacts	REVISION strategies and exam techniques	REVISION

## Assessment information

- 2 examination papers are taken at the end of Y11 worth 50% each
- 1 Non examination assessment: Programming Project taken over 20 hours in controlled conditions (exam conditions)
- Grades 1-9 are awarded

Link to specification

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



## KS5 Computer Science & ICT Curriculum Overview (Year 12 & 13)

At KS5, we offer both A Level Computer Science and the Cambridge Technical Introductory Diploma in IT. This is so that we can offer a choice of pathways into further education/employment in this subject for different learners.

A Level Computer Science tends to suit the more theoretical learners. The course builds on GCSE knowledge although the GCSE is not a prerequisite. This is a challenging and rewarding course which requires logical and mathematical thinking. Programming and algorithmic thinking are also strong elements of the course.

We offer the Cambridge Technical Introductory Diploma in IT for students who prefer a more hands-on approach to learning about IT. This course is split 50/50 coursework to exams. There is a broader focus on the current issues and legalities compared to the computer science course which is useful for anyone considering IT in a business context. Students are able to pick from optional practical units on which they work independently, but with supervision.

Both qualifications can lead to further study at university, apprenticeships or to employment.

		Term 1	Term 2	Term 3
OCR A level Computer Science	YEAR 12	1.4 Data types, data structures and boolean algebra 2.2 Problem solving and programming	1.1 The characteristics of contemporary processors, input, output and storage devices 2.1 Elements of computational thinking 2.3 Algorithms	1.2 Software and software development 3.1. Analysis of the problem 3.2 Design of the solution
	YEAR 13	1.3 Exchanging data: How data is exchanged between different systems 3.3 Developing the solution 3.4 Evaluation	1.5 Legal, moral, cultural and ethical issues Project work Revision	Revision

### Assessment information

- 2 examination papers are taken at the end of Y13 worth 40% each
- 1 Non examination assessment: Programming Project which is worth 20%
- Grades A\*-U are awarded

Link to specification

<https://ocr.org.uk/Images/170844-specification-accredited-a-level-gce-computer-science-h446.pdf>



	Term 1	Term 2	Term 3
OCR Cambridge Technical Introductory Diploma in IT	Computer hardware Computer software Business IT systems Styles, classification and the management of global information Use of global information and the benefits to individuals and organisations Understand the principles of information security	Ethical and operational issues and threats to computer systems  The legal and regulatory framework governing the storage and use of global information  Understand the process flow of information	Exam revision for Unit 1, 2 exams  Start of coursework modules  Unit 6 Application Design (Students usually do 3 options from the Application Developer strand)
	Unit 21 Web design and prototyping	Unit 13 Social Media and digital marketing  Unit 15 Games design and prototyping	Completing coursework

## Assessment information

- 2 examination papers are taken at the end of Y12 worth 25% each (Unit 1, Unit2)
- 3 optional units with a combined weighting of 50%
- Grades A\*-U are awarded

Link to specification

<https://www.ocr.org.uk/qualifications/cambridge-technicals/information-technology/units/#level-3>

## Enrichment Activities

- A computing club is run once a week after school to support and extend programming skills for KS3 and KS4 pupils
- A school trip to Bletchley Park is organised for Y8 students to learn about the developments in computing and encryption during the second world war
- KS5 visit the National Museum of Computing