Curriculum on a page – Computer Science

	Autumn Term	Spring term	Summer term	Assessment of learning	Enrichment opportunities / wider reading
Year 7	Basic digital literacy E-Safety	How Computers work Computational thinking - Algorithms & Programming	Scratch & Python programming	*End of topic assessments for each area.*	**http://teach-ict.com/2016/ks3/ks3_home.html** **https://www.bbc.com/bitesize/subjects/zvc9q6f**
Year 8	Modelling Data - Spreadsheets Data Representation	Networks Using media	Python programming		http://teach-ict.com/2016/ks3/ks3_home.html https://www.bbc.com/bitesize/subjects/zvc9q6f
Year 9	Computer Systems Cyber Security	Memory & Storage Python programming	Python programming Impact of Computer Science	*End of topic assessments for each area.* *On-line quizzes* *Exam style questions*	https://www.bbc.co.uk/bitesize/subjects/zvc9q6f *https://teach-ict.com/2016/GCSE_Computing/OCR_J277/OCR_J277_home.html* *https://www.ocr.org.uk/qualifications/gcse/computer-science-j277-from-2020/*
Year 10	Computational thinking & Algorithms Data representation	Computational Logic Programming Fundamentals System Architecture	Networks & Network security & protocols		https://teach-ict.com/2016/GCSE_Computing/OCR_J277/OCR_J277_home.html https://www.ocr.org.uk/qualifications/gcse/computer-science-j277-from-2020/ https://student.craigndave.org/gcse-ocr-j277-computer-science-videos
Year 11	Algorithms Programming tasks Robust programs Translators	Programming tasks System Software Ethical, Moral, legal issues Revision	Revision		https://teach-ict.com/2016/GCSE_Computing/OCR_J277/OCR_J277_home.html https://student.craigndave.org/gcse-ocr-j277-computer-science-videos

Department: **CS**

EPS	Year 7	Year 8	Year 9	Year 10	Year 11
2	**Focus:** Digital literacy E-safety **Structure:** Short answer questions and extended response **Knowledge and skills assessed:** File management Email Online dangers How to stay safe online How to avoid being a victim of fraud and theft Online. The principles of good passwords	**Focus:** Using spreadsheets Data representation **Structure:** Computer based test - completion of spreadsheet skills. Short answer questions and extended response **Knowledge and skills assessed:** Setting up and using a spreadsheet for a specific purpose. Basic formulas/functions Advanced formulas Creating graphs Using formatting appropriately. Know how data needs to be converted into a binary format to be processed by a computer. Know how to convert positive denary whole numbers (0-255) into 8 bit binary numbers and vice versa. Explain the use of binary codes to represent characters Explain the term character set & ASCII. Digital Image representation-pixels.	**Focus:** Computer Systems Cyber Security **Structure:** Short answer questions and extended response **Knowledge and skills assessed:** Definition of a computer system and the 4 main elements Definition & examples of embedded system What is the CPU What is the purpose of the CPU Components of the CPU What is the Von Neumann architecture and registers The main factors which affect the performance of a CPU The Fetch – Execute cycle. The risks of holding data Customer profiling Explain the different types of malware Understand how phishing operates Discuss how data can be intercepted Understand the meaning of DDOS and brute force attacks Explain the effects of a DDOS attack Explain how to be protected against DDOS attacks	**Focus:** Computational thinking Algorithms Data representation **Structure:** Exam style questions short answer and extended response **Knowledge and skills assessed:** Understand the term and processes in computational thinking. Be able to use the skills of abstraction, decomposition and algorithmic thinking. Be able to use a linear search to find data. Be able to use a binary search to find data. Understand the differences between a linear and a binary search. Understand the principles of a bubble sort. Be able to perform a bubble sort on a set of data. Understand how the number of comparisons increases in a bubble sort. Understand the principles of a merge sort. Be able to perform a merge sort on a set of data. Understand the principles of an insertion sort. Be able to perform an insertion sort on a set of data.	**Focus:** Algorithms recap Robust Programming Translators System Software **Structure:** Exam style questions short answer and extended response **Knowledge and skills assessed:** Understand the term and processes in computational thinking Be able to use the skills of abstraction, decomposition and algorithmic thinking. Understand the differences between selection, iteration and sequence. Be able to produce an algorithm using a flowchart. Be able to produce an algorithm using pseudocode. Be able to find and correct errors in algorithms. To understand the elements of defensive program design Know how comments and indentation can support maintainability Describe the role of testing, including how to identify errors and select appropriate test data.

| | | | Understand the concept of SQL injection
Explain how a vulnerability can be exploited.
Explain what is meant by 'network forensics'
Understand the concept of penetration testing
To understand the effects of user access levels on a system
To understand how and why passwords must be kept secure and the levels of complexity
To understand how encryption works | Be able to produce an algorithm using a flowchart.
Be able to produce an algorithm using pseudocode.
Be able to find and correct errors in algorithms.

