The Victorian Curriculum

Digital Technologies (DLTV/VCAA)

Introduction to the Digital Technologies curriculum(F-10)

Webinar – 8 February 2018

Steve Allen – VCAA Specialist Teacher (Glenroy West PS)
Darrel Branson – VCAA Specialist Teacher (Mildura West PS)
Phil Feain – VCAA Curriculum Manager, Digital Technologies

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2018

Where are you at?

- How many of you were in schools that implemented the DigiTech curriculum last year (2017)?
- How many of you are in schools implementing the curriculum this year (2018)?
- How many of you are new to teaching Digital Technologies?

Curriculum

Digital Technologies Curriculum

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

Rationale and Aims

Print this page

Rationale

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.

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.

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.

Scope and Sequence F-10

http://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/introduction/scope-and-sequence

Victorian Curriculum
Foundation–10

Digital Technologies: Foundation – Level 10

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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				
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.	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.	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. Students explain how text, image and sound data can be represented and secured in digital systems and presented using digital systems. They analyse and evaluate data from a range of sources to model solutions and create information. 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. They design user experiences and algorithms incorporating branching and iterations, and develop, test, and modify digital solutions. Students evaluate information systems and their solutions in terms of meeting needs, innovation and sustainability.	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.

Planning and reporting

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/curriculumplanning.aspx

Victorian Curriculum F–10

Revised curriculum planning and reporting guidelines

December 2015

Victorian Curriculum

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Resources

Getting started – VCAA Web page

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/intro.aspx

Curriculum area advice

Digital Technologies

Introduction

Curriculum planning and assessment

Teaching resources

External resources

Frequently asked questions

STEM

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Foundation–10

Introducing the curriculum

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.

Computational thinking is at the core of this curriculum. 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 empowers students to move from being confident users and consumers of digital systems – ICT as a general capability – to being discerning and creative problem solvers, equipped for an increasingly knowledge-based economy and society.

When creating digital solutions students use data, information, processes and digital systems. Digital systems are often referred to as either digital technologies or ICT. 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.

The Digital Technologies curriculum is new, and it is a discipline based learning area, not a capability. In the Victorian Curriculum, skills associated with ICT as a capability are either specifically embedded in the content descriptions of Mathematics, Media Arts, Geography, English and Digital Technologies or schools have the flexibility to determine how these skills will be used in their teaching and learning programs for other curriculum areas.

To view the Digital Technologies curriculum, please visit the Victorian Curriculum F–10 website.

Presentation

A PowerPoint presentation outlining the key components of the Digital Technologies curriculum is available:

Introducing Digital Technologies (pptx - 320.28kb)

Unpacking content descriptions

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/teachresources.aspx

Unpacking content descriptions

The following materials are designed to assist teachers to become more familiar with the curriculum by "unpacking" the 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.

This package of resources outline:

- A suggested focus for lessons
- Sample activities to be undertaken by the students.

These resources cover **a selection** of the content descriptions from each band, not all the content descriptions.

YR/LvL	Unpacking the Content Descriptions
F-2	Unpacking_Digital_Technologies_Content_Descriptions (docx - 366.61kb)
3-4	Unpacking_Digital_Technologies_Content_Descriptions (docx - 367.16kb)
5-6	Unpacking_Digital_Technologies_Content_Descriptions (docx - 365.02kb)
7-8	Unpacking_Digital_Technologies_Content_Descriptions (docx - 367.71kb)
9-10	Unpacking_Digital_Technologies_Content_Descriptions (docx - 369.45kb)

Unpacking content descriptions

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LEVEL 7 - 8

Digital Technologies: Unpacking the Content Descriptions

Strand	Creating Digital Solutions
Content Description	Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors
Related extract from Achievement Standard	They design user experiences and algorithms incorporating branching and iterations, and develop, test, and modify digital solutions.
Suggested focus	Lessons may focus on: • reviewing flowchart symbols • reviewing how algorithms may look as English statements • creating a flowchart to represent an algorithm • creating an algorithm as English statements • tracing algorithms to make predictions based on different input

Sample activities

• reviewing flowchart symbols to determine meaning and usage
• reviewing how algorithms may look when written as English statements
• comparing the same algorithm presented:
  • as a flowchart
  • as English statements
• comparing algorithms with statements in a:
  • visual programming language
  • general-purpose programming language
• creating a flowchart for a common task where decisions and repetition are made, for example searching for a word in the dictionary
• creating an algorithm as English statements for a common task where decisions and repetition are made, for example entering in a class set of test scores
• tracing algorithms to check accuracy, predict output based on given input (desk-checking) and identify any errors

Sample programs

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/teachresources.aspx

Sample program plans and coverage maps

There is no one set way that a school could develop their teaching and learning program. Teachers and schools have the flexibility to create teaching and learning plans that respond to the needs of their students.

The following samples show how a school could conceptualise units of work to cover the content and to assess against the achievement standards in a two year planning cycle.

These resources contain two parts:

- **Program planning templates**
  This demonstrates 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.
- **Curriculum Area plans**
  This provides a visual representation of how the Digital Technologies curriculum will 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.

These two planning components are interrelated. Each provides a different perspective on the teaching and learning program. Both types of plans are important to consider when making decisions about the best way to deliver the curriculum in each school context.

Curriculum Planning Templates

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Curriculum Planning Template: Digital Technologies 9-10 (Sample Program 3)

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 the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (VCDTDS045)		Analyse simple compression of data and how content data are separated from presentation (VCDTDI046)		Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements (VCDTDI047)		Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data (VCDTDI048)		Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities (VCDTDI049)		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)	
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 #
Network Theory	Semester 1 / Year 9	☑	1	☐		☐		☐		☐		☐		☐		☐		☐		☐	
Imaging Editing	Semester 1 / Year 9	☐		☑	2	☐		☐		☐		☐		☐		☐		☐		☐	
Community Project		☐		☐		☐		☐		☐		☐		☐		☐		☐		☐	
a. Research and data collection	Semester 1 / Year 9	☐		☐		☑	3	☐		☐		☐		☐		☐		☐		☐	
b. Creating posters	Semester 1 / Year 9	☐		☐		☐		☑	3	☐		☐		☐		☐		☐		☐	
Programming Project		☐		☐		☐		☐		☐		☐		☐		☐		☐		☐	
a. Project management	Semester 1 / Year 10	☐		☐		☐		☐		☑	4	☐		☐		☐		☐		☐	
b. Analysis - Requirements	Semester 1 / Year 10	☐		☐		☐		☐		☐		☑	5	☐		☐		☐		☐	
c. Design & development	Semester 1 / Year 10	☐		☐		☐		☐		☐		☐		☑	6	☑	6	☑	6	☐	
d. Evaluation	Semester 1 / Year 10	☐		☐		☐		☐		☐		☐		☐		☐		☐		☑	7

Levels 7 and 8 Achievement Standard

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 and secured in digital systems and presented using digital systems.
- They analyse and evaluate data from a range of sources to model solutions and create information.
- 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.
- They design user experiences and algorithms incorporating branching and iterations, and develop, test, and modify digital solutions.
- Students evaluate information systems and their solutions in terms of meeting needs, innovation and sustainability.

Levels 9 and 10 Achievement Standard

Separated by line. Number in brackets, e.g. (3), can be used as an identifier in various parts of the template.

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. (1)
- Students explain simple data compression, and why content data are separated from presentation. (2)
- 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. (3)
- Students share and collaborate online, establishing protocols for the legal and safe use, transmission and maintenance of data and projects. (4)
- Students define and decompose complex problems in terms of functional and non-functional requirements. (5)
- They design and evaluate user experiences and algorithms, and develop and test modular programs, including an object-oriented program. (6)
- Students evaluate their solutions and information systems in terms of risk, sustainability and potential for innovation. (7)

Level 9 Assessments

Unit (Title)	Assessment	Achievement Standard/s
Network Theory	Case study and network diagram using MS Visio	1
Imaging Editing	Written report and series of manipulated images demonstrating an understanding of compression	2
Community Project a. Research and data collection	Written report and questionnaire - Research into a community issue	3
Community Project b. Creating posters	Posters promoting community issues using software	3

Level 10 Assessments

Unit (Title)	Assessment	Achievement Standard/s
Programming Project a. Project management	Project management plan - Gantt chart and evidence of online collaboration	4
Programming Project b. Analysis - Requirements	Written Report - Discussion of software solution requirements	5
Programming Project c. Design and development	Mock-ups, algorithms, testing table and software solution	6
Programming Project d. Evaluation	Written report - Student evaluation of how software solution met requirements	7

Curriculum Area Plans

Curriculum Area Plan: Digital Technologies - Years 9 and 10 (Sample Program 3)

	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Year 9	Semester 1	Role of hardware, software, data and networks - 9.1.1					Data compression - 9.1.2					Techniques for acquiring data - 9.1.3				Analyse and visualise data - 9.1.4			
		Network Theory					Image Editing					Community Project a. Research and data collection				Community Project b. Creating posters			
	Semester 2																		
Year 10	Semester 1	Manage and collaborate - 10.1.1		Decompose problems - 10.1.2		Design user experience - 10.1.3		Design algorithms - 10.1.4		Develop modular programs - 10.1.5								Evaluate solutions - 10.1.6	
		Programming Project a. Project management		Programming Project b. Analysis - Requirements		Programming Project c. Design and development												Programming Project d. Evaluation	
	Semester 2																		
	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

* Based on 3 x 45 minutes teaching time per week

Key

Digital Systems

Data and Information

Creating Digital Solutions

Topic, level, semester, sequence

Professional Learning with VCAA Specialist Teachers

Professional learning opportunities

Foundation – 10 Curriculum

- Curriculum planning and assessment
- Curriculum area advice
- Professional learning
- Frequently asked questions
- Subscribe to curriculum updates

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Professional learning

- Current professional learning opportunities
- Past professional learning sessions

Current professional learning opportunities

Professional learning opportunities designed to support schools and teachers familiarise themselves with the Victorian Curriculum F-10 are now available. Deep familiarisation with the Victorian Curriculum F-10 is essential to enable the development of a comprehensive teaching and learning program.

