Introducing the Victorian Curriculum: Digital Technologies 7–10

Phil Feain – Digital Technologies
Curriculum Manager

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VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

VICTORIA State Government

Acknowledgement of Country

I would like to acknowledge the traditional custodians of the many lands across Victoria on which each of you are living, learning and working from today.

For myself and those of us in the Melbourne metropolitan area, we acknowledge the traditional custodians of the Kulin Nations.

When acknowledging country, we recognise Aboriginal and Torres Strait Islander peoples' spiritual and cultural connection to country and acknowledge their continued care of the lands and waterways over generations, while celebrating the continuation of a living culture that has a unique role in this region.

I would like to pay my respects to Elders past, present and emerging, for they hold the memories, traditions, culture and hopes of all Aboriginal and Torres Strait Islander peoples across the nation, and hope they will walk with us on our journey.

Outline of the session

The session will explore:

- the aims of the curriculum
- how it is structured
- where to find both curriculum documentation and support resources
- and how to assess against the Achievement Standards.

Aims

Aims of the Digital Technologies curriculum

The Digital Technologies curriculum aims to ensure that students can:

- 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.

DT vs dt vs ICT

Digital Technologies

- Provides students with the opportunity to acquire and apply specific ways of thinking about problem solving to create innovative, purpose-designed digital solutions.
- It is a way of analysing problems and precisely and logically designing solutions that can be understood and carried out through the use of programming languages. Design and systems thinking also contribute to the problem-solving approach in this curriculum.

digital technologies

- These are the digital resources, such as tablets, notebooks, cameras, phones and data probes that allow data and information to be manipulated, stored and communicated.

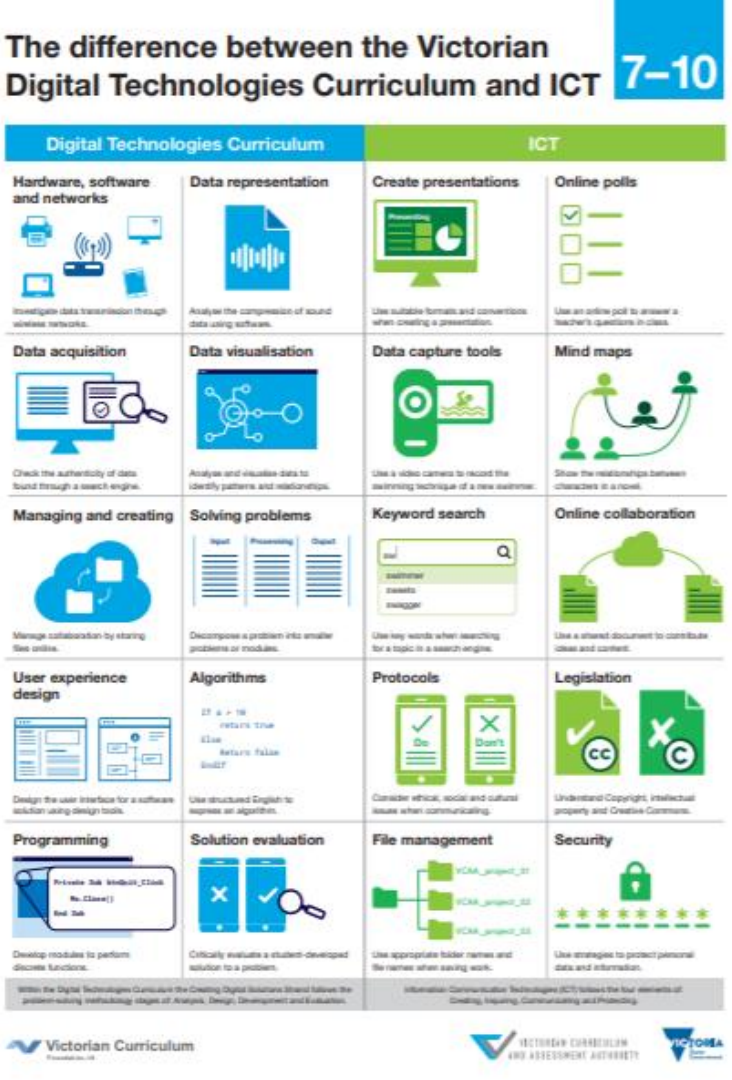
ICT

- Involves developing students as confident users and consumers of digital systems.

Digital Technologies vs ICT

- This poster was developed to show the difference between the Digital Technologies Curriculum and ICT.
- It provides examples of the Digital Technologies Curriculum and ICT.
- This is to help teachers to visualise the content of each.

https://www.vcaa.vic.edu.au/curriculum/foundation-10/resources/digital-technologies/Pages/Help-me-find-a-teaching-resource.aspx



Ways of thinking

Known as the ways of thinking there are three types of thinking:

- computational thinking
- design thinking
- systems thinking

This forms the basis of problem-solving where students learn to:

- **analyse** a problem or need
- **design** a solution to a problem or a need
- **develop** the solution
- **evaluate** the solution to see if it met requirements

This works well with the Creating Digital Solutions strand.

Ways of thinking

Computational thinking:

- decomposition – breaking the problem down
- organising data logically
- developing algorithms

Design thinking:

- generating creative and innovative ideas
- mock-ups, prototypes, etc.
- analysing and evaluating ideas against criteria

Systems thinking:

- interactions and interrelationships between components, devices and people are analysed

