
Key Messages
Tips for implementation
Curriculum alignment
Lesson examples

Australian Professional Standards for Teachers

DOMAINS OF TEACHING	STANDARDS
Professional Knowledge	1. Know students and how they learn 2. Know the content and how to teach it
Professional Practice	3. Plan for and implement effective teaching and learning 4. Create and maintain supportive and safe learning environments 5. Assess, provide feedback and report on student learning
Professional Engagement	6. Engage in professional learning 7. Engage professionally with colleagues, parents/carers and the community

What is the relationship between the Information and Communication Technology general capability and the Digital Technologies subject?

ICT General Capability

Assists students to become:

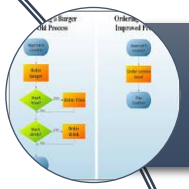
Effective **USERS** of ICT across all Learning Areas

Digital Technologies

Assists students to become:

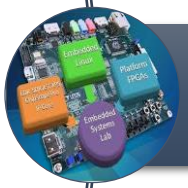
Confident **DEVELOPERS** of digital solutions

Overarching aims of the Digital Technologies curriculum



Design, create, manage and evaluate sustainable and innovative solutions

Apply computational thinking concepts

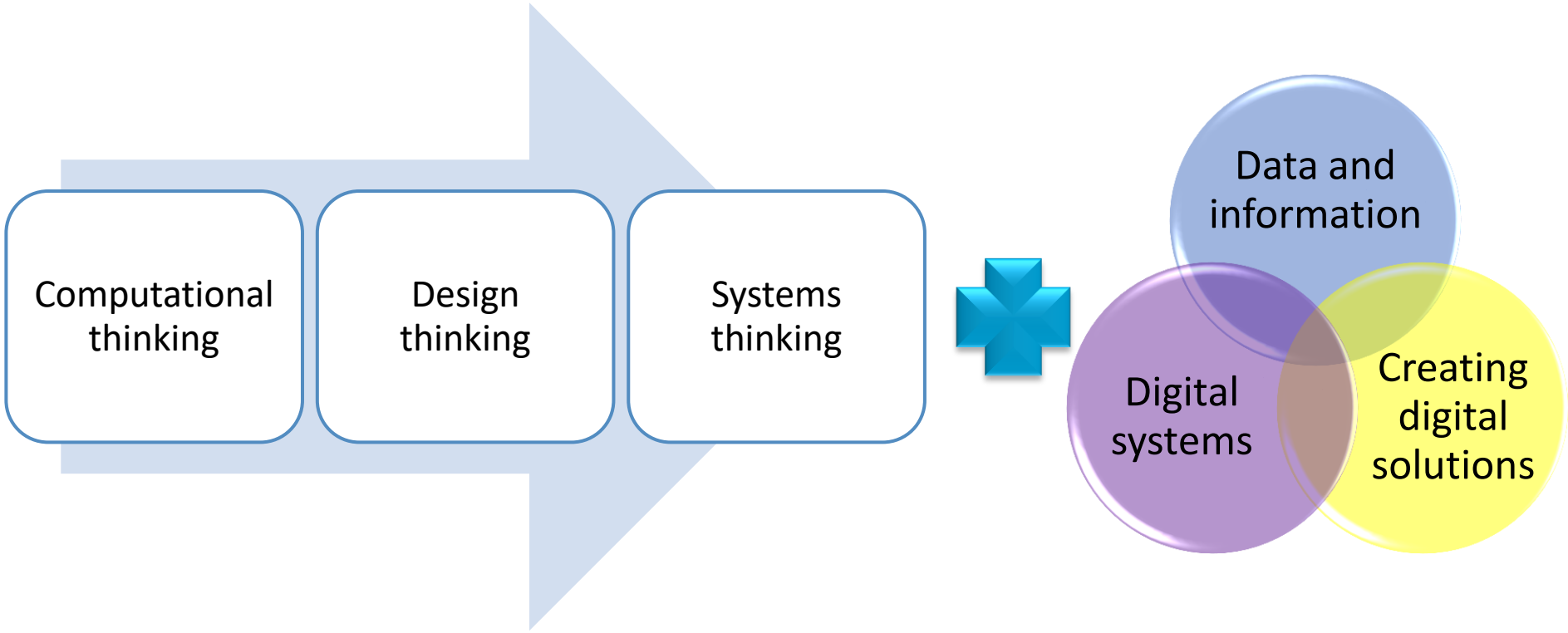


Confidently use digital systems

Apply protocols and legal practices when communicating, collaborating and creating solutions

