Subject: Computing

Curriculum Vision

Empower students with transferable ICT and computational thinking skills that help them thrive in a rapidly changing digital world, preparing them for future study, employment, and success across a range of subjects and careers.

Curriculum Intent

The Computing curriculum is designed to develop responsible, competent, confident, and creative users of technology. It enables learners to understand and apply the key principles and concepts of computer science, think critically and analytically when solving problems, and gain practical experience in writing computer programs to bring their ideas to life.

Curriculum Offer: KS3

	Year 7	Year 8	Year 9
Term 1	**Topic 1: Digital Media** This unit builds upon learners' prior knowledge and experiences from Key Stage 2. Students will utilise digital design applications such as Canva to produce a poster and presentation slides based on E-safety theme. The unit focuses on the principles of effective visual communication, including the purposeful use of text, imagery, layout, and design style, with consideration of the target audience. Learners will develop an understanding of how digital media can be used to convey clear and impactful messages.	**Topic 1: Media – Vector Graphics** This unit builds upon the Year 5 Introduction to Vector Graphics topic, which introduced learners to fundamental concepts such as working with objects, layers, and grouping. In this unit, students will further develop their understanding and practical skills in vector graphic editing software. Learners will design a range of digital graphics — from logos and icons to posters, board games, and detailed illustrations — applying principles of composition, precision, and creativity. The unit aims to strengthen	**Topic 1: Python Programming with Sequences of Data** This unit builds upon the programming knowledge and skills developed throughout Years 7 and 8. Learners will explore how data can be represented and processed through sequences, including lists and strings. They will carry out a range of operations, from accessing individual elements to manipulating entire sequences. The unit deepens learners' understanding of structured data handling and strengthens their ability to apply programming

		learners' digital design competencies while enhancing their ability to create purposeful and visually engaging media.	constructs effectively within Python.
Term 2	**Topic 2: Networks** This topic extends learners' understanding of information technology use beyond Key Stage 2 by introducing the fundamental concepts of computer networks and associated hardware. Students will explore how data is transmitted across different types of networks and identify factors that influence network performance. The unit places particular emphasis on the structure of the internet and the range of services it provides, developing learners'	**Topic 2: Layers of Computing Systems** This topic connects to the Networks units studied in previous years and provides learners with a conceptual understanding of how computing systems are structured. Students will explore the different layers that make up a computer system — from software applications and operating systems to the underlying hardware components and binary data that drive computation. The unit develops learners' understanding of	**Topic 2: Animations** This unit establishes connections between computer science principles, computational thinking, and their applications within the creative industries. Learners will gain insight into how professionals create 3D animations using *Blender*, an industry-standard software package. Through practical, project-based learning, students will develop foundational skills in 3D modelling, texturing, and animating. They will also gain an appreciation of how 3D animation

	comprehension of connectivity and communication in the digital world.	abstraction within computer systems and how the layers interact to process, store, and execute instructions efficiently.	contributes to a wide range of media products, producing outputs such as 3D models, short videos, and immersive VR experiences.
Term 3	**Topic 3: Programming Essentials in Scratch – Part I** As the introductory programming unit in Key Stage 3, this topic consolidates and extends learners' foundational understanding of programming concepts established in Key Stage 2. The unit assumes no prior programming experience but provides opportunities for progression through practical exploration. Learners will develop their knowledge of key computational constructs, including sequencing,	**Topic 3: Developing for the Web** Linking closely with the programming units taught in Years 8 and 9, this unit introduces learners to the core technologies underpinning the internet and the World Wide Web. Students will gain practical experience in writing and editing web content using HTML and CSS, understanding how web pages are structured and styled. The unit also explores how websites are indexed and retrieved through	**Topic 3: Data Science** Linked to the *Networks* unit from Year 7, this topic introduces learners to the principles and practices of data science. Students will learn how to use data to investigate real-world problems and identify opportunities for positive change. By analysing both local and global datasets, learners will develop an understanding of how data visualisation techniques can be used to identify trends, patterns, and correlations. The unit encourages critical thinking, data literacy, and