Structure

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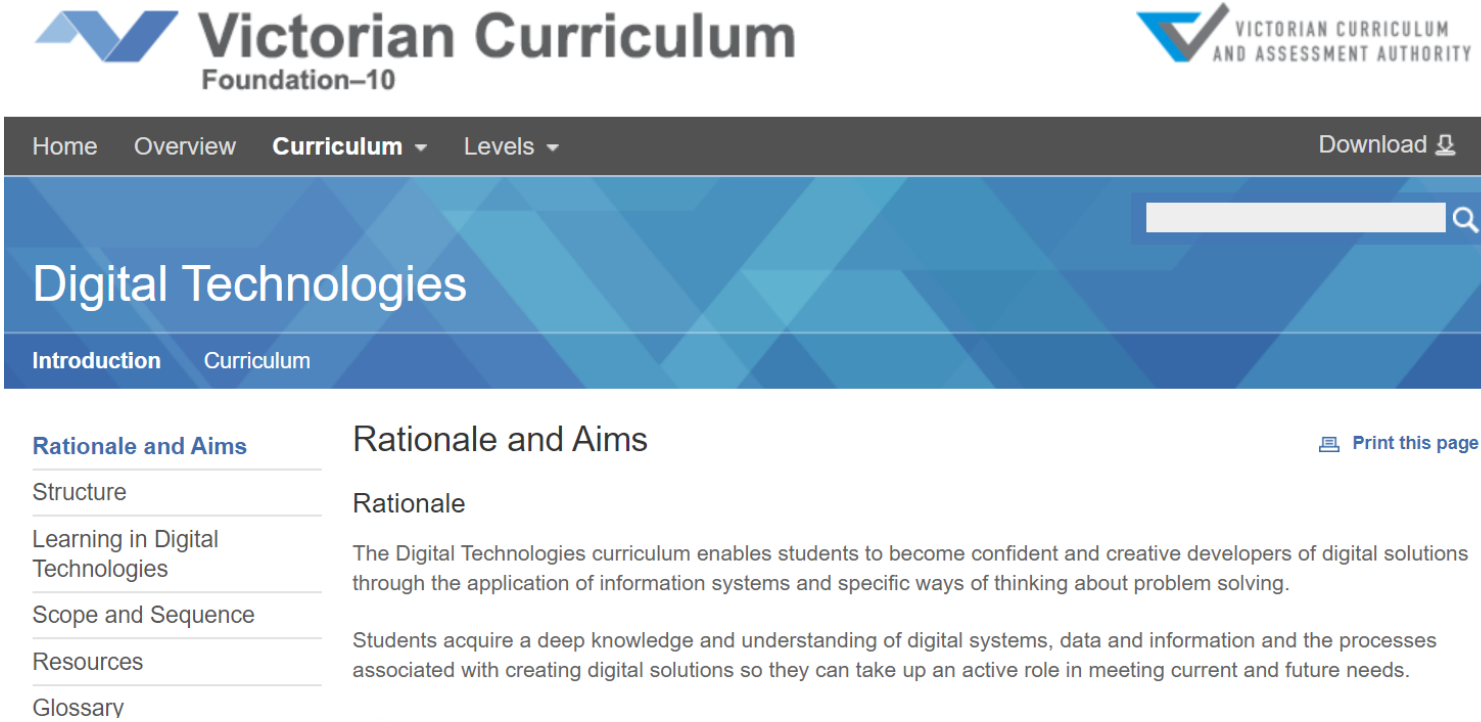
https://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/introduction/rationale-and-aims

Digital Technologies Curriculum



Scope and Sequence F–10

Foundation – Level 2	Levels 3 and 4	Levels 5 and 6	Levels 7 and 8	Levels 9 and 10
Digital Systems				
Identify and explore digital systems (hardware and software components) for a purpose	Explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data	Examine the main components of common digital systems, and how such digital systems may connect together to form networks to transmit data	Investigate how data are transmitted and secured in wired, wireless and mobile networks	Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems
Data and Information				
Recognise and explore patterns in data and represent data as pictures, symbols and diagrams	Recognise different types of data and explore how the same data can be represented in different ways	Examine how whole numbers are used as the basis for representing all types of data in digital systems	Investigate how digital systems represent text, image and sound data in binary	Analyse simple compression of data and how content data are separated from presentation
Collect, explore and sort data, and use digital systems to present the data creatively	Collect, access and present different types of data using simple software to create information and solve problems	Acquire, store and validate different types of data and use a range of software to interpret and visualise data to create information	Acquire data from a range of sources and evaluate their authenticity, accuracy and timeliness	Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements
Independently and with others create and organise ideas and information using information systems, and share these with known people in safe online environments	Individually and with others, plan, create and communicate ideas and information safely, applying agreed ethical and social protocols	Plan, create and communicate ideas, information and online collaborative projects, applying agreed ethical, social and technical protocols	Analyse and visualise data using a range of software to create information, and use structured data to model objects or events	Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data
			Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account	Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities
Creating Digital Solutions				
Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems	Define simple problems, and describe and follow a sequence of steps and decisions involving branching and user input (algorithms) needed to solve them	Define problems in terms of data and functional requirements, drawing on previously solved problems to identify similarities	Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints	Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs
		Design a user interface for a digital system, generating and considering alternative design ideas	Design the user experience of a digital system, generating, evaluating and communicating alternative designs	Design the user experience of a digital system, evaluating alternative designs against criteria including functionality, accessibility, usability and aesthetics
		Design, modify and follow simple algorithms represented diagrammatically and in English, involving sequences of steps, branching, and iteration	Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors	Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases
	Develop simple solutions as visual programs	Develop digital solutions as simple visual programs	Develop and modify programs with user interfaces involving branching, iteration and functions using a general-purpose programming language	Develop modular programs, applying selected algorithms and data structures including using an object-oriented programming language
Explore how people safely use common information systems to meet information, communication and recreation needs	Explain how student-developed solutions and existing information systems meet common personal, school or community needs	Explain how student-developed solutions and existing information systems meet current and future community and sustainability needs	Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability	Evaluate critically how well student-developed solutions and existing information systems and policies take account of future risks and sustainability and provide opportunities for innovation
Achievement Standard				
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https://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/introduction/scope-and-sequence

