

Key Stage 3 Computing

In order to allow pupils to pursue both ICT and Computer Science at GCSE and beyond, the recently revamped curriculum is as follows.

Year 7 Computing

Unit 1 – Impact of technology – Collaborating online respectfully

A primer for learners on how to use the school network appropriately. This unit builds in time for teacher-led discussions on why appropriate usage is important, as well as allowing for opportunities to highlight online safety issues.

Unit 2 - Modelling data – Spreadsheets

Learners are introduced to the wonderful world of spreadsheets and the concept of cell referencing. They collect, analyse, and manipulate data, before turning it into graphs and charts. Data is beautiful!

Unit 3 - Networks from semaphores to the Internet

Imagine a world without computer networks: there would be no more YouTube, Google, instant messaging, online video gaming, Netflix, and iTunes; no online shopping; no file sharing; and no central backups of information. This unit begins by defining a network and addressing the benefits of networking, before covering how data is transmitted across networks using protocols.

Unit 4 - Programming essentials in Scratch – part I

This unit is the first programming unit of KS3. The aim of this unit is to build learners' confidence and knowledge of the key programming constructs. Importantly, this unit does not assume any previous programming experience, but it does offer learners the opportunity to expand on their knowledge throughout the unit. The main programming concepts covered in this unit are sequencing, variables, selection, and count-controlled iteration. All of the examples and activities for this unit use Scratch 3.

<https://scratch.mit.edu/>

Unit 5 - Programming essentials in Scratch – part II (constrained by time, this unit is not currently delivered)

This unit begins right where 'Programming I' left off. Learners will build on their understanding of the control structures' sequence, selection, and iteration (the big three), and develop their problem-solving skills. Learners will learn how to create their own subroutines, develop their understanding of decomposition, learn how to create and use lists, and build upon their problem-solving skills by working through a larger project at the end of the unit.

Unit 6 - Using media – Gaining support for a cause

Pupils develop a deeper understanding of information technology and digital literacy by using their skills across the unit to create a blog post about a real-world cause that they are passionate about and would like to gain support for.

<u>Year 7</u> <u>Computing</u>	<u>Autumn</u> <u>1</u>	<u>Autumn</u> <u>2</u>
	• Unit 1	• Unit 2
	<u>Spring 1</u>	<u>Spring 2</u>
	• Unit 3	• Unit 4
	<u>Summer</u> <u>1</u>	<u>Summer</u> <u>2</u>
	• Unit 6	• Unit 6

Year 8 Computing

Unit 1 - Computing systems

This unit takes learners on a tour through the different layers of computing systems: from programs and the operating system, to the physical components that store and execute these programs, to the fundamental binary building blocks that these components consist of. The aim is to provide a concise overview of how computing systems operate, conveying the essentials and abstracting away the technical details that might confuse or put off learners. The last lessons cover two interesting contemporary topics: artificial intelligence and open-source software. These are linked back to the content of the unit, helping learners to both broaden their knowledge and focus on the topics addressed in the unit. The unit assumes no prior knowledge. There are, however, links to the 'Representations' units taught in Years 8 and 9 and the 'Networks' units taught in Years 7 and 8.

Unit 2 - Developing for the web

In this unit, learners will explore the technologies that make up the internet and World Wide Web. Starting with an exploration of the building blocks of the World Wide Web, HTML, and CSS, learners will investigate how websites are catalogued and organised for effective retrieval using search engines. By the end of the unit, learners will have a functioning website.

Unit 3 - Introduction to Python programming

This unit introduces learners to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness, selection, and iteration. Emphasis is

placed on tackling common misconceptions and elucidating the mechanics of program execution. A range of pedagogical tools is employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples. The Year 7 Programming units are a prerequisite for this unit.

Unit 4 – Media – Vector graphics

Vector graphics can be used to design anything from logos and icons to posters, board games, and complex illustrations. Through this unit, students will be able to better understand the processes involved in creating such graphics and will be provided with the knowledge and tools to create their own.

