



Melton West Primary School

Version 2

Digital Technologies Curriculum & Assessment Suite

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1.1. Digital Technologies Curriculum Overview

Victorian Curriculum – Rationale and Aims

Rationale	Aims
<p>The Digital Technologies curriculum enables students to become confident and creative developers of digital solutions through the application of information systems and specific ways of thinking about problem solving.</p> <p>Students acquire a deep knowledge and understanding of digital systems, data and information and the processes associated with creating digital solutions so they can take up an active role in meeting current and future needs.</p> <p>The curriculum has been designed to provide practical opportunities for students to explore the capacity of information systems to systematically and innovatively transform data into digital solutions through the application of computational, design and systems thinking.</p> <p>The curriculum also encourages students to be discerning decision makers by considering different ways of managing the interactions between digital systems, people, data and processes (information systems) and weighing up the possible benefits and potential risks for society and the environment.</p>	<p>The Digital Technologies curriculum aims to ensure that students can:</p> <ul style="list-style-type: none"> design, create, manage and evaluate sustainable and innovative digital solutions to meet and redefine current and future needs use computational thinking and the key concepts of abstraction; data collection, representation and interpretation; specification, algorithms and development to create digital solutions apply systems thinking to monitor, analyse, predict and shape the interactions within and between information systems and the impact of these systems on individuals, societies, economies and environments confidently use digital systems to efficiently and effectively automate the transformation of data into information and to creatively communicate ideas in a range of settings apply protocols and legal practices that support safe, ethical and respectful communications and collaboration with known and unknown audiences.

Victorian Curriculum – Digital Technologies Structure

Digital Systems	Data and Information	Creating Digital Solutions
<p>Focuses on the hardware, software and network components of digital systems. Students initially learn about a range of hardware and software, and progress to an understanding of how data are transmitted between components within a system, and how the hardware and software interact to form networks.</p>	<p>Focuses on the properties of data, how it is collected and represented, and how it is interpreted in context to produce information. Students learn how data is represented and structured symbolically for use by digital systems, as well as techniques for collecting, managing and organising data that is used to solve problems and create and communicate ideas and information.</p>	<p>Explores the interrelated processes and associated skills by which students create digital solutions. Students engage in the four processes of analysing, designing, developing and evaluating. Creating Digital Solutions requires skills in using digital systems and computational, design and systems thinking, and interacting safely by using appropriate technical and social protocols.</p>

Victorian Curriculum – Digital Technologies Achievement Standards

Level D Achievement Standard	Level 2 Achievement Standard	Level 4 Achievement Standard	Level 6 Achievement Standard
<p>By the end of Level D, students use key functions of digital systems and indicate their purpose.</p> <p>Students collect, sort and recognise, with assistance different types of patterns in data. They use digital systems to display results using pictures, symbols and diagrams.</p> <p>Students use a sequence of steps and decision making processes to solve a simple problem.</p>	<p>By the end of Level 2, students identify how common digital systems are used to meet specific purposes.</p> <p>Students use digital systems to represent simple patterns in data in different ways and collect familiar data and display them to convey meaning.</p> <p>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 these in safe online environments.</p>	<p>By the end of Level 4, students describe how a range of digital systems and their peripheral devices can be used for different purposes.</p> <p>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. They plan and safely use information systems when creating and communicating ideas and information, applying agreed protocols.</p> <p>Students define simple problems, and design and develop digital solutions using algorithms that involve decision-making and user input. They explain how their developed solutions and existing information systems meet their purposes.</p>	<p>By the end of Level 6, students explain the functions of digital system components and how digital systems are connected to form networks that transmit data.</p> <p>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 collaboratively using validated data and agreed protocols.</p> <p>Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs and develop their digital solutions, including a visual program. Students explain how information systems and their developed solutions meet current and future needs taking sustainability into account.</p>



1.1. Digital Technologies Curriculum Overview

Victorian Curriculum – Learning in Digital Technologies

In Digital Technologies, students are actively engaged in the processes of analysing problems and opportunities, designing, developing and evaluating digital solutions, and creating and sharing information that meets a range of current and future needs. Students learn to safely and ethically exploit the capacity of information systems to create digital solutions. These solutions and information are created through the application of computational, design and systems thinking, and technical skills.