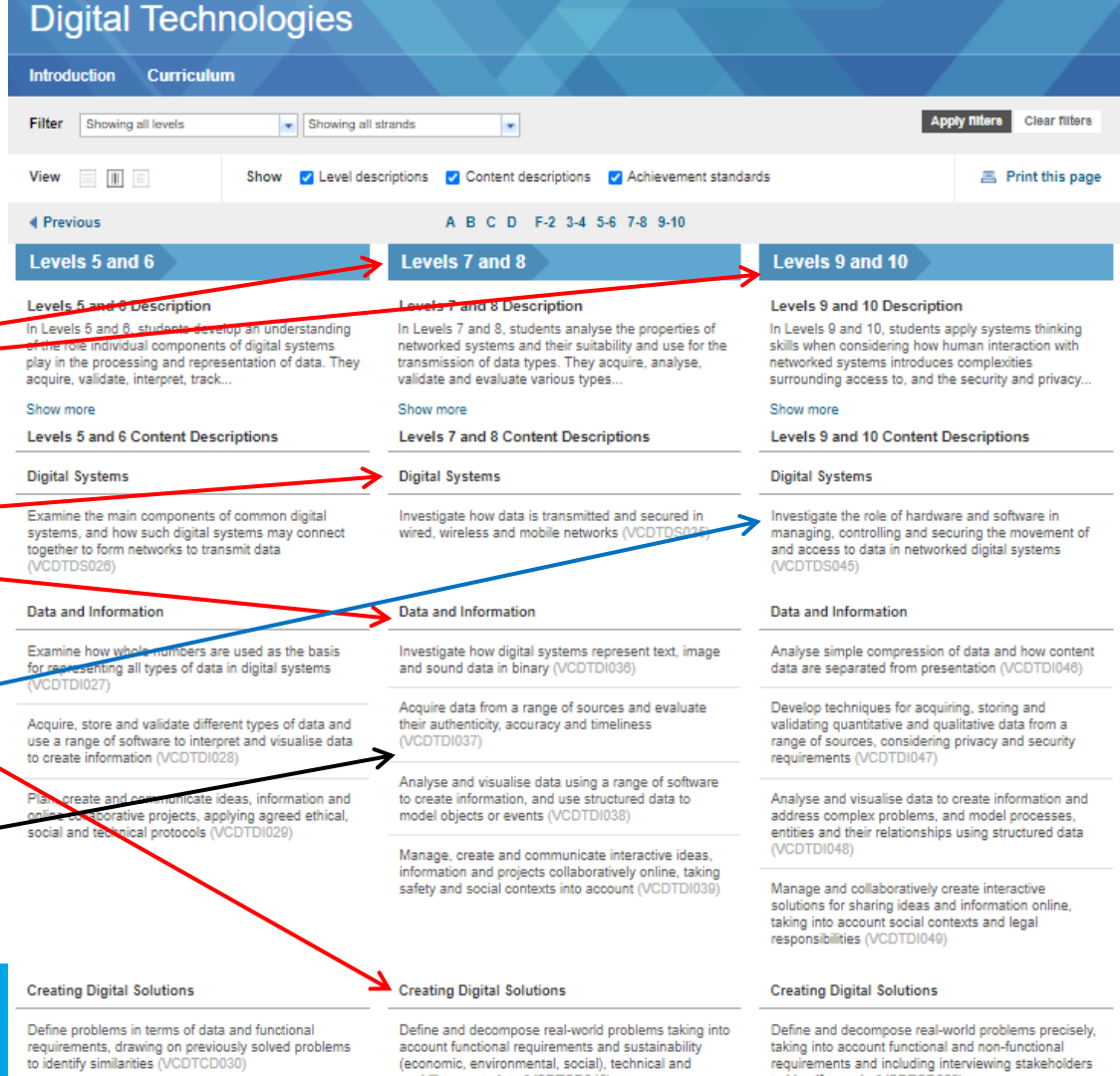
Components

Bands

Strands

Content Descriptions

Link to Elaborations



Content Descriptions

Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors

Elaborations

Digital Technologies / Levels 7 and 8 / Creating Digital Solutions

Content description	Elaborations
Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors	• 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

Code

VCDTCD042

ScOT catalogue terms

Diagrams; Predictions (Science); Trial and error; Algorithms

Strands

Strands	Digital Systems	Data and Information	Creating Digital Solutions
	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.	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.	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.

Digital Systems

Victorian Curriculum
Foundation–10

Digital Technologies: Foundation – Level 10

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Continuum

Data and Information

Victorian Curriculum
Foundation–10

Digital Technologies: Foundation – Level 10

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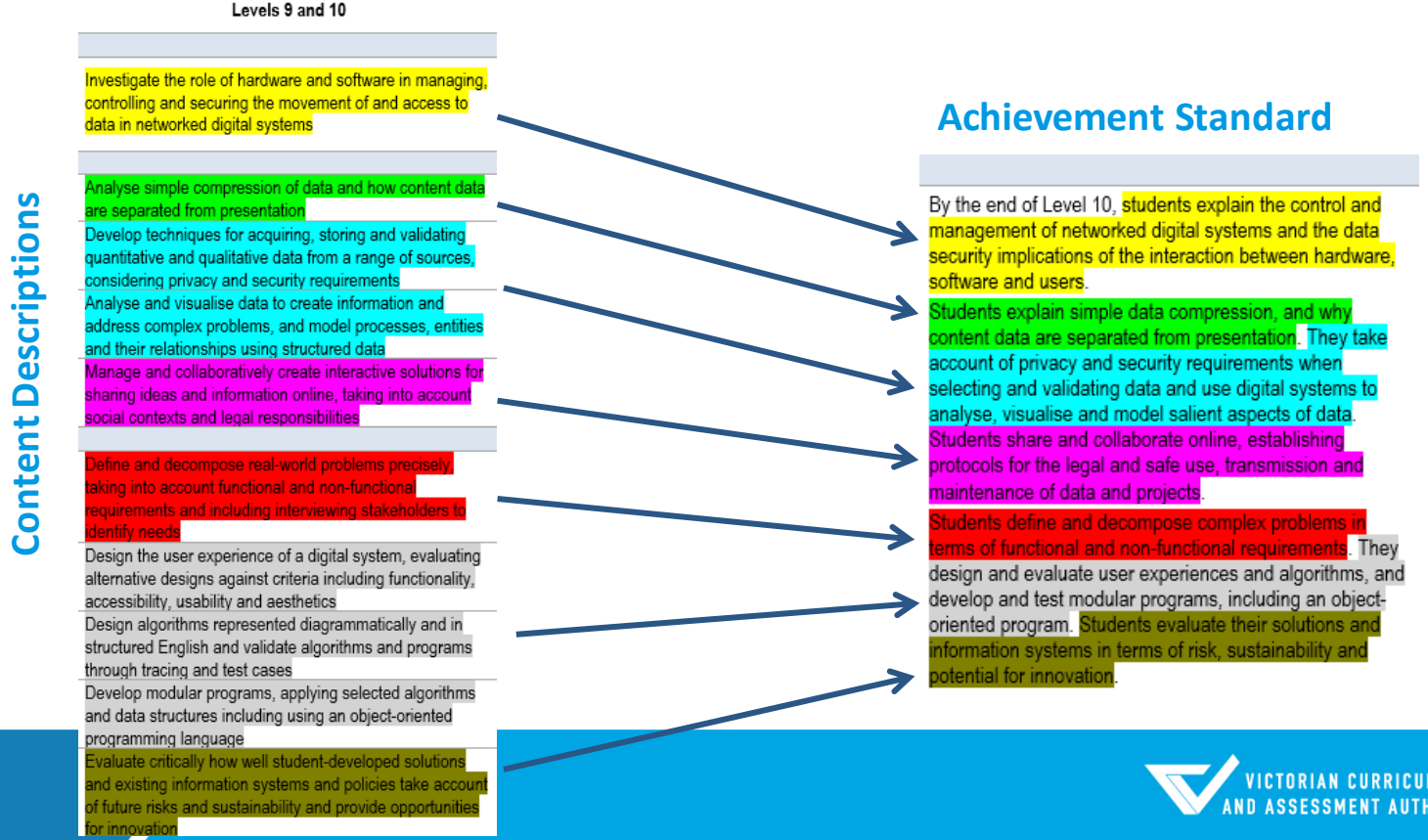
Continuum

Achievement Standards



Achievement Standards

Levels 7 and 8	Levels 9 and 10
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Assessing against the Achievement Standards – Example (7–8)

Achievement Standard extract

By the end of Level 8, students distinguish between different types of networks and their suitability in meeting defined purposes.