	variables, selection, and count-controlled iteration, fostering logical thinking and problem-solving skills.	search engines, providing insight into how the web is organised and navigated. Learners will apply this knowledge to design and develop simple, functional web pages.	evidence-based reasoning to inform decision-making.
Term 4	**Topic 4: Modelling Data Using Spreadsheets** Recognising the transitional stage of Year 7 learners, this unit assumes minimal prior experience with spreadsheets. It introduces the fundamental concepts of data modelling and progresses learners from basic formula use to the application of more advanced functions, such as COUNTIF statements. By the end of the unit, learners will be able to construct and manipulate spreadsheets effectively to	**Topic 4: Representations** In this unit, learners will build upon their understanding of the decimal number system to explore how information can be represented digitally. Students will be introduced to the concept of binary digits and how binary is used to represent numbers, text, and other forms of data within a computer system. Through a series of guided activities, learners will develop a conceptual and practical understanding of how digital systems encode	**Topic 4: Representations – Going Audio-Visual** Building on the Year 8-unit *Representations: From Clay to Silicon*, this unit explores how digital media such as images and sounds are represented and processed by computers. Learners will examine the binary structures that underpin these media types, gaining a deeper understanding of sampling, resolution, and data encoding. Through practical activities using design software such as *GIMP* and *Audacity*,

	model and analyse data, developing transferable digital skills applicable across the curriculum.	information. The unit links abstract theory to real-world applications, helping learners appreciate the role of binary representation in modern computing.	learners will manipulate images and sounds, applying theoretical concepts to real-world digital media tasks. The unit integrates creative design with computational understanding, reinforcing the relationship between theory and practice.
Term 5	**Topic 5: Programming Essentials in Scratch – Part II** This unit builds directly on the foundational programming knowledge developed in Programming Essentials – Part I. Learners will deepen their understanding of the core control structures — sequence, selection, and iteration — while refining their computational thinking and problem-	**Topic 5: Mobile App Development** This topic extends learners' programming knowledge from previous units and prepares them for more advanced study in Years 8 and 9. Using a block-based programming environment, students will explore key programming constructs and apply computational thinking to design, develop, and evaluate their own	**Topic 5: Introduction to Cybersecurity** This topic builds on prior learning from Digital Media and Networks in Year 7, as well as Web Development in Year 8. Learners will develop an understanding of the importance of cybersecurity in protecting data and systems. The unit examines common cyber threats, including social engineering, hacking,

	solving abilities. The topic introduces subroutines, lists, and the concept of decomposition, culminating in a larger programming project that encourages independent design, development, and evaluation.	mobile applications. Learners will plan and decompose a larger project into manageable components, establish success criteria, collect user feedback, and refine their work through iteration. The unit emphasises both technical proficiency and the design process, encouraging creativity and problem-solving.	Distributed Denial of Service (DDoS) attacks, and malware. Learners will also explore the motivations behind cybercrime and consider the value of personal data to individuals and organisations. Practical and theoretical components will equip learners with knowledge of strategies and best practices for safeguarding data and networks against potential threats.
Term 6	**Topic 6: Gaining Support for a Cause** This topic develops learners' digital literacy and understanding of information technology from Key Stage 2 by focusing on the responsible and ethical use of online information. Students will	**Topic 6: Introduction to Python Programming** Building on the Year 7 *Scratch Essentials I and II* units, this topic introduces learners to text-based programming through the Python language. The unit begins with simple programs involving input	**Topic 6: Applying Programming Skills with Physical Computing** This unit extends learners' experience of Python programming, building upon their prior understanding of variables, data structures, and control flow developed in Years 8

	examine issues relating to copyright, licensing, and the legal implications of using digital content. They will also learn to apply strategies for evaluating the reliability and credibility of online sources. Through practical application, learners will design and develop a blog to promote a chosen cause, demonstrating effective use of digital tools for communication and advocacy.	and output before progressing to the use of arithmetic operations, randomisation, selection, and iteration. Emphasis is placed on developing learners' understanding of how programs are executed and addressing common misconceptions in programming logic. By the end of the unit, learners will have gained a solid foundation in Python, preparing them for further development of their coding and problem-solving skills in future units.	and 9. Through the use of the *BBC Micro:bit*, learners will apply their coding skills in a physical computing context, creating interactive programs that respond to real-world inputs. They will become familiar with the hardware components of the Micro:bit and develop simple programs to utilise sensors, LEDs, and buttons. This hands-on approach reinforces core programming principles while introducing students to common programming patterns used in embedded systems and digital devices.

