Victorian Curriculum - Technologies: Digital Technologies - Strands with Elaborations

PROGRESSION IS HIGHLIGHTED IN THE FOLLOWING DOCUMENT VIA **BOLDED TEXT**.

Bands/Level Indicators	BAND DESCRIPTIONS	Digital Systems		Data and Information		Creating Digital Solutions			
		Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations
Foundation to Year 2	**Foundation to Year 2** In Foundation to Level 2, students are introduced to common digital systems and patterns that exist within data they collect. Students organise, manipulate and present this data, including numerical, categorical, text, image, audio and video data, in creative ways to create meaning. Students use the concept of abstraction when defining problems, to identify the most important information. They begin to develop their design thinking skills by conceptualising algorithms as a sequence of steps for carrying out instructions, such as identifying steps in a process or controlling robotic devices. Students describe how information systems meet information, communication and recreation needs. Through discussion with teachers, students learn to apply safe practices to protect themselves and others as they interact online for learning and communicating. Across the band, students will have had the opportunity to create a range of digital solutions through guided play and integrated learning, such as using robotic toys to navigate a map or recording science data with software applications.	Identify and explore digital systems (hardware and software components) for a purpose (VCDTDS013)	* Playing with and using different digital systems for transferring and capturing data, for example using a tablet to take a photograph of a grandparent and recording an interview with them about life in the past * Exploring and using digital systems for downloading and storing information, for example knowing how to download images from a website and insert them into a document * Exploring and identifying hardware and software components of digital systems when creating ideas and information, for example experimenting with different ways of providing instructions to games software using a mouse, touch pad, touch screen, keyboard, stylus * Recognising and using hardware and software components of digital systems and experimenting with their functions, for example playing with interactive toys and robotic devices to determine which ones can work with other devices * Recognising that a digital system follows instructions or commands, for example instructing robotic toys to perform a function such as a dance movement * Constructing a model of a real or imaginary digital systems device for use in role-play scenarios and explaining the features of the device to an adult	Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (VCDTDI014)	* Sorting objects and events based on easily identified characteristics and using digital systems to represent patterns in data, for example sorting birthdates and presenting the patterns using seasonal symbols * Making generalisations about data sets, for example comparing different ways of travelling to and from school using classroom data, discussing results and finding patterns in modes of travel * Experimenting with different ways of representing patterns, for example using materials, sounds, movements or drawing * Exploring with patterns of objects or symbols to represent data, for example the symbol 12 may represent different data to 21 * Learning about how data are represented by changing pixel density (resolution) in a photograph with support and noting the change in file size to successfully email to a friend	Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (VCDTCD017)	* Experimenting with very simple, step-by-step procedures to explore programmable devices, for example providing instructions to physical or virtual objects or robotic devices to move in an intended manner * Jointly writing and entering a simple set of instructions to sequence events and actions, for example scanning personal photographs and collating and ordering significant personal events or milestones and describing the steps involved in the process * Presenting a sequence of instructions or events in a series of slides or screens with text and pictures * Recognising sequences of instructions or events that are commonly experienced such as the sequence of traffic lights or how their lunch order is taken and delivered * Following a series of instructions to use a piece of hardware or software, for example taking a photograph, editing and storing it to include in a slow motion	Explore how people safely use common information systems to meet information, communication and recreation needs (VCDTCD018)	* Sharing and describing ways that common information systems can be used to meet communication needs, for example computers can be used as phones and social networking tools allowing communication between families living in different regions * Recognising and discussing the need for cyber-safety when using online information systems, for example recognising that shared personal information can be used for undesirable purposes and that using a password is a means of protecting identity * Recognising safe ergonomic practices when children are playing with information systems, for example recognising the need to take regular breaks to avoid eye strain and repetitive strain injuries * Discussing how a range of information systems support personal needs and impact on others, for example text to speech software can be used to meet the communications needs of people with vision loss * Sharing ideas about the ways information systems are being used by families and friends in everyday life, for example comparing current digital play equipment with play equipment of 20 years ago