Victorian Curriculum – Key Concepts

<p>Abstraction</p>	<p>Abstraction involves hiding details of an idea, problem or solution that are not relevant, to focus on a manageable number of aspects. Abstraction is a natural part of communication: people rarely communicate every detail, because many details are not relevant in a given context. The idea of abstraction can be acquired from an early age. For example, when students are asked how to make toast for breakfast, they do not mention all steps explicitly, assuming that the listener is an intelligent implementer of the abstract instructions. Central to managing the complexity of information systems is the ability to 'temporarily ignore' the internal details of the subcomponents of larger specifications, algorithms, systems or interactions. In digital systems, everything must be broken down into simple instructions.</p>
<p>Data collection, representation and interpretation</p>	<p>The data concepts focus on the properties of data, how they are collected and represented, and how they are interpreted in context to produce information.</p> <ul style="list-style-type: none"> • Data collection describes the numerical, categorical and textual facts measured, collected or calculated as the basis for creating information and its binary representation in digital systems. • Data representation describes how data are represented and structured symbolically for storage and communication, by people and in digital systems. • Data interpretation describes the processes of extracting meaning from data. <p>These concepts in Digital Technologies build on a corresponding Statistics and Probability strand in the Mathematics curriculum. The Digital Technologies curriculum provides opportunities to acquire deep knowledge of the nature of data and their representation, and computational skills for interpreting data. The data concepts provide rich opportunities for authentic data exploration in other learning areas while developing data processing and visualisation skills.</p>
<p>Specification, algorithms and development</p>	<p>The concepts of specification, algorithms and development focus on the precise definition and communication of problems and their solutions. This begins with the description of tasks and concludes in the accurate definition of computational problems and their algorithmic solutions. These concepts draw from logic, algebra and the language of mathematics, and can be related to the scientific method of recording experiments in science:</p> <ul style="list-style-type: none"> • Specification describes the process of defining and communicating a problem precisely and clearly. For example, explaining the need to direct a robot to move in a particular way. • An algorithm is a precise description of the steps and decisions needed to solve a problem. Algorithms will need to be tested before the final solution can be implemented. Anyone who has followed or given instructions, or navigated using directions, has used an algorithm. Algorithmic thinking skills can be developed without programming. For example, students can follow the steps within a recipe or describe directions to locate items. • Development describes the automation of an algorithm, typically by using appropriate software or writing a computer program.
<p>Digital systems</p>	<p>The digital systems concept focuses on the components of digital systems:</p> <ul style="list-style-type: none"> • Hardware and software (computer architecture and the operating system) • Networks and the internet (wireless, mobile and wired networks and protocols). • The broader definition of an information system that includes data, people, processes and digital systems falls under the interactions and impacts concept.
<p>Interactions and impacts</p>	<p>The interactions and impacts concept focuses on all aspects of human interaction with and through information systems, and the enormous potential for positive and negative economic, environmental and social impacts enabled by these systems:</p> <ul style="list-style-type: none"> • Interactions refer to all human interactions with information systems, especially user interfaces and experiences, and human-human interactions including communication and collaboration facilitated by digital systems. This concept also addresses methods for protecting stored and communicated data and information. • Impacts describe analysing and predicting the extent to which personal, economic, environmental and social needs are met through existing and emerging digital systems and devices; and appreciating the transformative potential of digital systems in people's lives. It also involves consideration of the relationship between information systems and society and in particular the ethical and legal obligations of individuals and organisations regarding ownership and privacy of data and information.

2.1. Digital Technologies Scope and Sequence

Information on the Scope and Sequence

Teams choose the strands of Digital Technologies that they are assigning a score and/or comment to in Semesters 1 and 2.

Victorian Curriculum – Digital Technologies Scope and Sequence

Strand	Level 2 Standard	Level 4 Standard	Level 6 Standard
Digital Systems	PS1: Identify how common digital systems are used to meet specific purposes	PS2: Describe how a range of digital systems and their peripheral devices can be used for different purposes	PS3: Explain the functions of digital system components and how digital systems are connected to form networks that transmit data
Data and Information	PS4: Use digital systems to represent simple patterns in data in different ways and collect familiar data and display them to convey meaning	PS5: Collect and manipulate different data when creating information and digital solutions	PS7: Manage the creation and communication of ideas, information and digital projects collaboratively using validated data and agreed protocols
		PS6: Plan and safely use information systems when creating and communicating ideas and information, applying agreed protocols	
Creating Digital Solutions	PS8: Design solutions to simple problems using a sequence of steps and decisions	PS10: Define simple problems, and design and develop digital solutions using algorithms that involve decision making and user input	PS11: Define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems
	PS9: Create and organise ideas and information using information systems and share these in safe online environments		PS12: Incorporate decision-making, repetition and user interface design into designs and develop digital solutions, including a visual program

3.1. Digital Technologies Essential Learnings

Level 2 Achievement Standard

By the end of Level 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 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 these in safe online environments.