Two series of professional learning will be made available. These series include opportunities to explore the elements of quality curriculum planning, and have been made available to all Victorian schools, across all sectors.

Specialist Teachers - peer-to-peer learning

The first series of professional learning, as part of the Education State Initiative and supported by the Department of Education, is being offered across the state as a variety of face-to-face workshops and online sessions, delivered by Specialist Teachers. Groups of schools can also request additional sessions relevant to their needs.

Click here to register or request a session

VCAA facilitated online professional learning

The second series of professional learning is offered by Curriculum Managers from the VCAA and stakeholders from a variety of organisations to continue supporting the implementation of the Victorian Curriculum F-10. These sessions are only offered online.

View the complete set of sessions here.

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/viccurr-proflearning.aspx

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Types of sessions

Professional Learning Menu		
Civics*	Critical and Creative Thinking	Digital Coding
Ethical Capability	Financial Literacy	Health Education and Personal and Social Capability*
Literacy in the Early Years	Music*	STEM

Devices in the Digital Technologies Curriculum (7-10)

Rosanna
(or close proximity)

Wednesday
7 March
9:00am-3:30pm
Book Now

This full-day workshop will be for teachers of the Digital Technologies curriculum from 7-10 wanting to support the use of digital devices in their classrooms. They will become familiar with the use of the devices, computational thinking, use across the strands and approaches to teaching with them. This workshop will be suitable for all 7-10 teachers.

Outline:

- Use of devices to support curriculum implementation
- Computational thinking
- Strands
- Approaches to teaching

Participants are required to bring laptops and/or any relevant digital devices.

Phil Feain
Curriculum Manager, Digital Technologies

Ph: (03) 9032 1724

feain.philip.a@edumail.vic.gov.au

The Digital Technologies Curriculum F-10

DLTV Webinar
Thursday 8th February 2018

Darrel Branson
VCAA Specialist Teacher
(Digital Technologies)
Mildura West Primary School

Steve Allen
VCAA Specialist Teacher
(Digital Technologies)
Glenroy West Primary School

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Who is with us today?

- Are you from Primary, Secondary or F-12?
- Are you participating individually or with a group?
- In which sector do you teach? Public, Catholic or Independent?

What to Expect in this Session

- Introduction to the Digital Technologies Curriculum
  - What is Digital Technologies
  - Key Concepts
  - Ways of Thinking
- Accessing Curriculum Materials
- Strands
- Curriculum Planning
- Digital Devices
- Resources

Digital Technologies Curriculum

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What is Digital Technologies?

- Curriculum area within the Victorian Curriculum that provides students with the opportunity to develop **computational thinking, design thinking and systems thinking.**

- Students will become familiar with identifying the **digital systems** around them, how those systems interact and communicate in **networks**, and how **data is collected, stored and transmitted.**

- As their understanding develops, students will **design, create and evaluate** their own digital solutions through the use of **programming languages.**

What is Digital Technologies?

- Thinking underpins the Digital Technologies curriculum.
- There are elements of coding throughout the curriculum. But only 4 out of 42 Content Descriptions from F - 10 specifically address students coding.
- Many aspects can be explored with Unplugged activities (without the use of devices or computers).

Aims of the Digital Technologies Curriculum

Aims of the Curriculum

- design, create, manage and evaluate … digital solutions
- use computational thinking and key concepts of **abstraction; data collection, representation and interpretation, specification, algorithms and implementation**
- confidently use **digital information systems**
- apply **protocols** and **legal practices** that support **safe**, **ethical** and **respectful** communications and **collaboration** with audiences
- apply **systems thinking** to **monitor, analyse, predict and shape interactions** between information systems

Progression of Programming Languages F-10

Visual Programming (Levels 3-6)

- Block based, for example:
  - Scratch or other block based programming software

General Purpose (Levels 7-8)

- Text based language, for example:
  - Python
  - Java Script
  - Visual Basic

Object Oriented (Levels 9-10)

- With graphical user interfaces, for example:
  - Visual Basic
  - C++

Consider the Context of your School

- Are you currently teaching Digital Technologies?
- Are you teaching as a specialist teacher or as a classroom teacher?
- How is Digital Technologies being offered in your school?

An Important Distinction

Information and Communication Technologies (ICT) are powerful tools that can support student learning across curriculum.

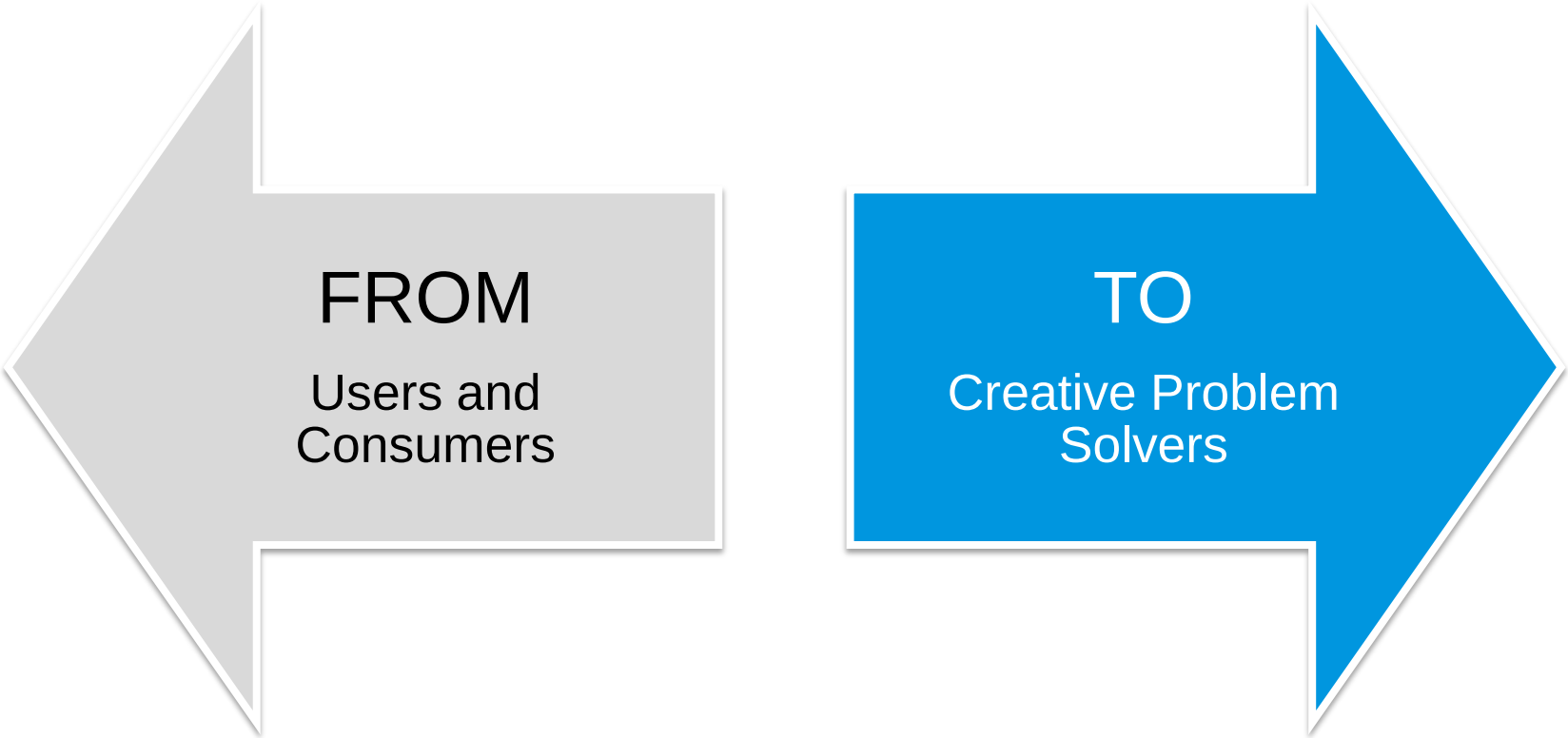
Students can develop and demonstrate their understanding of concepts and content in Digital Technologies through using a range of ICT tools and skills.

It is also important that students know how to use these ICT efficiently and responsibly, as well as learning how to protect themselves and secure their data.

Why Digital Technologies?