				Collect, explore and sort data, and use digital systems to present the data creatively (VCDTDI015)	* Collecting, and sorting data through play, for example collecting data about favourite toys and sorting them into categories such as toys they like or dislike * Locating image or text data, for example searching through a digital photo library, taking into account cultural considerations such as appropriate use of images of deceased Aboriginal and Torres Strait Islanders * Exploring, imagining and comparing the usefulness of different data displays, for example jointly creating simple column graphs and picture graphs to represent different types of items * Exploring and creating graphs to represent classroom data, for example collecting data on the country of birth of each student and presenting the results as a picture graph * Using digital systems to organise data to improve meaning, for example using visualisation software to create a mind map (diagram) showing relationships between characters in a story * Using common software to present data creatively, for example using word processing, multimedia, graphic, numeric and presentation software to create a slideshow, movie, sounds, image, chart, word art, poster or drawing				
				Independently and with others create and organise ideas and information using information systems, and share these with known people in safe online environments (VCDTDI016)	* Using different types of data such as images, sound and text to create information for sharing online, for example creating a multimedia class profile that includes a photo of each student, a personal audio recording and a written message * Planning and creating text, drawings and sound files to share online, for example jointly creating a photo story to illustrate a fable or fairy-tale from the Asia region or a local Aboriginal and Torres Strait Islander community story * Making ethical decisions when using images for public viewing and using the work of others, for example asking the question 'What is fair and just?' to compare images of events or activities and decide whether or not to publish * Participating in safe online environments, for example sharing ideas and information through intranets, messaging only to people they know, bookmarked websites and moderated online spaces				
Foundation to Year 2 Achievement Standard	NOTE: The standards are not divided into Strands or Sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	By the end of Year 2, students identify **how** common digital systems are used to meet **specific** purposes.		Students use digital systems to represent simple patterns in data in different ways and and collect **familiar** data and display them **to convey meaning**.		Students **design** solutions to simple problems using a sequence of steps and decisions.		They create and organise ideas and information using information systems and share information in safe online environments	

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Levels 3 and 4	In Year 3 and 4, students **explore** digital systems **in terms of their components, and peripheral devices such as digital microscopes, cameras and interactive whiteboards**. They collect, manipulate and **interpret** data, **developing an understanding of the characteristics of data and their representation**. Students further develop their computational thinking skills using the concept of abstraction to analyse simple problems, **use techniques such as summarising facts to deduce conclusions**. They **record simple solutions to problems through text and diagrams and develop their designing skills. They initially follow prepared** algorithms **to describe their own that support branching (choice of options) and user input. Their solutions are implemented using appropriate software including visual programming languages that use graphical elements rather than text instructions**. **With teacher guidance, students identify and list the major** steps **needed to complete a task or project. When sharing ideas and communicating in online environments they develop an understanding of why it is important to consider the feelings of their audiences** and apply safe practices and **agreed social protocols that demonstrate respectful behaviour**. Across the band, students will have had opportunities to create a range of digital solutions, **such as interactive adventures that involve user choice, modelling simplified real-world systems and simple guessing games**.	Explore and use **a range of** digital systems **with peripheral devices for different** purposes**, and transmit different types of data** (VCDTDS019)	* Using different peripheral devices to display information to others, for example using a mobile device, interactive whiteboard or a data projector to present information * Using specific peripheral devices to capture different types of data, for example using a digital microscope to capture images of living and non-living things * Experimenting with different types of digital system components and peripheral devices to perform input, output and storage functions, for example a keyboard, stylus, touch screen, switch scan device or joystick to input instructions; a monitor, printer or tablet to display information; a USB flash drive and external hard drive as storage peripheral devices * Recognising that images and music can be transferred from a mobile device to a computer, for example using a cable to connect a camera and computer to upload images for a photo story	Recognise **different types of** data and explore **how the same data can be represented in different ways** (VCDTDI020)	* Recognising that numbers, text, images, sounds, animations and videos are all forms of data when stored or viewed using a digital system * Using a table to reorganise information that includes sentences, and/or words, and/or numbers and/or images * Recognising representations of different types of data such as waves for sound * Exploring codes and symbols that are representations of data, for example morse code and semaphore and how similar symbols in Aboriginal and Torres Strait Islander art can represent different concepts depending on the context, for example three circles, drawn as lines, can represent ants, fruit, flowers or eggs depending on the art region	**Define simple problems, and describe** and follow a sequence of steps and decisions involving branching and user input (algorithms) needed to solve them (VCDTCD023)	* Stating the nature of the problem and some of its features, such as what need is associated with the problem, who has the problem and why does the problem exist * Describing, using drawings, pictures and text, the sequence of steps and decisions in a solution, for example preparing a chart to show the order of events in a game and the decisions that a player must make * Experimenting with different ways of describing a set of instructions, for example writing two versions of the same simple set of instructions for a programmable robotic device * Explaining to others how to follow technical instructions, for example demonstrating how to capture and download images from a mobile device * Defining and describing the sequence of steps needed to incorporate multiple types of data in a solution, for example charting the sequence of steps in selecting and downloading images and sound to create a book trailer	**Explain how student-developed solutions and existing** information systems meet **common personal, school or community** needs (VCDTCD025)	* Investigating how information systems are used in communities and explaining what needs are being met, for example students jointly creating a short survey and collecting data about how many community residents use the online library borrowing system to download e-books and why * Visiting an online museum, for example accessing an international museum online and being able to zoom in on the textures of historic Asian objects * Exploring information systems that suit particular home or personal needs, for example using speech recognition software that can help speakers whose language background is not English, or a system to monitor energy or water consumption in the home * Testing the adequacy of student-developed solutions, for example asking a classmate to review a digital solution and provide feedback	**Develop simple solutions as visual programs** (VCDTCD024)	* Designing and developing a simple interactive digital solution using a visual programming language, for example preparing the content and design of a simple guessing game that provides options in English and an Asian language * Exploring common elements of standard user interfaces that are familiar and appeal to users, for example navigation links on the left and top of web pages to help users interact with the site * Developing programs that make decisions on the basis of user input or choices such as through selecting a button, pushing a key or moving a mouse to 'branch' to a different segment of the solution * Creating options for users to make choices in solutions, for example a user input and branching mechanism such as buttons in a slideshow to allow users to make choices
				Collect, **access** and present **different types of** data **using simple software to create information and solve problems** (VCDTDI021)	* Selecting appropriate formats or layout styles to present data as information depending on the type of data and the audience, for example graphs suit data that shows trends or comparisons; lists suit text data that needs to be presented in alphabetical order; animations suit images that show actions and relationships * Using different techniques to present data as information, for example creating a column chart in a spreadsheet by colouring cells to represent different items * Improving the appearance and usability of data, for example using colour, headings and labelling of images to organise and accurately identify data * Using software to sort and calculate data when solving problems, for example sorting numerical data in ascending or descending order and automating simple arithmetic calculations using nearby cells and summing cell ranges in spreadsheet or database software * Exploring different online sources to access data, for example using online query interfaces to select and retrieve data from an online database such as a library catalogue or weather records						
				Individually and with others, **plan,** create and **communicate**ideas and information **safely, applying** agreed **ethical** and social protocols (VCDTDI022)	* Considering ways of managing the use of social media to maintain privacy needs, for example activating privacy settings to avoid divulging personal data such as photographs, addresses, and names and recognising that all digital interactions are difficult to erase (digital footprints) * Using a range of online tools to share information and being aware that information may be received at different times, for example adding entries to a class blog, participating in a web conference or online chat with an author, or participating in a forum on a specific topic * Organising and creating different types of information for sharing and collaborating online, for example planning the sequence and appearance of an animation, and sharing it online with students from another school * Managing a project that involves students working together to publish online, for example identifying how group members can help each other to avoid delays in finishing the project * Discussing digital citizenship rules and behaviours for participating in an online environment, for example not using all capital letters when expressing a strong viewpoint about a contentious matter and ensuring that the audience is aware of your identity * Making ethical decisions when faced with reporting inappropriate online behaviour or acknowledging digital products created by others, for example making a decision based on how individuals would like to be treated by others						
Levels 3 and 4 Achievement Standard	NOTE: The standards are not divided into Strands or Sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	By the end of Level 4, students **describe how** a range of digital systems and their peripheral devices can be used for different purposes.		Students **explain** how the same data sets can be represented in different ways. They collect and **manipulate** different data when creating information and digital solutions.		Students define simple problems, **design and implement digital solutions using** algorithms that involve decision-making and **user input**.		They plan and safely use information systems when creating and communicating ideas and information, applying agreed protocols.		They explain how their developed solutions and existing information systems meet **their purposes**.	

