



KS3 COMPUTER SCIENCE

NEXT STEPS

Unit 5: Data science

In this unit pupils will discover how to use data to investigate problems and make changes to the world around them. Pupils 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 6: 3D animation

This unit introduces learners to 3D animations using industry-standard software. They will gain a greater understanding of how 3D animation is used to make the media products that we consume. They will explore the basics of modelling, texturing, animating to create 3D models.

Unit 3: Foundation of AI

Pupils will explore different ways to collect data, focusing on questionnaires and surveys. They will learn the importance of presenting data clearly using graphs and charts for effective analysis. As part of the unit, pupils will also design a professional-quality magazine cover, considering both purpose and target audience.

Unit 4: Cyber Security

This unit takes learners on a journey of discovery of techniques that cybercriminals use to steal data, disrupt systems, and infiltrate networks. The pupils 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: Representations – going audiovisual

In this unit, pupils 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.

Unit 1: Python Advanced

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.

YEAR 9

Unit 4: Mobile app

This unit takes pupils from designer to developer to create their own mobile app. Using App Lab from code.org, learners will familiarise themselves with the coding environment and have an opportunity to build on the programming concepts they used in previous units to undertake a project.

Unit 5: Data Modelling

Develop and model data within a spreadsheet. Pupils will progress from using basic formulas to using inbuilt functions they will apply sorting and searching techniques to data and explore how conditional formatting can be used to present data effectively.

Unit 6 – Developing for the web

In this unit pupils will gain an understanding of how websites are displayed within a browser using HTML and CSS. Starting with an introduction to how websites are requested and delivered to our computer via the internet and the World Wide Web.

Unit 3: Intro to Python

An introduction to Python, a powerful but easy-to-use high-level programming language. The focus is on getting pupils to understand the process of developing programs, the importance of writing correct syntax, being able to formulate algorithms for simple programs and debugging their programs.

Unit 2: Data Representation

Humans use symbols to record, process and transmit information. Introduce binary digits to you pupils as the symbol's computers use to perform these tasks and focus on the representation of text and numbers.

Unit 1: Computer systems

Understand the hardware and software components that make up computer systems. Students will also look at technology over time and see how modern-day systems compare with old technology.

YEAR 8

Unit 4: Networks

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 5: Data Modelling

Introduce pupils to the wonderful world of spreadsheets and the concept of cell referencing. Ask them to collect, analyse, and manipulate data, before turning it into graphs and charts. Data is beautiful!

Unit 6: Using media to gain support for a cause

Pupils will learn how to create digital artwork using vector graphic software. They will design a design, create and evaluate a IDMP developing key skills in digital creativity.

YEAR 7

Unit 3: Programming essentials in Scratch

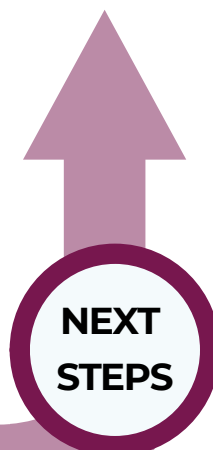
The aim of this unit is to build pupils' confidence and knowledge of the key programming constructs. The main programming concepts covered in this unit are sequencing, variables, selection, and count-controlled iteration.

Unit 2: Introduction to computer systems

This is a theoretical unit covering the necessary basic knowledge of computer components, covering; input, output and storage devices.

Unit 1: Clear messaging in digital media

This unit is designed to build upon students' experience in key stage 2. This unit has been devised as a transitional unit to allow learners to confidently move from Year 6 to Year 7. By the end of the unit, they should also be able to use the school network safely and respectfully, be able to recognise risk and provide suggestions as to how to avoid risk.



**NEXT
STEPS**



2.5 Programming Languages & IDEs

What are the characteristics of languages; high and low-level. What is the purpose of translators, compilers, interpreters? What is Little Man Computer? Tools in an IDE; editors, error diagnostics, run-time environments & translators.

2.5 End of Unit Test



Exam Practice



Exam Paper 1



Exam Paper 2



2.3 Producing Robust Programs

Why use defensive programming? Use of defensive designs. Testing to make sure it works and debugging, is that normal, boundary, invalid or erroneous? Refine it! Create code which is easy to maintain. Know the purpose of testing and types used for validation.

1.6 End of Unit Test



1.6 Ethical, Legal and Cultural Concerns

What are the issues created and addressed by technology and the impact on society including ethical, legal, cultural, environmental and privacy. Legislation, Data Protection, computer misuse, copyright and licences.



2.3 End of Unit Test



1.5 Systems Software

What are operating systems & interfaces? What is memory, peripheral, user and file management? What is utility software and why do they need encryption, defragmentation and file management & data compression?

1.5 End of Unit Test



1.4 Network Security

What forms of attack happen to computers and networks? What's malware, phishing, brute force attacks, DoS and Interception & theft. How to prevent attacks. What is an SQL injection, Firewalls, password encryption and security.

1.4 End of Unit Test



**YEAR
11**

2.2 Programming Fundamentals

Using variables, constants, operators, inputs/outputs. Sequences, selection & iteration. Arithmetic, integers, Boolean. Characters & string manipulation, data types and casting. String manipulation & file handling, open, read, write, close. Storing data in records. Using SQL to search for data. Using arrays, sub programs.

2.2 End of Unit Test



2.1 End of Unit Test



2.1 Algorithms

Using abstraction, decomposition and algorithmic thinking to define a problem. Create structure diagrams & flowcharts. How to efficiently search and sort data. Writing algorithms using Python. What are binary, bubble, merge, insertion sorts. How do I identify bugs and fixes? What are trace tables?



1.2 Memory & Storage

What is primary & secondary storage and what is the purpose of RAM and ROM, the differences between them, the advantages and disadvantages? Why do we need virtual memory? What is flash memory? What are the common types of storage? What types are used for what? What is data capacity?

What's a nibble? What is binary, denary, hexadecimal and ASCII? What is a character set? What are bitmaps, image resolution, colour depth and metadata? How can sound be sampled and stored? How does sampling rates, duration and bit depth affect the size of sound files and quality of its playback? What is compression? What is the difference between lossy and lossless compression?



2.4 Boolean Logic

Creating simple logic diagrams and truth tables. Combine Boolean and logical operators to solve problems



1.3 End of Unit Test



1.3 Computer Network Connections & Protocols

What are LANS & WANS? What factors affect the performance of networks? What does client server and peer-to-peer mean? What hardware do you use on a LAN? What is the Internet really? What is a DNS, hosting, the cloud, web server and client mean? Routers & switches. What are star and mesh network topologies? Wired or not to be wired, is that the question? What is Ethernet, Wi-Fi and Bluetooth connections and how do they work? Why is cryptography and encryption. What are private and public keys and how do they work? What's an IP and MAC address? How do I learn these TCP/IP, HTTP, HTTPS, FTP, POP, IMAP, SMTP, and what are layers?



1.2 End of Unit Test



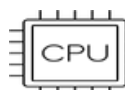
**YEAR
10**

1.1 End of Unit Test



1.1 Systems Architecture

What is the CPU? How does it function? What are the components it is made of? What are the common characteristics which affect performance? What are embedded systems? Who is Von Neumann



Introduction

Specification requirements. Mark Scheme. Course calendar. Where to find resources. Folder Setup. Workbooks. Homework calendar. Student/Teacher expectations