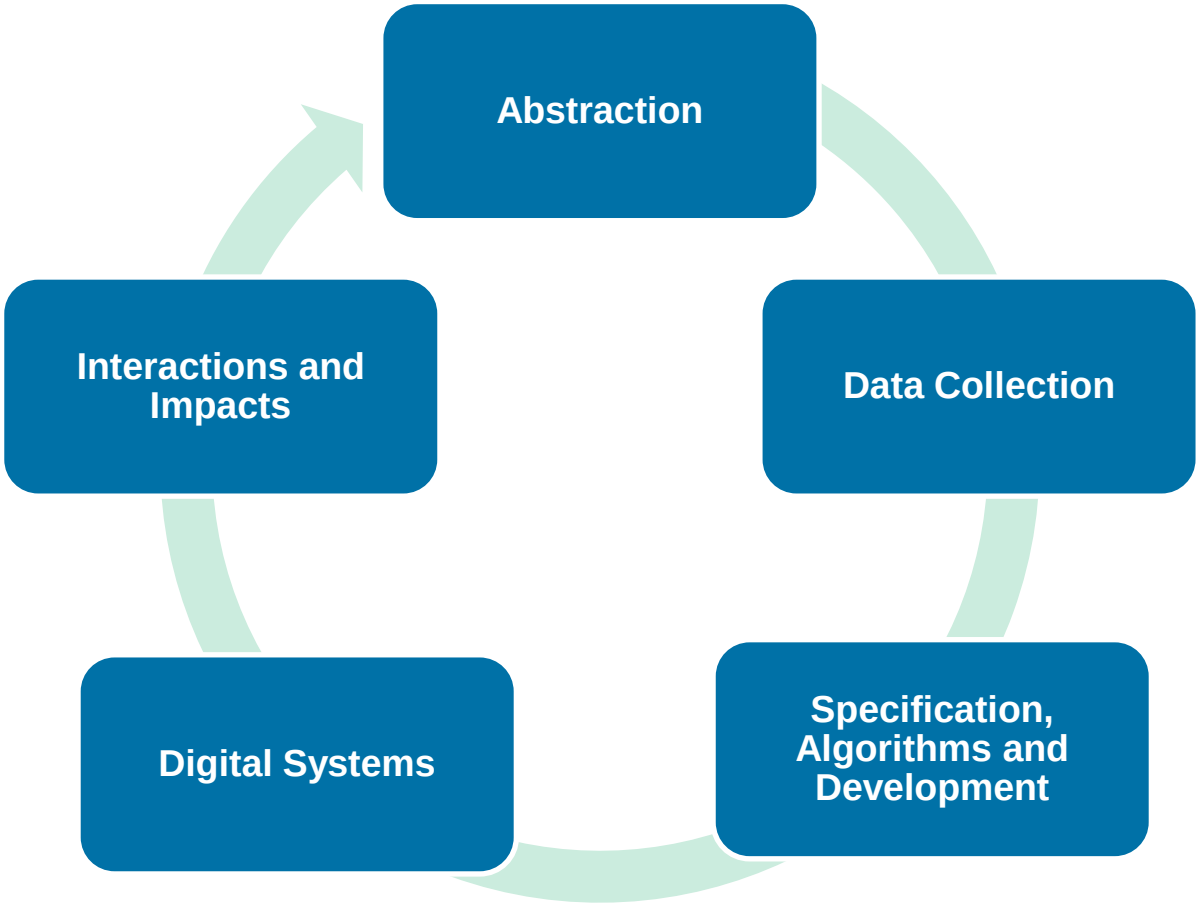
- Specific Ways of Thinking – much of curriculum area is underpinned by computational thinking
- Problem solving
- Students as developers of innovative and creative digital solutions

Why Digital Technologies?



Key Concepts

Key Concepts



http://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/introduction/learning-in-digital-technologies

Abstraction

Reducing complexity in problems by ignoring details.

A range of situations:

- Comparing months (March, August), numbers of cars passing the school in an hour, temperature overnight...

All could use the same comparison:

Is 8 > 3?

Data collection, representation and interpretation

Collecting data such as user input - clicking buttons, pressing key, microphone detecting level of sound, matching a password to stored user credentials…

Data from sensors - temperature, light, sound, motion

Representation - visualising data, how it is shown back to a user

Interpretation - presenting data in context so information can be created.

Specification, algorithms and development

Specification - defining (decomposing) a problem precisely and clearly

Algorithm - sequence of steps and decisions (yes/no, true/false) needed to solve a problem

Development - creation of the digital solution, an iterative process of testing and reviewing

Digital systems

Hardware - the components and peripheral devices that make up a digital system

Software - the operating system and programs that provide instructions

Networks - digital devices that are connected to transmit data via wireless, wired and mobile means

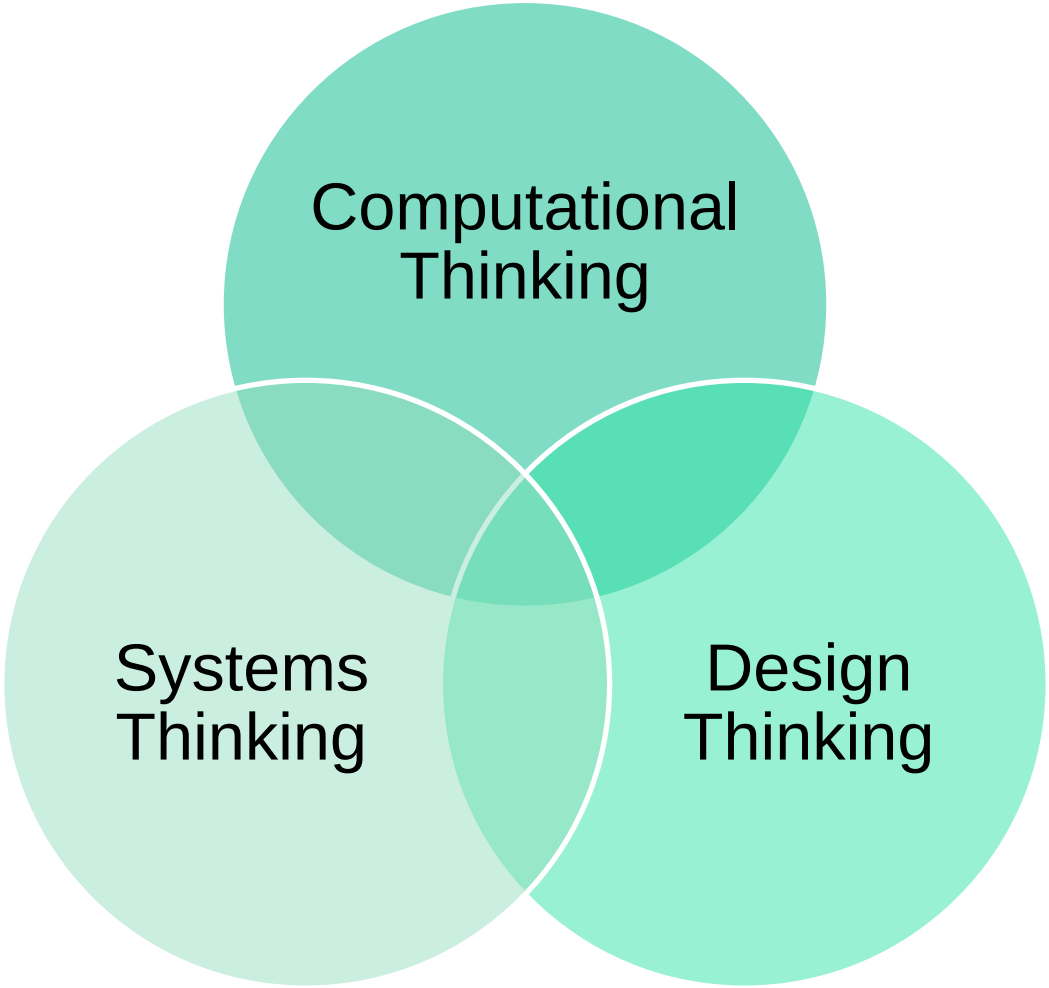
Interactions and impacts

Interactions - how are people able to successfully use the digital solution? Are there assumptions about ability or knowledge intended audience?

Impacts - environmental, social and economic ramifications from the use of a digital system including ethical and legal obligations concerning data

Ways of Thinking

Ways of Thinking



Computational Thinking

An approach that involves breaking down problems into the smallest discrete parts, identifying and organising the data needed to solve the problem, and creating step by step sequences of instructions for implementing a solution.

Decomposition - breaking down the problem

Data - user input, gathered by sensors, time, duration, conditions...

Algorithm - sequence of instructions

Design Thinking

Using circumstances, events or identified problems to imagine creative and innovative solutions.

The process of generating ideas when developing a solution:

- What if we...
- Wouldn’t it be great if..
- How about...
- Why don’t we…

Visualise the solutions - draw, sketch, mock-up, prototype, justify, evaluate.

“Is there a better way?”

Systems Thinking

- Exploring the connections and interactions between components, devices and people
- Interactions of components or resources within one digital system (could involve peripheral devices)
- Interactions of digital systems within networks or information systems (intended vs unintended outputs
- Interactions of people with digital systems
- Impacts of digital systems on individuals, groups and society in general

Accessing the Digital Technologies Curriculum

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Rationale and Aims

Print this page

Rationale

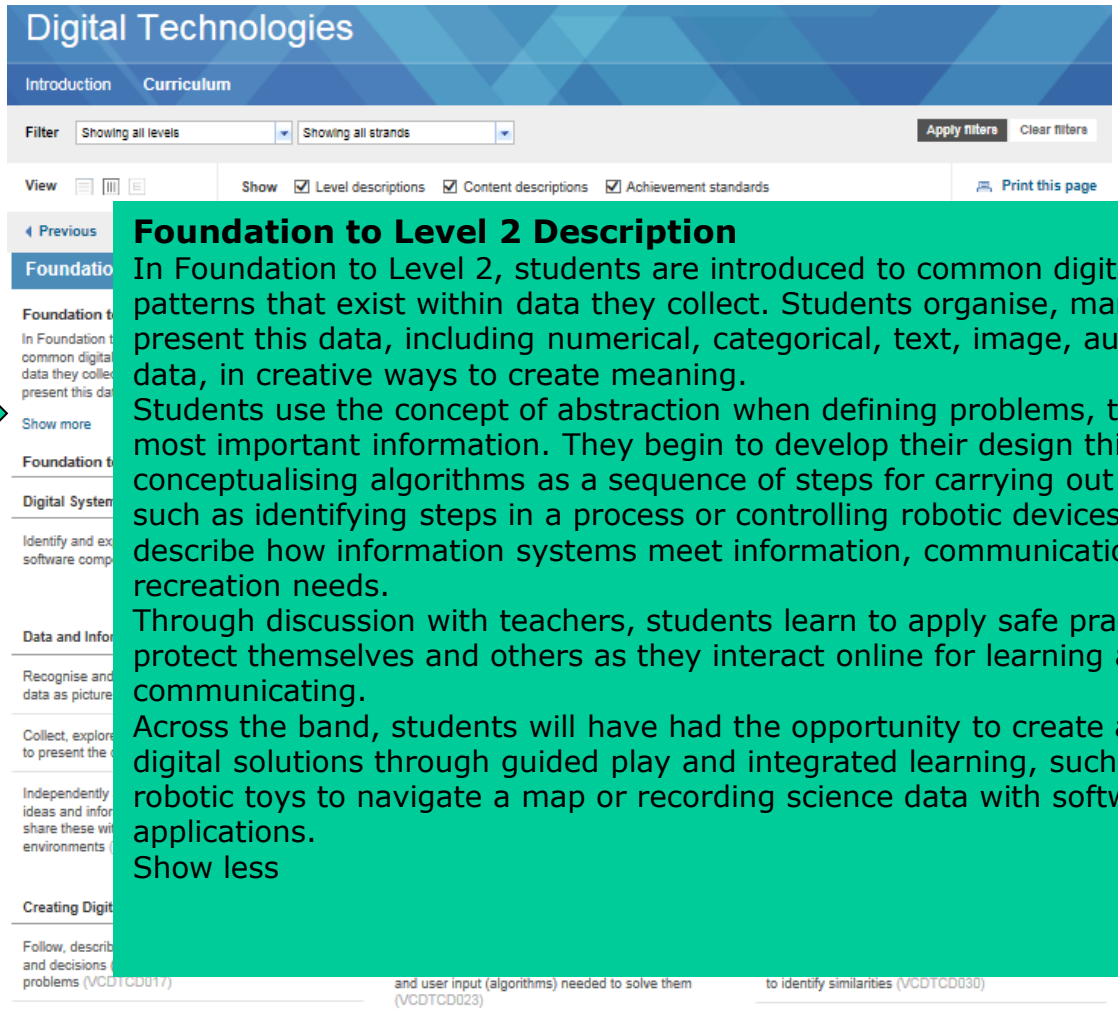
The Digital Technologies curriculum enables students to become confident and creative developers of digital solutions through the application of information systems and specific ways of thinking about problem solving.

