

What is the <b>intent statement</b> for you subject? What does the <b>discipline offer</b> young people? What is the subject's <b>purpose</b> ? This should be a short, snappy statement.	
	The computing curriculum at TCs is designed to give students an understanding of the 3 core strands of computing, 1. Computer Science, developing an understanding of how the digital world around them works. 2. Digital literacy, to have confidence in exploring digital tools and use them to create new digital artifacts 3. Digital Design, to be able to respond to problems and generate creative solutions using appropriate digital tools. Computing gives all students an awareness and how technology every aspect of life in addition to considering its impact on society, both positive and negative, in the future. The practical development of skills in the core strands of computing fosters resilience and creativity in becoming digital creators as well as consumers.
What are the <b>core aims</b> of the curriculum? What <b>key knowledge</b> do you want students to have at the end of their learning journey?	
Year 7	<b>Core Aims:</b>
	The KS3 curriculum has been designed to ensure learners have sufficient knowledge to stay safe online and use computers safely in life. The KS3 curriculum also provides focus on developing resilient learners who are able to learn from mistakes and effectively solve problems. The topics at KS3 give a basis of knowledge, skills, and understanding to allow students to progress onto either Creative media or Computer Science at KS4 and will provide exposure to those subjects so that students can make an informed decision on their GCSE choices.
	<b>Key knowledge:</b>
	<b>Key skills:</b>
	Students develop software formatting skills and explore concerns surrounding the use of other people's work, including licensing and legal issues
	Topic 1 Clear messaging in digital media: Combining the use of office based digital tools (MS office) and cloud based collaboration tools (Google GSuite) to produce digital artifacts for a specific purpose.
	Students will develop an understanding of the terms 'internet' and 'World Wide Web', and of the key services and protocols used and the types of hardware required for wired and wireless data transmission
	Networks - from semaphores to the internet: recognise and understand the hardware used for communication and the different protocols used for communication on different parts of the internet. Recall and explain the process of transmitting data over the internet and the legal aspects of online communication
	Modelling data using spreadsheets: Students will develop knowledge of spreadsheets and their practical uses in the workplace, Knowledge will develop to incorporate understanding of formulae to visualising information, so they are able to confidently model data with a spreadsheet.
	Using media - Gaining support for a cause: Creating a digital product for a real-world cause. Develop data analysis skills in terms of collection, sampling and drawing conclusions from the evidence gained. Develop practical skills in choosing the appropriate method of display data in an understandable way, exporting it for use in a variety of different applications

	<p>Programming essentials in Scratch - part I: Applying the programming constructs of sequence, selection, and iteration in Scratch. Using subroutines to decompose a problem that incorporates lists in Scratch. This module explores the fundamentals of computational thinking and introduces the concepts of sorting and searching algorithms</p>	<p>Programming essentials in Scratch: Applying the programming constructs of sequence, selection, and iteration in a visual programming language in order to create solutions to problems that can be displayed on a screen but also used on a device independent from a computer (microbit). Skills will be developed further to create modular programs that use subroutines to decompose a problem that incorporates and manipulates lists of data</p>
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	<b>Key knowledge:</b>	<b>Key skills:</b>
Year 8	<p>Developing for the web: Using HTML (HyperText Markup Language) and CSS (Cascading Style Sheets) to create webpages.</p> <p>Representations - from clay to silicon: Representing numbers and text using binary digits. Understanding why computers cannot process real-world numbers and how numbers are used to not only allow a computer to function but also to represent both still images, audio and video</p> <p>Mobile app development: Using event-driven programming to create an online gaming app in response to a client brief. Developing</p> <p>Media - Vector graphics: To develop and understanding of the different forms of graphics such as vector and bitmaps and the pros and cons of each. To develop knowledge of the different forms of compression and apply that knowledge to the development of graphics for different purposes.</p> <p>Layers of computing systems: Exploring the fundamental components that</p>	<p>Developing programming skills for the internet, using HTML and CSS to create webpages for a client</p> <p>Developing computing numeracy skills in the conversion of denary to binary and hexadecimal values. Applying those skills to estimate the size of common files and apply this understanding in order to explore how images and audio are represented by a computer system</p> <p>Mobile app development: developing computational thinking skills of decomposition and abstraction to determine the specific needs of a client brief. To further refine knowledge of programming syntax and skills in programming in order to produce a product</p> <p>Media – Creating Bitmap and Vector graphics. Creating vector graphics through objects, layering, and path manipulation. Utilising software tools to repurpose create graphics for different purposes using cropping and optimization methods appropriate to an application.</p> <p>Layers of computing systems Identifying key components of a computer systems and what their purpose is and</p>

