COMPUTER SCIENCE Year 11 Curriculum End Points and Key Vocabulary

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Unit of Work	• CT: Problem Solving with Programming AT1 Principles: Hardware 2 and Networks 2	• CT: Problem Solving with Programming AT2 Principles: Issues & Impact 1 and Programming Languages	• CT: Problem Solving with Programming SpT1 • Principles: Data 3	• CT: Problem Solving with Programming SpT2 Principles: Issues & Impacts 2	Revision	
Ethos Links	**STEM** - problem solving, programming, making links & applying knowledge, what IoT is, what embedded systems are, how data is routed around the internet, protocols **Character** - risk-taking, resilience, perseverance & learning from mistakes, critical thinking, reasoning & making judgements, researching, analysis & evaluation	**STEM** - problem solving, programming, making links & applying knowledge **Character** - risk-taking, resilience, perseverance & learning from mistakes, critical thinking, reasoning & making judgements, researching, analysis & evaluation **Sustainability** - impact of technology on environment, amount of energy being generated by technology	**STEM** - problem solving, programming, making links & applying knowledge, how bitmap images are represented, how sound is represented, constructing expressions to calculate the size of bitmap and sound files, compression of data **Character** - risk-taking, resilience, perseverance & learning from mistakes, critical thinking, reasoning & making judgements	**STEM** - problem solving, programming, making links & applying knowledge, laws associated with the use of technology, AI and robotics, privacy, keeping data safe **Character** - risk-taking, resilience, perseverance & learning from mistakes, critical thinking, reasoning & making judgements, researching, analysis & evaluation	**STEM –** problem solving, making links & applying knowledge **Character –** Critical Thinking, reasoning & making judgements, analysis & evaluation	
Learning End Points	• **CT: Problem Solving with Programming AT1** • By the end of this unit students will know and understand: • The terms: ○ 'procedure' ○ 'function' ○ 'parameter'	• **CT: Problem Solving with Programming AT2** • By the end of this unit students will know and understand: • Describe the characteristics of a bubble sort • Describe the characteristics of a binary search • **Principles: Issues & Impact 1 and**	• **CT: Problem Solving with Programming SpT1** • By the end of this unit students will know and understand: • Define the terms valid, erroneous, boundary (extreme) data • Understand the characteristics of one-dimensional data structures • Discuss efficiency considerations for one-dimensional structures	• **CT: Problem Solving with Programming SpT2** • By the end of this unit students will know and understand: • The characteristics of two-dimensional structures (record/entity/row, column/field, mixed types)	• **Revision** • By the end of this unit students will know and understand: • The structure of the Exams • How to answer theory questions	

	'return value' 'local variable' 'global variable' - When to use Local and Global variables **Principles: Hardware 2 and Networks 2** - By the end of this unit students will know and understand: - Define what is meant by the term 'embedded system', 'Internet of Things' (IoT) - How an embedded system differs from a general-purpose computer - Applications of embedded systems - The role of embedded systems in the IoT - Security and privacy issues	**Programming Languages** - By the end of this unit students will know and understand: - The environmental impact of the manufacture of digital technology - Ways in which the environmental impact can be reduced - How the energy consumed by digital devices harms the environment - How energy consumption can be reduced - Define what is meant by the term 'e-waste', 'low-level language', 'high-level language', 'compiler', 'interpreter' and 'intellectual property' - Environmental issues associated with the disposal of digital technology - How responsible recycling can reduce the environmental impact of digital technology - How the short replacement cycle of mobile phones and	**Principles: Data 3** - By the end of this unit students will know and understand: - How bitmap images are represented in binary - Define what is meant by the terms 'bitmap', 'pixel', 'resolution', 'colour depth', 'amplitude', 'sample rate', 'bit depth' and 'sample interval' - How the number of available bits impacts on the accuracy of the representation and why there is always a trade-off between resolution and storage space/bandwidth. - The process of converting analogue sound into binary data. - Why an analogue sound is never fully reproducible in binary - Factors that affect the fidelity of the digital representation - Reasons for wanting to reduce file sizes (storage, streaming) - How compression affects file sizes	- Define the terms local and global in terms of variables - Define the terms function, procedure, parameters, return value **Principles: Issues & Impacts 2** - By the end of this unit students will know and understand: - Define the meaning of the terms 'AI', 'machine learning', 'robotics', 'algorithmic bias', 'digital footprint', 'identity theft' and 'data misuse' - Applications of these AI, machine learning and robotics - Ethical issues associated with the use of AI, machine learning and robotics	- How to answer programming questions - Key points from units covered over the course	

	associated with the IoT • Why power is an important consideration for many IoT devices • How packet switching is used to transmit data between devices on the internet • The purpose of an IP address • The role of routers • How the TCP/IP stack enables different types of devices attached to different networks to communicate with each other across the internet • What each layer of the stack does • What each protocol does •	other digital devices impacts on the environment • Why each processor has its own unique instruction set • How writing a program in a low-level language differs from writing one in a high-level language • The need for program translators • The advantages/disadvantages of each approach • Possible consequences of IP theft • How copyright, patents and trademarks help to protect IP •	• The difference between lossless and lossy compression • The advantages/disadvantages of each type of compression •	• Safety and accountability issues associated with the use AI, machine learning and robotics • The benefits and drawbacks of AI, machine learning and robotics and recommend how they should be regulated • How and why organisations collect personal data • Benefits and drawbacks of sharing personal data with other people and organisations. • Privacy concerns associated with the collection and use of personal data • Why it is difficult to attribute ownership of personal data to a specific individual • The rights of data subjects and the obligations of		

				organisations laid down in the UK Data Protection Act		
Key Vocabulary	CT: Problem Solving with Programming AT1 Algorithms Develop Code Constructs Data Types Operators Subprograms Principles: Hardware 2 and Networks 2 Hardware 2 Networks 2	CT: Problem Solving with Programming AT2 Algorithms Types of Errors Searching & Sorting Decomposition & Abstraction Input & Output Principles: Issues & Impact 1 and Programming Languages Issues & Impacts Programming Languages	CT: Problem Solving with Programming SpT1 Algorithms Data Types Types of Errors Decomposition & Abstraction Input & Output Subprograms Principles: Data 3 Data 3	CT: Problem Solving with Programming SpT2 Algorithms Decomposition & Abstraction Input & Output Subprograms Develop Code Principles: Issues & Impacts 2 Issues & Impacts	Revision Exam Keywords	