# Computing — Key Stage 3 Curriculum Plan — Year 9

**Department Information:**
*Computing is taught to all KS3 students. Year 7 & 8 have one lesson a week and Year 9 have 3 lessons over a two-week period.*

**ACHIEVE in the curriculum:**
*Students are expected to be ambitious during their learning in KS3. They will have opportunities to collaborate on tasks with their peers. In addition, students can demonstrate their integrity, endurance and versatility particularly when it comes to challenging topics e.g. programming.*

**Curriculum Aims & Intent:**
*The aim is for students to understand and apply the fundamental principles and concepts of Computer Science, including analysing and solving problems through practical experience by designing, writing and debugging programs. Students will become informed on how to stay safe online by learning about a range of online safety topics. Students will use their creativity to creating multimedia publications as well through coding.*

**Resources:**
*PG Online resources, CAS/STEM resources, other teacher resources, the internet, laptops/computers.*
*https://www.bbc.co.uk/bitesize/subjects/zvc9q6f*
*https://app.edublocks.org/*
*https://code.org/tools/applab*
*https://www.w3schools.com/python/*

**How we keep parents informed:**
*Year 9 - Progress reports are published 4 times per year, in October, December, March and July, with a face-to-face parents' evening in January. GCSE Options Evening is also in January.*

**How parents can help their child:**
*Parents/carers can help students by supporting their child's learning and providing a suitable space to study as well as helping them develop good study skills and by encouraging students to be curious and explore topics and applications.*

**What we study and when:**

| Term | Unit, Topic Or Summary Of Work Covered | Knowledge, Understanding & Skills Developed | ACHIEVE / Personal Development Focus | How The Work Is Assessed | Careers Links |
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| 1 | (i) Computational Thinking | -Understands what is meant by computational thinking and the different parts logical thinking, algorithmic thinking, abstraction and decomposition.<br>- Applying computational thinking skills to problems. | Ambitious<br>Endurance<br>Collaborative | Review/Assessment. | Developer, Programmer. |
| | (ii) Edublocks Websites | -Constructs solutions (algorithms) that use repetition and two-way selection.<br>-Understands what HTML is and uses HTML to structure a static web page. | Ambitious<br>Endurance | Creating an effective website. | Technology Industry. |

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| | (iii) Understanding Computers | -Recognises & modifies HTML tags.<br>-Understand what CSS is and the benefits of using CSS to style pages instead of in-line formatting.<br>- Views the web page in a browser.<br><br>- Uses a variety of software to manipulate and present digital content: data and information.<br>- Shows an awareness of the elements of a computer and the CPU.<br>- Recognises & classifies input, output & storage devices and outlines the input-process-output cycle. | Ambitious Endurance | Creates an effective presentation. | Website designer. Content Creator.<br><br>Technology Industry. |
| **2** | (i) Spreadsheets | -Identifies features of a spreadsheet.<br>-Formats a spreadsheet.<br>-Creates formulae and uses functions, interprets data.<br>-Creates graphs. | Ambitious Endurance | Review/Assessment. | Handling data, Finance. Office worker, Analyst. |
| | (ii) Flowcharts & Control | -Understands what an algorithm is. Understands a sequence of instructions.<br>- Identifies flowchart symbols (start, end, input, output and subroutine). Be able to break down problems into distinct steps (decomposition).<br>- Create flowcharts for a given scenario. | Ambitious Endurance | Review/Assessment. | Programmer. Industries using control & automation. |
| | (iii) Algorithms - Turtle (Python) | -Demonstrate simple algorithms using loops, and selection. Detects and corrects errors i.e. debugging, in algorithms.<br>-Defines what an algorithm is. Reproduces/ Follows algorithms step-by-step. | Ambitious Endurance | Review/Assessment. | IT Industry, Developer, Programmer. |
| **3** | (i) Text-based Programming (Python) | -Writes simple programs using print and inputs. Understands data types and comparative and Boolean operators.<br>-Assigns variables.<br>-Understands and applies the programming constructs. | Ambitious Endurance Collaborative | Review/Assessment. | IT Industry, Developer, Programmer. |
| | (ii) Computer Crime & Cybersecurity | -Identifies different types of computer crime.<br>-Learns how to protect from threats.<br>-Shows an understanding of Health & Safety and copyright.<br>-Learns about legislation relating to these. | Ambitious Endurance | Creates an effective publication. | Cybersecurity. Data Protection. |
| | (iii) Networks | -Describes the key features of a network, including the benefits of networks.<br>-Describes network technologies and topologies. | Ambitious Endurance Integrity | Review/Assessment. | Network Manager, Network |

