Curriculum Plan - Overview

Through KS3 students will follow a series of topics, develop their understanding of computational concepts and equipping them with the necessary skills to solve real world problems.

The Computing Curriculum has been written to support all pupils. Each lesson is sequenced so that it builds on the learning from the previous lesson, and where appropriate, activities are scaffolded so that all pupils can succeed and thrive. Scaffolded activities provide pupils with extra resources, such as visual prompts, to reach the same learning goals as the rest of the class. Exploratory tasks foster a deeper understanding of a concept, encouraging pupils to apply their learning in different contexts and make connections with other learning experiences. As well as scaffolded activities, embedded within the lessons are a range of pedagogical strategies (defined in the ‘Pedagogy’ section of this document), which support making computing topics more accessible.

All learning objectives have been mapped to the National Centre for Computing Education’s taxonomy of ten strands, which ensures that units build on each other from one key stage to the next.

**Assessment Opportunities.**

Every lesson includes formative assessment opportunities for students to complete. These opportunities ensure that misconceptions are recognised and addressed if they occur. They vary from observation or questioning, to marked activities. These assessments are vital to ensure that learning suits the needs of the pupils. The learning objectives are introduced in the slides of every lesson. Every lesson has a starter activity and a plenary that can be used as an opportunity for formative assessment.

Every unit includes a summative assessment framework in the form of either a multiple-choice quiz (MCQ). All units are designed to cover both skills and concepts from across the computing national curriculum. Units that focus more on conceptual development include an MCQ. Units that focus more on skills development end with a project. However, within the ‘Programming’ units, the assessment framework (MCQ) has been selected on a best-fit basis.

Each of the MCQ questions has been carefully chosen to represent learning that should have been achieved within the unit. In writing the MCQs, a diagnostic assessment approach has been used to ensure that the assessment of the unit is useful to determine both how well pupils have understood the content, and what pupils have misunderstood, if they have not achieved as expected. Each MCQ includes an answer sheet that highlights the misconceptions that pupils may have if they have chosen a wrong answer. This ensures that gaps in learning will be addressed in later units.

**Unit summaries**

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| **Year** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **7** | **Online Use.**  Using online collaboration tools respectfully. An introduction to the computing lab. | **Spreadsheets.**  Sorting and filtering data and using formulas and functions. | **Word Processors.**  Preparing a range of professional documents, such as letters, blogs, acknowledging copyright and trusted sources. | **Multi-media.**  Gaining support for a cause. Creating a digital product for a real-world cause. | **Web design.**  HTML designed web-pages using CSS formatting and the use of multimedia files. | **Scratch Basics**.  Applying programming constructs of sequence, selection and iteration. |
| **8** | **Advanced Scratch.**  Using subroutines to decompose a problem that incorporates lists in Scratch. | **Binary.**  Representing numbers, sound and text using binary digits. | **Networks.** Fundamental elements that make up a network. | **Vector Graphics.** Creating vector graphics through objects, layering and path manipulation | **Mobile App Development.** Using an interface and code to provide a suitable app. | **Python Basics.**  Applying the programming constructs of sequence, selection, and iteration in Python |
| **9** | **Python programming.** Manipulating strings and lists. Creating a programming project. | **Physical computing.**  Sensing and controlling with the Micro-bit. | **Cybersecurity.** Identifying how users and organisations can protect themselves from cyberattacks. | **Audio Visual.** Representing images and sound using binary digits | **Ethical**  Reviewing legal, social and environmental issues. | **Networks.**  Reviewing threats, preventative measures and protocols. |