Apply systems thinking to monitor, analyse, predict and shape interactions

Students apply different ways of thinking when determining and using appropriate data, processes and digital systems to create innovative digital solutions.



Ways of thinking about problem solving

Computational thinking, for example

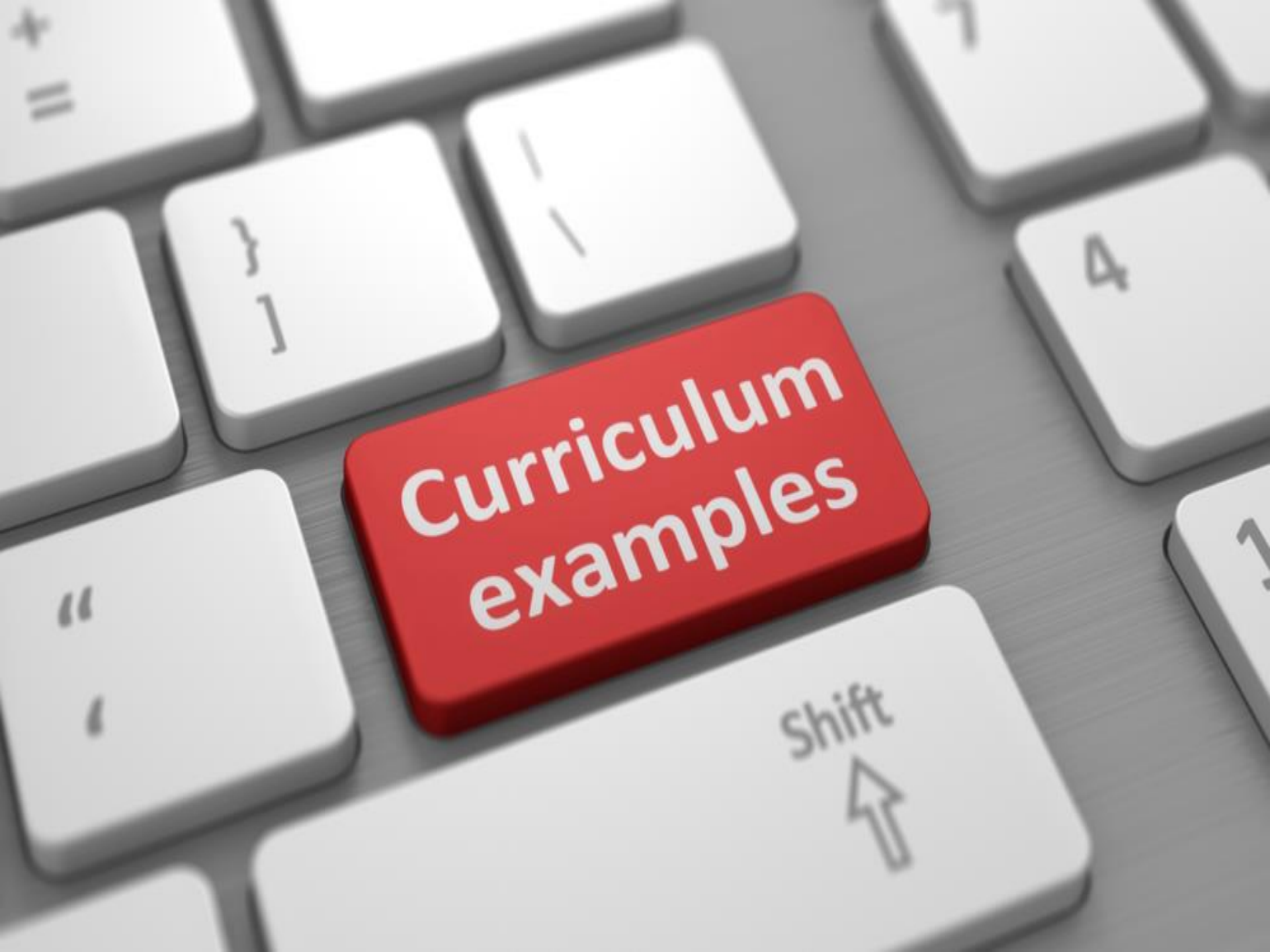
- modelling aspects of solutions
- sequencing steps and decisions (algorithms)
- deconstructing problems into their component parts