Content Description

Investigate how data is transmitted and secured in wired, wireless and mobile networks (VCDTDS035)

Idea for an assessment activity

Students draw a diagram of their home or school network using symbols to show the network components (such as servers, routers, printers, devices, transmission media) and show transmission rates. This can be hand drawn or completed using drawing software.

Assessing against the Achievement Standards – Example (7–8)

Ideas for delivery of unit

- Identify and describe different types of network components for both wired and wireless networks. Network components should include servers, routers, switches, devices such as desktop computers, laptops or tablet devices, and printers.
- As part of the description discuss what each component is used for and how it works.
- Draw simple diagrams of each of the components using symbols.
- Identify and describe a range of transmission media for wired, wireless and mobile networks.
- Include the transmission rates for each of the transmission media.
- Provide examples of where each of the transmission media would be used.

Questions

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Programming

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General-purpose programming (7–8)

python-drawing_shapes.py

```
# Program to draw a variety of shapes
# Eduard Schaepman 2017

from turtle import *

# Draw a square
def drawSquare (numSides):
    print ('Drawing a square.')
    while numSides > 0:
        numSides = numSides - 1
        forward(50)
        left(90)

# Main part of program
def main():

    # Ask user to enter the number of sides of the shape to draw
    numSides = int(input('Number of sides: '))

    # Determine what shape to draw
    if (numSides == 4):
        drawSquare(numSides) # Draw a square
    else:
        # Display a message when program can't draw a particular shape.
        print ("Can't draw a shape with", numSides, "sides.")

# Start the program
main()

```

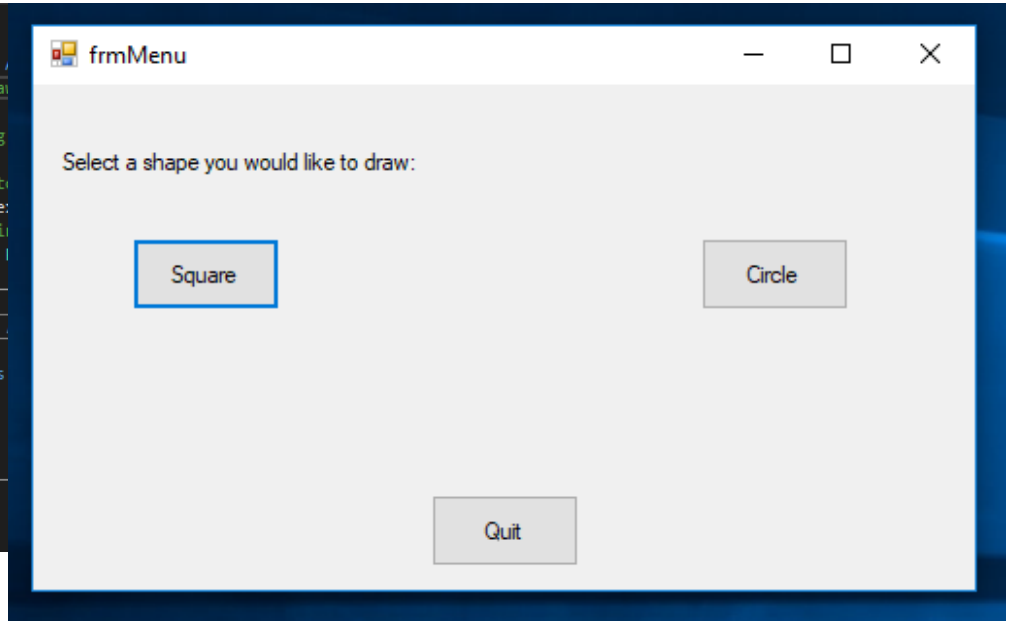
Levels 7 and 8

– Using Python
– **branching** using IF…ELSE statements
– **iteration** using a WHILE statement
– using **functions**

Example provided by Specialist Teacher - Eduard Schaepman

Object-oriented programming (9–10)

```
1   Public Class frmMenu
2
3       Private Sub btnSquare_Click(sender
4           'Activate the form that the dra
5           frmShapeDisplay.Activate()
6           'Show the form that the drawing
7           frmShapeDisplay.Show()
8           'Change the text of the label t
9           frmShapeDisplay.lblShapeName.Te
10          'Call the 'DrawSquare' subrouti
11          frmShapeDisplay.DrawSquare(New
12      End Sub
13
14      Private Sub btnCircle_Click(sender
24
25      Private Sub btnQuit_Click(sender As
26          Me.Close()
27      End Sub
28
29  End Class
```



Levels 9 and 10

– Using Visual Basic

– developing **modular programs**

– need to apply selected **algorithms** and **data structures**

Example provided by Specialist Teacher - Eduard Schaepman

Curriculum planning support resources

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

VICTORIA State Government

https://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/introduction/rationale-and-aims

Glossary

- A six page glossary for Digital Technologies is available on the Victorian Curriculum F–10 website for Digital Technologies.
- The glossary defines a list of terminology that is relevant to the learning area.
- Teachers are encouraged to make themselves familiar with this terminology.

Digital Technologies Glossary

Abstraction

The process of reducing complexity to formulate generalised ideas or concepts, for example reducing a computing problem to its fundamental concepts.

Algorithm

A description of the steps and decisions required to solve a problem. For example, to find the largest number in a list of positive numbers:

1. Note the first number as the largest
2. Look through the remaining numbers, in turn, and if a number is larger than the number found in 1, note it as the largest.
3. Repeat this process until complete. The last noted number is the largest in the list.

Flowcharts are often useful in visualising an algorithm.

Binary

The use of two states or permissible values to represent data, such as the on and off position of a light switch or the transistors in a computer silicon chip that can be in either the electrical state of ON or OFF.

Binary data are typically represented as a series of single digits referred to as binary digits (or bits) due to each taking on the value of either 0 or 1. For example, if we wanted to represent a four-colour system (e.g. CMYK - cyan, magenta, yellow, and key (black)) in binary the two-digit codes 00, 01, 10 and 11 could be used.