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Levels 5 and 6	In Year 5 and 6, students develop an understanding of the role individual components of digital systems play in the processing and representation of data. They acquire, validate, interpret, track and manage various types of data and are introduced to the concept of data states in digital systems and how data are transferred between systems. They learn to develop abstractions further by identifying common elements across similar problems and systems and develop an understanding of the relationship between models and the real-world systems they represent. When creating solutions, students analyse problems clearly by defining appropriate data and requirements. When designing, they consider how users will interact with the solutions, and check and validate their designs to increase the likelihood of creating working solutions. Students increase the sophistication of their algorithms by identifying repetition and incorporate repeat instructions or structures when developing their solutions through visual programming, such as reading user input until an answer is guessed correctly in a quiz. They evaluate their solutions and examine the sustainability of their own and existing information systems. Students progress from managing the creation of their own ideas and information for sharing to working collaboratively. In doing so, they learn to negotiate and develop plans to complete tasks. When engaging with others, they take personal and physical safety into account, applying social and ethical protocols that acknowledge factors such as social differences and privacy of personal information. They also develop their skills in applying technical protocols such as devising file naming conventions that are meaningful and determining safe storage locations to protect data and information. Across the band, students will have had opportunities to create a range of digital solutions, such as games or quizzes and interactive stories and animations.	Examine the main components of common digital systems, and how such digital systems may connect together to form networks to transmit data (VCDTDS026)	* Describing digital systems as having internal and external components that perform different functions, for example external components for inputting data including keyboard, microphone, stylus; internal processing components include the central processing unit; external output components including speakers, projector, screen; and data and information storage components include cloud and external devices * Explaining how data may be transmitted between two digital systems in different ways, for example that wires or cables are used in wired networks and radio waves are used to transmit data in wireless or mobile networks * Investigating how the internal and external components of digital systems are coordinated to handle data, for example how a keyboard, central processing unit and screen work together to accept, manipulate and present data and information * Identifying different types of networks that allow data to be sent between digital systems, for example wired, wireless and mobile	Examine how whole numbers are used as the basis for representing all types of data in digital systems (VCDTDI027)	* Recognising that digital systems represent all types of data using number codes that ultimately are patterns of 1s and 0s * Explaining that binary represents numbers using 1s and 0s and these represent the on and off electrical states respectively in hardware and robotics * Recognising that the numbers 0, 1, 2 and 3 could be represented by the patterns of two binary digits of 00, 01, 10 and 11 * Representing whole numbers in binary, for example counting in binary from zero to 15, or writing a friend's age in binary * Exploring how division by two can be used as a technique to determine the binary representation of any whole number by collecting remainder terms * Representing the state of an object in a game as active or inactive using the respective binary values of 1 or 0	Define problems in terms of data and functional requirements, drawing on previously solved problems to identify similarities (VCDTCD030)	* Checking existing solutions to identify features that are transferable to new but similar digital solutions, for example identifying if there are any similarities, such as user age and special requirements, between an existing game and a new game to be created * Investigating characteristics of user interfaces that are common for particular types of problems, for example, touch screens encourage users to respond more intuitively than keyboards, or the consistent placement of symbols in games to speed up users' responses * Using and interpreting data, establishing the root cause of a problem, for example using an annotated diagram to identify omissions, duplications or mismatches of data * Describing in simple terms the nature of a problem and what a solution needs to achieve, for example what need the problem is associated with, who the solution is needed for, what data are needed and what features the solution would need to include	Explain how student-developed solutions and existing information systems meet current and future community needs and sustainability needs (VCDTCD034)	* Using sustainability criteria to explain how well a