Curriculum Overview – Computing

"In some ways, programming is like painting. You start with a blank canvas and certain basic raw materials. You use a combination of science, art and craft to determine what to do with them."

Andrew Hunt

The way we teach computing meets every requirement of the National Curriculum and it also satisfies our unique in-house ethos based around the three key pillars of *Mind*, *Heart*, *Connect*. In this respect, it helps our pupils use computing not just for learning and enjoying the subject itself, but also for developing essential personal qualities and life skills.

Our carefully sequenced teaching is shaped by the *National Centre for Computing Education*, and for the youngest learners revolves around the three principal subject areas of *Knowledge and Use of Computing*, *Creating with Computing* and *Programming with Computing*. Together, these areas help develop a solid foundation covering everything from using technology and data through to digital creativity and writing code. Pupils go on to gain a deeper knowledge and understanding as they get older, with tasks becoming increasingly complex and challenging, whether that's learning new coding languages or creating ever-more sophisticated digital graphics.

Our commitment to promoting good digital citizenship underpins all of our teaching. For example, we strongly encourage pupils to understand the connection between their enjoyment of technology and social media and their obligation to use it carefully, for their own sake and that of other people. Here, we talk about issues like self-image and identity, and the need for care around the creation and curation of digital profiles and reputations. Online relationships, bullying and copyright law are all covered too, as well as how to successfully navigate everyday safety and wellbeing challenges like privacy, bullying, screen time and self-regulation. These topics help to bring computing into the sphere of our school-wide Character Curriculum, where we help and encourage pupils to be responsible, conscientious and always socially aware.

Pragmatism also informs our overall approach, and while we accept and explore the risks associated with the online world and digital technology, we also accept and celebrate the central and positive part they can play in so many aspects of contemporary life. By doing this, we aim to equip every single pupil with the skills, appreciation and awareness to make sure digital technologies and social media enrich their lives and work in their favour, not against them. At the same time, we teach our learners to develop and apply their critical thinking skills, helping them become digitally savvy consumers capable of evaluating sources and seeing through fake news and bias.

Giving pupils digital literacy and a digital voice is key to our mission around inclusivity, and it's also a great way for us to help pupils make the most of computing's particularly high value as an important social leveller. For example, we see coding as a worldwide language and a universal tool of self-expression, and we encourage our pupils to understand this perspective and use it to their advantage. We also use computing as an arena where all pupils can carefully develop their digital identities in order to connect with each other, with their wider community and with the world as a whole, both real and online.

		Term 1	Term 2	Term 3
Year 1	Knowledge/Skills:	**Using Technology and data** Basic IT knowledge of hardware and inputs. Simple word processing, saving and editing a document. Establishing principles of e-safety by looking at rules to keep them safe and healthy when using technology.	**Creating with Technology** Continue work on word processing and look at how to use the different tools to change the look of their text. Painting a digital picture using a variety of tools. Comparing digital art with real life art.	**Programming with Computing** Explore individual command. Identify what commands do and start to predict programme outcomes. Introduced to basic program design and simple algorithms. Introduction to Scratch. Investigating sprites and backgrounds. Using programming blocks to use, modify and create programmes.
	Computing Skills	Right click, left click, Select, drop, and drag. Redo and undo. Save.	Shape and line tools. Fill tool. Brush tool. Chaing the font. Typing.	Scratch
	National Curriculum Aims	1.4, 1.5, 1.6	1.4, 1.6	1.1, 1.2, 1.3, 1.4, 1.5
	Teach Computing Taxonomy	Computing systems; Effective use of tools; Impact of technology; safety and security	Creating media; Computing systems; Design and develop; Effective use of tools;	Algorithms; Design and Develop; Impact of technology; Programming
	Education for a Connected World	Health, wellbeing, and lifestyle; Copyright and ownership	Copyright and ownership	Privacy and security
	Knowledge revisited	Basic IT Skills, e-Safety	IT Editing skills	What is an Algorithm
Year 2	Knowledge/Skills:	**Using Technology** Understand how technology is used in everyday life and the benefits it can bring. Introduce the term data and how data can be collected, used and present using pictograms.	**Creating with Technology** Take digital pictures using different devices and gain experience editing and improving photos. Explore how music can evoke emotions. Make patterns and music with real life and digital tools.	**Programming with Computing** Develop understanding of instructions in sequences and using logical reasoning to predict outcomes. Give different commands and investigate outcomes. Continue work on ScatchJr to use and modify designs to create their own quizzes before evaluating and improving their work.
	Computing Skills	Revisiting basic **Computing** skills from Y1	Hardware, Physical Computing; Music Lab Software	Scratch Jr
	National Curriculum Aims	1.4, 1.5, 1.6	1.4, 1.5, 1.6	1.1, 1.2, 1.3, 1.4
	Teach Computing Taxonomy	Computing systems; Effective use of tools; Networks; safety and security	Creating media; Computing systems; Design and develop; Effective use of tools;	Algorithms; Design and Develop; Impact of technology; Programming