Victorian Curriculum – Level 2 Essential Learnings

Strand	Prioritised Standard	Essential Learnings	Lesson Ideas	Suitable Technologies
Digital Systems	PS1: Identify how common digital systems are used to meet specific purposes	<p>PS1.1: I can understand how an iPad, keyboard, monitor, and mouse works</p> <p>PS1.2: I can name the parts of a computer and how they activate, e.g. a computer has a power on/off button, hard disk, keyboard, mouse, screen</p> <p>PS1.3: I can understand the difference between hardware and software</p> <p>PS1.4: I can understand that networks form when devices are connected together</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Learning to alter the volume and brightness settings on an iPad to suit the intended purpose, e.g. listening to music, playing a game, watching a video; Logging into a range of digital systems using usernames and password by applying ICT Acceptable Use Agreement protocols, e.g. learning to protect one's privacy. <p>Without Technologies:</p> <ul style="list-style-type: none"> Roleplaying a human network using concrete materials (e.g. string) to show how information travels through different systems across the network. 	<ul style="list-style-type: none"> Netbooks iPads Samsung Galaxy smartphones Digital cameras Fitbits Printers Photocopiers.
Data and Information	PS4: Use digital systems to represent simple patterns in data in different ways and collect familiar data and display them to convey meaning	<p>PS4.1: I can collect and represent learning in different ways using apps</p> <p>PS4.2: I can make comments about my learning on apps, e.g. ClassDojo portfolios</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Taking digital photographs of known places around the school and creating a mind map in Popplet or Explain Everything to represent the data; Using BrainPOP Jr. to watch an educational video and directing students to use the 'mind mapping' activity to link and connect familiar data contained within the video; Sequencing and ordering students' birthdates using a table in Google Docs. Using Tilt Brush on the Samsung Gear VR to sketch and create data in creative ways. <p>Without Technologies:</p> <ul style="list-style-type: none"> Creating tessellating shapes to enable students to explore simple patterns through colour. 	<ul style="list-style-type: none"> Netbooks iPads Samsung Galaxy smartphones Digital cameras Printers Popplet (iPad app) Explain EDU (iPad app) Tilt Brush (Gear VR app).
Creating Digital Solutions	PS8: Design solutions to simple problems using a sequence of steps and decisions	<p>PS8.1: I can understand what 'code' and 'algorithm' means</p> <p>PS8.2: I can use computational thinking to solve problems</p> <p>PS8.3: I can apply code in different apps, e.g. Scratch Jr., Spheros</p> <p>PS8.4: I can follow and describe steps needed to solve problems, i.e. algorithms</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Using BeeBot to create a set of commands to achieve specific outcomes, e.g. reaching one point to another; Using Scratch Jr. to follow and input commands to achieve specific outcomes, e.g. moving a sprite across the screen; Using Lightbot or Daisy Dinosaur to input a series of commands to achieve a goal. <p>Without Technologies:</p> <ul style="list-style-type: none"> Creating a human computation thinking game where one student gives explicit directions and commands for another student to follow, e.g. turn left, walk forward three steps. 	<ul style="list-style-type: none"> Netbooks iPads BeeBots Scratch Jr. (iPad app) Minecraft (iPad app) Lightbot (iPad app) Daisy Dinosaur (iPad app).
	PS9: Create and organise ideas and information using information systems and share these in safe online environments	<p>PS9.1: I can explain how to make a strong password, e.g. avoid simple number sequences ('12345'), avoid sharing passwords with others, etc</p> <p>PS9.2: I can understand what information is safe to share online</p> <p>PS9.3: I can explain how to protect my personal information online</p> <p>PS9.4: I can describe ways to be 'cybersafe'</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Using SeeSaw or ClassDojo (Class Story) to share information and ideas in a moderated teacher space; Using Hector's World or Zippep's Astro Circus to teach students about cybersafety in an interactive way. <p>Without Technologies:</p> <ul style="list-style-type: none"> Introducing passwords in an engaging way, such as through the 'Password Rap' (http://goo.gl/j69txy); Creating posters that describe how to create a password and the pertinent things to consider when making a password; Creating a variety of lessons designed to introduce students to the school's ICT Acceptable Use Agreement. 	<ul style="list-style-type: none"> Netbooks iPads Spheros Hector's World (website) Zippep's Astro Circus (website) ClassDojo (website and iPad app).