	<p>make up a computer system developing an understanding of how that system functions and the factors that influence its performance.</p> <p>Introduction to Python programming: Applying the programming constructs of sequence, selection, and iteration in Python.</p>	<p>their role in a wider computer system. Application of knowledge in identifying factors that improve or limit the system and recommend solutions to eliminate those problems</p> <p>Introduction to Python programming Identifying the common programming constructs that underpin all languages. Explore the similarities and differences between programming in Python and programming in a visual language. Expand on programming skills through multi-level selection and using iterative and condition-controlled loops.</p>
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	<b>Key knowledge:</b>	<b>Key skills:</b>
Year 9	<p>Python programming: Developing existing knowledge with sequences of data Manipulating strings and lists. Creating a programming project.</p> <p>Media - Animations Creating 3D animations through object manipulation and tweaking and adjusting lighting and camera angles.</p> <p>Data science Using data to investigate problems and make real-world changes.</p> <p>Representations - going audio-visual Representing images and sound using binary digits.</p> <p>Introduction to cybersecurity Identifying how users and organisations can protect themselves from cyberattacks.</p> <p>Developing physical computing projects Sensing and controlling with the micro: bit.</p>	<p>Write programs that display messages, receive keyboard input, and use simple arithmetic expressions in assignment statements,</p> <ol style="list-style-type: none"> <li>1. Use selection (if-elif-else statements) to control the flow of program execution</li> <li>2. Locate and correct common syntax errors</li> </ol> <p>Develop skills from 2d modelling and design in year 7 and 8 into modelling and animation in 3d</p> <p>Understand the importance and value of data in society and use tools such as spreadsheets and databases to investigate and manipulate datasets for different purposes and audiences.</p> <p>Build on understanding of how computers process information to establish how audio/visual digital artifacts are stored and be able to create new assets and process them for storage in the most effective form.</p> <p>To be able to identify and explain methods of keeping data secure, the methods used to illegally access personal information and the methods of encryption used to ensure safe data transfer across local and global networks</p>

		Utilise prior learning to independently create a digital product in response to a specific brief
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	<b>Core aims:</b>	
	At KS 4 students build on the skills they have learned in KS 3. The curriculum develops the student's ability to become a more resilient learner that is focused on logical thinking, decomposition, and abstraction of problems to ultimately become advanced at solving computational and creative problems. Students also continue to develop skills in digital literacy where they use computer systems to create and evaluate digital products for specific audiences and purposes	
	<b>Key knowledge:</b>	<b>Key skills:</b>
Year 10 Computer Science	<p>Students will learn what is Computational thinking and the different types of algorithms they can use for sorting and searching items in a list. Students will learn about algorithms like drawing flowcharts and writing pseudo code to solve a problem.</p> <p>Students will find out characteristics and purpose of different levels of programming language like high-level languages and low-level languages. Students will learn about the different types of tests that are carried out to detect errors in their program. Students will learn about the IDEs used to develop programs.</p> <p>Students learn about the purpose of the CPU and the fetch, decode, and execute cycle.</p> <p>Students will Understand the registers in the Von Neumann architecture and common components in the CPU and how common characteristics of CPU's affect their performance such as cache, clock speed, number of cores. Students will learn about primary storage such as RAM and ROM as well as secondary storage such as magnetic, optical, and solid state</p> <p>Students will learn about different programming constructs like sequence, selection and Iteration. They will learn to code arrays/lists,</p>	<p>Student will develop their programming skills through coding solutions to problems, starting with simple programs like writing inputs and outputs, using iterations in their code and interpret, correct and complete algorithm.</p> <p>Students will use logic gates to create truth tables that match logic diagrams.</p> <p>Students will be able to develop skills in a variety of programming languages including being able to manipulate machine code (little man computer) to create calculations</p> <p>Students will be able to apply the knowledge gained regarding programming to develop increasingly complex programs as solutions to problems, they will be able to test their solutions and collaborate with others in improving the efficiency of their programs</p> <p>Students will be able to apply their learning from the year to real world examples regarding analysing computational problems and determining a solution while justifying its appropriateness.</p>