Curriculum Offer: KS4

	Year 10	Year 11
Term 1	**Computer Systems** Building on the foundational knowledge developed at Key Stage 3 in *System Architecture*, this unit provides learners with a comprehensive understanding of how computer systems function. The unit explores the key components of the Central Processing Unit (CPU) within the Von Neumann architecture, focusing on the roles of the Arithmetic Logic Unit (ALU), control unit, and registers. Learners will examine the purposes of primary memory, including RAM, ROM, cache, and virtual memory, as well as the importance of secondary storage and the comparative advantages of different storage devices in practical applications. This unit establishes the theoretical foundation for understanding how software and hardware interact within a computer system.	**Logic Gates** Building on the *Computer Systems* unit studied in Year 10, this topic introduces learners to the fundamental logic gates — AND, OR, and NOT — including their symbols, Boolean expressions, and associated truth tables. Learners will explore how logic gates are combined to perform computational operations and construct truth tables for circuits with up to three inputs. They will also learn how logical expressions can be used to describe and simplify digital circuits. This unit provides a bridge between theoretical computing principles and the physical implementation of logical operations in hardware systems.

Term 2	**Algorithms** This unit builds upon the programming skills and computational thinking concepts introduced in Year 9. Learners will develop their understanding of algorithms by exploring the design, analysis, and implementation of key search and sort algorithms, including linear search, binary search, bubble sort, and merge sort. The unit also reinforces core aspects of computational thinking such as decomposition, abstraction, and pattern recognition. Students will interpret and construct flowcharts, trace algorithms to predict outputs, and apply logical reasoning to evaluate algorithmic efficiency and performance.	**Ethical, Legal, Cultural and Environmental Issues** In this unit, learners will explore the broader impact of computer science and digital technology on individuals, organisations, and society. Through real-world examples and case studies, students will examine the ethical, legal, cultural, privacy, and environmental implications of technological developments. They will identify a range of stakeholders affected by technology and analyse how these impacts are experienced, mitigated, or adapted to within different contexts. The unit aims to develop learners' ability to consider the responsibilities of computer scientists and users, fostering informed and ethical decision-making in the use and design of digital systems.
Term 3	**Programming Techniques** This practical and theory-integrated unit extends learners' programming knowledge from Key Stage 3 and Year 9 Python studies. It aims to develop both competence and confidence in coding	**Additional Programming Techniques** This unit extends the programming knowledge and problem-solving skills developed in the Algorithms and Programming Techniques units from Year 10. Learners will consolidate and expand

	to GCSE standard. The unit covers essential programming constructs including sequence, selection, iteration, subroutines, and data handling using strings, lists, dictionaries, and external data files. Learners will apply these concepts to solve computational problems, reinforcing understanding through hands-on programming tasks. Theoretical concepts are interleaved with practice to ensure learners can make clear connections between coding principles and the underlying theory required for examination.	their understanding of core programming concepts through the introduction of additional techniques, including string manipulation, file handling, and the use of records and arrays to store data. Students will also learn to use SQL to search and manage data, implement subprograms for modular design, and apply random number generation in their programs. Key principles of defensive design and program testing are revisited to reinforce good programming practice. The unit is delivered through a combination of theoretical instruction and practical programming exercises, with a focus on GCSE exam preparation and application.
Term 4	**Cybersecurity** Building on the Year 9 *Cybersecurity* unit, this topic enhances learners' awareness of the threats, vulnerabilities, and countermeasures associated with digital systems. Students will define key terms such as *cybersecurity* and *network security* before examining various types of cyberattacks. The unit distinguishes between non-automated attacks, such as social engineering (including blagging,	**Exam Preparation** This unit focuses on consolidating and refining learners' understanding of key concepts across the GCSE Computer Science curriculum. Students will revisit core topics from both Year 10 and Year 11, reinforcing their theoretical knowledge and practical programming skills. Emphasis will be placed on mastering fundamental principles, addressing areas of misconception, and strengthening exam