	Knowledge revisited	Dat and Information, Data Safety	Moving a Robot, Digital writing	Basic programming Scratch, Sequencing
Year 3	Knowledge/Skills:	**Using Technology and data** Compare digital and non-digital devices before introducing to computer networks that include network infrastructure devices like routers and switches. Introduction to branching databases. Understand what attributes are and how to use them to sort groups. Create and evaluate branching database.	**Creating with Technology** Create a stop-frame animation story adding other types of media. Introduction to 'text' and 'images' and understand how they can be used to communicate messages. Use desktop publishing software to create media.	**Programming with Computing** Explore the concept of sequencing in programming through Scratch. Use motion, sound, and event blocks to create their own programs. Explore movement and design sprites to move through a maze. Introduction of pen blocks.
	Computing Skills	Revisiting basic **Computing** skills from Y2	Pixel image software; Music Lab Software	Scratch
	National Curriculum Aims	2.2, 2.4, 2.6	2.5, 2.6, 2.7	2.1, 2.2, 2.3, 2.6
	Teach Computing Taxonomy	Computing systems; Impact of technology; Networks; Design and develop; Effective use of tools	Creating media; Computing systems; Design and develop; Effective use of tools; Impact of technology	Algorithms; Design and Develop; Impact of technology; Programming
	Knowledge revisited	IT around us, Data & Safety	Pictograms	Programming A – Repetition in shapes, Scratch Jnr, Algorithms
Year 4	Knowledge/Skills:	**Using Technology and data** Apply their knowledge of networks to understand the internet and the need for security. Explore the World Wide Web and learn about who owns content and what they can access, add, and create. Discuss and debate fake news and its consequences. Understand how and why data is collected over time. Look at data points, data sets and logging intervals. Begin to analyse data and use	**Creating with Technology** Identify input and output devices to work with sound digitally. Discuss ownership of digital audio and copyright. Record and produce a podcast using Audacity. Develop their skills to manipulate images and how they can be reused and resaved. Revisit learning on fake news and fake images. Select, use, and combine various tools in software, word, PowerPoint and create presentation	**Programming with Computing** Scratch, Introduction to repetition and loops within programming. Create programmes by planning, modifying and testing commands to create shapes and patterns. Select, use and combine various tools Identify the similarities and differences between controlled and infinite loops and use existing knowledge to modify