student-developed solution meets its requirements, for example personal data are secured (social) and the solution can only be viewed on screen to avoid printing (environmental) * Explaining why people interact so readily with touch systems, for example touch input requires less dexterity to issue instructions and is designed to be accessible to users through the use of icons * Imagining how the functioning of one type of information system could be applied in a new way to meet a community need, for example considering how an electronic tracking system such as a global positioning system (GPS) could be used to find people who are lost * Comparing past and present information systems in terms of economic, environmental and social sustainability, for example comparing energy levels required to store data and purchase devices * Exploring the ethics and impact of management practices on the use of communication networks, for example internet censorship from a local, national and global perspective and the impact on freedom of access and expression * Considering practices to save energy and other resources when using information systems, for example switching off when not in use, ensuring electronic devices are in energy-saving mode	Develop digital solutions as simple visual programs (VCDTCD033)	* Experimenting with different options that involve repeat instructions, for example a continually repeating slideshow, a repeated movement in an animation, a repeated calculation in a spreadsheet * Planning and implementing a solution using a visual programming language, for example designing and creating a simple computer game involving decisions and repetitions, suitable for younger children, that requires user input to make selections, taking into account user responses * Following a design and creating a solution that is interactive, using a visual programming language, for example creating a quiz that provides feedback on response and allows the user to try again * Programming a robot to operate independently, for example to find its way out of a maze * Experimenting with different ways of instructing to make choices and repeat instructions, for example using 'IF' statements to allow for making choices and iterations (repeat instructions) until a goal is achieved	Design a user interface for a digital system, generating and considering alternative designs (VCDTCD031)	* Exploring different features of user interfaces that allow people from different cultures to access information irrespective of language background, for example using icons and consistently placing icons or symbols in games interfaces to reduce the frustrations of game players * Applying the principles and elements of design to a set of requirements in order to produce a user interface for a system that addresses an identified need, for example to emphasise or highlight an area of the screen to draw the viewer's attention to an event or action * Designing the user interface of a solution using different design tools, for example using a storyboard to outline the stages of a game or a mock-up to show the placement of icons * Generating alternative designs for a user interface, for example sketching different concepts for a splash screen of a game or interactive multimedia experience or designing different user interfaces for people with visibility loss, taking into account size of icons and responsive font size	Design, modify and follow simple algorithms represented diagrammatically and in English involving sequences of steps, branching, and iteration (VCDTCD032)	* Following a diagram of a simple method of sorting numbers or words * Following, modifying and describing the design of a game involving simple algorithms represented diagrammatically or in English, for example creating a flowchart with software that uses symbols to show decisions, processes and inputs and outputs * Experimenting with different ways of representing an instruction to make a choice, for example branches in a tree diagram or using an 'IF' statement to indicate making a choice between two different circumstances using a spreadsheet or a visual program * Experimenting with different ways of representing an instruction to make a repetition, for example loops in a flowchart diagram or using a 'REPEAT' statement * Designing the instructions for a robot vacuum cleaner to clean a room * Using different design tools to record ways in which digital solutions will be developed, for example creating storyboards or flowcharts to record relationships or instructions about content or processes
				Acquire, store and validate different types of data and use a range of software to interpret and visualise data to create information (VCDTDI028)	* Using digital systems to validate data, for example setting data types in a spreadsheet to make sure a date is input correctly * Selecting and using peripheral devices suitable to the data type, for example using a data probe to collect data about changing soil temperatures for plants, interpreting the data and sharing the results as a digital graph * Recognising the difference between numerical, text and date formats in spreadsheets * Using software to automate calculations to help with interpreting data, for example using functions to make arithmetic calculations using multiple cells and summing cell ranges * Acquiring data from online sources by narrowing the focus, for example filtering data using provided options or performing queries using advanced search functions * Using data visualisation software to help in interpreting trends, for example uploading data to a web application and building a visualisation of the dataset										
