Curriculum Overview – Computer Science

CAISTER ACADEMY
Creative Education Trust

Year	Overview	Year 7 based on 39 GLH Year 8 & 9 on 19 GLH	Student Resources
7	Students in Year 7 will have 6 significant blocks of study during their lessons so that they are enabled to engage in the Year 8 programme of study successfully.	**Common Application Software:** File management operations, email utilization, word processing software, presentation software, **Research Skills** : how to efficiently find accurate information on the internet **Introduction to programming:** Block Based Programming, Representation, Binary **Number Models** : using Spreadsheet software **What's in the box:** Understanding of computing systems fundamentals, IPSO, Hardware & Software basics **Control Systems** : using flowcharts to control simulations	MS Office applications, Word, Powerpoint, Excel, Outlook, TEAMs Scratch Repl.it Flowol
		Assessment: Formative assessment – Creation of documents using application software Summative assessment – Online assessment covering core aspects of computer application use. Formative assessment – Creation of a block-based programming solution in Scratch Summative assessment – Online assessment of understanding of core concepts covered during programme of study. Formative assessment – Understanding of computing systems fundamentals Summative assessment – Assessment of understanding of core concepts covered during programme of study.	
8	In Year 8, students build upon the introduction to programming and then take this to the next stage of development by applying it to their study of the Python programming language. Students are taught to identify a problem, break it down into component parts and devise solutions for the whole based on each of the identified components.	**Data Representation** : using Binary, ASCII to represent values, text, images etc. **Introduction to text-based programming:** Python language used to create simple programs. **Information and Reliability:** issues such as AI, Machine learning Databases and their impact on computing in daily life **Number Models 2** : using more advanced features of Spreadsheet software **Digital Photography**: Capturing and editing digital images	MS Office applications, Access Scratch Repl.it
		Formative assessment – Use of variables, expressions and conditionals in programming. Summative assessment – Online assessment covering core aspects of programming. Summative assessment – Online assessment of understanding of core concepts covered during programme of study.	
9	In Year 9, students are taught to take their understanding of programming and apply the concepts of Human Computer Interaction (HCI) to design solutions to given problems. Initially, students are given a simple touch screen scenario to work with before progressing onto more challenging problems.	**Introduction to HCI:** students are taught to consider the range of human-computer interactions in everyday life, the needs of different audiences, accessibility issues and design-specific considerations. **Ethical and legal issues :** exploring the social cultural, ethical and legal issues around computing technologies **Computing Careers:** exploring the way computing affects career options and examining some careers within computing. **IDMP:** planning, making and evaluating an Interactive Digital Media Product	MS Office 365 Repl.it W3Schools.com

Year	Overview	Autumn 1 (Weeks 1 – 7)	Autumn 2 (Weeks 8 – 14)	Spring 1 (Weeks 15 - 20)	Spring 2 (Weeks 21 - 25)	Summer 1 (Weeks 26 - 32)	Summer 2 (Weeks 33 - 38)	Student Resources
10	Year 10 students begin studying for both papers of the OCR J277 Computer Science exam. Although units for both exam papers are taught during this year, the focus is on achieving competency with the required computational thinking and programming skills, culminating in the compulsory programming project in the final term of the Year. This will enable students to develop and practice the key skills required for the *Computational Thinking, Algorithms and Programming* exam paper which will require students to create program code using either pseudocode or a high-level language. All skills developed in the classroom will be taught using the Python programming language.	**Systems architecture:** embedded and general-purpose computer systems and their characteristics; computer hardware including the CPU, fetch-decode-execute cycle, CPU components and performance, primary storage and the purpose of and difference between ROM and RAM; virtual memory; secondary storage and its characteristics. **Computational thinking:** abstraction, decomposition and algorithmic thinking, flowcharts and pseudocode to represent algorithms. **Programming fundamentals:** variables, constants, operators, inputs, outputs, data types and assignment in Python; basic programming constructs including sequence, selection and iteration; arithmetic and Boolean operators.	*Key Stage 4 Formal Assessments – Classroom Based*	**Data representation:** units of data storage, how computers use binary, calculations of data requirements, converting binary, denary and hexadecimal numbers, adding binary numbers, binary shifts, ASCII and Unicode character sets and the use of binary to represent text data. **Boolean logic:** AND, OR, XOR and NOT logic gates, logic circuits, truth tables. **Additional programming techniques:** string manipulation, working with files, storing and manipulating data in records using SQL. **Producing robust programs:** defensive design, including authentication, input validation and the use of subroutines within programs.	*Key Stage 4 Formal Assessments – Classroom Based*	**Computer networks:** LANs, WANs, factors that affect network performance, P2P networks, network hardware, the Internet, client-server networks, network topologies, wired and wireless networks, Wi-Fi and Bluetooth, IP and MAC addressing, common protocols, network layers; threats to computer networks including malware, social engineering, DDoS attacks, data interception and SQL injection; threat prevention methods.	*Year 10 Mock Examinations*	OCR J277 resources Class text book TEAMs notebook Solo Learn Teach-ICT Know it all Ninja
	Extra-Curricular: After school club for students to pursue areas of personal study or intervention based on curriculum focus.	Summative assessments – End of topic tests based on past exam questions; programming challenge to develop a solution to a given problem.		Summative assessment – End of topic tests based on past exam questions.		Summative assessment - Programming project based on previous non-exam assessment activity.		
11	Year 11 students continue studying for both papers of the OCR J277 Computer Science exam. The focus for Year 11 is on the theoretical knowledge required for the *Computer Systems* exam paper, although units covering both exam papers will be taught. Revision and recap time is built-in for the final term of the academic year.	**Computer Ethics:** impact of technology on wider society, including ethical, legal, cultural, environmental and social issues; legislation relevant to computer science, licensing. **Operating Systems:** purpose and functionality of operating systems and utility software, including user interfaces, memory, user and file management; purpose and functionality of utility software including encryption, defragmentation, and data compression. **Testing:** purposes and types of testing of testing, iterative and terminal testing, syntax and logic errors, test data, refining algorithms. **Searching and sorting algorithms:** binary search, linear search, bubble sort, merge sort, insertion sort. **Programming project:** students will have the opportunity to design, write, test and refine a program to complete a given task.	*Year 11 Mock Examinations A – Classroom based / Exam room*	**Data Representation:** recap of prior learning and use of binary to represent text; how images are stored as pixels, represented in binary, metadata, colour-depth and resolution and how they affect the size and quality of an image; how sound is stored in digital form, the effect of sample rate and bit-depth on the size and quality of a sound file. **Compression:** the need for compression; lossy and lossless compression.	*Year 11 Full Mock Examinations – Examination Rooms* — **Paper 1 Revision** **Systems** **Data Representation** **Networks** **Security** **Ethical issues**	*Year 11 Mock Examinations A – Classroom based / Exam room* — **Paper 2 Revision** **Algorithms** **Boolean logic** **Programming Languages & IDE's** **Exam revision**	**GCSE Examination Window**	OCR J277 resources Class textbook TEAMs notebook Solo Learn Teach-ICT Know it all Ninja

	Extra-Curricular: After school club for students to pursue areas of personal study or intervention based on curriculum focus.	Summative assessments – End of topic tests based on past exam questions		Summative assessment – End of topic tests based on past exam questions.		Summative assessment – End of topic tests based on past exam questions.		Summative assessment – End of topic tests based on past exam questions.		