		data loggers to answer questions.		existing animations and games using repetition.
	Computing Skills	Revisiting basic **Computing** skills from Y2	Audacity; Getpaint.net	Logo; Scratch
	National Curriculum Aims	2.2, 2.4, 2.5, 2.6	2.5, 2.6, 2.7	2.1, 2.2, 2.3, 2.6
	Teach Computing Taxonomy	Computing systems; Impact of technology; Networks; Design and develop; Effective use of tools	Creating media; Computing systems; Design and develop; Effective use of tools; Impact of technology	Algorithms; Design and Develop; Impact of technology; Programming
	Education for a Connected World	Copyright and ownership;	Copyright and ownership; self-image and identity	
	Knowledge revisited	Computing Systems and networks	Creating Media	Programming A – Repetition in shapes
Year 5	Knowledge/Skills:	**Using Technology and data** Select, use, and combine various tools on word, PowerPoint and excel Develop understanding of computer systems and how information is transferred between systems and devices. Examine small- and large-scale systems and take part in a collaborative online project. Explore flat-file database to organise data and learn to present it in a variety of diverse ways.	**Creating with Computing** Introduction to vector drawings and use different tools to help them create images. Introduction to objects and layers to develop more complex pieces of work. Select, use, and combine various tools. Develop video editing skills of capturing, editing, and manipulating video.	**Programming with Computing** Scratch, Explore the concept of selection using Crumble. Introduction to microcontrollers and learn how to connect and programme components through the application of their existing programming knowledge. **Use sequence, selection, and repetition in programs; work with variables and various forms of input and output** **Abstraction, use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs**
	Computing Skills	Revisiting basic **Computing** skills from Y2	Google Drawings or Photoshop; Fireworks	Scratch; Crumble controller
	National Curriculum Aims	2.1, 2.2, 2.4, 2.5, 2.6	2.5, 2.6, 2.7	2.1, 2.2, 2.3, 2.6
	Teach Computing Taxonomy	Computing systems; Impact of technology; Networks; Design and develop; Effective use of tools	Creating media; Computing systems; Design and develop; Effective use of tools; Impact of technology	Algorithms; Design and Develop; Impact of technology; Programming
	Education for a Connected World	Copyright and ownership;	Managing online information; Online relationships; Online	Copyright and ownership

			Reputation; Self-image and identity	
	Knowledge revisited	Computing systems and networks – Sharing information	Data and information – Flat-file databases	Programming A – Selection in physical computing, Selection
Year 6	Knowledge/Skills:	**Using Technology and data** Develop understanding of how to find information on the World Wide Web through learning how search engines work and what influences searching, and through comparing different search engines. Introduction to spreadsheets learning how to organise data into columns and rows to create data sets. Understanding the importance of formatting data to support calculations and formulas.	**Creating with Technology** Develop knowledge and understanding of using a computer to produce a 3D model. Working in a 3D space, including combining 3D objects to make a house, and examining the differences between working digitally with 2D and 3D graphics. Create a website for a chosen purpose. Identify what makes a good web page and design and evaluate websites.	**Programming with Computing** Explore variables in programming. Relate variables to real-world examples of values that can be set and changed. Use variables to create a simulation of a scoreboard. Use the 'Use-Modify-Create' model to experiment with variables. Designing, writing, and debugging programs, find error Building on learning from Y3, 4 and 5, use micro: bit. Build simple program to test in their micro: bit.
	Computing Skills	Excel	Google sites.	Scratch; Micro: bit, Small Basics
	National Curriculum Aims	2.1, 2.4, 2.5, 2.6	2.5, 2.6, 2.7	2.1, 2.2, 2.3, 2.6
	Teach Computing Taxonomy	Computing systems; Impact of technology; Networks; Design and develop; Effective use of tools	Creating media; Computing systems; Design and develop; Effective use of tools; Impact of technology	Algorithms; Design and Develop; Impact of technology; Programming Designing, writing and debugging programs
	Education for a Connected World	Managing online information; Online relationships; Online Reputation;	Managing online information; Online relationships; Online Reputation; Self-image and identity	Privacy and security; Copyright and ownership
	Knowledge revisited	Computing systems and networks – Communication	Creating media, Data, and information – Spreadsheets	Programming A – Variables in games Programming B – Sensing Small basics
Year 7	Knowledge/Skills:	**Using Technology and data** Understand how to use the school network safely and appropriately. Learn to use TEAMs.	**Media** Developing understanding around networks and looking at how data is	**Programming with Computing** Build confidence and knowledge of the key programming constructs.