				Plan, create and communicate ideas, information and online collaborative projects, applying agreed ethical, social and technical protocols (VCDTDI029)	* Applying practices that support the organisation of collaborative problem-solving, for example finding online meeting times that suit all members, and agreeing on ways of protecting files and sharing information digitally with members * Applying safe practices while participating in online environments, for example checking the default privacy settings to ensure maximum protection of personal details, being aware of online filtering techniques and policies used at school and at home * Considering ways of managing the use of social media to maintain privacy needs, for example activating privacy settings to avoid divulging personal data such as photographs, addresses and names * Developing a set of 'rules' about appropriate conduct, language and content when communicating online, and using these rules as a basis for resolving ethical dilemmas * Using digital systems to create web-based information taking into consideration referencing conventions, for example creating a blog, website or online learning space for sharing ideas * Using a range of communication tools to share ideas and information, for example participating in collaborative online environments										
Levels 5 and 6 Achievement Standard	NOTE: The standards are not divided into Strands or Sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	By the end of Year 6, students explain the functions of digital system components and how digital systems are connected to form networks that transmit data.		Students explain how digital systems use whole numbers as a basis for representing a variety of data types. They manage the creation and communication of ideas, information and digital projects colaboratively using validated data and agreed protocols.		Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems.		Students explain how information systems and their developed solutions meet current and future needs and taking sustainability into account.		They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program.					

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Levels 7 and 8	In Levels 7 and 8, students analyse the properties of networked systems and their suitability and use for the transmission of data types. They acquire, analyse, validate and evaluate various types of data, and appreciate the complexities of storing and transmitting that data in digital systems. Students use structured data to model objects and events that shape the communities they actively engage with. They further develop their understanding of the vital role that data plays in their lives, and how the data and related systems define and are limited by technical and sustainability (environmental, economic and social) constraints. Students develop abstractions further by identifying common elements while decomposing apparently different problems and systems to define requirements, and recognise that abstractions hide irrelevant details for particular purposes. When analysing problems, students identify the key elements of the problems and the factors and constraints at play. They design increasingly complex algorithms that allow data to be manipulated automatically, and explore different ways of showing the relationship between data elements to help computation, such as using pivot tables, graphs and clearly defined mark-up or rules. They progress from designing the user interface to considering user experience factors such as user expertise, accessibility and usability requirements. They broaden their programming experiences to include general-purpose programming languages, and incorporate subprograms into their solutions. They predict and evaluate their developed and existing solutions, considering time, tasks, data and the safe and sustainable use of information systems, and anticipate any risks associated with the use or adoption of such systems. Students plan and manage individual and team projects with some autonomy. They consider ways of managing the exchange of ideas, tasks and files, and techniques for monitoring progress and feedback. When communicating and collaborating online, students develop an understanding of different social contexts, for example acknowledging cultural practices and meeting legal obligations. Across the band, students will have had opportunities to create a range of digital solutions, such as interactive web applications or programmable multimedia assets or simulations of relationships between objects in the real world.	