	<p>procedures and functions, records and files.</p> <p>Students will learn about SQL and how to use it in their queries when searching for information in a database.</p>	
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<p>Year 11 Computer Science</p>		
	<p><b>Key knowledge:</b></p>	<p><b>Key skills:</b></p>
	<p>Students will develop an understanding of data representation such as how number, characters, images and sound are represented by the computer in binary. Students will learn the need for compression and be able to describe the difference between lossy and lossless compression.</p>	<p>Students will be able to carry out several mathematical formulae including conversions between binary, denary, hexadecimal in addition to bitwise manipulation, representing binary in two different negative forms and simple binary addition and subtraction</p>
	<p>Students will develop knowledge about the internet, Wide Area Network (WAN) and Local area Networks (LAN). They will understand the different wireless modes of connection, including Wi-Fi and Bluetooth as common standards. Students will learn about encryption, client server and peer-to-peer networks as well as standards, protocols and layers</p>	<p>Students will be able to use their knowledge of data representation and compression to estimate potential file size</p> <p>Students will be able to determine the most appropriate LAN for a specific purpose and identify potential areas of bottlenecking, they will be able to explain the process of data transmission and the different types and purpose of data that is transmitted across a WAN</p>
<p>students will learn about forms of attack and threats posed to a network such as: Malware, Phishing, Social engineering, Brute force attacks, Denial of service attacks, Data interception and theft, SQL injection. Students will understand how to identify and prevent vulnerabilities including the use of penetration testing, anti-malware software,</p>	<p>Students will be able to contextualise their learning to be able to provide advice and guidance to a client based on a specific scenario. They will also be able to analyse real world examples of potential legal and ethical concerns and be able to determine the specific law that has</p>	

	<p>firewalls, user access levels etc. Students will also learn about the operating system and utility software.</p> <p>Students will learn about Impacts of digital technology on wider society including Ethical issues, Legal issues, Cultural issues, Environmental issues and Privacy issues. They will find out about legislations relevant to Computer Science like The Data Protection Act 2018, Computer Misuse Act 1990, Copyright Designs and Patents Act 1988, Software licences like open source and proprietary</p>	<p>been breached and suggest how the problem can be remedied</p>
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<p>Year 12 Computer Science</p>	<p><b>Core aims:</b></p>	
	<p>The KS 5 program of study develops the ability of students to become independent learners and to use research to extend their knowledge beyond the scope of the specification. Computer Science at KS 5 provides students with the challenge of programming a computer game that embeds complexities, and creativity and allows students to problem solve following a test-driven development process. The curriculum enables students to become critical thinkers that are able to apply and evaluate their knowledge to different scenarios. The Game development course follows on from experiences in Creative media at KS4 developing, artistic and mathematical skills further to create 3D animations and modelling, providing a portfolio of evidence to support the development of a final polished game project.</p>	
	<p><b>Key knowledge:</b></p> <p>Year 12 Students will develop an in-depth knowledge of computing principles, building on previous learning at Key stage 3 and GCSE which will cover the characteristics of contemporary systems architecture and other areas including the following:</p> <ul style="list-style-type: none"> <li>• Operating systems (open and closed systems), different types of systems architecture and processor and the key components of a computer system.</li> <li>• Introduction to programming where students can learn and apply existing knowledge of programming techniques to new programming languages including development of GUI (Graphical User Interface) interfaces.</li> </ul>	<p><b>Key skills:</b></p> <p>Students will be able to carry out several mathematical formulae including conversions between binary, denary, hexadecimal in addition to bitwise manipulation, representing binary in two different negative forms and simple binary addition and subtraction</p> <p>Students will be able to use their knowledge of data representation and compression to estimate potential file size</p> <p>Students will be able to determine the most appropriate LAN for a specific purpose and identify potential areas of bottlenecking, they will be able to explain the process of data transmission and the different types</p>

