Computing KS3 Curriculum Overview

By the end of KS3, students should:

KNOW	Students to create, communicate and solve problems using technology. This can be achieved by students knowing, remembering, and then applying rich knowledge across the three pillars of computing: Computer Science, Information Technology and Digital Literacy. The knowledge and skills embedded into the curriculum allows students to innovate, gain confidence and build strategies for creativity and problem solving, enabling them to communicate effectively in a digital world.
DO	Students to become competent in their use of computing topics within the pillars of digital literacy, computer science and information technology.
APPRECIATE	Students to appreciate the wider area of ICT and the ever changing effect ICT can have on daily life and the wider world.

Curriculum Coverage:

	Topic	*Sub Topic*	*Coverage*	
Year 7	**Introduction to Networks**	Logging into the system	• Logging on to the school system • Using TEAMS, SharePoint and Citrix	• Sending emails • Common health and safety problems associated with computer use.
		Hardware and software	• Difference between hardware and software • Difference between inputs and outputs	• Memory and storage
		Networks	• What a network is • Why networks are used	• Advantages and disadvantages of using a network
	Online safety	Introduction to online safety	• Safety concerns about being online	• Making a positive online reputation
		Online Reputation	• Digital footprints	
		Credibility and fake news	• Checking digital content for creditability/ trustworthiness	• Techniques to check if a source is trustworthy
		Right to privacy and The Bubble	• Legal rights to privacy within the UK	• Phenomenon of the filter bubble
	Modelling	What is a spreadsheet?	• What a spreadsheet is used for	• Features of a spreadsheet
		How to use basic formulas	• Using SUM, MAX, MIN and AVERAGE	
		How to create graphs	• Creating simple bar, line and pie charts	• Using appropriate titles, axis names and legends
		How to sort and filter	• Sort data in ascending and descending order	• Filter data for a specific scenario
	Computational Thinking	What is logical thinking?	• Use and understand the logic gates AND, OR and NOT	
		What is algorithmic thinking?	• Define algorithms	• Understand when sequence, selection and iteration are used
		What is abstraction, decomposition and pattern-recognition?	• Understand the key computational terms and how these are applied	
	Scratch	What is logic and sequencing in programming?	• Use script blocks to create a sequence	
		How is selection used to write programs?	• Use control section in Scratch to create an ‘if’ scenario	• Know how to ‘debug’
		How is iteration used to write programs?	• Use a variety of loops in Scratch	

Curriculum Coverage continued:

	Topic	Sub Topic	Coverage
Year 8	**Cyber Security**	You and your data	• Difference between data and information
		Social Engineering methods	• Shouldering • Phishing • Blagging • Name generator attack
		What are script Kiddies?	• Hacking • Other methods to disrupt networks, e.g. DDOS
		Different types of malware	• Virus • Worms • Trojan • Adware • Spyware • Ransomware
	Binary and Data Representation	Different units of information	• Bit • Nibble • Byte • Kilobyte • Megabyte • Gigabyte
		Difference between Binary and Decimal	• Base2 • Base10
		Converting Binary into Decimal and vice versa	• Methods to convert Base2 to Base10 • Methods to convert Base10 to Base2
		Addition in Binary	• Learn the patterns in binary to add 3 binary numbers together
	Graphics	Difference between a bitmap and Vector	• Bitmaps made up of pixels • Vectors made up of lines and shapes
		Calculate the representation of an image size	• Formula to calculate image size and colour depth
		Manipulating Digital Images	• Use different tools to manipulate images in graphic software
	Python	Write a simple programs to display a message	• Use the print function • Assign variables
		Use a relational operators to form logical expressions	• Use if and elif statements to make a selection
		How iteration controls the flow of a program execution	• Use for and while loops
	Developing the Web	Fundamental design principles	• Design principles like hierarchy, balance, contrast and white space
		User experience design	• How users interact with their website • Making sure it's intuitive and enjoyable to use
		Content Creation	• Create high-quality content for their website: text, images and videos

Curriculum Coverage continued:

	Topic	Sub Topic	Coverage
Year 9	**Algorithms**	What is a flow chart and how are they constructed?	• Symbols that make up a flowchart
		Explain how data can be sorted	• Merge • Bubble sort
		Explain how data can be searched	• Binary search • Linear search
	Python	Counted Loops with Python Turtle	• Use repetition to make programs more efficient
		Using procedures with Python Turtle	• Define and call functions (subroutines)
		Using random with Python Turtle	• Use inbuilt functions within Python to call upon a random item
	Modelling	How to use advanced functions	• V-look up • Counta • Count • What if
		Be able to set up macro and links	• Create a macro to do an automated task, such as print
		Create Pivot Charts	• Advanced chart creation
	Database	Understand key terms and the use of databases	• Fields • Primary keys • Records
		Be able to set up a relational database	• Use of relational databases • Purpose of a foreign key
		Set up queries	• Use inbuilt features to create queries for a given scenario
	AI	What is AI?	• Purpose of AI • Use of AI
		Ethics of AI	• Consider some simple ethical hypothetical problems
		Turing tests and chatbots	• How intelligence can be measured in humans and computers

The Wider KS3 Curriculum:

Competitions: Typing challenges

Homework expectations: Homework is set every other week using quizzes and keyword activities which will allow students time to consolidate skills and knowledge they have already covered in detail in lessons and so boosting the impact on their long term memory.