Unit 5 - Mobile app development (constrained by time, this unit is not currently delivered)

Today, there’s an app for every possible need. With this unit you can take learners through the entire process of creating their own mobile app, using App Lab from code.org. Building on the programming concepts learners used in previous units, they will work in pairs to perform user research, design their app, write the code for it, before finally evaluating and publishing it for the world to use.

Unit 6 - Representations – from clay to silicon

Humans use symbols to record, process and transmit information. In this unit, we introduce binary digits to learners as the symbols that computers use to perform these tasks and focus on the representation of text and numbers.

<u>Year 8</u> <u>Computing</u>	<u>Autumn</u> <u>1</u>	<u>Autumn</u> <u>2</u>
	• Unit 1	• Unit 2
	<u>Spring 1</u>	<u>Spring 2</u>
	• Unit 3	• Unit 4
	<u>Summer</u> <u>1</u>	<u>Summer</u> <u>2</u>
	• Unit 6	• Unit 6

Year 9 Computing

Unit 1 – Cybersecurity

This unit takes learners on a journey of discovery of techniques that cybercriminals use to steal data, disrupt systems, and infiltrate networks. The learners will start by considering the value their data holds and what organisations might use it for. They will then learn about social engineering and other common cybercrimes, and finally look at methods to protect against these attacks.

Unit 2 – Data science

In this unit, learners will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. Learners will be exposed to both global and local data sets and gain an understanding of how visualising data can help with the process of identifying patterns and trends.

Unit 3 – Media – Animations

Films, television, computer games, advertising, and architecture have been revolutionised by computer-based 3D modelling and animation. In this unit learners will discover how professionals create 3D animations using the industry-standard software package, Blender. By completing this unit learners will gain a greater understanding of how this important creative field is used to make the media products that we consume. Sessions will take learners through the basics of modelling, texturing, and animating; outputs will include 3D models and short videos. <https://www.blender.org/>

Unit 4 – Physical computing (constrained by time, this unit is not currently delivered)

This unit applies and enhances the learners' programming skills in a new engaging context: physical computing, using the BBC micro:bit. In the first half of the unit, learners will get acquainted with the host of components built into the micro:bit, and write simple programs that use these components to interact with the physical world. In the process, they will refresh their Python programming skills and encounter a range of programming patterns that arise frequently in physical computing applications. In the second half, learners will work in pairs to build a physical computing project. They will be required to select and design their project purposefully, apply what they have learnt by building a prototype, and keep a structured diary throughout the process. The Year 8 and 9 programming units are prerequisites for this unit. It is assumed that learners are already able to write Python programs that use variables and data structures to keep track of information. They are also expected to be able to combine sequence, selection, iteration, and function/method calls to control the flow of program execution.

Unit 5 – Python programming with sequences of data

This unit introduces learners to how data can be represented and processed in sequences, such as lists and strings. The lessons cover a spectrum of operations on sequences of data, that range from accessing an individual element to manipulating the entire sequence. Great care has been taken so that the selection of problems used in the programming tasks are realistic and engaging: learners will process solar system planets, book texts, capital cities, leaked passwords, word dictionaries, ECG data, and more. A range of pedagogical tools are employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples. The Year 7 and 8 Programming units are prerequisites for this unit. It is assumed that learners are already able to write Python programs that display messages, receive keyboard input, use simple arithmetic expressions, and control the flow of program execution through selection and iteration structures.

Unit 6 – Representations – going audiovisual

In this unit, learners will focus on making digital media such as images and sounds, and discover how media is stored as binary code. You will draw on familiar examples of composing images out of individual elements, mix elementary colours to produce new ones, take samples of analogue signals to illustrate these ideas, and then bring all these things together to form one coherent narrative. The unit has a significant practical aspect; you will use design software (GIMP and Audacity in this case) to manipulate images and sounds. This will help you to understand how the underlying principles of digital representations are applied in real settings.

<u>Year 9</u> <u>Computing</u>	<u>Autumn</u> <u>1</u>	<u>Autumn</u> <u>2</u>
	• Unit 1	• Unit 2
	<u>Spring 1</u>	<u>Spring 2</u>
	• Unit 3	• Unit 5
	<u>Summer</u> <u>1</u>	<u>Summer</u> <u>2</u>
	• Unit 6	• Unit 6