Branching

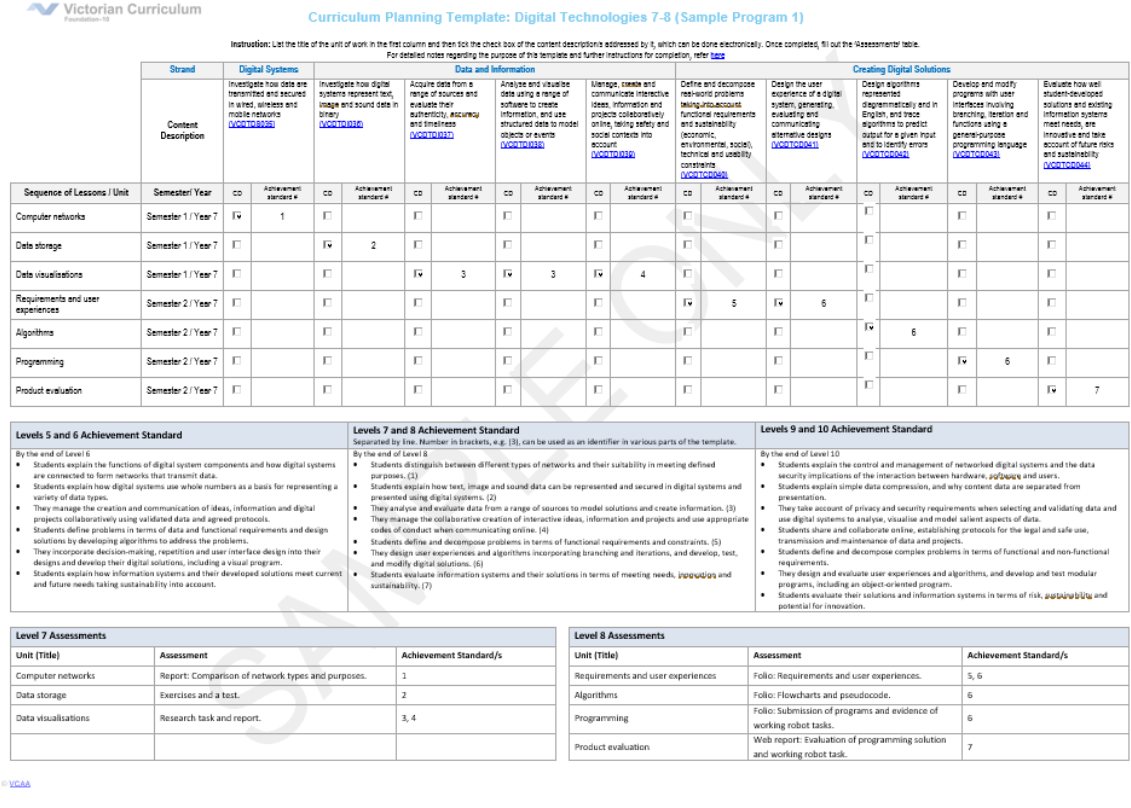
Branching occurs when an algorithm makes a choice to do one of two or more actions depending on sets of conditions and the data provided.

diagram illustrating branching

https://www.vcaa.vic.edu.au/curriculum/foundation-10/resources/digital-technologies/Pages/Help-me-find-a-teaching-resource.aspx

Curriculum planning templates

- These resources demonstrate the coverage of the content descriptions in a number of units taught across a two-year planning cycle.
- Each unit is linked to extracts from the achievement standard and outlines assessment strategies.
- There are three samples for each band.



Victorian Curriculum

Curriculum Planning Template: Digital Technologies 7-8 (Sample Program 1)

Instruction: List the title of the unit of work in the first column and then tick the check box of the content description/s addressed by it, which can be done electronically. Once completed, fill out the 'Assessments' table.
For detailed notes regarding the purpose of this template and further instructions for completion, refer here

Strand	Digital Systems		Data and Information								Creating Digital Solutions									
Content Description	Investigate how data are transmitted and secured in wired, wireless and mobile networks (VCDTDI035)		Investigate how digital systems represent text, image and sound data in binary (VCDTDI034)		Acquire data from a range of sources and evaluate their authenticity, accuracy and timeliness (VCDTDI037)		Analyse and visualise data using a range of software to create information, and use structured data to model objects or events (VCDTDI038)		Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account (VCDTDI039)		Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints (VCDTDD040)		Design the user experience of a digital system, generating, evaluating and communicating alternative designs (VCDTDD041)		Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (VCDTDD042)		Develop and modify programs with user interfaces involving branching, iteration and functions using a general-purpose programming language (VCDTDD043)		Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability (VCDTDD044)	
Sequence of Lessons / Unit	Semester/ Year	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #
Computer networks	Semester 1 / Year 7	☑	1	☐		☐		☐		☐		☐		☐		☐		☐		☐	
Data storage	Semester 1 / Year 7	☐		☑	2	☐		☐		☐		☐		☐		☐		☐		☐	
Data visualisations	Semester 1 / Year 7	☐		☐		☑	3	☑	3	☑	4	☐		☐		☐		☐		☐	
Requirements and user experiences	Semester 2 / Year 7	☐		☐		☐		☐		☐		☑	5	☑	6	☐		☐		☐	
Algorithms	Semester 2 / Year 7	☐		☐		☐		☐		☐		☐		☐		☑	6	☐		☐	
Programming	Semester 2 / Year 7	☐		☐		☐		☐		☐		☐		☐		☐		☑	6	☐	
Product evaluation	Semester 2 / Year 7	☐		☐		☐		☐		☐		☐		☐		☐		☐		☑	7

Levels 5 and 6 Achievement Standard	Levels 7 and 8 Achievement Standard Separated by line. Number in brackets, e.g. (3), can be used as an identifier in various parts of the template.	Levels 9 and 10 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.	By the end of Level 8 • Students distinguish between different types of networks and their suitability in meeting defined purposes. (1) • Students explain how text, image and sound data can be represented and secured in digital systems and presented using digital systems. (2) • They analyse and evaluate data from a range of sources to model solutions and create information. (3) • They manage the collaborative creation of interactive ideas, information and projects and use appropriate codes of conduct when communicating online. (4) • Students define and decompose problems in terms of functional requirements and constraints. (5) • They design user experiences and algorithms incorporating branching and iterations, and develop, test, and modify digital solutions. (6) • Students evaluate information systems and their solutions in terms of meeting needs, opportunities and sustainability. (7)	By the end of Level 10 • Students explain the control and management of networked digital systems and the data security implications of the interaction between hardware, software and users. • Students explain simple data compression, and why content data are separated from presentation. • They take account of privacy and security requirements when selecting and validating data and use digital systems to analyse, visualise and model salient aspects of data. • Students share and collaborate online, establishing protocols for the legal and safe use, transmission and maintenance of data and projects. • Students define and decompose complex problems in terms of functional and non-functional requirements. • They design and evaluate user experiences and algorithms, and develop and test modular programs, including an object-oriented program. • Students evaluate their solutions and information systems in terms of risk, sustainability and potential for innovation.

Level 7 Assessments		
Unit (Title)	Assessment	Achievement Standard/s
Computer networks	Report: Comparison of network types and purposes.	1
Data storage	Exercises and a test.	2
Data visualisations	Research task and report.	3, 4

Level 8 Assessments		
Unit (Title)	Assessment	Achievement Standard/s
Requirements and user experiences	Folio: Requirements and user experiences.	5, 6
Algorithms	Folio: Flowcharts and pseudocode.	6
Programming	Folio: Submission of programs and evidence of working robot tasks.	6
Product evaluation	Web report: Evaluation of programming solution and working robot task.	7

https://www.vcaa.vic.edu.au/curriculum/foundation-10/resources/digital-technologies/Pages/Help-me-find-a-teaching-resource.aspx

Curriculum area plans

These resources provide a visual representation of how the Digital Technologies curriculum could be covered across two years, showing the units by topic, the sequencing of the topics, the coverage of the three strands within the Digital Technologies curriculum and the time allocated to each strand and unit. There are three samples for each band. These are developed from the Curriculum Planning Templates.