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.

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.

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

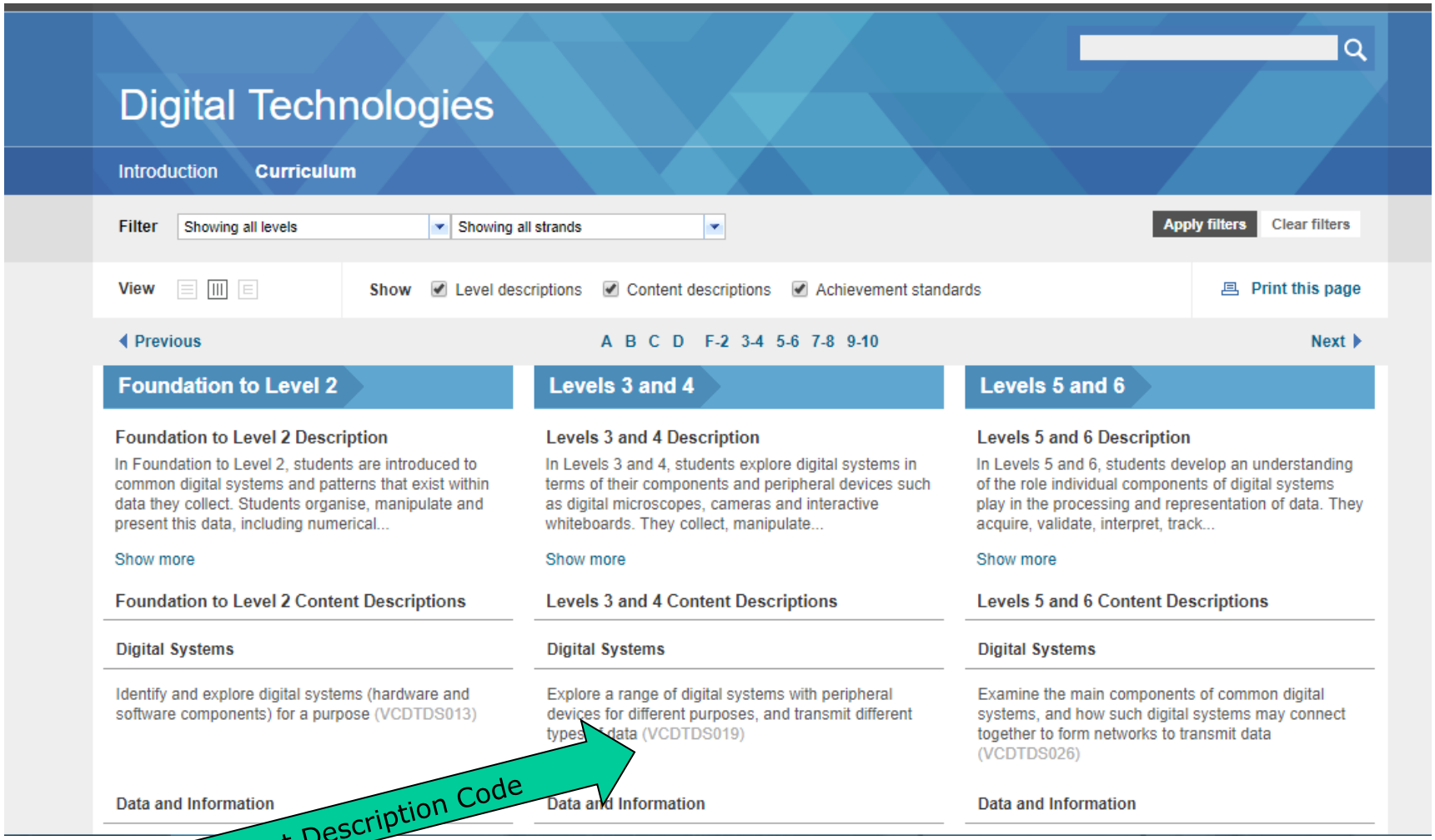
Curriculum



Show More

http://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/curriculum/f-10#level=3-4

Content Descriptions



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Digital Systems F-2

Digital Technologies / Foundation to Level 2 / Digital Systems

Content description	Elaborations
Identify and explore digital systems (hardware and software components) for a purpose	• 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

What is required to be explicitly taught

Suggestions of activities to address part of Content Description

ScOT catalogue terms

Computers; Computer programs; Interfaces (ICT)

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Scope and Sequence F-10

Levels

Strands

Content Descriptions

Achievement Standards

Victorian Curriculum
Foundation–10

Digital Technologies: Foundation – Level 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 precisely, taking into account functional and non-functional requirements, interviewing stakeholders to
			Design a user interface for a digital system, generating and considering alternative design ideas		
			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 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	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.	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 digital solutions using algorithms [illegible] making and user input. They [illegible] solutions and [illegible] purposes.	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. Students explain how text, image and sound data can be represented and secured in digital systems and presented using digital systems. They analyse and evaluate data from a range of sources to model solutions and create information. 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. They design user experiences and algorithms incorporating branching and iterations, and develop, test, and modify digital solutions. Students evaluate information systems and their solutions in terms of meeting needs, innovation and sustainability.	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.

http://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/introduction/scope-and-sequence

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Strands

Strands F-10

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 they are collected and represented, and how they are interpreted in context to produce information. Students learn how data are 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

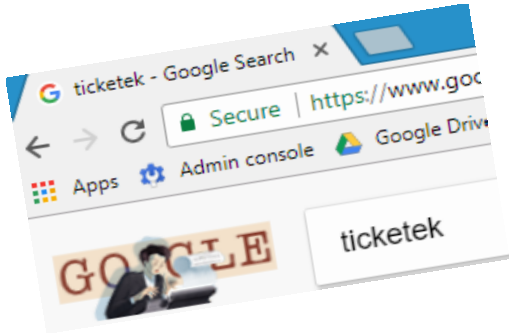
Data and Information

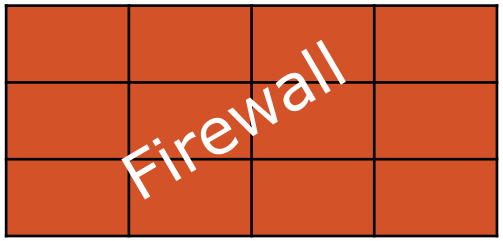
Creating Digital Solutions

Digital Systems Levels F-10

F-2	• Identify and explore digital systems (hardware and software components) for a purpose
3 and 4	• Explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data
5 and 6	• Examine the main components of common digital systems, and how such systems may connect together to form networks to transmit data
7 and 8	• Investigate how data are transmitted and secured in wired and wireless and mobile networks
9 and 10	• Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital solutions.

Example: Digital Systems





F - 2 → **3 - 4** → **5 - 6** → **7-10**

Image credits: Eduard Schaepman & Megan van der Velden

Data and Information Levels F-6

Levels F-2	Levels 3 and 4	Levels 5 and 6
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
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
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

Data and Information Levels 7-10

Levels 7-8	Levels 9-10
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
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**
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**