Design thinking, for example

- generating ideas for further development
- evaluating ideas, based on criteria
- conceiving opportunities for new solutions

Systems thinking, for example

- seeing connections between solutions, systems and society
- identifying components of systems
- identifying intended and unintended outputs of a system


Curriculum examples
Shift

acara AUSTRALIAN CURRICULUM, ASSESSMENT AND REPORTING AUTHORITY

Australian CURRICULUM

Digital Technologies: Sequence of content F-10 *Strand: Knowledge and understanding*

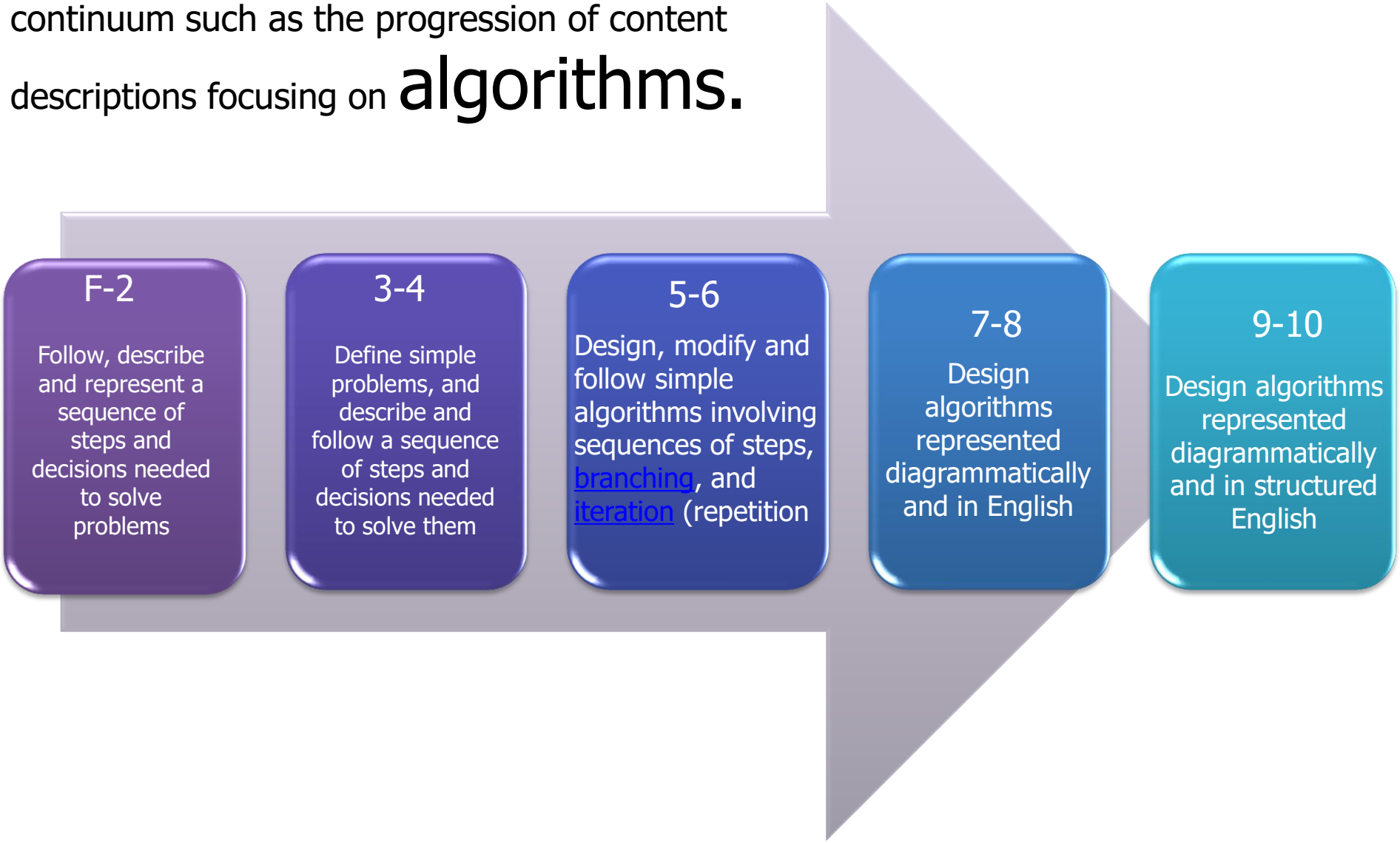
	F-2	3-4	5-6	7-8	9-10 (Elective subject)
Digital systems	Recognise and explore digital systems (hardware and software components) for a purpose (ACTDIK001)	Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data (ACTDIK007)	Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014)	Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance (ACTDIK023)	Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034)
Representation of data	Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (ACTDIK002)	Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008)	Examine how whole numbers are used to represent all data in digital systems (ACTDIK015)	Investigate how digital systems represent text, image and audio data in binary (ACTDIK024)	Analyse simple compression of data and how content data are separated from presentation (ACTDIK035)

