Broadlands Academy – Computer Science

Curriculum Overview 2024-25

KS3 National Curriculum

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem
- use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions
- understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
- understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems
- understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits
- undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
- understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 7	**Learning to use G-suite** **E-Safety**		**Basic Programming Techniques (Scratch)** Students program a pac-man game	**Databases** Make a top trumps template using G-suite and store info in a database. Use mail merge to create the physical card	**Spreadsheets** Help a celebrity business to manage their small business finances using formulas	

Year 8 **(1x term due to 2 lesson per week)**	**Computer Hardware** Gives examples of how data is stored on a computer. Explains the function of the main internal parts of basic computer architecture.	**Computer Hardware - binary** Introduction to how computers communicate using binary Convert between binary and denary	**3D design - sketchup** Uses a variety of software to manipulate and present digital content: data and information. Creates digital content to achieve a given goal through combining software packages and internet services to communicate with a wider audience	**HTML - web site coding** 1. Constructs solutions (algorithms) that use repetition and two-way selection. Solves problems through decomposition. 2. Uses logical reasoning to predict outputs, showing an awareness of inputs. Selects similarities and differences in situations and uses these to solve problems (pattern recognition).	**Databases** Students query an existing database to solve a murder mystery	**Spreadsheets** Students manage a celebrity band's finances E.g. ticket sales, VAT
Year 9 **(1x term due to 1 lesson per fortnight)**	**Programming algorithms & evaluation** Students use logical reasoning to predict outputs, showing an awareness of inputs. Select similarities and differences in situations and use these to solve problems (pattern recognition).	**Introduction to Python Programming** Students identify the differences between, and appropriately use if and if, then and else statements; have practical experience of a high-level textual language.		**End of KS3 module - the Apprentice** Students will receive a challenge from 'Lord Sugar' that will require students to use the skills they have learnt in KS3		**Spreadsheets** Students extend on their previous learning to use more advanced formulas e.g. VLOOKUP

Year 10	**Introduction to Python** Students will recap prior learning from year 9 with added emphasis on improving literacy in this unit	**Computational thinking, algorithms and programming** Algorithms Data representation	**Computational thinking, algorithms and programming** Programming techniques	**Computational thinking, algorithms and programming** Producing robust programs Computational logic	**Computational thinking, algorithms and programming** Translators and facilities of languages	**Programming Project - practice coursework** • Programming techniques • Analysis • Design • Development • Testing, evaluation and conclusions
Year 11	**Programming Project - assessed coursework** • Programming techniques • Analysis • Design • Development • Testing, evaluation and conclusions		**Computer systems** • Systems Architecture • Memory • Storage	**Computer systems** • Wired and wireless networks • Network topologies, protocols and layers • System security	**Computer systems** • System software • Ethical, legal, cultural and environmental concerns	**Revision for terminal exams** Exam technique, recap of weak areas identified from mock exams