Example: Representing Data

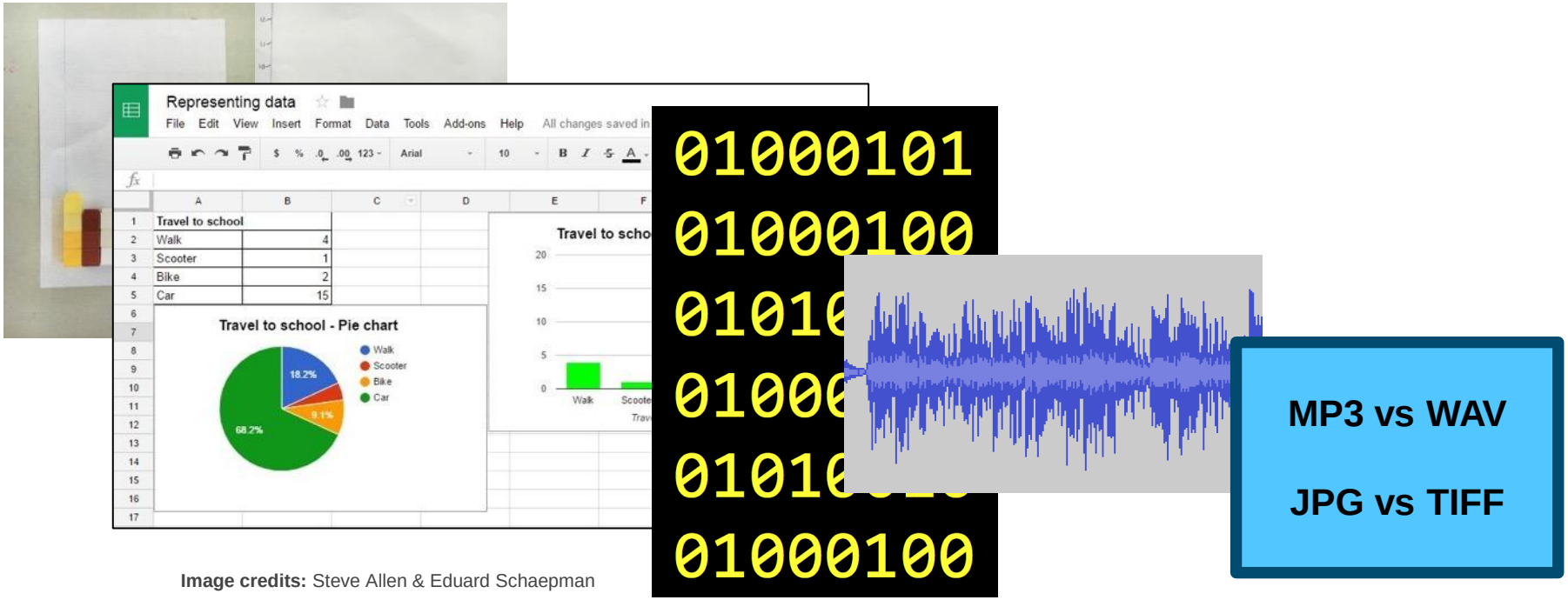


Image credits: Steve Allen & Eduard Schaepman

F - 2 → 3 - 4 → 5 - 6 → 7 - 8 → 9 - 10

Creating Digital Solutions Levels F-6

Levels F-2	Levels 3 and 4	Levels 5 and 6
	Define problems in terms of functional requirements	Define problems in terms of data and functional requirements, drawing on previously solved problems to identify similarities
	Design a user interface	Design a user interface for a digital system, generating and considering alternative design ideas
Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems	Develop algorithms with branching and iteration	Design, modify and follow simple algorithms represented diagrammatically and in English, involving sequences of steps, branching, and iteration
	Develop simple visual programs	Develop digital solutions as simple visual programs
Explore how people safely use common information systems to meet information, communication and recreation needs	Explain how student-developed solutions meet needs	Explain how student-developed solutions and existing information systems meet current and future community and sustainability needs

Creating Digital Solutions Levels 7-10

Levels 7 and 8	Levels 9 and 10
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 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 **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 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**
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**

Creating Digital Solutions

Explores processes and skills by which students *create* **digital solutions**

Four stages:

- **Analysing**
- **Designing**
- **Developing**
- **Evaluating**

Problem Solving Methodology

Creating Digital Solutions requires:

- skills in using digital systems
- different ways of thinking (computational, design and systems thinking)
- interacting safely by using appropriate
- technical and social protocols.

Example: Creating an algorithm

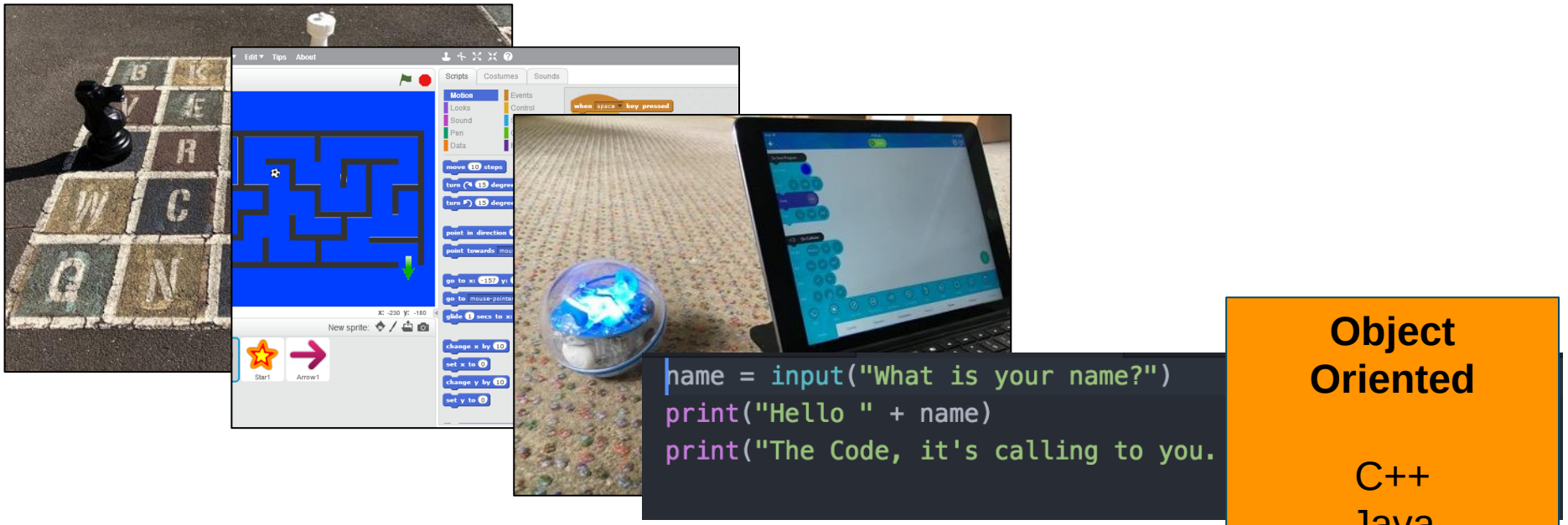


Image credits: Steve Allen & Eduard Schaepman

Object Oriented

C++
Java

F - 2 → 3 - 4 → 5 - 6 → 7 - 8 → 9 - 10

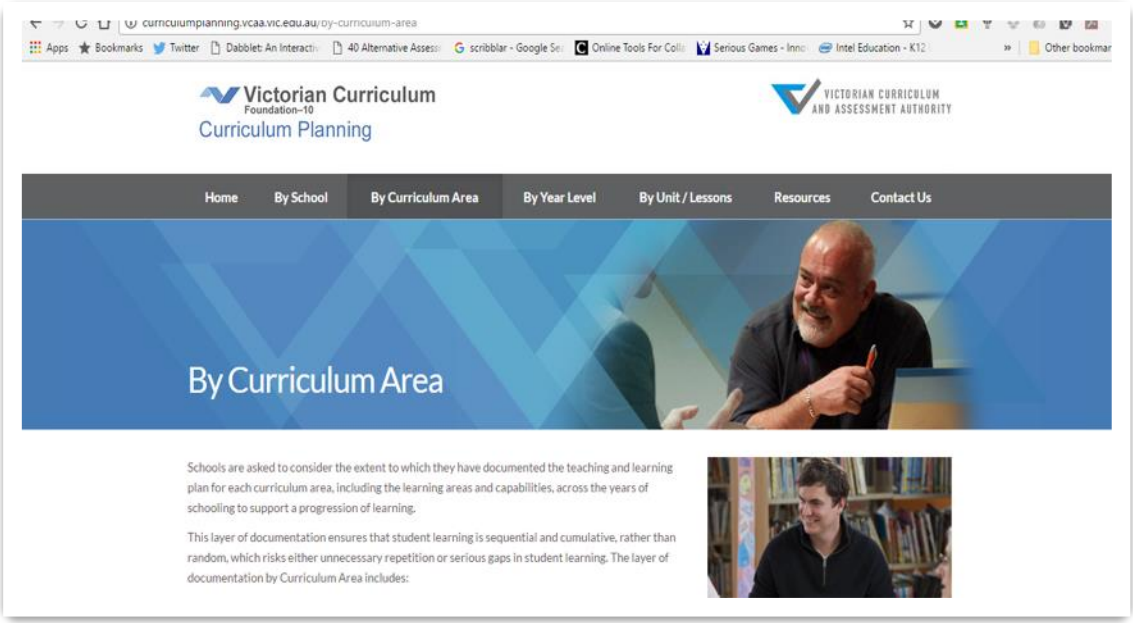
Curriculum Planning

Curriculum Planning

Four areas:

- School
- Curriculum Area
- Year Level
- Unit/Lessons

Read in conjunction with Revised F-10 Curriculum Planning and Reporting Guidelines



http://curriculumplanning.vcaa.vic.edu.au/

http://www.vcaa.vic.edu.au/Documents/viccurric/RevisedF-10CurriculumPlanningReportingGuidelines.pdf

Sample Program Levels 7 and 8

Curriculum Area Plan: Digital Technologies - Years 7 and 8 (Sample Program 3)

	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						
		Network project			Imaging			Issues Project a. Research and data collection		Issues Project b. Developing charts with spreadsheets			Web authoring						
	Semester 2																		
Year 8	Semester 1	Decompose problems – 8.1.1		Design user experience – 8.1.2		Design algorithms – 8.1.3			Develop and modify programs – 8.1.4									Evaluate solutions – 8.1.5	
		Programming Project a. Analysis		Programming Project b. Design					Programming Project c. Development									Programming Project d. Evaluation	
	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

Curriculum Area Plans

Sample program plans and coverage maps

There is no one set way that a school could develop their teaching and learning program. Teachers and schools have the flexibility to create teaching and learning plans that respond to the needs of their students.

The following samples show how a school could conceptualise units of work to cover the content and to assess against the achievement standards in a two year planning cycle.

These resources contain two parts:

- Program planning templates
  This demonstrates 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.
- Curriculum Area plans
  This provides a visual representation of how the Digital Technologies curriculum will 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.

These two planning components are interrelated. Each provides a different perspective on the teaching and learning program. Both types of plans are important to consider when making decisions about the best way to deliver the curriculum in each school context.