		Deeper understanding around online safety and mobile phone usage. Continue learning about spreadsheets and the concept of cell referencing. Collecting, analysing, and manipulating data.	transmitted across networks using protocols. Develop deeper understanding of information technology and digital literacy by creating a blog post about a real-world cause.	Develop understanding of control structures sequence, selection, and iteration and develop their problem-solving skills. Create their own subroutines and develop their understanding of decomposition.
	Computing Skills	Excel		Scratch; Micro: bit, small basics
	National Curriculum Aims	3.1, 3.7, 3.8, 3.9	3.5, 3.7, 3.8	3.2, 3.3, 3.4, 3.8
	Teach Computing Taxonomy	Computing systems; Impact of technology; Networks; Design and develop; Effective use of tools	Creating media; Computing systems; Design and develop; Effective use of tools; Impact of technology	Algorithms; Design and Develop; Impact of technology; Programming
	Education for a Connected World	Online bullying; online relationships; privacy and security	Privacy and security	Copyright and ownership; Managing online information
	Knowledge revisited	Impact of technology – Collaborating online respectfully	Spreadsheets, using media – Gaining support for a cause	Programming essentials in Scratch, Small Basics
Year 8	Knowledge/Skills:	**Using Technology and data** Gain an overview of how computing systems operate whilst looking at artificial intelligence and open source software. Introduction to WWW, HTML and CSS. Cataloguing and organising websites for effective retrieval using search engines.	**Media** Using vector graphics to design logos, icons, and board games.	**Programming with Computing** Introduction to Python looking simple programming using input and output moving through arithmetic operations, randomness, selection and iteration. Build an app using App Lab from code.org. Building on programming concepts used in previous units to research, design their app, write the code for it and evaluating and publishing it.
	Computing Skills	Mobile app development	Media – Vector graphics	Scratch, Python, App Lab from code.org
	National Curriculum Aims	3.4, 3.5, 3.6, 3.8	3.7, 3.8	3.1, 3.2, 3.3, 3.4, 3.8
	Teach Computing Taxonomy	Computing systems; Impact of technology; Networks; Design and develop; Effective use of tools	Creating media; Computing systems; Design and develop; Effective use of tools; Impact of technology	Algorithms; Design and Develop; Impact of technology; Programming
	Education for a Connected World	Internet	Ethics	Programming, Pseudocode

	Knowledge revisited	Computing systems, Internet	App Development, Data Representation	Introduction to Python programming, Small Basics
Year 9	Knowledge/Skills:	Students complete Information Technology challenges to earn points towards equivalent of the Duke of Edinburgh award. Bronze, Silver, and Gold award. Challenge elements include: citizen, worker, maker, and entrepreneur for Bronze award. Challenges relate to E-Safety, Digital Literacy, Cloud-based systems and storage, cyber security, networking, social media ethics, big data, internet of things, user interfaces and experiences, design psychology, automation, virtual reality, video editing, coding, research, and problem solving and more. The iDEA award links to the national curriculum for computing and covers concepts such as programming through the creation and evaluation of computational abstractions in the programming modules and use of more than one programming language. In the iDEA award, students use JavaScript, Python, and SQL to interpret, correct and create code. Students will learn to work with Boolean logic during the binary module and during the user interface and sys admin, students will learn how hardware and software communicate.		
	Computing Skills	Safety & Security, Design, Data structure, Networks	Physical Computing, Ethics, Data Representation	Small Basics, Python
	National Curriculum Aims	3.1, 3.7, 3.8, 3.9	3.5, 3.7, 3.8	3.2, 3.3, 3.4, 3.8
	Teach Computing Taxonomy	Computing systems; Impact of technology; Networks; Design and develop; Effective use of tools	Creating media; Computing systems; Design and develop; Effective use of tools; Impact of technology	Algorithms; Design and Develop; Impact of technology; Programming
	Education for a Connected World	Online bullying; online relationships; privacy and security	Privacy and security Micro: bit, Physical Computing	Copyright and ownership; Managing online information
	Knowledge revisited	Cybersecurity, Data Science, Media, Design	Physical computing, Representation	Python programming with sequences of data, Pseudocode