Curriculum Area Plan: Digital Technologies - Years 7 and 8 (Sample Program 1)

	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Year 7	Semester 1	Data transmission – 7.1.1					Digital systems investigation – 7.1.2				Acquiring data – 7.1.3		Analyse and visualise data – 7.1.4			Manage, create and communicate ideas – 7.1.5			
		Computer networks					Data storage				Data visualisations								
	Semester 2	Decompose problems – 7.2.1	Design user experience – 7.2.2		Design algorithms – 7.2.3				Develop and modify programs – 7.2.4									Evaluate solutions – 7.2.5	
		Requirements and user experience			Algorithms				Programming									Product evaluation	
Year 8	Semester 1																		
	Semester 2																		
	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

* Based on 2 x 45 minutes teaching time per week

Key: Digital Systems | Data and Information | Creating Digital Solutions | Topic, level, semester, sequence

Lesson planning support resources

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

VICTORIA State Government

https://www.vcaa.vic.edu.au/curriculum/foundation-10/resources/digital-technologies/Pages/Help-me-find-a-teaching-resource.aspx

Unpacking Content Descriptions

- When curriculum planning, one of the most important aspects for teachers is to connect the intention of the lesson/s with the appropriate content descriptions and to enable students to demonstrate progress in their learning based upon the achievement standards.

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

LEVEL 9 - 10

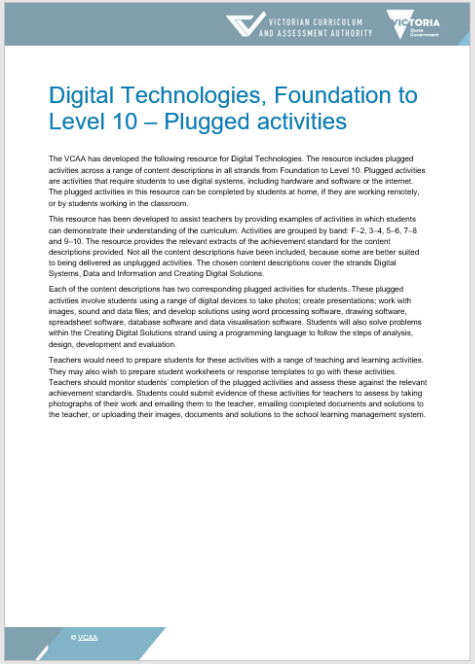
Digital Technologies: Unpacking the Content Descriptions

Strand	Digital Systems
Content Description	Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems
Related extract from Achievement Standard	Students explain the control and management of networked digital systems and the data security implications of the interaction between hardware, software and users.
Suggested focus	Lessons may focus on: • investigation of different types of networks and security features • characteristics of key hardware and software components • communication protocols and standards • transmission media • network configurations • visual representation of common networks • security implications of the network and user levels

Sample activities
• communicating with each other using simple physical devices and protocols • investigating the history and development of the Internet • investigating two different operating systems with regards to characteristics, such as security, processing and storage • demonstrating an understanding of packet switching, routing and protocols • evaluating the advantages and disadvantages of different transmission media used in networks, for example Wi-Fi, Ethernet and fibre-optic • listening to a talk by the school's IT Manager about the school network and how data is secured • using Visio to create a network map of a building in the school, clearly identifying network configuration, devices and transmission media • making recommendations concerning the security implications for a sample network

https://www.vcaa.vic.edu.au/curriculum/foundation-10/resources/digital-technologies/Pages/CurriculumAdviceforRemoteandFlexibleLearning.aspx

Plugged and unplugged activities



VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

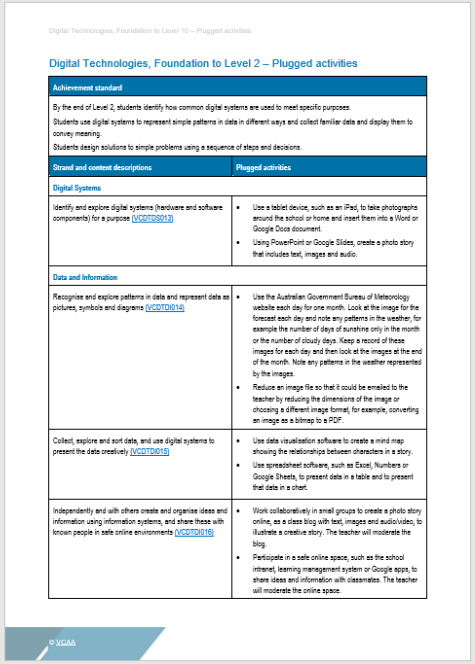
Digital Technologies, Foundation to Level 10 – Plugged activities

The VCAA has developed the following resource for Digital Technologies. The resource includes plugged activities across a range of content descriptions in all strands from Foundation to Level 10. Plugged activities are activities that require students to use digital systems, including hardware and software or the internet. The plugged activities in this resource can be completed by students at home, if they are working remotely, or by students working in the classroom.

This resource has been developed to assist teachers by providing examples of activities in which students can demonstrate their understanding of the curriculum. Activities are grouped by band: F–2, 3–4, 5–6, 7–8 and 9–10. The resource provides the relevant extracts of the achievement standard for the content descriptions provided. Not all the content descriptions have been included, because some are better suited to being delivered as unplugged activities. The chosen content descriptions cover the strands Digital Systems, Data and Information and Creating Digital Solutions.

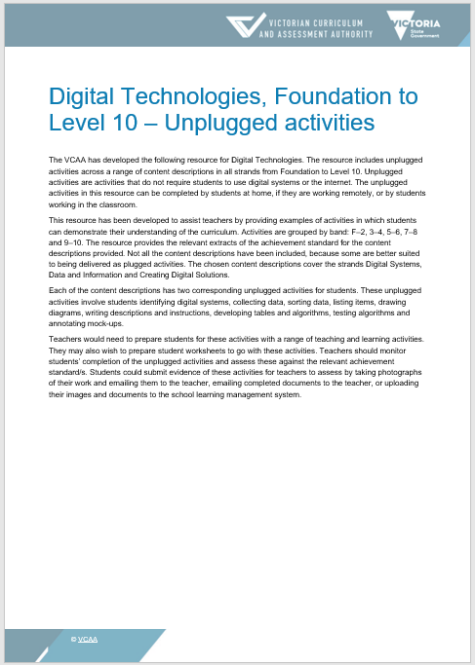
Each of the content descriptions has two corresponding plugged activities for students. These plugged activities involve students using a range of digital devices to take photos; create presentations; work with images, sound and data files; and develop solutions using word processing software, drawing software, spreadsheet software, database software and data visualisation software. Students will also solve problems within the Creating Digital Solutions strand using a programming language to follow the steps of analysis, design, development and evaluation.