DigiTech_CPT_annotated_example (pdf - 1,005.83kb)

YR/LvL	Program Planning Template	Curriculum Area Plan
F-2	DigiTech_CPT_F-2 (docx - 181.53kb)	DigiTech_P-2_Curriculum_Area_Plan (docx - 84.79kb)
3-4	DigiTech_CPT_3-4 (docx - 232.05kb)	DigiTech_3-4_Curriculum_Area_Plan (docx - 75.08kb)
5-6	DigiTech_CPT_5-6 (docx - 373.6kb)	DigiTech_5-6_Curriculum_Area_Plan (docx - 76.12kb)
7-8	DigiTech_CPT_7-8 (docx - 428.75kb)	DigiTech_7-8_Curriculum_Area_Plan (docx - 73.88kb)
9-10	DigiTech_CPT_9-10 (docx - 340.31kb)	DigiTech_9-10_Curriculum_Area_Plan (docx - 71.1kb)

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/teachresources.aspx

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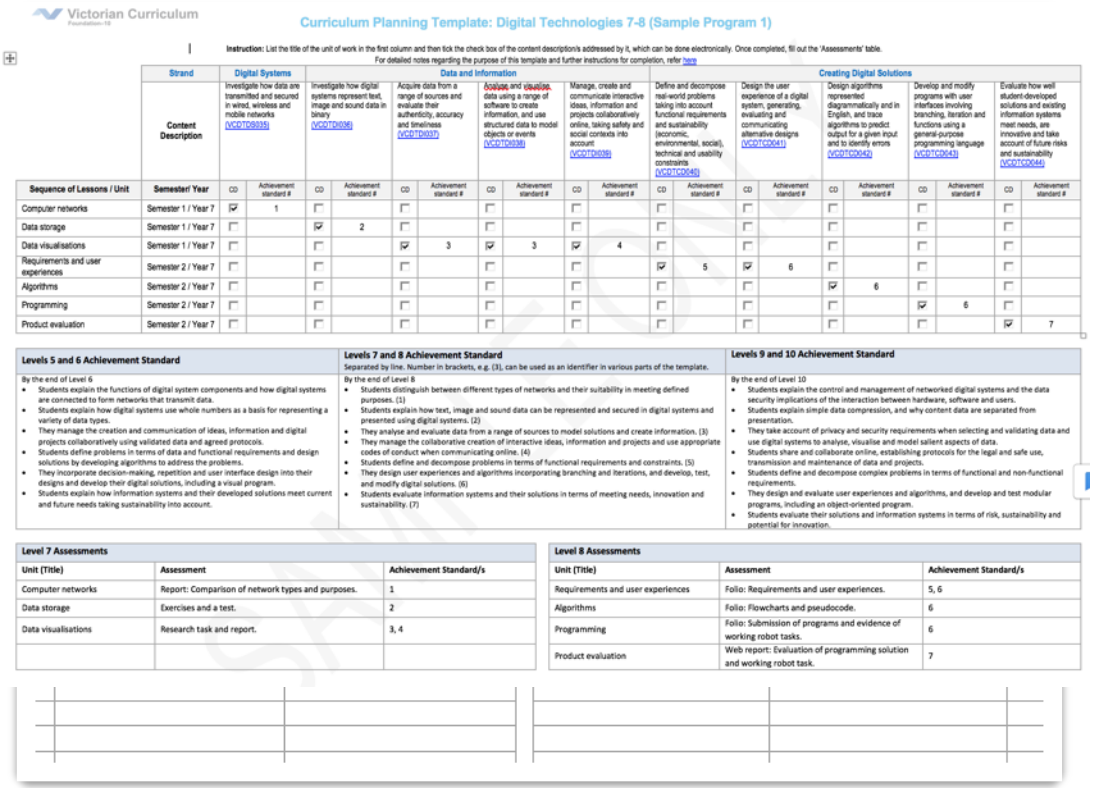
Curriculum Planning Template

- Templates from VCAA website – downloadable documents

  http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/digitechcmt.aspx

- Authentic links to other curriculum areas



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 (VCDTD035)		Investigate how digital systems represent text, image and sound data in binary (VCDTD036)		Acquire data from a range of sources and evaluate their authenticity, accuracy and timeliness (VCDTD037)		Collect, access and validate data using a range of software to create information, and use structured data to model objects or events (VCDTD038)		Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account (VCDTD039)		Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints (VCDTCD040)		Design the user experience of a digital system, generating, evaluating and communicating alternative designs (VCDTCD041)		Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (VCDTCD042)		Develop and modify programs with user interfaces involving branching, iteration and functions using a general-purpose programming language (VCDTCD043)		Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability (VCDTCD044)	
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, innovation 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

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Program Planning Templates

Sample program plans and coverage maps

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DigiTech_CPT_annotated_example (pdf - 1,005.83kb)

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7-8	DigiTech_CPT_7-8 (docx - 428.75kb)	DigiTech_7-8_Curriculum_Area_Plan (docx - 73.88kb)
9-10	DigiTech_CPT_9-10 (docx - 340.31kb)	DigiTech_9-10_Curriculum_Area_Plan (docx - 71.1kb)

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/teachresources.aspx

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Unpacking Content Descriptions

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

FOUNDATION TO LEVEL 2

Digital Technologies: Unpacking the Content Descriptions

Strand	Creating Digital Solutions
Content Description	Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems
Related extract from Achievement Standard	Students design solutions to simple problems using a sequence of steps and decisions.
Suggested focus	Lessons may focus on: • introducing algorithms and following steps sequentially • discussing the terminology around algorithms • making decisions when following step-by-step instructions • solving a problem by developing an algorithm, for example writing a sequence of steps or using arrows or symbols

Sample activities
Unplugged – without a digital device: • following basic step-by-step instructions, such as a recipe • use of terminology: start, stop, forwards, backwards, left and right • using cards with arrows or symbols to create a simple algorithm • programming a class mate as a robot, for example developing instructions for another student to follow • following instructions and steps sequentially, including decision-making • recording the steps as symbols to solve a problem, for example using arrows Plugged - with a digital device: • exploring the functions of buttons on a digital device • experimenting with a digital device, for example going forward and backward • programming a digital device to follow a simple sequence of steps to solve a problem, for example following a set of instructions written as arrows • programming a digital device to make a square programming a digital device to follow a path to avoid an obstacle

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http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/teachresources.aspx

Unpacking Content Descriptions

Unpacking content descriptions

The following materials are designed to assist teachers to become more familiar with the curriculum by "unpacking" the 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.

This package of resources outline:

- A suggested focus for lessons
- Sample activities to be undertaken by the students.

These resources cover a selection of the content descriptions from each band, not all the content descriptions.

YR/LvL	Unpacking the Content Descriptions
F-2	Unpacking_Digital_Technologies_Content_Descriptions (docx - 366.61kb)
3-4	Unpacking_Digital_Technologies_Content_Descriptions (docx - 367.16kb)
5-6	Unpacking_Digital_Technologies_Content_Descriptions (docx - 365.02kb)
7-8	Unpacking_Digital_Technologies_Content_Descriptions (docx - 367.71kb)
9-10	Unpacking_Digital_Technologies_Content_Descriptions (docx - 369.45kb)

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/teachresources.aspx

Other VCAA Resources

VCAA Website

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

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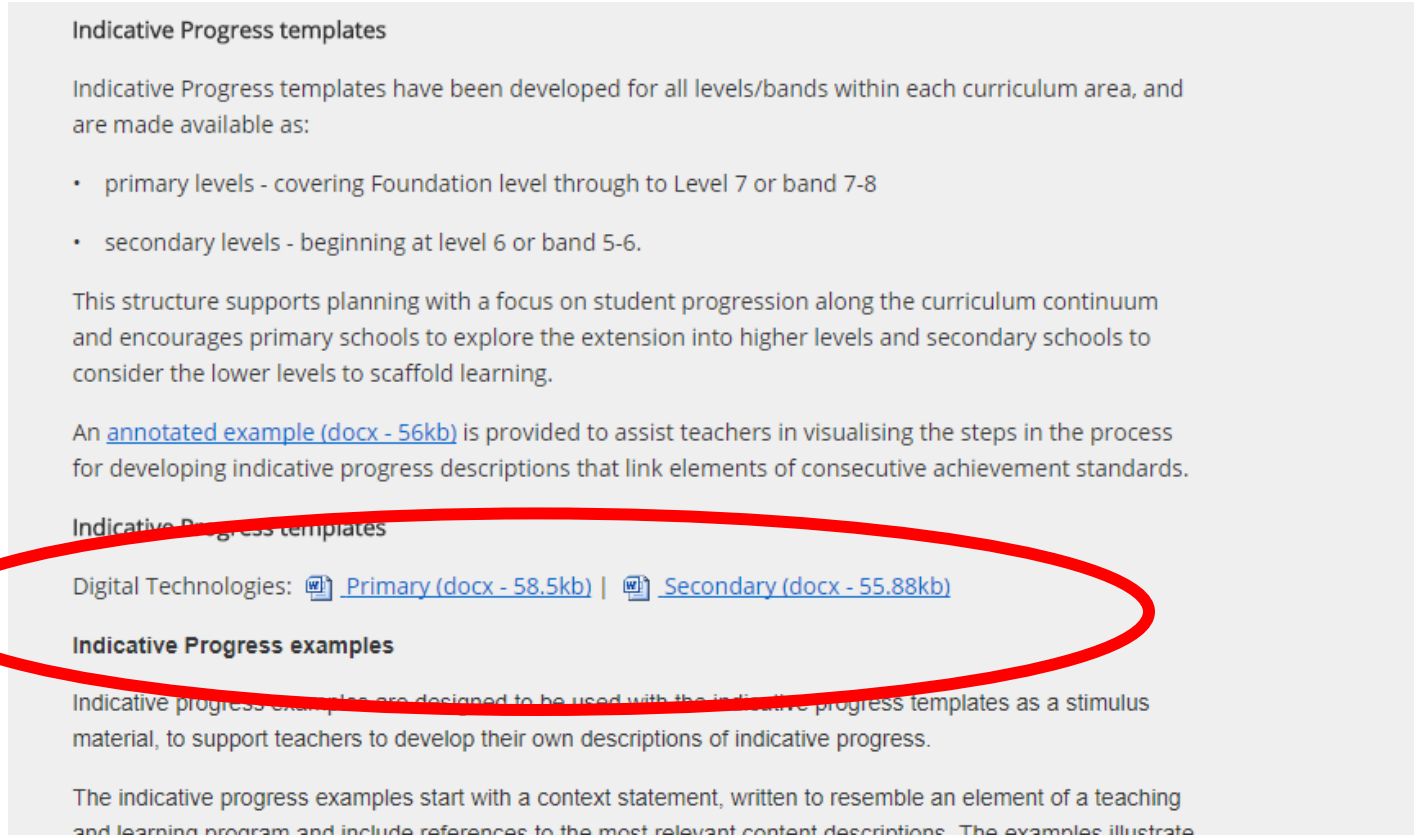
VCAA Website – Indicative Progress



Indicative Progress templates

Indicative Progress templates have been developed for all levels/bands within each curriculum area, and are made available as:

- primary levels - covering Foundation level through to Level 7 or band 7-8
- secondary levels - beginning at level 6 or band 5-6.