3.2. Digital Technologies Essential Learnings

Level 4 Achievement Standard

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. They plan and safely use information systems when creating and communicating ideas and information, applying agreed protocols. Students define simple problems, and design and develop digital solutions using algorithms that involve decision-making and user input. They explain how their developed solutions and existing information systems meet their purposes.

Victorian Curriculum – Level 4 Essential Learnings

Strand	Prioritised Standard	Essential Learnings	Lesson Ideas	Suitable Technologies
Digital Systems	PS2: Describe how a range of digital systems and their peripheral devices can be used for different purposes	<p>PS2.1: I can explain the difference between input and output devices</p> <p>PS2.2: I can describe how data transfers from one device to another, e.g. Wi-Fi, ethernet, viruses</p> <p>PS2.3: I can explain how peripheral devices communicate information, e.g. Virtual Reality headsets, projectors</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Using digital cameras in responsible and ethical ways in a variety of learning areas. Transferring a photograph from a digital camera to a computer using a USB/lightning cable and illustrating the computing process. <p>Without Technologies:</p> <ul style="list-style-type: none"> Roleplaying as different peripheral devices connected to a digital system through concrete materials (e.g. string) and acting out the functions and purposes that they serve in digitally-appropriate ways. 	<ul style="list-style-type: none"> Notebooks iPads Samsung Galaxy smartphones Digital cameras Printers Photocopiers Gear VR (controller)
Data and Information	PS5: Collect and manipulate different data when creating information and digital solutions	<p>PS5.1: I can collect, access and present data in different ways, e.g. word document that uses images, hyperlinks, references, tables, different fonts</p> <p>PS5.2: I can create data using different representations, e.g. characters, images, sounds, instructions</p> <p>PS5.3: I can convert between file types, e.g. .docx to .pdf</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Editing a photograph or other digital media on the computer using appropriate software from the eduSTAR software catalogue Using Google Classroom, Gmail or ClassDojo (Class Story) to share images among their learning community in a safe online environments Converting a .doc into a .pdf file. 	<ul style="list-style-type: none"> Netbooks iPads Samsung Galaxy phones Digital cameras Printers Popplet (iPad app) Explain EDU (iPad app) Tilt Brush (Gear VR app).
	PS6: Plan and safely use information systems when creating and communicating ideas and information, applying agreed protocols	<p>PS7.1: I can model the safe, responsible and ethical use of technology, i.e. as detailed in the ICT Acceptable Use Agreement</p> <p>PS7.2: I can explain how to build and manage a healthy identity online, e.g. digital footprint</p> <p>PS7.3: I can detect and respond to cyberbullying situations</p> <p>PS7.4: I can explain how to protect my personal information from misuse</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Accessing the resources on the Office of the eSafety Commissioner website, e.g. Cybersmart Detectives, Cybersmart Hero, Cybersmart Forever. Collaborating in an online game safely and responsibly to complete a specified challenge, e.g. Minecraft building challenge. <p>Without Technologies:</p> <ul style="list-style-type: none"> Creating digital footprint posters on how one's actions, choices and responsibilities online can be accessed and retrieved many years down the track with real-life implications. Roleplaying cyberbullying situations and describing strategies in hypothetical scenarios where they have experienced cyberbullying. Teaching students to recognise when to seek help in cyberbullying situations including how to be a positive bystander. 	<ul style="list-style-type: none"> Netbooks iPads Samsung Galaxy phones Digital cameras Printers Popplet (iPad app) Explain EDU (iPad app) Tilt Brush (Gear VR app).
Creating Digital Solutions	PS10: Define simple problems, and design and develop digital solutions using algorithms that involve decision making and user input	<p>PS10.1: I can use abstraction to define and explain problems, e.g. using graphic organisers in 'reading' to find the main idea and its supporting details</p> <p>PS10.2: I can implement solutions using software, e.g. visual programming languages that use graphical elements like Scratch</p> <p>PS10.3: I can record simple solutions to problems through text and diagrams that support branching, i.e. choice of options with user input</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Using Scratch to implement digital solutions using a graphical programming interface, e.g. creating an animated story or quiz in Scratch. Using Spheros to implement digital solutions using a graphical programming interface, e.g. programming the Sphero to navigate through an obstacle course. Using Google Sheets to create simple mathematical formulas, e.g. typing =RANDBETWEEN(1,10) to generate a random number between 1 and 10. <p>Without Technologies:</p> <ul style="list-style-type: none"> Creating a written flowchart that supports branching as a means of solving simple solutions to problems, e.g. problems in the yard (could also be done in mind mapping software such as Popplet). Complete graphing paper programming activities where students program each other to draw pictures (https://goo.gl/fdRrKP). Analysing and creating algorithms with conditional statements, e.g. 'if... then...' (https://goo.gl/rcb3xz). 	<ul style="list-style-type: none"> Netbooks iPads Samsung Galaxy phones Digital cameras Printers Popplet (iPad app) Explain EDU (iPad app) Tilt Brush (Gear VR app).