IT KS4 Curriculum Overview

By the end of KS4, students should:

KNOW	Students have that knowledge that underpins effective use of skills, process and attitudes in the IT sector such as how different user interfaces meet user needs, how organisations collect and use data to make decisions, virtual workplaces, cyber security and legal and ethical issues.
DO	Students to continue to develop an understanding of the 3 pillars of ICT allowing them to use software application effectively as well as understand the use of ICT in society.
APPRECIATE	Appreciate the impacts of digital technology to the individual and to wider society.

Curriculum Coverage:

	Topic	*Sub Topic*	*Coverage*	
Year 10	**Planning, creating and manipulating and storing images**	Planning and designing an image	• Analyse requirements to a specified client brief and identify client success • Plan design (sketches and layouts) with annotations	• Identify and select image source and identify key qualities of images and limitations of editing • Identify any copyright or intellectual property rights and reference source
		Creating and modifying an image using appropriate tools and techniques	• Compare file formats and fitness for purpose • Import, create and modify images uses standard and advanced tools	• Select software according to image type, along with properties and canvas size based on output requirements
		Storing the image appropriately and outputting the final image in a format that is fit for purpose	• Store images using version control and appropriate file type • Output the final version in an optimised format	• Test the file types electronically and digitally for fitness for purpose • Evaluate final product against success criteria, identifying possible improvements
	Planning, creating, modifying and using databases	Planning, creating, modifying and using databases	• Analyse requirements to a specified client brief and identify client success • Identify the entities within a specified brief and design	• Give detailed justification for field types used and choice of validation rules applied to the field types
		Creating and modifying a database	• Create and add tables with appropriate fields, primary key, data types and effective validation rules and error messages • Add, edit and delete records	• Link the tables using key fields and relationships and import the data from a given CSV file • Check and test the database to ensure it is error free and functions correctly
		Interrogating a database	• Create select queries, using a query builder including single table/single criteria; multiple tables/multiple criteria; wildcard; parameter, calculations	• Produce reports from queries, with at least one report showing customisation for fitness of purpose
		Creating user interfaces	• Create effective data entry forms that simplify data entry and navigation, include relevant fields and accept data and validation	• Enhance layout of the form to include an image for business purposes • Add features and controls that make the system user friendly and allow the user to navigate records, forms, queries and reports easily, visual basic (VB) and/or macro.
		Testing and evaluative a database	• Provide a test plan and select a range of test data including valid, extreme and erroneous data • Give detailed reasons for all testing methods	• Give evidence for the testing carried out to test plan including evidence of test pass/fail • Evaluate the testing successes and failures and identify improvements.
	Planning, creating, modifying and using spreadsheets	Planning and designing a spreadsheet	• Analyse requirements to a specified client brief and identify client success	• Design a spreadsheet structure including worksheets, navigation, formulae, tools and techniques to be applied.
		Creating and formatting a spreadsheet	• Import data from a CSV. File and enhance the layout and the format • Create a navigation menu and define a print area	• Facilitate data entry through use of form controls, e.g., buttons, check box, drop-down lists, combo boxes, spinners, scroll bar
		Use of appropriate data formatting and adding suitable validation rules	• Use data formatting, conditional formatting and the date/time function • Use validation checks and messages	• Facilitate data entry through use of validation form controls, e.g., drop-down lists, combo boxes, spinners, scroll ball
		Use of appropriate formulae and functions to meet set outcomes	• Use formulas with single operators and brackets to prioritise • Use complex functions such as IF and VLOOKUP along with macros to link native function	• Use simple functions, such as SUM, COUNTA etc along with relative and absolute cell referencing
		Arranging, reducing and outputting data to help make decisions	• Use sorting on single and multiple items • Use filters	• Create a chart/graph with appropriate title legend axis labels and formatting
		Modifying data and formulae to model 'what if' scenarios	• Use ‘what if’ investigations to change data and formula	
		Testing and evaluating spreadsheets	• Provide a test plan and select a range of test data including valid, extreme and erroneous data • Evaluate the testing successes and failures and identify improvements and suggest how to implement them	• Use a test table, based on the success criteria, giving detailed reasons for test methods and evidence of testing being carried out