Digital Technologies: Sequence of content F-10 *Strand: Processes and production skills*

	F-2	3-4	5-6	7-8	9-10 (Elective subject)
Collecting, managing and analysing data	Collect, explore and sort data, and use digital systems to present the data creatively (ACTDIP003)	Collect, access and present different types of data using simple software to create information and solve problems (ACTDIP009)	Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016)	Acquire data from a range of sources and evaluate authenticity, accuracy and timeliness (ACTDIP025) Analyse and visualise data using a range of software to create information, and use structured data to model objects or events (ACTDIP026)	Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements (ACTDIP036) Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data (ACTDIP037)
Creating digital solutions by:					
Investigating and defining	Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (ACTDIP004)	Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them (ACTDIP010)	Define problems in terms of data and functional requirements drawing on previously solved problems (ACTDIP017)	Define and decompose real-world problems taking into account functional requirements and economic, environmental, social, technical and usability constraints (ACTDIP027)	Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (ACTDIP038)

Progression of content

Knowledge and skills are represented as a continuum such as the progression of content descriptions focusing on **algorithms.**



Prep -2	Mathematics	Digital Technologies (By the end of Year 2)
Strand	**Measurement and Geometry**	**Digital Technologies knowledge and understanding**
	Units of Measure Location and transformation	Algorithms
Content Description	Compare and order duration of events using everyday language of time Describe position and movement	Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems
	Interpret simple maps of familiar locations and identify relative positions of key features *Buzzing with Beebots (Digital Technologies HUB)*	

Learning Focus:

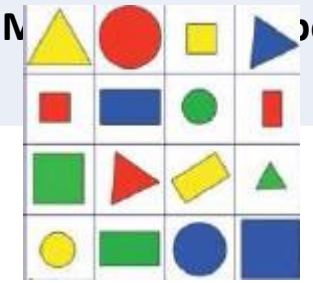
Follow and describe a series of steps to program a floor robot. Plan a route to program a robot to follow a path and write a sequence of steps (algorithm). Students use directional language to write a set of instructions.