	phishing, and pharming), and automated attacks, such as Denial-of-Service (DoS) and SQL injection. Learners will also explore methods for protecting systems and individuals from cyber threats, gaining an understanding of how cybersecurity principles underpin personal, organisational, and national safety in an increasingly connected world.	technique. Through a combination of targeted revision sessions, practice questions, and past paper analysis, learners will develop confidence in applying their knowledge effectively under exam conditions. The unit aims to equip students with the strategies and resilience required to maximise their performance in both components of the final GCSE examination.
Term 5	**Topic 5: Computer Networks** This unit builds on learners' prior understanding from *Cybersecurity* and Year 9 *Networks* units. It introduces key concepts relating to how computer systems communicate across networks. Learners will study the structure and function of the Internet, including IP addressing, packet switching, and Domain Name System (DNS) services. The unit also covers network topologies, Ethernet protocols, and the principles of virtual networking. Further exploration includes wireless networking, frequencies, and encryption techniques. Through practical and theoretical activities,	**Exam Preparation** This unit focuses on consolidating and refining learners' understanding of key concepts across the GCSE Computer Science curriculum. Students will revisit core topics from both Year 10 and Year 11, reinforcing their theoretical knowledge and practical programming skills. Emphasis will be placed on mastering fundamental principles, addressing areas of misconception, and strengthening exam technique. Through a combination of targeted revision sessions, practice questions, and past paper analysis, learners will develop confidence in applying their knowledge effectively under exam

	learners will develop a detailed understanding of how networks operate and how data is transmitted securely across them.	conditions. The unit aims to equip students with the strategies and resilience required to maximise their performance in both components of the final GCSE examination
Term 6	**Topic 6: Data Representation** This unit builds upon foundational knowledge introduced in *Computer Systems* and explores how data of different types is represented and processed within digital systems. Learners will investigate how numbers, text, images, and sound are encoded using binary, and how characteristics such as bit depth, resolution, and sample rate affect quality and file size. The unit also introduces methods of data compression, focusing on lossless techniques such as Run-Length Encoding (RLE) and Huffman Coding. Through practical examples and problem-solving activities, learners will develop an appreciation of how binary representation underpins all forms of digital media and information processing.	

Curriculum Offer: KS5 (Sixth Form)

Component	Year 12 / 13
Paper 1: Computer Systems	Paper 1 covers the core principles of computer systems, including processor architecture, the Fetch-Decode-Execute cycle, and factors affecting CPU performance. Students explore different processor types, input/output and storage devices, and the role of systems software such as operating systems, memory management, and device drivers. The unit also addresses software development methodologies, programming paradigms including procedural, assembly, and object-oriented programming, and detailed data representation techniques. Key topics include data structures, Boolean algebra, logic gates, and relevant computer legislation, alongside ethical, legal, cultural, and environmental impacts of technology.
Paper 2: Algorithms and Programming	Paper 2 focuses on algorithms and advanced programming concepts. Students study searching and sorting algorithms, computational thinking, and algorithm efficiency. Programming techniques such as file handling, SQL, and defensive programming are developed. The paper includes relational databases, normalization, transaction processing, and SQL queries. Networking topics cover protocols, internet structure, security, and encryption. Web technologies including HTML, CSS, and JavaScript are examined. Finally, students learn data compression, encryption, hashing, and their applications, preparing them for practical and theoretical challenges in computing.
Component 3: Non-Exam Assessment (NEA)	The NEA is a practical programming project where students apply their knowledge to design, develop, test, and evaluate a solution to a real-world problem. This coursework component assesses students' ability to manage the full software development lifecycle independently, demonstrating their programming proficiency, computational thinking, and problem-solving skills in a controlled, extended project.

Careers

The Computer Science course develops essential skills for careers in software development, data science, cybersecurity, network engineering, and IT consultancy. Students build practical programming and problem-solving abilities, with A Level learners deepening their experience through the NEA project. Employer engagement and work experience opportunities enhance learning by offering real-world insights and professional exposure, helping students explore career pathways and build valuable connections within the technology sector.