Investigate how data are transmitted and secured in wired, wireless and mobile networks (VCDTDS035)	* Explaining that networks have components that control the movement of data, for example routers, hubs, switches and bridges manage data traffic and that the characteristics of these components impact on the operation (speed and security) of networks * Explaining how cellular radio towers (transceivers) and mobile phones work together to create mobile networks * Comparing the reliability and speed of transmitting data through wireless, wired and mobile networks * Recognising that there are different communications protocols for transmitting data in networks, for example hypertext transfer protocol (HTTP) is used for transferring web page files in a browser, file transfer protocol (FTP) is used for sending and receiving any files over a network and transmission control protocol/internet protocol (TCP/IP) is used for controlling file transfers over the internet	Investigate how digital systems represent text, image and audio data in binary (VCDTDI036)	* Explaining that characters in text correspond to numbers defined by the character set, for example 'A' corresponds to 65 in the ASCII and Unicode character sets * Recognising that Unicode attempts to represent the written symbols of every language; and using Unicode charts to look up characters from Asian writing systems * Investigating the different representation of bitmap and vector graphics and its consequences, for example pixelation in magnified bitmap and vector images * Investigating how colours are represented in images and videos, for example manipulating red, green and blue (RGB) colours in an image editor * Converting between decimal and 8-bit (1 byte) unsigned binary, covering whole numbers typically used for characters and RGB, for example 65 in decimal is 01000001 in 8-bit binary * Explaining ways media elements are presented, for example the difference between embedded and linked media elements	Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints (VCDTCD040)	* Determining the factors that influence proposed solution ideas, for example user age affects the language used for instructions, dexterity affects the size of buttons and links, hearing or vision loss influence captioned or audio-described multimedia as alternative ways that common information is presented on a website * Investigating types of environmental constraints on solutions, for example reducing energy consumption and on-screen output of solutions * Identifying that problems can be decomposed into sub elements, for example creating a decision tree to represent the breakdown and relationships of sub elements to the main problem or identifying the elements of game design such as characters, movements, collisions and scoring * Starting from a simplified system, gradually increase complexity until a model of a real-world system is developed, and record the difficulties associated with each stage of development	Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability (VCDTCD044)	* Comparing student-developed solutions with existing solutions that solve similar problems, for example identifying differences in the user interface of two adventure games and explaining how these differences affect the usability or appeal of the game * Judging the quality of a student-developed solution based on specific criteria such as meeting an economic need or contributing to social sustainability * Investigating what features of touch input rather than keyboard or mouse input contribute to their success in meeting a wide range of needs, for example mimicking a common movement such as expanding or contracting a hand to change the size of an object on screen, suits users with a range of dexterity * Evaluating the success of information systems in meeting an economic, environmental or social objective, for example interviewing a local business owner to find out how effectively their information system supports a business objective such as increasing market share * Considering the effects of e-waste on societies and environments, for example the impacts of toxic chemicals when hardware is disposed of, and the practice of dumping unwanted digital systems overseas, particularly in the Asia region * Comparing cloud-based information systems to client-based information systems on the basis of security of transmitted and stored data and energy costs			Develop and modify programs with user interfaces involving branching, iteration and functions in a general-purpose programming language (VCDTCD043)	* Developing and modifying digital solutions by implementing instructions contained in algorithms * Using a programming language developing a digital game that manipulates models of real-world objects * Programming a robot to recognise particular objects and to treat them differently, for example to choose objects based on colour * Creating digital solutions that provide user navigation and prompts with controlled repetitions, for example an information kiosk that has layers of buttons and prompts the user three times before returning to the beginning	Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (VCDTCD042)	* Investigating and designing some common algorithms, such as to search, sequence, sort, merge and control data structures * Checking the accuracy of an algorithm before it is implemented, for example desk checking it with test data to see if the instructions produce the expected results * Using diagrams to describe key decisions, for example creating flowcharts using digital systems to describe a set of computational instructions * Using structured English to express algorithmic instructions, for example using conventional statements such as 'while' and 'endwhile' in a 'while loop' when describing interactive instruction