This structure supports planning with a focus on student progression along the curriculum continuum and encourages primary schools to explore the extension into higher levels and secondary schools to consider the lower levels to scaffold learning.

An annotated example (docx - 56kb) is provided to assist teachers in visualising the steps in the process for developing indicative progress descriptions that link elements of consecutive achievement standards.

Indicative Progress templates

Digital Technologies: Primary (docx - 58.5kb) | Secondary (docx - 55.88kb)

Indicative Progress examples

Indicative progress examples are designed to be used with the indicative progress templates as a stimulus material, to support teachers to develop their own descriptions of indicative progress.

The indicative progress examples start with a context statement, written to resemble an element of a teaching and learning program and include references to the most relevant content descriptions. The examples illustrate

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/cpa.aspx

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Victorian Curriculum
Foundation–10

CURRICULUM AREA: Digital Technologies *toward* Level 10 Achievement Standard

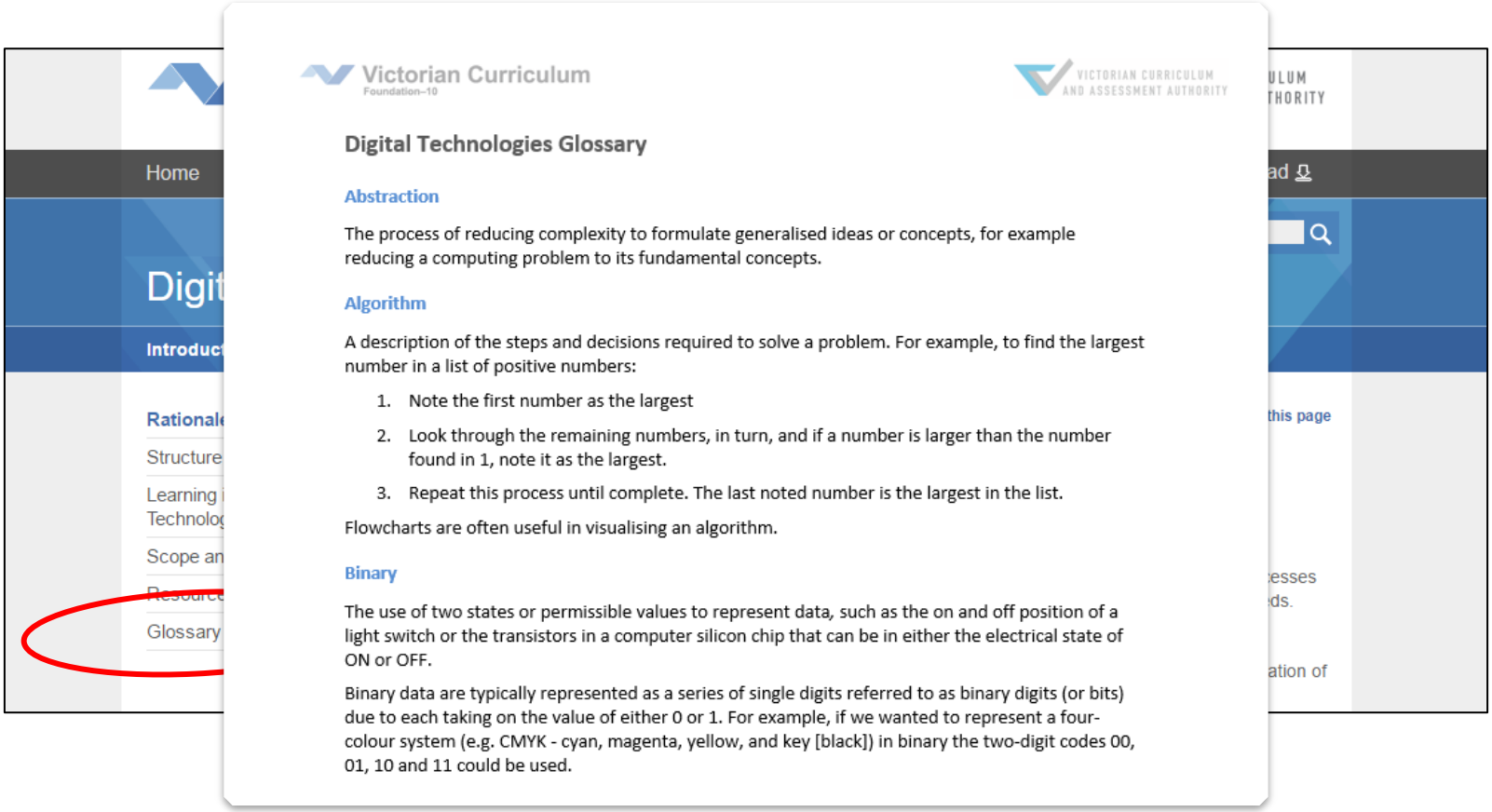
Context: Legal Responsibilities
Students, who as part of a larger project are planning and developing a mobile application for a cafe or restaurant, will explore the legal responsibilities involved when collecting and storing data for use in a mobile application. The teaching and learning plan focuses on the strands of Data and Information and Creating Digital Solutions.

Content Description:

- Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements (VCDTDI047)
- 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)

Digital Technologies Level 8 Achievement Standard	Example of Indicative Progress towards Level 10 Achievement Standard	Digital Technologies Level 10 Achievement Standard
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 and secured in digital systems and presented using digital systems. • They analyse and evaluate data from a range of sources to model solutions and create information. • 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. • They design user experiences and algorithms incorporating branching and iterations, and develop, test, and modify digital solutions. • Students evaluate information systems and their solutions in terms of meeting needs, innovation and sustainability.	**In Digital Technologies, indicative progression towards the Level 10 achievement standard may be when students:** • identify privacy and security requirements that existing social media platforms and mobile applications use when collecting personal data. • describe potential risks in the storage and access to customer personal data when the student developed mobile application is used to place an order.	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.

Glossary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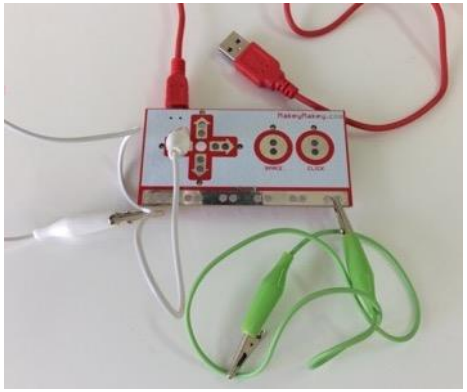
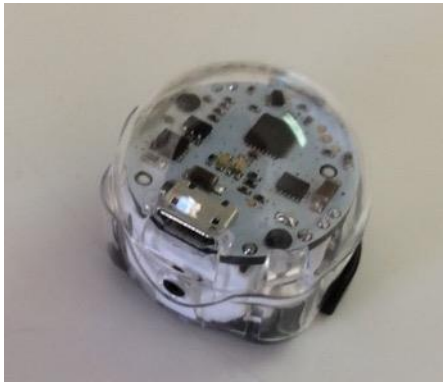
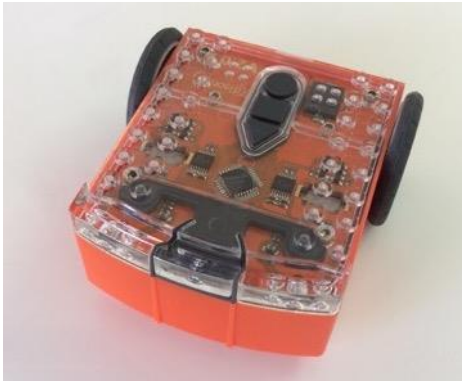
Digital Technologies Glossary
Abstraction
The process of reducing complexity to formulate generalised ideas or concepts, for example reducing a computing problem to its fundamental concepts.
Algorithm
A description of the steps and decisions required to solve a problem. For example, to find the largest 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.
this page

Digital Devices in Digital Technologies

There are wide range of options







This is just a sample!

Think before you code!

- Digital devices are very engaging!!!
- But step back from the device and do the thinking?
  - What does it need to do? (Functional requirements)
  - Break down the problem (Decomposition)
  - What are the important/relevant parts? (Abstraction)
  - What are the steps in sequence we need to solve it? (Algorithms)

Digital Systems

Hardware and Software in Digital Devices

Hardware

- Micro controller
- Computer Processor Unit (CPU)

Input

- Sensors such as light, sound, direction, speed & acceleration, temperature etc.

