

Computer Science Progression Grid

Outcomes / Success criteria	Problem Solving	Programming	Data	Computers	Communication and the Internet
Beginning	I understand what an algorithm is. I can write an algorithm as a sequence for programming. I can identify basic data structures (string and integer). I can identify the necessary input and output.	I can make use of programming constructs as a sequence. I can use simple variables. I can use comments in my programs. I am aware programs can have errors. I can display text on screen.	I understand that computers use binary to represent data. I know the terms bit, nibble. Byte, KB, MB, GB, TB.	I understand the input-process-output model. I know the different between ROM and RAM. I can draw the fetch-execute cycle. I know what an operating system is. I know the difference between utility and application software.	I understand why computers are connected in a network. I am aware of the need to protect myself online. I can successfully report online abuse. I know not to post personal details online I understand the purpose of HTML and I am aware of how websites are designed. I can design a basic website.
Developing	I know what algorithms are used for. I know how to create an algorithm to solve a particular problem. I can use algorithms to develop programs using selection. I can identify suitable data structures. I can identify the necessary inputs and outputs	I can make use of programming constructs using selection. I can code an algorithm using programming blocks. My programs are clear to read. I can identify errors of syntax. I can identify basic Boolean logic types. I can ask for an input from the user. I can use +, -, *, / operators.	I understand how computers use bitmaps to store images (pixels, resolution and colour depth). I can convert between binary and denary for 4 bit numbers. I understand how computers encode characters using ASCII. I can convert between units of storage.	I can identify the main components of a computer system (CPU, MEMORY, Storage, Input/output devices). I can name the components of a CPU. I can explain how the fetch-execute cycle works. I can explain the different functions of an operating system.	I understand the different types of networks (LAN, WAN), I know the difference between wired and wireless connectivity. I understand what is meant by the internet I am prepared to face online threats! I can adapt my online profiles to stop access to my shared photos/information. I can program some basic HTML/CSS to make a webpage
Secure	I am able to interpret algorithms as flowcharts. I can use algorithms to develop programs using iteration. I can explain bubble sort. I can construct solution to problems by breaking the problem down.	I can make use of programming constructs using iteration. I know how to code an algorithm in a high-level language. I can select applicable variable names. I can fix syntax errors. I can use Boolean logic to control programs. I know what a global variable is. I can write code that accepts and responds appropriately to user input	I can convert between binary and denary for 8 bit numbers. I understand why Hexadecimal is also used. I can use a Caesar algorithm. I can organise data in a structured database.	I know the purpose of the main components of a computer system (CPU, MEMORY, Storage, Input/output devices). I can describe the different functions of RAM And ROM. I can explain how the ALU operates (Von Neumann). I know how an operating system manages files, processes, hardware and the user interface. I understand the purpose	I can produce information to help others fight online abuse. I can edit HTML to change the appearance of a website.

				and functions of utility software	
Confident	<p>I am able to interpret algorithms from pseudocode. I can understand the purpose of a given algorithm. I know how to identify and correct errors in algorithms</p>	<p>I can use comments to clarify my program steps. I am aware of what logic errors are. I understand the purpose of a test plan. I know what arrays are and why we use them. I know why we need validation. I can write data to a file.</p>	<p>I understand how computers use binary to store sound. I can add up binary numbers and explain overflow. I can convert between binary and hexadecimal. I understand the characteristics of structured and unstructured data.</p>	<p>I can explain how the different components of a computer system work together. I can explain how data is stored on physical devices and on cloud systems. I can produce logic statements for a given problem. I can explain how an operating system manages the computer (HW, GUI). I understand what is meant by high-level and low-level programming languages.</p>	<p>I understand the different types of usage models (client-server, peer-to-peer). I understand characteristics of network topologies (bus, ring, star, mesh). I understand the importance of network security and I am able to use appropriate validation and authentication techniques (access control, physical security and firewalls)</p>
Exceptional	<p>I am able to interpret algorithms from program code. I can determine results of an algorithm given test data. I can explain linear search.</p>	<p>I can identify and correct logic errors in my program. I can write a test plan to identify errors. I can identify strengths in a program. I can use arrays and lists to organise data. I can use global variables. I know how to use validation on user input. I can read data from a file.</p>	<p>I can use two's complement to manipulate binary notation. I understand the need for compression and methods of compression (lossy and lossless).</p>	<p>I can explain the benefits of Cloud storage and the use of backup. I understand the need for embedded systems and can explain their functions. I can program machine code using the Little Man Computer©</p>	<p>I understand the role of and need for network protocols (Ethernet, Wi-Fi, TCP/IP, and HTTP. HTTPS, FTP, email (POP3, SMTP, and IMAP)). I understand different forms of cyberattack (based on technical weaknesses and behaviour) including social engineering (phishing) and digital devices. I understand what is meant by the world wide web (WWW) and components of the WWW (web server URLs, ISP, HTTP, HTTPS, HTML)</p>
Beyond	<p>I am able to decompose a problem into smaller sub-problems. I can use abstraction effectively to model aspects of the real world. I am able to program abstractions of real-world examples</p>	<p>I can apply suitable test data to prevent errors in my program. I can suggest improvements to a program. I can write arrays and lists to txt files.</p>	<p>I understand the limitations of binary representation of data. I can explain how run-length encoding works.</p>	<p>I can choose the best components for a computer based on needs of a client. I understand how software can be used to simulate and model aspects of the real world.</p>	<p>I understand that data can be transmitted in packets using layered protocol stacks (TCP/IP). I understand methods of identifying vulnerabilities including hacking, commercial analysis tools and review of network and user policies.</p>