

Mark Rutherford School

Long Term Curriculum Plan: Computer Science 2025.26

	Autumn Term		Spring Term		Summer Term	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	E-Safety	Alice Programming	Understanding Computers	Data Modelling using Spreadsheets	Kodu Game Design	Creativity Project
Key concepts:	Social Media Settings, Reporting abuse, cyberbullying, being safe online, good use of social media	Scene design, story boards, Program structure, sequence, selection, iteration, use of methods	Input devices, Storage, Cloud storage, basic computer networks, emerging technology, use of Artificial Intelligence, Technology and the Environment.	Simple calculations using excel, Cells, rows, columns, simple formulae; addition, multiplication, formatting data, line graphs and pie charts	Designing simple computer games, programming concepts, sequence, selection, iteration. OOP concepts, use of Methods	Pupils given a digital literacy project to do. Use of a Word Processor, Presentation, video and audio development
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8	E-Safety	Data Representation	Python Programming using Turtle	Data Modelling	Python Programming	Creativity Project
Key concepts:	Use of strong passwords, reasons why passwords are changed, different types of access methods; biometric, cards, keypads	Binary numbers, how data is represented in the computer, binary to denary conversion, binary to hexadecimal conversion	Basic program structure, iteration, sequence, selection, types of loops, data input, formatting for output	Simple calculations using excel, Cells, rows, columns, simple formulae; addition, multiplication, formatting data, line graphs and pie charts	Basic program structure, iteration, sequence, selection, types of loops, data input, formatting for output	Pupils given a digital literacy project to do. Use of a Word Processor, Presentation, video and audio development
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9	E-Safety	Boolean Logic	HTML and JavaScript	Python Programming	Computer Technology	Creativity Project

Key concepts:	Cyber attacks, viruses, Phishing, Ransomware, cost of cybercrime to business, firewalls, hacking	Logic gates, Logic circuits, hexadecimal numbers, adding binary numbers, binary to hex conversion	HTML tags, headers, bold, italics, hyperlinks, using images in html Input and output using JavaScript	Basic program structure, iteration, sequence, selection, types of loops, data input, formatting for output	Software, Application, Systems, Utilities Hardware, input, process, output, storage	Pupils given a digital literacy project to do. Use of a Word Processor, Presentation, video and audio development
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10	Algorithms, Data Representation	Robust programs, CPU architecture	Key Algorithms, Data Storage	Programming fundamentals, Wired and Wireless Networks	Program development, Image and Sound	Language Translators
Key concepts:	Algorithms Pseudocode, Flowcharts, Coding basics, Program structure, Program Testing Computer Systems Number representation, binary addition, logic gates	Algorithms Program validation, decomposition, abstraction, program testing, comments, Computer Systems Components of the CPU, Data storage hardware, Computer Architecture, Von Neuman Architecture, CPU registers, embedded systems	Algorithms Linear Search, Binary Search, Bubble Sort, Merge Sort, Insertion Sort Computer Systems HDD, SSD, Internal Storage, RAM, ROM, Virtual Storage	Algorithms Programming fundamentals, sequence, selection, iteration, Boolean operators, Common Arithmetic Operators Computer Systems Data communication hardware, Communication protocols, network topologies, types of networks	Algorithms Use of SQL , Using flat files to store data, Program testing, documenting programs, more advanced features of Python Computer Systems Characters, images, sound, data compression	Algorithms High level languages, Machine code, Compilers, Interpreters, Integrated Development Environment features Computer Systems Networks and topologies, Star, Mesh, Bus, use of DNS, Network cables
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11	NEA Project, Wired and Wireless Networks	Data Types, Threats to computer systems	Defensive design, Operating systems	Computer Languages, IDEs Legal Aspects of Computer use	Revision	Revision
Key concepts:	Algorithms Flowcharts, Pseudocode, Test	Algorithms Iterative testing, Final testing, refinement	Algorithms Indentation, White space, Comments, Functions,	Algorithms Programming Languages, use of IDEs, Boolean Logic		

	<p>plan, success criteria, data dictionary</p> <p>Computer Systems</p> <p>Wired and Wireless networks, common protocols, HTTP, SMTP, POP, IMAP, HTTPS</p>	<p>Integers, Boolean, Strings, casting, float/real</p> <p>Computer Systems</p> <p>Viruses, phishing, cybersecurity</p>	<p>Procedures, Parameters, Test Plan</p> <p>Computer Systems</p> <p>Types of operating systems, Operating Systems functions, Graphics Interface, Command Line Operation Systems</p>	<p>Computer Systems</p> <p>Legal aspects of Computer use, computers and the environment</p>		
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12	Algorithms , The Processor	Data Structures , Processors	Computational Thinking	Object Oriented Programming , Data Structures	Programming Techniques , Programming Languages	Computational Methods, Compression, Encryption and Hashing
Key concepts:	<p>Sorting and Searching Algorithms Dijkstra, A Star Algorithm</p> <p>Fetch, Decode, Execute cycle, Registers, Caching Von Neumann and Harvard Architecture</p>	<p>Linked Lists Array and Lists Tree Structures Binary Search Trees</p> <p>The differences between and uses of CISC and RISC processors. GPUs and their uses Multicore and Parallel systems.</p>	<p>Decomposition Abstraction Concurrent Thinking Thinking Ahead Algorithmic thinking</p> <p>Input and Output, RAM, ROM, Flash memory, virtual storage. Morgan’s Laws, distribution, association, commutation, double negation. Karnaugh maps, Boolean expressions.</p>	<p>Classes and Objects Methods Writing and reading from CSV files Constructors Implementing Data Structures</p> <p>Systems Software, Operating Systems, Multi-tasking, Bios, Device Drivers linked-list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table</p>	<p>Global and local variables. Modularity, functions and procedures, parameter passing by value and passing by reference</p> <p>Classes, objects, methods, attributes, inheritance, encapsulation and polymorphism.</p>	<p>Features that make a problem solvable by computational methods. Problem recognition. Problem decomposition. Use of divide and conquer. Use of abstraction.</p> <p>Loss vs Lossless compression. Run length encoding and dictionary coding for lossless compression. Symmetric and asymmetric encryption. Different uses of hashing.</p>
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 13	NEA Project	NEA Project	Time and Space Complexity	Legal, Ethical and Moral issues		

	Databases and Networks	HTML and the Web	Data Types			
Unit theme:	Problem Analysis LANs and WANS	Project Design and Development Web Technologies, Revision	Program Development Data Conversion, Revision	Computing related legislation Revision		
Key concepts:	Problem Identification, Thinking Ahead, Concurrency, Inputs, Process, Output The internet structure: The TCP/IP Stack. DNS Protocol layering. LANs and WANS. Packet and circuit switching.	Problem Decomposition, Abstraction, Flowcharts, Structure charts, Coding, Program Iterative testing, Documentation, Evaluation HTML, CSS and JavaScript. Search engine indexing. PageRank algorithm. (d) Server and client side processing.	Measures and methods to determine the efficiency of different algorithms, Big O notation (constant, linear, polynomial, exponential and logarithmic complexity Floating point arithmetic, positive and negative numbers, addition and subtraction. Bitwise manipulation and masks: shifts, combining with AND, OR, and XOR.	Computers in the workforce. , Automated decision making. , Artificial intelligence. , Environmental effects. , Censorship and the Internet. Analyse personal information. , Piracy and offensive communications. Layout, colour paradigms and character sets.		