	<ul style="list-style-type: none"> <li>• Data types, structures and algorithms that can be applied to systems to sort and manipulate information, including exploration of machine learning techniques used to develop AI</li> <li>• Exchanging data and web technologies</li> <li>• Using Boolean algebra, moving from simple logic gates to the development and simplification of logical equations, solving logic problems visually using Karnaugh maps</li> <li>• Legal and ethical issues in modern computing considering the use of data and the legislation applied to given scenarios while considering the impact on different stakeholder groups</li> </ul> <p>Students will develop their knowledge regarding the development of Algorithms and problem solving. Other areas covered within this theme include the following:</p> <ul style="list-style-type: none"> <li>• exploring the individual elements of computational thinking</li> <li>• the further development of Programming techniques</li> <li>• Software development methodologies</li> <li>• Algorithms</li> <li>• Standard algorithms for searching and sorting data.</li> </ul>	<p>and purpose of data that is transmitted across a WAN</p> <p>Students will be able to contextualise their learning to be able to provide advice and guidance to a client based on a specific scenario. They will also be able to analyse real world examples of potential legal and ethical concerns and be able to determine the specific law that has been breached and suggest how the problem can be remedied</p> <p>Students will be able to write complete solutions to computational problems without the use of a computer through coherently developed pseudocode</p>
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Year 13 Computer Science		
	Key knowledge:	Key skills:
	<p>Students will continue to develop knowledge of the following areas, continuing from year12:</p> <ul style="list-style-type: none"> <li>• Software and its development</li> <li>• Types of programming languages</li> <li>• Data types, representation and structures</li> <li>• Exchanging data and web technologies</li> <li>• Following algorithms</li> <li>• Using Boolean algebra</li> <li>• Legal, moral and ethical issues.</li> <li>• Elements of computational thinking</li> <li>• Programming and problem solving</li> <li>• Pattern recognition, abstraction and decomposition</li> <li>• Algorithm design and efficiency</li> <li>• Standard algorithms.</li> </ul>	<p>Students will be able to carry out several mathematical formulae including conversions between binary, denary, hexadecimal in addition to bitwise manipulation, representing binary in two different negative forms and simple binary addition and subtraction</p> <p>Students will be able to use their knowledge of data representation and compression to estimate potential file size</p> <p>Students will be able to determine the most appropriate LAN for a specific purpose and identify potential areas of bottlenecking, they will be able to</p>

	<p>Students will spend much of year 13 working on developing their own programming project for their internally assessed component 3. This will enable them to demonstrate the skills and knowledge necessary to meet the Assessment Objectives. Students will need to analyse the problem, design a solution, implement the solution and give a thorough evaluation.</p>	<p>explain the process of data transmission and the different types and purpose of data that is transmitted across a WAN</p> <p>Students will be able to contextualise their learning to be able to provide advice and guidance to a client based on a specific scenario. They will also be able to analyse real world examples of potential legal and ethical concerns and be able to determine the specific law that has been breached and suggest how the problem can be remedied.</p> <p>Students will need to analyse a problem, design a solution, implement the solution and give a thorough evaluation as to the effectiveness of the developed solution.</p>
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