Curriculum Map – GCSE Computer Science

All GCSE topics in teaching order, with the coding journey and programming tasks for each.

#	Topic	Key content	CodeBuddycs	Programming tasks & homework	Exam-style programming tasks
YEAR 10 — AUTUMN TERM					
1	**Working With Data (Variables & Data Types)**	Variables, constants, inputs/outputs Primitive data types, arithmetic operators Debugging Program readability: layout, indentation, comments, meaningful identifiers, white space Error types: logic, syntax, runtime Libraries: math, random, time	Python Foundations Inputs, Outputs & Variables	My Pet; Split the Pizza Pets — Data Types; Pets at Home HW 10.1 Character Profile	#1 Circle Area #4 Cheese Rolls #16 Curtains
2	**Hardware & CPU Architecture**	Hardware vs software, input/output devices CPU components, stored program concept, buses FDE cycle and address bus calculations Von Neumann architecture; main memory (RAM) Clock speed, pipelining	Theory unit	—	—
3	**Selection & Flowcharts**	IF statements, Boolean logic Flowcharting algorithms (Driving School, Authentication)	IF Selection	Traffic Lights; Grade Calculator; Seasons Driving School; Guessing Game; Stock Routing HW 10.2 Fight or Run; HW 10.3 Journey Planner	#3 Prism #8b Flow Chart
4	**Embedded Systems**	Characteristics, examples, microcontroller tasks Embedded vs general-purpose systems	Theory unit	—	—
5	**Memory & Storage**	RAM vs ROM Optical, magnetic and solid-state storage File organisation	Theory unit	—	—
YEAR 10 — SPRING TERM					
6	**Repetition**	WHILE, FOR, counters, flags Random numbers, loop control	Loops	Guessing Game; Theme Park Ride; Fever Monitor For Loops – Total; Double a Number; Login (3 Attempts); Calculator Challenge – Pokémon Battle HW Adventure For Loops; HW 10.6 The Shop	#5 Year Group #6 Rocket #7 Animal Guessing Game #9 Exercise (debug)
7	**Data Representation**	Binary, denary, hexadecimal Binary addition, overflow Two's complement; binary shifts Unsigned integers (0–255) and two's complement (−128 to +127) Logical vs arithmetic shifts 7-bit ASCII character encoding Data storage units: bit, nibble, byte, kibibyte–tebibyte File size and data capacity calculations	Theory unit	—	#2 ASCII
8	**Bitmaps, Sound & Compression**	Pixels, resolution, colour depth ADC, sample rate, fidelity Lossy vs lossless compression Amplitude, bit depth, sample interval Limitations of binary representation (number of bits)	Theory unit	Challenge 4: Image Size (debug)	—
9	**1D Data Structures**	Lists/arrays, indexing, append/delete Iteration over lists, range()	Lists	Scores List; Shopping List Deck of Cards; Counting Elements	#8 Planets (debug) #15 Pasta Shapes