Teachers would need to prepare students for these activities with a range of teaching and learning activities. They may also wish to prepare student worksheets or response templates to go with these activities. Teachers should monitor students' completion of the plugged activities and assess these against the relevant achievement standard/s. Students could submit evidence of these activities for teachers to assess by taking photographs of their work and emailing them to the teacher, emailing completed documents and solutions to the teacher, or uploading their images, documents and solutions to the school learning management system.



Digital Technologies, Foundation to Level 2 – Plugged activities

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.	
Strand and content descriptions	**Plugged activities**
Digital Systems	
Identify and explore digital systems (hardware and software components) for a purpose (VCDTDS013)	• Use a tablet device, such as an iPad, to take photographs around the school or home and insert them into a Word or Google Docs document. • Using PowerPoint or Google Slides, create a photo story that includes text, images and audio.
Data and Information	
Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (VCDTDI014)	• Use the Australian Government Bureau of Meteorology website each day for one month. Look at the image for the forecast each day and note any patterns in the weather, for example the number of days of sunshine only in the month or the number of cloudy days. Keep a record of these images for each day and then look at the images at the end of the month. Note any patterns in the weather represented by the images. • Reduce an image file so that it could be emailed to the teacher by reducing the dimensions of the image or choosing a different image format, for example, converting an image as a bitmap to a PDF.
Collect, explore and sort data, and use digital systems to present the data creatively (VCDTDI015)	• Use data visualisation software to create a mind map showing the relationships between characters in a story. • Use spreadsheet software, such as Excel, Numbers or Google Sheets, to present data in a table and to present that data in a chart.
Independently and with others create and organise ideas and information using information systems, and share these with known people in safe online environments (VCDTDI016)	• Work collaboratively in small groups to create a photo story online, as a class blog with text, images and audio/video, to illustrate a creative story. The teacher will moderate the blog. • Participate in a safe online space, such as the school intranet, learning management system or Google apps, to share ideas and information with classmates. The teacher will moderate the online space.



VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

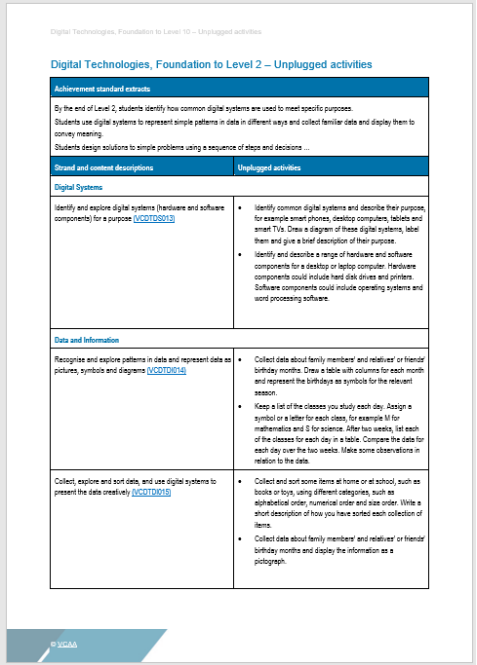
Digital Technologies, Foundation to Level 10 – Unplugged activities

The VCAA has developed the following resource for Digital Technologies. The resource includes unplugged activities across a range of content descriptions in all strands from Foundation to Level 10. Unplugged activities are activities that do not require students to use digital systems or the internet. The unplugged activities in this resource can be completed by students at home, if they are working remotely, or by students working in the classroom.

This resource has been developed to assist teachers by providing examples of activities in which students can demonstrate their understanding of the curriculum. Activities are grouped by band: F–2, 3–4, 5–6, 7–8 and 9–10. The resource provides the relevant extracts of the achievement standard for the content descriptions provided. Not all the content descriptions have been included, because some are better suited to being delivered as plugged activities. The chosen content descriptions cover the strands Digital Systems, Data and Information and Creating Digital Solutions.

Each of the content descriptions has two corresponding unplugged activities for students. These unplugged activities involve students identifying digital systems, collecting data, sorting data, listing items, drawing diagrams, writing descriptions and instructions, developing tables and algorithms, testing algorithms and annotating mock-ups.

Teachers would need to prepare students for these activities with a range of teaching and learning activities. They may also wish to prepare student worksheets to go with these activities. Teachers should monitor students' completion of the unplugged activities and assess these against the relevant achievement standard/s. Students could submit evidence of these activities for teachers to assess by taking photographs of their work and emailing them to the teacher, emailing completed documents to the teacher, or uploading their images and documents to the school learning management system.



Digital Technologies, Foundation to Level 2 – Unplugged activities

Achievement standard extracts	
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 …	
Strand and content descriptions	**Unplugged activities**
Digital Systems	
Identify and explore digital systems (hardware and software components) for a purpose (VCDTDS012)	• Identify common digital systems and describe their purpose, for example smart phones, desktop computers, tablets and smart TVs. Draw a diagram of these digital systems, label them and give a brief description of their purpose. • Identify and describe a range of hardware and software components for a desktop or laptop computer. Hardware components could include hard disk drives and printers. Software components could include operating systems and word processing software.
Data and Information	
Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (VCDTDI014)	• Collect data about family members' and relatives' or friends' birthday months. Draw a table with columns for each month and represent the birthdays as symbols for the relevant season. • Keep a list of the classes you study each day. Assign a symbol or a letter for each class, for example M for mathematics and S for science. After two weeks, list each of the classes for each day in a table. Compare the data for each day over the two weeks. Make some observations in relation to the data.
Collect, explore and sort data, and use digital systems to present the data creatively (VCDTDI015)	• Collect and sort some items at home or at school, such as books or toys, using different categories, such as alphabetical order, numerical order and size order. Write a short description of how you have sorted each collection of items. • Collect data about family members' and relatives' or friends' birthday months and display the information as a pictograph.

Example of unplugged activities (7–8)

Strand and content descriptions	Unplugged activities
Digital Systems	
Investigate how data is transmitted and secured in wired, wireless and mobile networks (VCDTDS035)	• Draw a simple diagram of your home or school network using symbols to show the wireless router, laptops or tablet devices and printers. Indicate whether devices are connected wirelessly. • Describe the purpose of the network components such as routers, hubs, switches and bridges. In the description include their characteristics and capabilities. You could also create a network diagram using these components.