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| | | -Explains the purpose of IP addresses and the key protocols used in accessing a web page. -Identifies factors that can affect network performance. | | | Administrator, IT Helpdesk. |
| **4** | (i) AI | -Understands what is meant by AI and Machine Learning<br>-Discusses ethical issues surrounding the application of information technology beyond school. Evaluate and explain how the use of technology can impact on society. | Ambitious<br>Endurance<br>Integrity | Review/Assessment. | AI or ML Industry. |
| | (ii) System Architecture | -Learns about different computer systems including embedded systems and exploring the role of system software, operating systems and utility software.<br>-Describes the components of CPU and the roles of each component. Explain the FDE cycle.<br>-Describes the characteristics of main memory, RAM & ROM, and cache memory.<br>-Explains secondary storage. | Ambitious<br>Endurance | Review/Assessment. | IT Industry. |
| | (iii) Data Representation | Describes how digital images are composed of individual elements. Compares the difference between bitmap and vector images.<br>-Understands that the colour of each pixel is represented using binary.<br>-Understands how text is represented in binary using ASCII Table.<br>-Understands how sounds are represented in binary. Calculates size for a given sound.<br>-Describes compression of images and sound. | Ambitious<br>Endurance | Review/Assessment. | IT Industry, Media Industry. |
| **5** | (i) Boolean Logic & Processing | -Recaps the logic gates AND, NOT, OR and NOR including their symbols and truth tables.<br>-Understands Binary and converting binary to denary and vice a versa. Carries out Binary addition.<br>-Understands Hexadecimal and conversions to denary and binary and vice a versa. | Ambitious<br>Endurance | Review/Assessment. | IT Industry. |
| | (ii) Programming & Algorithms (Python) | -Finds where information can be filtered out in generalising problem solutions (abstraction).<br>-Uses logical reasoning to predict outputs, showing an awareness of inputs.<br>-Demonstrates simple algorithms using sequence, selection and iteration. Detects and corrects errors i.e. debugging, in algorithms. | Ambitious<br>Endurance<br>Collaborative | Review/Assessment. | Software Developer, Programmer. IT / Gaming Industry |
| | | -Defines a list and array. Uses a list in a program. | Ambitious<br>Endurance<br>Collaborative | Review/Assessment. | IT Industry |

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| | (iii) Python Next Steps | -Manipulates the lists using append() and remove(), and perform a list activity to undertake practice using such methods. Index items in a list. -Sort and reverse sort a list. Use for loop in a list. | | | |
| **6** | (i) Searching & Sorting Algorithms | - Identifies why computers need to search data.<br>-Describes how linear search is used and performs linear search to find a position of an item in a list.<br>-Describes how binary search is used and performs binary search to find a position of an item in a list. | Ambitious<br>Endurance<br>Collaborative | Review/Assessment. | Software Developer, Programmer. |
| | (ii) Ethical, Legal, Privacy & Environmental | -Understands and applies key terms: privacy, legal, ethical, environmental and cultural. Explains legislation relating to these.<br>-Explains what is meant by the digital divide.<br>-Identifies positive and negative aspects of the use of technology including AI, in relation to the above impacts of technology. | Ambitious<br>Endurance<br>Collaborative | Review/Assessment. | IT Industry. |
| | App design/ development | - Identifies when a problem needs to be broken down (decomposition). Uses a block-based programming language to create a sequence.<br>- Implements and customises GUI elements to meet the needs of the user.<br>- Uses user input in an event driven programming environment (AppLab).<br>- Uses variables. Identifies and fix common coding errors and establishes user needs when completing a creative project. | Ambitious<br>Endurance<br>Collaborative | Creates an effective app for a given purpose/audience. | App Development. |