3.3. Digital Technologies Essential Learnings

Level 6 Achievement Standard

By the end of Level 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 collaboratively 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. They incorporate decision-making, repetition and user interface design into their designs and develop their digital solutions, including a visual program. Students explain how information systems and their developed solutions meet current and future needs taking sustainability into account.

Victorian Curriculum – Level 6 Essential Learnings

Strand	Prioritised Standard	Essential Learnings	Lesson Ideas	Suitable Technologies
Digital Systems	PS3: Explain the functions of digital system components and how digital systems are connected to form networks that transmit data	<p>PS3.1: I can describe the history of the computer, e.g. the evolution of the Internet and computer networking</p> <p>PS3.2: I can describe the role and functions of different components of a computer, e.g. Bluetooth, Apple TV, anti-virus software, infra-red technologies</p> <p>PS3.3: I can explain the process of data transmission across networks, e.g. social media, Google Drive, Microsoft Word, email</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Exploring the components of a computer in a hands-on way including naming the components and detailing the functions that they perform. <p>Without Technologies:</p> <ul style="list-style-type: none"> Completing a timeline of the history of the computer and the Internet Undertaking research into how the Internet works; Completing a flowchart of how data transmits across networks; Exploring EEEEEK - A Mouse! to explore the history of mouse engineering; Teaching students about routing and deadlock in networks through physical games (e.g. 'The Orange Game,' working together to find solutions to networking problems (see CSUnplugged, https://goo.gl/9mJXrE). 	<ul style="list-style-type: none"> Notebooks iPads.
Data and Information	PS7: Manage the creation and communication of ideas, information and digital projects collaboratively using validated data and agreed protocols	<p>PS6.1: I can validate data using software to illustrate the data visually, e.g. conditional formatting in Microsoft Excel</p> <p>PS6.2: I can investigate how data is collected, sorted and represented using survey data, e.g. Australian Bureau of Statistics (census data), SurveyMonkey</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Playing the Home Internet Survey, an interactive game designed to support students with exploring how data is collected, sorted and represented (https://goo.gl/Mn4s3r - only works in Flash); Investigating large quantities of data using the Australian Bureau of Statistics website Collecting personal survey data through SurveyMonkey and other online surveying tools. 	<ul style="list-style-type: none"> Notebooks iPads.
Creating Digital Solutions	PS11: Define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems	<p>PS11.1: I can use systems thinking to understand interrelationships, e.g. the design to solution process</p> <p>PS11.2: I can represent algorithms diagrammatically and in English</p>	<p>Without Technologies:</p> <ul style="list-style-type: none"> Creating a systems thinking diagram or an algorithmic flowchart to show all possible solutions to a given problem, whether it be a technology-related problem or otherwise. 	<ul style="list-style-type: none"> Notebooks iPads.
	PS12: Incorporate decision-making, repetition and user interface design into designs and develop digital solutions, including a visual program	<p>PS12.1: I can design solutions to problems as visual programs</p> <p>PS12.2: I can create visual programs that follow a systems thinking diagram or flowchart</p>	<p>With Technologies:</p> <ul style="list-style-type: none"> Building an app or designing a game that requires algorithmic thinking and decision-making, e.g. Gamestar Mechanic; Using Arduino kits to program and create a product using simple algorithmic rules, e.g. flashing LED lights; Creating a PowerPoint button-linked solution or game that uses branching and user input. 	<ul style="list-style-type: none"> Notebooks iPads Spheros Arduino kits SpheroEdu Scratch Gamestar Mechanic.