

Computer Science Target Related Expectations (TReE)

		Pathway 1 (Target Grade 1-3)	Pathway 2 (Target Grade 4-6)			Pathway 3 (Target Grade 7-8)	
		Computer Science Knowledge	Algorithms, Computational Thinking and Problem solving	<p>Be able to explain what an algorithm is.</p> <p>Solve problems by decomposing them into smaller parts.</p>	<p>Understand that algorithms can contain errors and flaws.</p> <p>Work with various forms of inputs and of outputs.</p>	<p>Recognise that different solutions can be used for the same problems.</p>	<p>Experience of high-level text-based languages.</p> <p>Identify various forms of inputs and of output.</p>
Programming and Development	<p>Design and create simple programs.</p> <p>Use variables in programs.</p> <p>Use repetition in programs.</p> <p>Use logical reasoning to detect simple errors in programs.</p>			<p>Understand the difference between, and appropriately use, IF, AND, IF THEN and ELSE (selection and iteration).</p> <p>Know that procedures can be used to hide detail.</p>	<p>Understand that programming bridges the gap between algorithmic solutions and computers.</p>		<p>Show understanding of coding by explaining how code works e.g. code commenting.</p>

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Computer Science Knowledge	Data and Data Representation	<p>Collect and present data.</p> <p>Analyse information.</p> <p>Evaluate information.</p> <p>Explore the effects of changing variables in models/simulations.</p>	<p>Explain the difference between data and information.</p> <p>Understand that sorting data can improve searches. Know what Binary is.</p>	<p>Recognises that inputting poor data results in inaccurate conclusions (Garbage In, Garbage Out).</p> <p>Explain the difference between binary and denary.</p>	<p>Understand the function and purpose of binary.</p> <p>Understand that digital computers use binary to represent all data.</p> <p>Know how bit patterns represent numbers and images.</p> <p>Know the principles behind compression algorithms for reducing file sizes.</p>	<p>Understand how numbers, images and sounds use the same bit patterns.</p> <p>Understand how variables affect file size and how that affects storage.</p> <p>Explain why binary is converted to denary.</p>	<p>Understand that electrical circuits use binary and Boolean logic.</p>
	Hardware and Processing	<p>Use a range of digital devices.</p>	<p>Describe a wide range of digital devices.</p> <p>Know that computers collect data from various input devices e.g. sensors.</p> <p>Know the difference between hardware and software and their roles in a computer.</p>	<p>Understand why and when computers are used.</p> <p>Understand the main functions of the operating system.</p> <p>Know the difference between physical, wireless and mobile networks.</p>	<p>Know the function of the main internal parts of a computer.</p> <p>Know the concepts behind the fetch-execute cycle.</p> <p>Know that different operating systems exist for hardware.</p>	<p>Understand the fetch-execute cycle and how the processor deals with instructions.</p>	<p>Understand the Von Neumann architecture in relation to the fetch-execute cycle.</p>

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<b>Communication, Networks and Online Safety</b>	<p>Know that there are different types of networks.</p> <p>Know that computer networks can provide multiple services such as the World Wide Web.</p> <p>Appreciate how search results are selected.</p> <p>Appreciate how search results are ranked.</p> <p>Identify a range of ways to report concerns about online content or behaviour.</p>	<p>Explain what a computer network is and how it can be used in a given situation.</p> <p>Know the difference between the Internet and the World Wide Web.</p> <p>Identify an awareness of a range of internet services. E.g. email</p> <p>Recognise what is acceptable and unacceptable behaviour when using technologies and online services.</p>	<p>Identify different network types.</p> <p>Identify different services provided by networks and the Internet.</p> <p>Explain the difference between the Internet and the World Wide Web.</p> <p>Knows different ways, and when, to report concerns. Identify different layouts for networks (network topologies).</p> <p>Identify unsafe situations that occur online.</p>	<p>Understand how search engines rank results. Identify the advantages and disadvantages of different layouts for networks.</p> <p>Understand the difference between physical, wireless and mobile networks. Identify the key words connected to how a network communicates.</p> <p>Explain what the different services provided by networks and the Internet do.</p> <p>Identify why unsafe situations occur online.</p>	<p>Demonstrate understanding of the names of network hardware – HUBS, ROUTERS, SWITCHES. Explain advantages and disadvantages of different layouts for networks.</p> <p>Identify the best time to use physical, wireless or mobile networks.</p> <p>Explain how a network communicates.</p> <p>Explain why someone might use the different services provided by networks and the Internet.</p> <p>Identify how to resolve unsafe situations that occur online.</p>	<p>Knows the names of protocols e.g. SMTP, Imap, POP, FTP, TCP/IP, HTTP and HTTPS.</p>
<b>Information Communication Technology</b>	<p>Select and use a variety of software to accomplish given goals.</p> <p>Be able to explain different types of software used for different purposes.</p>	<p>Understand the importance of content in relation to audience and purpose.</p> <p>Understand conversion between different file formats.</p>	<p>Recognise the audience when designing and creating digital content.</p> <p>Understand the potential of IT for collaboration when computers are networked.</p>	<p>Recognise the need to adapt products to suit different audiences and for different purposes.</p>	<p>Justify choice of digital devices, applications and services. Explain the impact of technology on society.</p> <p>Fully justify why a source is reliable.</p> <p>Declare the sources used for a task using a bibliography or sources document and fully justify why they are reliable.</p>	<p>Able to explain how the use of technology impacts on society from a range of perspectives including social, economic, political, legal, ethical and moral issues.</p>