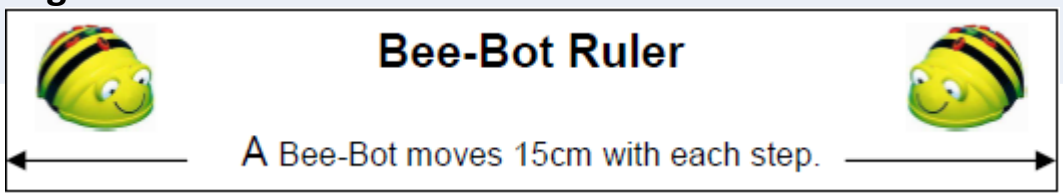
Sequence Game

Digital Technology systems are not magic but follow instructions.

Students can record their learning e.g. video recording with commentary explaining the algorithm they have used. (Explain Everything app)

M **erating ICT**





DIGITAL TECHNOLOGIES HUB

Digital Technologies Knowledge and Understanding

Buzzing with Bee-Bots

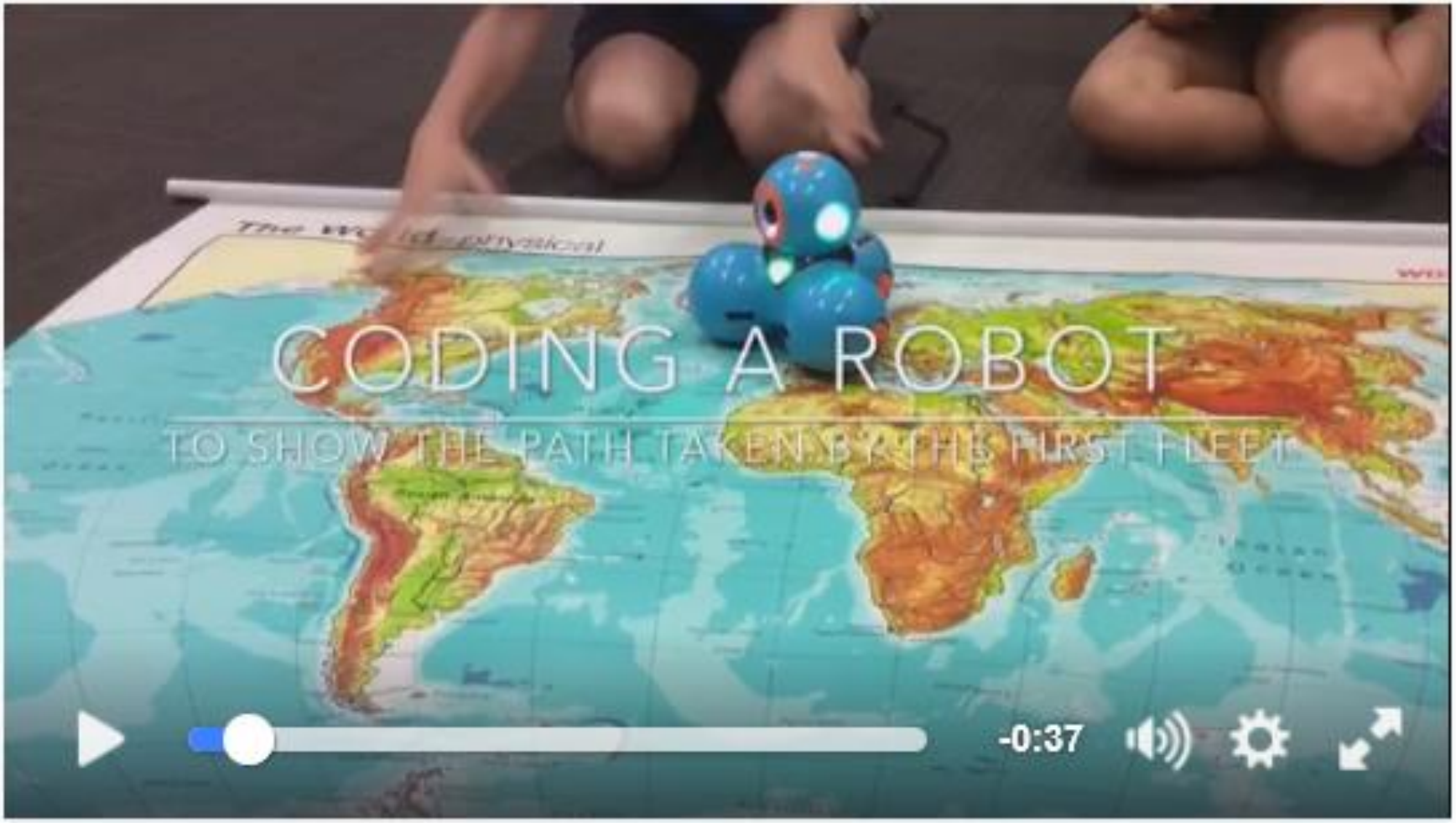
Resource categories	Lesson ideas
Key audiences	Primary teacher
Bands	F-2
Australian Curriculum	Mathematics, English