Output

- Motors
- Speaker
- Lights

Software

How are programs used by the Digital System

- Instructions
- Sequences
- Algorithms
- Branching (if … then)
- Iteration (loop/repeat)

Creating Digital Solutions

Foundation – Level 2	Levels 3 and 4	Levels 5 and 6
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
		Design a user interface for a digital system, generating and considering alternative design ideas
		Design, modify and follow simple algorithms represented diagrammatically and in English, involving sequences of steps, branching, and iteration
	Develop simple solutions as visual programs	Develop digital solutions as simple visual programs
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

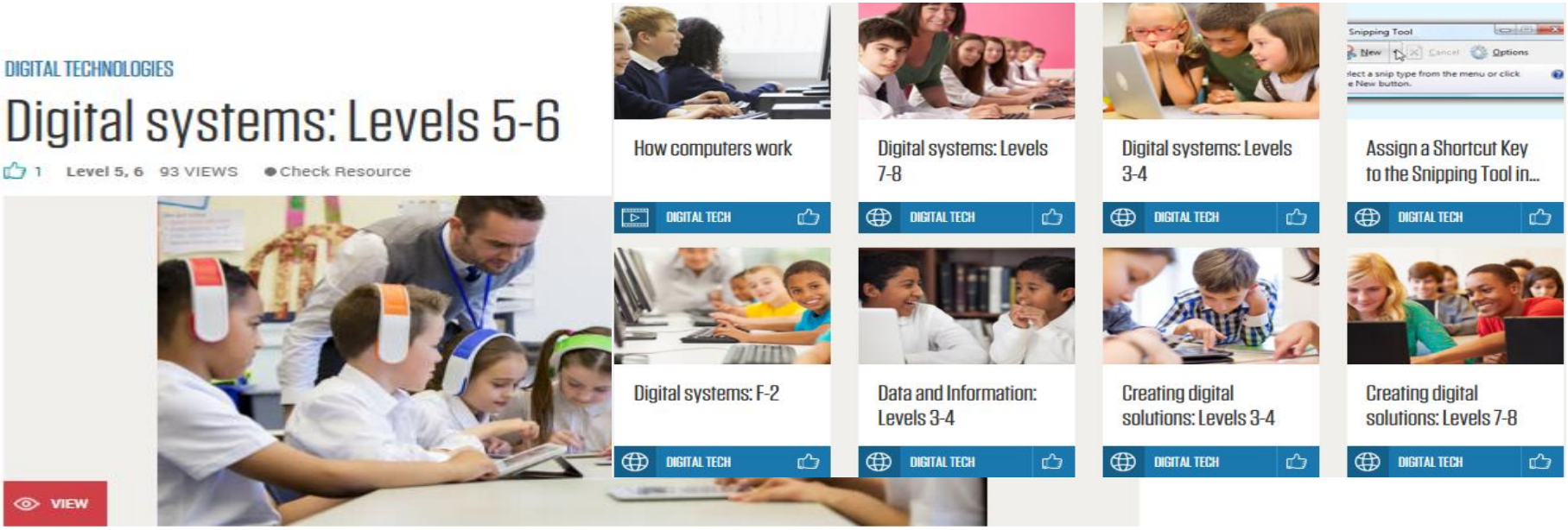
Creating Digital Solutions

Levels 7 and 8	Levels 9 and 10
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 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 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 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
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

Other Online Resources

Fuse

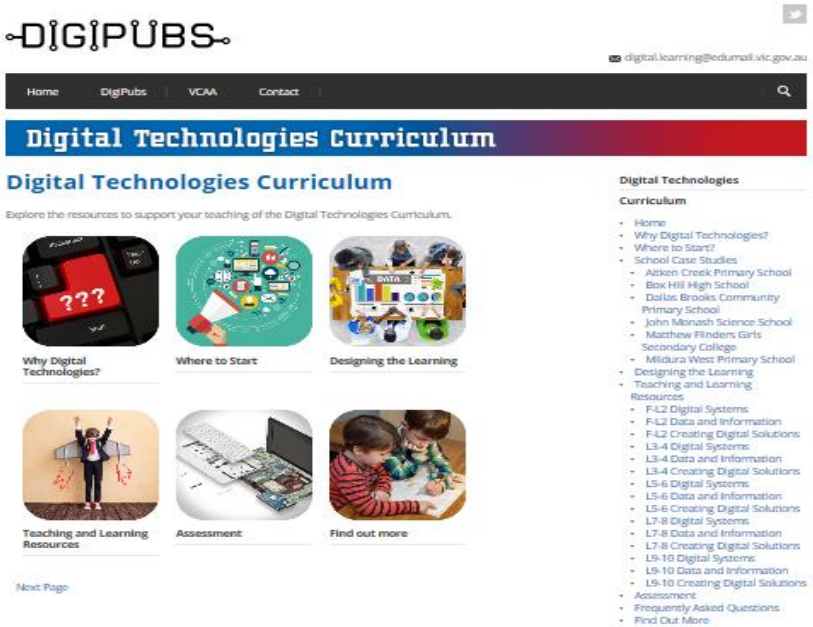
https://fuse.education.vic.gov.au/



http://www.digipubs.vic.edu.au/pubs/digitaltechnologies/digital-technologies-L5_L6_digital_systems

Examine the main components of common digital systems, and how such digital systems may connect together to form networks to transmit data.

DigiPubs



http://www.digipubs.vic.edu.au/pubs/digitaltechnlogies/digital-technologies-curriculum

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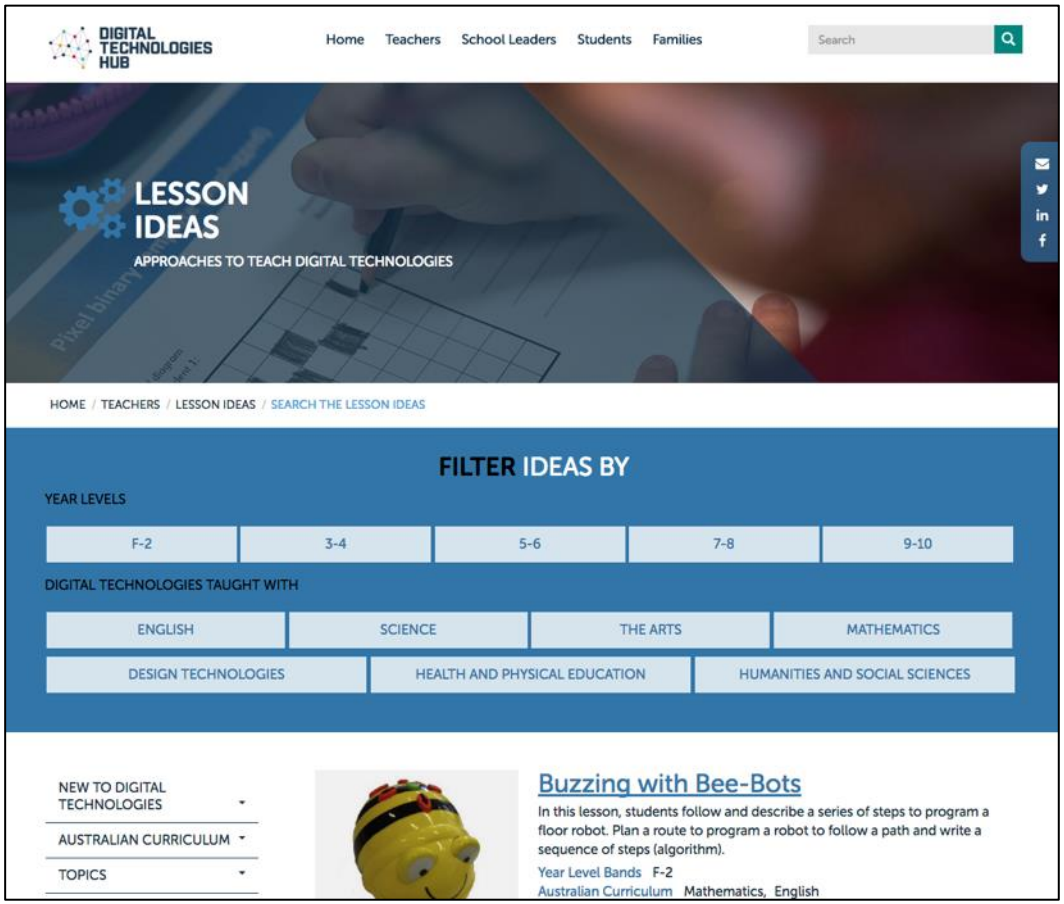
Digital Technologies Hub



https://www.digitaltechnologieshub.edu.au

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Useful Resources

Victorian Curriculum website (http://victoriancurriculum.vcaa.vic.edu.au/)

VCAA DigiTech resources (http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/digitech.aspx)

VCAA Professional learning (http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/viccurr-proflearn.aspx)

ACARA Work Samples (http://resources.australiancurriculum.edu.au/)

Useful Resources (cont)

DigiPubs (DET) (**http://www.digipubs.vic.edu.au/**)

CS Unplugged (University of Canterbury, NZ) (**http://csunplugged.org**)

CSER MOOC (University of Adelaide)
(**http://csermoocs.adelaide.edu.au/moocs/**)

Digital Learning News (DET) (**http://diglearning.global2.vic.edu.au/**)

Curriculum Mapping Templates (VCAA)
(http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/digitech/digitechcmt.aspx)

Questions?

VCAA Support

- To find online webinars or face-to-face sessions in your area:

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/viccur-proflearn-specialists.aspx

- To request a session for your local network:

http://www.vcaa.vic.edu.au/Pages/foundation10/viccurriculum/viccur-proflearn-specialists.aspx#request

Thank you for your participation

Please take the next few minutes to complete our short survey

https://goo.gl/KHGqjk

https://vcaa.qualtrics.com/jfe/form/SV_8cZifMZ64EDrjMx

Darrel Branson
VCAA Specialist Teacher
(Digital Technologies)
Mildura West Primary School

Steve Allen
VCAA Specialist Teacher
(Digital Technologies)
Glenroy West Primary School