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Computer Science Skills	Algorithms, Computational Thinking and Problem solving	Plan a set of instructions e.g. diagram that show a logical sequence.	Use repetition, IF, THEN and ELSE.  Use logical reasoning to predict outcomes.	Design a solution by breaking it into parts to create sub-solutions (decomposition).  Identify key algorithms used by computers such as sorting and searching.	Use a range of operators.  Select appropriate data types.  Plan and develop a sequence of instructions using pseudo-code or flowchart symbols.  Design Solutions by decomposing a problem into parts, creating a solution for each part.  Use searching and sorting algorithms to find and arrange data, items or things.	Plan and develop a solution with pseudo code and flowchart symbols including separate representations for different functions or parts.	Use logical reasoning to explain how increasingly complex algorithms works.
	Programming and Development	Create programs that implement algorithms.  Create a variable.	Use loops, selection statements such as IF, THEN and ELSE. (iteration).  Use logical reasoning to detect and correct simple errors in programs.	Design solutions to problems that use loops (iteration) and other decisions (selection).  Add operators to terminate loops.  Design, write and debug programs using procedures.	Detect syntax errors.  Demonstrate skills in a high level textual language.  Use a range of operators e.g. Boolean.  Select appropriate data types e.g. numerical, string.  Use procedures and functions.	Independently detect and correct syntax errors.  Use procedures and functions (e.g. tags for HTML).	Use local and global variables and know the difference between them.  Develop code that is easy to read and use.

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Computer Science Skills	Data and Data Representation	Use filters or search criteria to find information.	<p>Identify data types.</p> <p>Use a finished model to answer questions such as “What if a number in a model changes?”</p>	<p>Perform complex searches using Boolean and relational operators such as &gt;, &lt; AND.</p> <p>Analyse and evaluate data and information.</p> <p>Identify field names and data types for given data.</p> <p>Make a model suitable for the requirements using formulae and formatting.</p>	<p>Convert binary to denary and denary to binary.</p> <p>Use simple criteria to search and find data.</p>	<p>Perform simple operations using bit patterns e.g. binary addition.</p> <p>Use your own complex criteria to search a database using the Boolean operators AND and OR.</p>	<p>Apply appropriate data validation techniques.</p>
	Communication, Networks and Online Safety		<p>Use a range of internet services.</p>	<p>Use simple search criteria to find only the information needed making sure it is useful for the task to be completed.</p> <p>Understand how results are selected using web crawler programs.</p> <p>Demonstrates responsible use of technologies and online services.</p> <p>Check your information is sensible and accurate by checking other sources.</p> <p>Identify key words when searching for information.</p> <p>Declare the sources used for a task using a bibliography or sources table.</p>	<p>Use simple search criteria when searching for information making sure it is reliable, accurate and without bias.</p> <p>Refine and summarise the information needed for a task (not copy and paste).</p> <p>Identify efficient key words when searching for information.</p> <p>Declare the sources for a task using a bibliography or sources document and explain why they are reliable or biased.</p> <p>Explain why a source might be reliable or biased.</p>	<p>Construct static web pages using HTML and CSS.</p>	<p>Demonstrate the secure use of online services and know how to report misuse and abuse.</p>

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<b>Information Communication Technology</b>	Collect, organise and present data and information in digital content to help complete a given task.	<p>Create digital content to achieve a given goal through combining software packages and internet services.</p> <p>Make appropriate improvements based on feedback and can comment on the success of the solution.</p>	<p>Make judgements about digital content when evaluating and repurposing it.</p> <p>Use success criteria to evaluate the quality of work, identify improvements and make some refinements.</p>	<p>Evaluate the appropriateness of digital devices, internet services and application software to achieve given goals.</p> <p>Set appropriate success criteria to evaluate the quality of solutions.</p> <p>Use success criteria to identify improvements and make appropriate refinements to the solution.</p> <p>Evaluate and determine the best digital devices, services and applications to achieve set goals.</p>	Use complex (more than one) criteria to find and search through information.	Note and act upon any feedback received on the development of products.

	Year 7 Units	Year 8 Units
<b>Algorithms, Computational Thinking and Problem solving</b>	Scratch (Term 2) Code.org (Term 3)	Algorithms & Programming (Term 2)
<b>Programming and Development</b>	Scratch (Term 2) Code.org (Term 3)	Python (Term 3)
<b>Data and Data Representation</b>		Binary (Term 2) Databases (Term 3)
<b>Hardware and Processing</b>		Understanding Computers (Term 1)
<b>Communication, Networks and Online Safety</b>	Digital Literacy (Term 1)	Networks & Communication (Term 1)
<b>Information Communication Technology</b>	Digital Literacy (Term 1)	