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YEAR 10 — SUMMER TERM					
10	**Operating Systems & Utility Software**	File management, scheduling, memory allocation Compression, backup, recovery, defragmentation Peripheral and user management Utilities: file repair, anti-malware	Theory unit	—	—
11	**Subprograms**	Procedures, functions, parameters Global vs local variables; maths libraries Reusable subroutines; flowchart symbols	Subprograms	Check Password; Temperature Converter; Ebay Seller Leaderboard; Shop Discount; Lucky Dip HW 10.4 Bridge of Death; HW 10.8 Zork Adventure	#10 Histogram #13 Shape of a Box #14 Random Passwords
12	**Turtle Programming (Computational Thinking)**	Coordinates, polygons, pen colours, fills Decomposition and abstraction Combining subprograms for complex graphics	Turtle GCSE	Square; Triangle; Polygon; Axes; Spiral	#17 Turtle Shapes (debug)
YEAR 11 — AUTUMN TERM					
13	**Networks & Internet Technologies**	LAN/WAN, routers, MAC & IP addressing Bandwidth, latency, transmission rates Wired vs wireless; Wi-Fi, Bluetooth, NFC, RFID Packet switching, TCP/IP, HTTP/FTP/SMTP Network topologies: bus, star, mesh 4-layer TCP/IP model: application, transport, internet, link Protocols: Ethernet, HTTPS, POP3, IMAP Range as a performance factor Network speeds (kbps, Mbps, Gbps); transmission time calculations	Theory unit	—	—
14	**Computational Thinking & Turtle (revisit)**	Decomposition and abstraction Trace tables Combining subprograms for complex graphics	Turtle Exam (exam-style tasks)	Donut; Draw Shapes; Fireworks; Target; Turtle Face Challenge 1: Gravity (code reading) HW Y11.1 MCQ Quiz; HW Y11.2 Maths Quiz Lives	#18 Turtle Gridlines
15	**Strings & Validation**	Presence, length, range, format checks String manipulation (index, upper/lower, slicing) Exception handling	Strings String Validation	ASCII Converter; Username Checker; Extract Initials Email Extracter; Formatting Strings; Three Little Words Password Checker Challenges 3, 6, 7: Password, Age Check, Palindrome HW Y11.3 Text Analyser; HW Y11.4 Validation	#19 Strings #20 User Identification #25 Caesar Cipher #26 Input Validation
16	**Authentication**	Username/password systems Flowchart and algorithm design	Applies Strings & Subprograms	Design and code a username/password login (builds on Login, Check Password, Username Checker)	—
17	**Ethical, Legal, Cultural & Environmental Issues**	E-waste, privacy, identity theft Data Protection Act, Computer Misuse Act Intellectual property, copyright, open vs proprietary software Environmental: energy consumption, manufacture, replacement cycle, disposal Personal data: ownership, consent, misuse Patents, trademarks, licensing	Theory unit	—	—
YEAR 11 — SPRING TERM					
18	**Types of Programming Languages**	High- and low-level languages Translators Compiler vs interpreter	Theory unit	—	—

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19	**1D Data Structures & Searching**	Linear search, binary search Sorting algorithms: bubble, merge Algorithm efficiency: number of compares, passes through a loop, use of memory	Algorithms	Linear Search; Binary Search; Bubble Sort	—
20	**2D Data Structures**	Creating and accessing tables/records Searching rows Nested iteration	2D Lists	Print Table; Average Scores; Top Student Challenges 8–11 (2D lists) HW Y11.5 Grade Tracker	#11 Weather Station #21 Board Game #22 Club Members #23 Election #24 Noughts and Crosses #27 Passwords
21	**Working With Files**	Reading, writing, appending CSV processing Storing file data in 2D lists	Files	Animal Farm; Cars; Pets (File); Username Search Books Manager; Songs; Music Manager Challenges 13–14 (files, 2D lists, subprograms) HW Y11.6 High Scores	#28 Bricks #29 Ice Creams #30 Coffee Shop #31 Cows #32 Tree Health
22	**Testing**	Valid, boundary, erroneous data Designing test tables Evaluate fitness for purpose and efficiency using test data Robust software: audit trails, code reviews		Write test tables for Password Checker and Y11.4 Validation	—
23	**Boolean Logic**	Truth tables, AND/OR/NOT Complex expressions Truth tables with up to three inputs	Theory unit	—	—
24	**AI & Machine Learning**	Definitions, applications Algorithmic bias Safety and accountability Robotics; legal liability	Theory unit	—	—
25	**Cybersecurity**	Malware types, anti-malware Social engineering: phishing, pretexting Penetration testing, firewalls, encryption IoT security and privacy Malware: viruses, worms, trojans, ransomware, key loggers Technical vulnerabilities: unpatched software, out-of-date anti-malware Ethical hacking; access control, physical security Acceptable use policies; backup and recovery	Theory unit	—	—
YEAR 11 — SUMMER TERM					
26	**Exam Preparation**	Revision for Paper 1 and Paper 2			