Curriculum Coverage continued:

	Topic	Sub Topic	Coverage	
Year 10	Planning, creating and modifying an automated document	Planning and designing an automated document	• Analyse requirements to a specified client brief and identify client success	• Design a standard document including location of place holders, formatting and features to be used.
		Creating an effectively structured data source and linking this to a standard document	• Create a standard and a source document • Create appropriately divided fields with data	• Create a link between the data source and standard document
		Appropriately structuring the content of the standard document and inserting fields as required	• Insert appropriate fields: address line; subject; salutation/valediction; personalised content within document • Check accuracy: spelling; grammar; proofread	• Add appropriate formatting and features: letterhead; watermark; autodate; alignment; set line spacing; justification; indexing; automatic fields; bullets; appropriate layout.
		Merging and outputting final documents	• Complete the merge and check accuracy • Check formatting following insertion of merged data	• Output merged documents • Evaluate the document and identify improvements.
	Complete NEA			
Year 11	How IT can be used to fulfil the needs of organisations and individuals	Functionality of different hardware devices	• Computing, input, output and storage devices	• Basic components and ports
		Functionality of different software	• System, Application and Utility software • Specialist and information handling software	• Open source and communication software
		Services provided by IT	• How each service improves efficiency/productivity for businesses and/or individual users	
	How data and information is used and transferred	Why data must be fit for purpose	• The difference between data and information and the need for good quality data • Benefits of encoding data and the reasons for doing it	• Improvements in speed of access and increased storage along with the advantages and disadvantages of using information and communication technology for storing data • File types, data compression and file properties
		How input data is checked for errors	• Methods of data capture with methods of validation and verification	• Possible sources of error and techniques to overcome errors
		How data transfers over different types of network	• Difference between LANs and WANs and the purpose of protocols • Network operations and topologies • Devices within a network and how data is transferred	• Threats to data transfer • Cloud computing Vs on house servers and emerging technologies
		Different types of connectivity	• Connection methods, along with Short, medium and long range wireless connections	• Ethernet, USB, micro USB and USB C and other emerging technologies
	Legal, moral, ethical, cultural and environmental impacts of IT and the need for cybersecurity	Risks to information held on computers	• Accidental damage and unintended disclosure • Malicious software and hacking	• Social engineering and emerging threats
		The impact of data loss, theft or manipulation on individuals and businesses	• Financial, Moral and Legal implications and data manipulations	• Loss of service, intellectual property and reputation
		Methods used to protect information	• Logical and physical protection	• Security policies and emerging technologies
		How moral and ethical issues affect computer users	• Privacy, security and cookies and data collection	• Monitoring individuals and the impact of data loss or damage
		How legal issues protect computer users	• Acts and legislation created to legally protect users, eg GDPR and Computer Misuse Act	
		The cultural, personal and environmental impact of ICT	• Changes in working practices to help employees and the environment	
		How a digital footprint can impact computer users	• Digital footprint – passive and active and posts on social media • Online theft and identity theft	• The risks of inappropriate images

The Wider KS4 IT Curriculum:

Homework expectations - Weekly retrieval quiz on SMHW and past paper questions. Students are encouraged to attend after school sessions to improve their coursework.

Computing KS4 Curriculum Overview

By the end of KS4, students should:

KNOW	Students have that knowledge that underpins effective use of skills, process and attitudes in the IT sector such as how different user interfaces meet user needs, how organisations collect and use data to make decisions, virtual workplaces, cyber security and legal and ethical issues.
DO	Students to continue to develop an understanding of the 3 pillars of ICT allowing them to use software application effectively as well as being able to program using Python.
APPRECIATE	Appreciate the impacts of digital technology to the individual and to wider society.

Curriculum Coverage:

	Topic	*Sub Topic*	*Coverage*	
Year 10	**Computing Concepts**	Fundamentals of data representation	• Number bases • Converting between number bases • Units of information • Binary arithmetic	• Character encoding • Representing images • Representing sound • Data compression
		Computer systems	• Hardware and software • Boolean Logic • Software classification	• Classification of programming languages and translators • Systems architecture
	Computational thinking and Programming Skills	Fundamentals of algorithms	• Representing algorithms	
		Programming	• Inputs and outputs	
	Computing Concepts	Fundamentals of computer networks	• The purpose of different types of networks	• Network security
		Cyber security	• Fundamentals of cyber security • Cyber security threats	• Methods to detect and prevent cyber security threats
Year 11	**Computer Concepts**	Ethical, legal and environmental impacts on digital technology on wider society, including issues of privacy	• Explain current ethical, legal and environmental impacts and risks of digital security	• Considering privacy issues
		Relational databases and structured query language	• Relational databases	• Structured query language
	Computational Thinking and Programming Skills	Fundamentals of Algorithms Programming	• Efficiency of algorithms • Searching algorithms • Sorting algorithms • Data types • Programming concepts • Arithmetic operations in a programming language • Relational operations in a programming language	• Boolean operations in a programming language • Data structures • String handling operations in a programming language • Random number generation in a programming language • Structured programming and sub routines • Robust and secure programming

The Wider KS4 Computing Curriculum:

Homework expectations - Homework expectations - Weekly retrieval quiz on SMHW and past paper questions.