Example of plugged activities (9–10)

Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (VCDTCD050)	• Use software such as Word, Pages or Google Docs to develop a set of questions to ask your teacher when interviewing them to clarify their needs and requirements for the software solution. Interview your teacher and record the responses. • Refer to the responses from the interview above and use software such as Word, Pages or Google Docs to list and describe the functional and non-functional requirements of the proposed software solution in a table for each.

Unit plan ideas

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Digital Technologies, Foundation to Level 10 – Unit plan ideas

The VCAA has developed the following resource for Digital Technologies. The resource includes unit plans that cover one strand and its associated content descriptions from Foundation to Level 10. The unit plans include ideas for learning activities and assessment activities that could be completed by students at home, if they are working remotely, or by students working in the classroom.

This resource has been developed to assist teachers with ideas for planning and delivering a series of lessons that meet the content descriptions and then assessing student work against the relevant achievement standard. The unit plans are grouped by band: F–2, 3–4, 5–6, 7–8 and 9–10. Each unit plan covers one strand: Digital Systems, Data and Information, or Creating Digital Solutions. Relevant extracts from the achievement standard have been provided.

Each of the unit plans includes a sample timeline and ideas for lesson activities and assessment activities. Each unit plan also contains a link to the relevant VCAA curriculum area plan resource, for teachers who want to develop units of work based on these resources.

The ideas in these unit plans involve students identifying and exploring hardware, software and network components, transmission media and network security; drawing diagrams; listing items and writing descriptions; recording their voice; conducting surveys; using spreadsheets; collaborating online; using computational and design thinking involving problem solving to determine requirements; interviewing stakeholders; generating designs and evaluation criteria; designing algorithms; developing programs; and evaluating solutions.

Teachers would need to prepare students before delivering a unit of work based on these unit plans. They could use a range of teaching and learning activities (see the Plugged activities and Unplugged activities on the Digital Technologies Curriculum advice for remote and flexible learning page). They may also wish to prepare student worksheets to go with the ideas in the unit plans.

Teachers should monitor students' completion of a unit of work and assess against the relevant achievement standard. Students could submit evidence for teachers to assess by taking photographs of their work and emailing them to the teacher; emailing completed documents or solutions to the teacher; or uploading images and documents to the school learning management system.

Digital Technologies, Levels 9 and 10 – Unit plan ideas

Achievement standard extracts
By the end of Level 10, ... Students define and decompose complex problems in terms of functional and non-functional requirements. They design and evaluate user experiences and algorithms, and develop and test modular programs, including an object-oriented program. Students evaluate their solutions and information systems in terms of risk, sustainability and potential for innovation.

Strand and content descriptions
Creating Digital Solutions Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (VCDTCD050) Design the user experience of a digital system, evaluating alternative designs against criteria including functionality, accessibility, usability and aesthetics (VCDTCD051) Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases (VCDTCD052) Develop modular programs, applying selected algorithms and data structures including using an object-oriented programming language (VCDTCD053) Evaluate critically how well student-developed solutions and existing information systems and policies take account of future risks and sustainability and provide opportunities for innovation (VCDTCD054)

Ideas for delivery of unit	
The unit may have 3 × 45-minute lessons each week over nine weeks.	
Week 1: Decompose problems	• Introduce students to breaking down complex problems into smaller problems. • Define functional and non-functional requirements in developing a solution. • Students interview stakeholders to identify their needs and the functional and non-functional requirements of the solution. • Assessment activity (refer to the assessment activities below).
Week 2: Design the user experience	• Create two or more designs of user interfaces for an app or a game. • Develop evaluation criteria for selecting the best design. • Consider a wide range of users, including people with disabilities. • Assessment activity (refer to the assessment activities below).
Week 3: Design algorithms	• Create simple algorithms and reuse control structures. • Design algorithms that use functions and data structures. • Define the rules of Structured English (pseudocode). • Develop algorithms that incorporate basic object-oriented programming concepts, such as calling a method and using object properties. • Test the expected output of algorithms using tracing and desk checking, making modifications and recording results. • Assessment activity (refer to the assessment activities below).

Weeks 4–8: Develop modular programs	• Review a general-purpose programming language by creating functions with arguments that return a value. • Identify and record the objects, events and properties in favourite games or apps. • Describe how methods are used in a simple program. • Create more complex programs that use methods and object properties. • Create modules that use classes, methods and object properties. • Progressively test the functionality of the program using a testing table to check actual output versus expected output and make modifications to the module where appropriate. • Assessment activity (refer to the assessment activities below).
Week 9: Evaluate student-developed solutions	• Discuss how the student-developed solution meets the functional and non-functional requirements of the stakeholder. • Investigate sustainability issues with digital solutions, such as e-waste, compatibility, energy use and redundancy. • Compare student-developed solutions with existing products and discuss potential room for innovation. • Develop evaluation criteria as a class to assess student-developed solutions that take into account user experience, original requirements and accessibility. • Assessment activity (refer to the assessment activities below).

Ideas for assessment activities	
Pre-test	• A simple written test on terminology and concepts from the Levels 7 and 8 Creating Digital Solutions strand
Decompose problems	• A written test on terminology and concepts • A written report on a game or application proposal that includes functional and non-functional requirements • A visual diagram showing the top-down design of a complex problem • A transcript of an interview with a stakeholder discussing their needs and identifying their functional and non-functional requirements
Design the user experience	• A written report of a specification of a software solution to be developed • A table with a list of evaluation criteria used to evaluate the completed software solution • Two or more mock-ups of the proposed user interfaces • A written report evaluating the mock-ups and a justification of the chosen mock-up to be created as a software solution
Design algorithms	• A written test on rules of flowcharts and Structured English • A workbook with algorithm solutions to given tasks in class • A portfolio of student-developed algorithms, including tracing and modifications

Develop modular programs	• A written test on terminology and concepts • A portfolio of working software solutions and testing tables for each modular program • An annotated visual report of a student's analysis of an existing game or application • A student proposal for a developed game or application
Evaluate student-developed solutions	• A written test on sustainability issues with digital technologies • A written report comparing student-developed solutions with existing solutions • A written evaluation report containing an evaluation table and conclusion that assesses a student's developed solution against the functional and non-functional requirements and the stakeholder's needs

Link to curriculum area plan
DigiTech 9–10 Curriculum Area Plan Sample Program 1 www.vcaa.vic.edu.au/curriculum/foundation-10/resources/digital-technologies/Pages/Help-me-find-a-teaching-resource.aspx

Contacts

Phil Feain

Digital Technologies Curriculum Manager

Ph: 9059 5146

Email: Philip.Feain@education.vic.gov.au or vcaa.f10.curriculum@education.vic.gov.au

For further advice about the implementation of the F–10 curriculum in Victorian schools, including developments, resources and professional learning opportunities, please subscribe to the F–10 Curriculum Update:
https://www.vision6.com.au/em/forms/subscribe.php?db=399327&s=112201&a=18689&k=799b5d6

Questions

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

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