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| **Week** | **Year 7 Computing Topics** | **Learning Objectives** | **Resources** |
| 1 | Autumn Term 1  Online use | Setting up folders and naming files | * School email /network account * Office 365 OneDrive and Outlook * Websites and videos (on presentations) * Lesson presentations * Teach-ict and BBC Bitesize websites * Team’s assignments |
| 2 | Rules when using the network |
| 3 | Email etiquette |
| 4 | Using advanced features of emails |
| 5 | E-Safety |
| 6 | Planning an effective presentation |
| 7 | Evaluating the presentation for its audience |
| 8 | Autumn Term 1 assessment |
| 9 | Autumn Term 2  Spreadsheets | Introducing spreadsheet uses and the given scenario | * Office 365 Excel software * MS Forms * Websites and videos (on presentations) * Lesson presentations * Teach-ict and BBC Bitesize websites * Team's assignments |
| 10 | Using rows, columns, cells, cell references and formatting tools |
| 11 | Formatting data types and adding data |
| 12 | Designing a staff sheet to calculate sales |
| 13 | Using the functions SUM, COUNTA, MAX AND MIN to perform calculations |
| 14 | Designing charts suitable for analysis |
| 15 | Peer assessing and evaluating the spreadsheet design |
| 16 | Analysing data for business decisions |
| 17 | Autumn Term 2 assessment |
| 18 | Spring Term 1  Word Processors | Use and evaluate appropriate features of a Word Processor to format a document for a purpose | * Office 365 Word * Websites and videos (on presentations) * Team’s assignments * Lesson presentations * Teach-ict and BBC Bitesize websites |
| 19 | Select appropriate images for a purpose, format them, and discuss impacts of the Creative Commons licence |
| 20 | Critique digital content for credibility to evaluate whether a source is trusted |
| 21 | Apply referencing techniques and discuss plagiarism and acknowledging sources |
| 22 | Construct an organised, credible blog using software, applying referencing and appropriate layout |
| 23 | Spring Term 1 assessment |
| 24 | Spring Term 2  Presentation | Use and evaluate appropriate features of presentation software for a specific purpose and audience | * Office 365 PowerPoint * Websites and videos (on presentations) * Team’s assignments * Lesson presentations * Teach-ict and BBC Bitesize websites |
| 25 | Select suitable images and animations, and facts. |
| 26 | Discuss legal considerations of images used and using the Creative Commons licence, plagiarism and acknowledging sources |
| 27 | Presenting to the class and receive feedback |
| 28 | Spring Term 2 assessment |
| 29 | Summer Term 1  HTML | Set up three web pages using Notepad and at least four HTML tags | * W3schools.com * Websites and videos (on presentations) * Lesson presentations * Plain paper and coloured pencils * Teams assignments |
| 30 | Apply CSS formatting to change font style, size and colour |
| 31 | Apply HTML and CSS to create and format tables to store data and images |
| 32 | Apply HTML and CSS to add and format images and text |
| 33 | Apply HTML and CSS to add internal and external hyperlinks |
| 34 | Summer Term 1 assessment |
| 35 | Summer Term 2  Scratch | Define, modify and predict a simple sequence | * Online Scratch * Office 365 Word * Lesson presentations * Scratch.mit.edu * Teams assignments |
| 36 | Define, predict, trace and make a sequence using variables |
| 37 | Use conditions as either True or False, to control the flow of a sequence or selection and modify a program |
| 38 | Create conditions using comparison and logic operators and identify them |
| 40 | Summer Term 2 Assessment |

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| **Week** | **Year 8 Computing Topics** | **Learning Objectives** | **Resources** |
| 1 | Autumn Term 1  Advanced Scratch | Modifying a sequence | * Online Scratch * Teams assignments * Office 365 Word * Lesson presentations * Scratch.mit.edu * Websites and videos |
| 2 | Define and predict sequences using variables using input / process / output |
| 3 | Use and modify selection statements in a program, using comparison and logical operators |
| 4 | Implement count-controlled iteration in a program |
| 5 | Detect and correct errors in a program (debugging) |
| 6 | Independently design a program using subroutine, selection, count-controlled iteration, operators and variables |
| 7 | Design a game using variables and loops. |
| 8 | Autumn Term 1 assessment |
| 9 | Autumn Term 2  Binary | Describe why and how computers use binary numbers | * Mini whiteboards and pens * Team’s assignments * Lesson presentations * Websites and videos |
| 10 | Convert binary to denary numbers |
| 11 | Convert denary to binary numbers |
| 12 | Discuss different data units and apply suitable uses for each |
| 13 | Convert hexadecimal numbers to denary |
| 14 | Converting analogue to digital sound |
| 15 | Comparing the application, benefits and drawbacks of digital image files |
| 16 | ASCII code and UNICODE |
| 17 | Autumn Term 2 assessment |
| 18 | Spring Term 1  Networks | Describe the types of networks: LANs and WANs | * Team’s assignments * Lesson presentations * Websites and videos * Scratch |
| 19 | Discuss issues that affect network performance |
| 20 | Evaluate different network topologies |
| 21 | Describe equipment required to run a network |
| 22 | Demonstrate building a network server using Scratch |
|  | Assess network threats and prevention methods. |
| 23 | Spring Term Assessment 1 |
| 24 | Spring Term 2  Vector Graphics | Explain properties of Vector images and draw basic shapes using different properties | * Team’s assignments * Lesson presentations * Websites and videos * inkscape.org |
| 25 | Manipulate individual and groups of objects (select, move, resize, rotate, duplicate, flip, z-order) |
| 26 | Experiment using tools to change the appearance of vector images (draw paths and edit path nodes) |
| 27 | Combine paths by applying operations (union, difference, intersection) to create a vector graphic design |
| 28 | Spring Term 2 assessment |
| 29 | SU1  Python Basics | Describe what algorithms and programs are and how they differ | * Team’s assignments * Lesson presentations * Websites and videos * code.org |
| 30 | Write simple Python to display messages, assign values to variables, and receive keyboard input |
| 31 | Write simple Python to display messages, assign values to variables, and receive keyboard input |
| 32 | Use simple arithmetic expressions in assignment statements to calculate values |
| 33 | Use binary (if, else statements) and multi-branch selection (if, elif, else statements) to control programs |
|  | Use iteration (while loops), using variables, to control the flow of program execution |
| 34 | Summer Term 1 assessment |
| 35 | SU2  Physical Computing –  Micro: bits | Write programs to display messages, receive input, and use arithmetic expressions, locate / correct syntax errors | * Teams assignments * Lesson presentations * Websites and videos * Micro:bits * Python * Spare batteries / power * Office 365 OneDrive |
| 36 | Perform common operations on lists or individual items and perform common operations on lists |
| 37 | Use iteration (while statements) to control the flow of program execution using strings or individual characters |
| 38 | Use iteration (for statements and loops) to iterate over list items, strings and characters |
| 39 | Use variables to keep track of counts and sums |
| 40 | Summer Term 2 assessment |

