Subject	Computer Science	Year Group	11					
	Unit 1 Comp. Thinking	Unit 1 Principles of Comp.	Unit 2 Comp. Thinking	Unit 2 Principles of Comp.	Unit 3 Comp. Thinking	Unit 3 Principles of Comp.	Unit 4 Comp. Thinking	Unit 4 Principles of Comp.
Scheme title	**Problem Solving**	**Protocols**	**Popular Algorithms**	**Impact and development of ICT**	**Tracing Code and Data Structures**	**Sound and Images**	**Solving Complex Problems**	**AI, Machine Learning and Data**
Knowledge in sequence	How do we use subprograms when writing programs? What are local/global variables and when should they be used? What are the math/time library modules and when could they be used?	What are Embedded Systems? What is the Internet of Things and how has consumer electronics changed in recent years? How does the Internet work and what is packet switching? What are protocols and how does TCP/IP work?	How do I write trace tables? What types of errors might you see when programming? What is a bubble sort and why do we need to sort data? What is a binary search and how is it different to a linear search? How do I write programs that involve a variety of programming techniques?	What are the environmental issues asssociated with IT? Why do we have low level and high level languages? How does code get translated from high level to low level? What is intellectual property and how is it protected?	How should I test code? How do we program using data structures? How do I complete a trace table for program with data structures? How do I find and fix errors in code?	How are bitmaps represented in binary? How is sound represented in binary? How do we work out file sizes for sound and images? How do we reduce file sizes (compression)?	How do you solve problems using two-dimensional data structures? How do you write effecient code using subprograms?	How do our own biases impact the programs we write? What is a digital footprint? What are the privacy concerns associated with the collection of data? What laws keep our data protected?
Purpose of scheme	Practise using sequence, selection and looping. Practise using seperation of concerns Introduced to local and global variables	To explore how the Internet 'works' To understand why protocols are important and needed.	To practise tracing code. To decribe the characterisitcs of popular algorithms To practise writing Python programs that involves a variety of techniques	To explore the environmental issues caused by technology. To explore why high level languages were developed and the need for translators. To understand the term 'intellectual property' and the rights and issues related to it.	To be able to design test tables with suitable test data. To practise reverse transversing a 1D data structure. To practise tracing code. To predict output, locate erros and fix errors.	To explore how sound and images are represented in binary. To practise contructing expressions to work out the file size of images and sound. To explore how compression tools can be used to make file sizes smaller.	To practise writing Python programs that use 2D data strucutures and subprograms. To practise writing Python programs that can read/write text files.	To explore what is meant by algorithmic bias. To explore how organisations collect personal data. To explore the privacy concerns related to the collection of data. To explore the laws associated with data collection.
Skills	Writing effecient programs using decomposition. Create suitable functions and procedures. Import and use module libraries.	Knowledge recall. Evaluation skills.	Constructing trace tables. Decomposition and abstraction. Writing programs using loops and subprograms.	Knowledge recall. Evaluation skills.	Constructing trace tables. Decomposition and abstraction. Writing programs using loops and subprograms.	Knowledge recall. Evaluation skills. Expression construction.	Writing effecient programs using decomposition. Create suitable functions and procedures. Import and use module libraries.	Knowledge recall. Evaluation skills.
Key words	Local, global, function, procedure, library module	Embedded system, packet, packet switching, protocol.	Trace tables, bubble sort, binary search, linear search, algorithm	E-Waste, low-level programming, high-level programming, translator, compiler, interpreter, intellectual property, copyright, patents, trademarks, open source, proprietary.	Erroneous, boundary and valid data, data structure; variables; runtime, syntax and logic errors.	Bitmap, pixel, resolution, colour depth, analogue, digital, amplitude, sample rate, bit depth, sample interval, lossy compression, lossless compression.	Data structure, function, procedure, parameter, index.	Alogorithmic bias, digital footpring, identity theft, identity fraud, Data Protection Act, Computer Misuse Act.
End point	Use mathematical methods. Write subprograms using parameters. Use string.format to create output.	State the purpose of a protocol. List three pieces of information stored in a packet header. Put the layers of the TCP/IP model in the correct order. Explain the role of protocols.	Compare algorithm efficiency (number of passes, number of compares). Apply a bubble sort to a list. Apply a binary search to a sorted list. Trace an algorithm to determine state of variables.	Describe one way of reducing the amount of e-waste that is generated. Identify a task for which a low-level language would be used and one for which a high-level language would be more suitable. State the purpose of a language translator. Describe how an interpreter differs from a compiler. Explain how a copyright differs from a patent. Explain why a software developer may prefer to use open source software rather than proprietary software.	Design test data to meet requirements. Justify the use of data structure. Use trace tables with nested constructs. Use a reverse linear search on a sorted list efficiently. Use a forward linear search on an unsorted list.	Describe how bitmap images are represented in binary. Explain the difference between image size and image resolution. Explain the limitations of binary representation of data (bitmaps). Construct an expression to calculate the file size of an image in kibibytes. Describe how analogue sound is represented in binary. Construct an. expression to calculate file sizes of sounds.	Use a trace table to find and fix errors. Linear search two-dimensional structure. Design and create test data. Translate a flowchart to code.	Explain one ethical concern associated with the use of social media. Describe how legislation helps to protect. personal data from misuse. Explain what is meant by the 'right to be forgotten' can help to protect the privacy of an individual. Explain how algorithmic bias can discriminate against some individuals. Describe two ways in which the use of AI and machine learning impacts on employment. Describe one potential societal benefit of the use of AI and machine learning.
Assessment Methods	Skills are teacher assessed End of unit test.	In class quizzes. End of unit test.	Skills are teacher assessed End of unit test.	In class quizzes. End of unit test.	Skills are teacher assessed End of unit test.	End of unit assessment.	Skills are teacher assessed End of unit test.	End of unit assessment.
Hours	7	7	7	7	7	7	7	7