In this lesson, students follow and describe a series of steps to program a floor robot. Plan a route to program a robot to follow a path and write a sequence of steps (algorithm).

https://www.digitaltechnologieshub.edu.au/

Digital Technologies Focus: Develop students' ability to define and communicate problems precisely and clearly.

English	Mathematics	Geography	History
Students: Order a sequence of events to retell a familiar fairy tale. Use the slide sorter function to arrange a set of Power Point slides in correct sequence to retell the fairy tale 'Goldilocks and the Three Bears' Students draw a set of instructions to complete a set task such as making a sandwich; cleaning teeth Use a flow chart to design the steps required to create an interactive spelling game	**Students:** Program a Bee-Bot, Dot and Dash to follow the outline of 2 dimensional straight lined shapes. Estimate the length of certain lines and use Bee-Bots to measure which distances are longer or shorter Play skip counting games. Use large number lines and program bee bot to stop at multiples of a set number	**Students:** Program a robot to follow a specific path from one continent to another across specific oceans and seas using a large world map. Capture images of landmarks or features they pass on their way to school and arrange these in sequence to create a map and accompanying narrative, 'My trip to school.' Use slide sorter in PowerPoint or Keynote to sequence the images.	**Students:** Order images and objects to show a sequence of significant personal events or milestones (such as birth, beginning to crawl, walk, talk, birth of a sibling, moving house, new teeth, first day of school etc.)

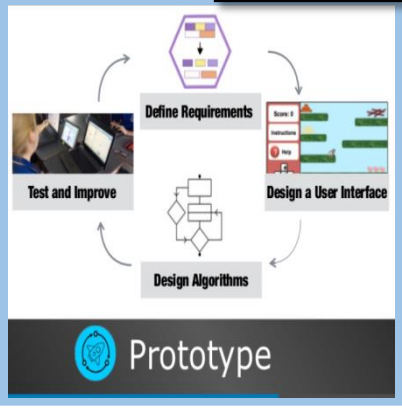

CODING A ROBOT
TO SHOW THE PATH TAKEN BY THE FIRST FLEET
-0:37

DIGITAL TECHNOLOGIES HUB

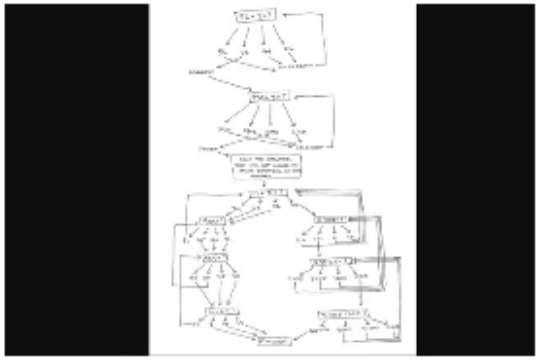
Introducing algorithms

Resource categories	Lesson ideas
Key audiences	Primary teacher
Bands	3-4
Australian Curriculum	Mathematics
Unplugged	✓

In this sequence of lessons, students design a sequence of steps for others to follow. They convey their instructions to peers and evaluate the work of others to determine if the outcome was successful.