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| **Week** | **Year 9 Computing Topics** | **Learning Objectives** | **Resources** |
| 1 | AT1  Python Programming | Write programs to display messages, receive input, and use arithmetic expressions, locate / correct syntax errors | * Teams assignments * Lesson presentations * Websites and videos IDLE v3 * Office 365 OneDrive |
| 2 | Perform common operations on lists or individual items and perform common operations on lists |
| 3 | Use iteration (while statements) to control the flow of program execution using strings or individual characters |
| 4 | Use iteration (for statements and loops) to iterate over list items, strings and characters |
| 5 | Use variables to keep track of counts and sums |
| 6 | Use algorithms to plan a programming project to develop solutions to meaningful problems |
| 7 | Combine key programming language features to develop solutions to meaningful problems |
| 8 | AT1 assessment |
| 9 | AT2  Physical Computing – Micro: bits | List the Micro: bit's input and output devices and use IDLE to write, execute and debug a Python program | * Teams assignments * Lesson presentations * Websites and videos * Micro:bits * Python * Spare batteries / power * Office 365 OneDrive |
| 10 | Write programs that use the Micro: using selection and random function to create an interactive game |
| 11 | Write programs that using variables and functions to create a digital pet |
| 12 | Design code to test times tables knowledge |
| 13 | Use selection and sensors to design a device for monitoring sunlight |
| 14 | Implement a physical computing project, while following, revising, and refining the project plan |
| 15 | Design a physical computing device to use variables to count steps |
| 16 | AT2 assessment |
| 17 | ST1  Cyber Security | Critique online services in relation to data privacy, discuss online data and the need for the Data Protection Act | * Teams assignments * Lesson presentations * Websites and videos * Office 365 OneDrive |
| 18 | Explain the need for the Computer Misuse Act, discussing hacking, DDoS and brute force attacks |
| 19 | Discuss implications of the Copyrights, Designs and Patents Act |
| 20 | Examine reliability of Internet sources and social / economic implications |
| 21 | Explain health and safety issues whilst working using computers. |
| 22 | ST1 assessment |
| 23 | ST2  Audio Visual | Describe how digital images are composed of individual elements (defining ‘pixels’, ‘resolution’, and ‘colour depth’) | * Teams assignments * Lesson presentations * Websites and videos * Audacity and GIMP software * Headphones / microphone |
| 24 | Describe how colours of pictures are represented using a binary digit and calculate the size of a digital image |
| 25 | Recall that sound is a wave and define key terms such as ‘sample’, ‘sampling frequency/rate’, ‘sample size’ |
| 26 | Perform basic sound editing tasks using appropriate software and calculate size for a given digital sound |
| 27 | SP2 assessment |
| 28 | SU1  Ethical | Discuss ethical issues: digital divide, self-driving cars and drones. | * Teams assignments * Lesson presentations * Websites and videos * Python / IDLE v3 |
| 29 | Discuss environmental issues: e-waste, sustainability, recycling, earth monitoring and monitoring nature. |
| 30 | Discuss privacy issues: CCTV, ID cards, personal data, AI and communication tracking. |
| 31 | Discuss cultural issues: use of social media and citizen journalism. |
| 32 | Discuss the use of technology in medicine: storing records, 3D printing and AI. |
| 33 | SU1 assessment |
| 34 | SU2  HTML | Set up three web pages using Notepad and at least four HTML tags | * W3schools.com * Websites and videos (on presentations) * Lesson presentations * Plain paper and coloured pencils * Teams assignments |
| 35 | Apply CSS formatting to change font style, size and colour |
| 36 | Apply HTML and CSS to create and format tables to store data and images |
| 37 | Apply HTML and CSS to add and format images and text |
| 38 | Apply HTML and CSS to add internal and external hyperlinks |
| 39 | Apply HTML and CSS to add bullets and formatted images for bullets |
| 40 | SU2 assessment |