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Data representation
Know how data needs to be converted into a binary format to be processed by a computer.
Know how to convert positive denary whole numbers   (0-255) into 8 bit binary numbers and vice versa.
Explain the use of binary codes to represent characters
Explain the term character set
Describe with examples (for example ASCII and Unicode) the relationship between the number of bits per character in a character set and the number of characters which can be represented.
Understand how a digital image and sound is made up | To be able to describe the different generations of programming language
To be able to describe the differences between Low Level and High-Level Languages
To evaluate the benefits of programming in both Low and High Level languages

To understand what is meant by Systems Software
To be able to describe the role and purpose of an Operating System including:
O User Interface
o Memory Management / Multitasking
o Peripheral Management and Drivers
o User Management
o File management
•To understand the need for Utility Software
•To be able to describe the purpose of
O Encryption Software
O Defragmentation
O Data Compression |
| 4 | **Focus:**
Algorithms & Programming
How Computers work

Structure:
Short answer questions and extended response

Knowledge and skills assessed: | **Focus:**
Networks
Using Media
Structure:

Short answer questions and extended response

Knowledge and skills assessed:

Understand why we network computers together | **Focus:**
Memory & Storage
Python programming

Structure:
Short and extended answer questions
Knowledge and skills assessed:

Understand the term 'memory'
Be able to explain the purpose of RAM | **Focus:**
Computer Logic
Programming

Structure:
Short answer questions and extended response
Practical test testing the skills developed in Python

Knowledge and skills assessed:

Explain why data needs to be in binary form | **Focus:**
Revision
Structure:

Knowledge and skills assessed:

All topic areas paper 1 and 2 |

	Understand the term and processes in computational thinking. Be able to define abstraction, decomposition and algorithmic thinking. Creating algorithms using flowcharts. Definition of a computer system and the 4 main elements Hardware V Software What is the CPU What is Binary	Understand what is meant by a LAN Understand what is meant by a WAN Understand the hardware needed to create a network Students will be able to identify a Star and Mesh Topology Skills Creating an appropriate digital artefact for a given audience. Sources of information and how to check the reliability of those sources. Licencing images/facts Formatting skills	Be able to explain the purpose of ROM Understand the need for virtual memory The purpose of secondary storage Identify common types of storage Match storage devices to their type of storage Explain the characteristics of common types of storage Be able to recommend a storage device for a situation How do we calculate storage requirements **Focus:** Python Programming Structure: Practical test of Python programming skills. **Knowledge and skills assessed**: The use of variables, constants, operators, inputs, outputs and assignments The use of 2 of the three basic programming constructs used to control the flow of a program: Sequence, selection.	Draw diagrams for the AND, OR and NOT gates Create a Truth Table for AND, OR and NOT gates Draw Logic Circuits and Truth Tables for 2nd Level Logic Circuits Programming The use of variables, constants, operators, inputs, outputs and assignments The use of the three basic programming constructs used to control the flow of a program: Sequence, selection, iteration (count and condition controlled loops) The use of basic string manipulation The use of basic file handling operations: open, read, write, close The use of arrays (or equivalent) when solving problems, including both one and two dimensional arrays The use of data types: Integer, real, Boolean, character and string, casting The common arithmetic operators The common Boolean operators.	
6	**Focus:** Game design in Scratch Python **Structure:** Practical test of Scratch skills along with some short answer questions. **Knowledge and skills assessed:**	**Focus:** Python Programming **Structure:** Practical test of Python programming skills. **Knowledge and skills assessed:**	**Focus:** Ethical, legal, cultural and environmental concerns through the use of technology **Structure:** Short and extended answer questions	**Focus:** System Architecture Networks **Structure:** Short and extended answer questions	

	The use of block programming to create a simple game. The use of the three basic programming constructs used to control the flow of a program: Sequence, selection and iteration	The use of variables, constants, operators, inputs, outputs and assignments The use of 2 of the three basic programming constructs used to control the flow of a program: Sequence, selection.	**Knowledge and skills assessed:** Understand what is meant by a key stakeholder Identify stakeholders in a range of scenarios Recognise and discuss issues related to Environmental, legal Cultural, Morals & Ethics	**Knowledge and skills assessed:** To be able to describe the purpose of the CPU To be able to state the function of the CPU (fetch and execute instructions stored in memory) To be able to describe how common characteristics of CPUs affect their performance: • Clock Speed • Cache Size • Number of Cores • To understand embedded systems • Their Purpose • Give examples Understand why we network computers together Understand what is meant by a LAN Understand what is meant by a WAN Understand what is meant by a client-server network Understand what is meant by a peer-to-peer network Understand the hardware needed to create a network Students will be able to identify a Star and Mesh Topology •Students will be able to compare Advantages and Disadvantages of Wi-Fi and Ethernet Explain what encryption is Know what layers are and their role Be able to explain the role of each layer Understand the concept of Packet Switching	

| | | | | Understand the different network protocols and what they do | |