IT KS5 Curriculum Overview

By the end of KS5, students should:

KNOW	Students to extend their knowledge on effective use of skills, process and attitudes in the IT sector such as how different user interfaces meet user needs, how organisations collect and use data to make decisions, virtual workplaces, cyber security and legal and ethical issues.
DO	Develop an understanding of the 3 pillars of ICT allowing them to use software application effectively as well as understand the use of ICT in society. Create IT projects in line with the current developments within the wider society.
APPRECIATE	Appreciate the impacts of digital technology to the individual and to wider society.

Curriculum Coverage:

	Topic	*Sub Topic*	*Coverage*	
Year 12	**Fundamentals of IT**	Understand computer hardware and software	• Computer hardware and components • Types of computer systems and connectivity methods • Communications hardware and trouble shooting • Units of measurement, number systems and conversions	• Types of software's, application software, utility software and operating systems • Communication methods and software trouble shooting • Protocols
		Understand business IT systems	• Types of servers • Virtualisation • Network characteristics	• Connectivity methods • Business systems
		Understand employability and communication skills used in an IT environment	• Communication skills and technology • Personal attributes, ready to work and job roles	• Professional bodies and industry certification
		Understand ethical and operational issues and threats to computer systems	• Ethical and operational skills • Threats	• Physical and Digital security • Safe disposal of data and computer equipment
	Global Information	Understand where information is held globally and how it is transmitted	• The holders of information • Types of information storage media • The internet	• World Wide Web Technologies • Information Formats along with advantages and disadvantages
		Understand the styles, classification and the management of global information	• Information styles and their uses • Information classification	• Quality of information and information management
		Understand the use of global information and the benefits to individuals and organisations	• Data versus information • Categories of information used by individuals and organisations	• Stages of data analysis and data analysis tools • Information system structure
		Understand the legal and regulatory framework governing the storage and use of global information	• UK legislation and regulation relating to the storage and use of information	• Global information protection legislation and regulation • Green IT
		Understand the process flow of information and the principles of security	• Information sources and data types • Data flow diagrams (DFDs) • Principles of information security	• Risks and Impacts • Protection methods including physical and logical protection
	Internet of Everything [Internal Assessment]	Understand what is meant by the Internet of Everything (IoE)	• What are Things? • Where the IoE is used and the applications of the use of IOE • Global Impacts	• The four pillars of the IoE • Connectivity and network connections • Security Issues
		Be able to repurpose technologies to extend the scope of the IoE	• Developments of the IOE	• Feasibility study

Curriculum Coverage continued:

	Topic	Sub Topic	Coverage	
Year 13	**Internet of Everything [Internal Assessment]**	Be able to present concept ideas for repurposed developments	• Business proposal • Pitch and feedback	• Stakeholders' considerations • Revision of proposal and possible success criteria
	Virtual and Augmented Reality [Internal Assessment]	Understand virtual and augmented reality and how they may be used	• Pioneers and uses of virtual and augmented reality • Areas of use of AR and VR	• Possible impacts of AR and VR
		Be able to design virtual and augmented reality resources	• Technologies needed to create an AR or VR product (hardware and software)	• Design the AR/VR product – aims, finance, quality, audience nature, content and hardware and software requirements
		Be able to create a virtual or augmented reality resource	• Develop, Test and Evaluate the AR/VR product	
		Be able to predict future applications for virtual and augmented reality	• Possible future developments of AR and VR and how they can be repurposed	
	Social Media and Digital Marketing [Internal Assessment]	Understand digital marketing	• The role of marketing within business • Digital Marketing and the tools	• Digital Marketing life cycles
		Understand the use of social media in a business	• Different types of research • Data as a resource and the use of data • Communication between staff and customers	• Legislation and business policy and practice • Ethical and moral issues
		Be able to plan content and propose appropriate social media channels for digital marketing campaigns	• Different social media channels • Potential outcomes and restrictions	• Target audience
		Be able to develop social media digital marketing campaigns	• Features of a social media marketing campaign • Campaign considerations	• Effectiveness of digital marketing campaigns • Recommend improvements to business processes to support digital marketing campaigns

The Wider KS5 Curriculum:

Homework expectations - Weekly retrieval quiz on SMHW and past papers in Year 12 and coursework tasks in Year 13.