				Acquire data from a range of sources and evaluate thier authenticity, accuracy and timeliness (VCDTDI037)	* Designing a search engine query to find specific information on the web and checking its accuracy against information contained in other sources, for example entering instructions such as intitle: and inurl: prefixes to find information within a general directory, and comparing the results with information found in a wiki * Acquiring data from a range of sources, for example people, websites, books, mobile phones, radiofrequency identification (RFID) and data repositories such as the Australian Bureau of Statistics datasets, and compiling these data into a digital format * Checking authenticity of data, for example ensuring the source or author is a reliable individual or organisation * Using techniques to locate data that are timely, for example using a filtering function to specify the timeframe, such as years, for the required data							Design the user experience of a digital system, generating, evaluating and communicating alternative designs (VCDTCD041)	* Designing the user interface of a solution using a range of design tools, for example using a storyboard to explain the stages of a game, and wire-frames and mock-ups to describe the appearance of a solution * Identifying features that make an effective game, such as storyline, goal, reward, gameplay and environment * Identifying similar digital systems and their user interfaces, assessing whether user interface elements can be re-used * Devising criteria and comparing alternative design ideas that address a problem, for example evaluating two design outlines on the basis of attractiveness, ergonomics, ease of use, emotional satisfaction and accessibility * Applying the principles and elements of design to a series of solutions to evaluate the success of each solution in holding the viewer's attention, for example identifying which colour combinations or framing of visual elements keep different audiences engaged with on-screen activity		
				Analyse and visualise data using a range of software to create information, and use structured data to model objects or events (VCDTDI038)	* Using features and functions of software to summarise data to create information, for example calculating a simple budget of income and payments and creating a summary table for analysis * Visualising data to create information, for example displaying geocoded data on a map * Applying a set of conditions to a spreadsheet to organise and filter data, for example using conditional formatting to highlight the state of particular cells, and filtering and sorting categorical data using column filters * Querying an existing database to extract data for analysis, for example devising multiple selection criteria or using simple structured query language (SQL) SELECT statements to select records and retrieve specified fields * Describing the attributes of complex objects, for example defining the records, fields, formats and relationships of a simple dataset * Modelling the attributes of real-world objects for a computer game										
				Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account (VCDTDI039)	*Discussing how different social contexts affect participation in global virtual spaces, for example considering the use of language, acronyms and humour, and providing opportunities for each team member to express their opinions on their own terms * Organising the instructions and files in readiness for the development of a solution, for example applying a file name convention such as author initials, version and date to all data files that are going to be used to create solutions * Creating a web-based project that involves modifying an existing website template or writing HTML and cascading style sheets (CSS), for example using webauthoring software and CSS to create a website that allows customers to interact with an enterprising solution, such as purchasing an item * Devising and applying protocols to manage the collaborative creation of solutions, for example planning to use cloud computing to store common files and establishing virtual meetings that acknowledge time zone differences * Organising the timeline, resources, file naming conventions, back-up measures and sequence of tasks required to collaboratively create solutions that meet specified needs										
Levels 7 and 8 Achievement Standard	NOTE: The standards are not divided into Strands or Sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	By the end of Level 8, students distinguish between different types of networks and their suitability in meeting defined purposes. Students explain how text, image and sound data can be represented, secured in digital systems and presented using digital systems.		They manage the collaborative creation of interactive ideas, information and projects and use appropriate codes of conduct when communicating online.		Students define and decompose problems in terms of functional requirements and constraints.		Students evaluate information systems and their solutions in terms of meeting needs, innovation and sustainability.		They analyse and evaluate data from a range of sources to model and create information.				They design user experiences and algorithms incorporating branching and iterations, and develop, test and modify digital solutions.	