5-6	Geography	Digital Technologies (By the end of Year 6)
Strand	**Knowledge and Understanding Inquiry and skills**	**Digital Technologies Processes and Production Skills**
Content Description Students build a game for younger students to educate about fallen power lines.	The impact of bushfires or floods on environments and communities, and how people can respond Work in groups to generate responses to issues and challenges Present ideas, findings, viewpoints and conclusions in a range of texts and modes that incorporate source materials, digital and non-digital representations and discipline-specific terms and conventions	Design a user interface for a digital system Implement digital solutions as simple visual programs involving branching, iteration (repetition), and user input Explain how student solutions and existing information systems are sustainable and meet current and future local community needs 
Students code a game for the local community in order to help them prepare their home for a severe weather event.	Students program a boom gate for people to stop them from entering dangerously flooded roads.	

DIGITAL TECHNOLOGIES HUB

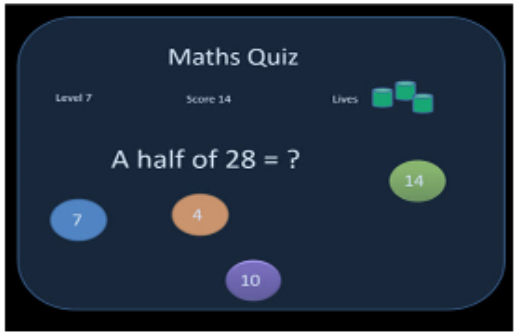


Making maths quizzes 1: Plan and test our programs

In this sequence of lessons students plan, create and edit a program that will ask maths questions that are harder or easier depending on user performance.

Year Level Bands 5-6

Australian Curriculum Mathematics

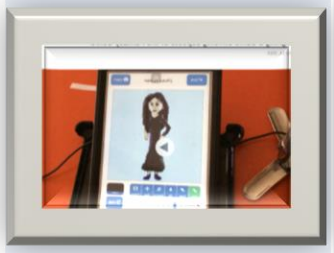


Making maths quizzes 2: Implementing a digital solution

In this sequence of lessons students implement a digital solution for a maths quiz. They test and assess how well it works.

Year Level Bands 5-6

Australian Curriculum Mathematics

Year 5-6	Digital Technologies (By the end of Year 6)	English
Strand	**Digital Technologies Processes and Production Skills**	**Creating literature**
		Creating fantasy characters
Content Description  	• Design a user interface for a digital system • Design, modify and follow simple algorithms involving sequences of steps, branching and iteration	Create literary texts using realistic and fantasy settings and characters that draw on the worlds represented in texts students have experienced **Creating texts**
	• Implement digital solutions as simple visual programs involving branching, iteration (repetition) and user input • Explain how student solutions and existing information systems are sustainable and meet current and future local community needs	Plan, draft and publish imaginative, informative and persuasive print and multimodal texts, choosing text structures, language features, images and sound appropriate to purpose and audience

Year 5-6	Digital Technologies (By the end of Year 6)	The Arts Media Arts
Strand	**Digital Technologies Processes and Production Skills**	
		Plan, produce and present media artworks for specific audiences and purposes using responsible media practice
Content Description	• Design a user interface for a digital system • Design, modify and follow simple algorithms involving sequences of steps, branching and iteration	Explore representations, characterisations and points of view of people in their community, including themselves, using settings, ideas, story principles and genre conventions in images, sounds and text
	• Implement digital solutions as simple visual programs involving branching, iteration (repetition) and user input • Explain how student solutions and existing information systems are sustainable and meet current and future local community needs	Develop skills with media technologies to shape space, time, movement and lighting within images, sounds and text Plan, produce and present media artworks for specific audiences and purposes using responsible media practice

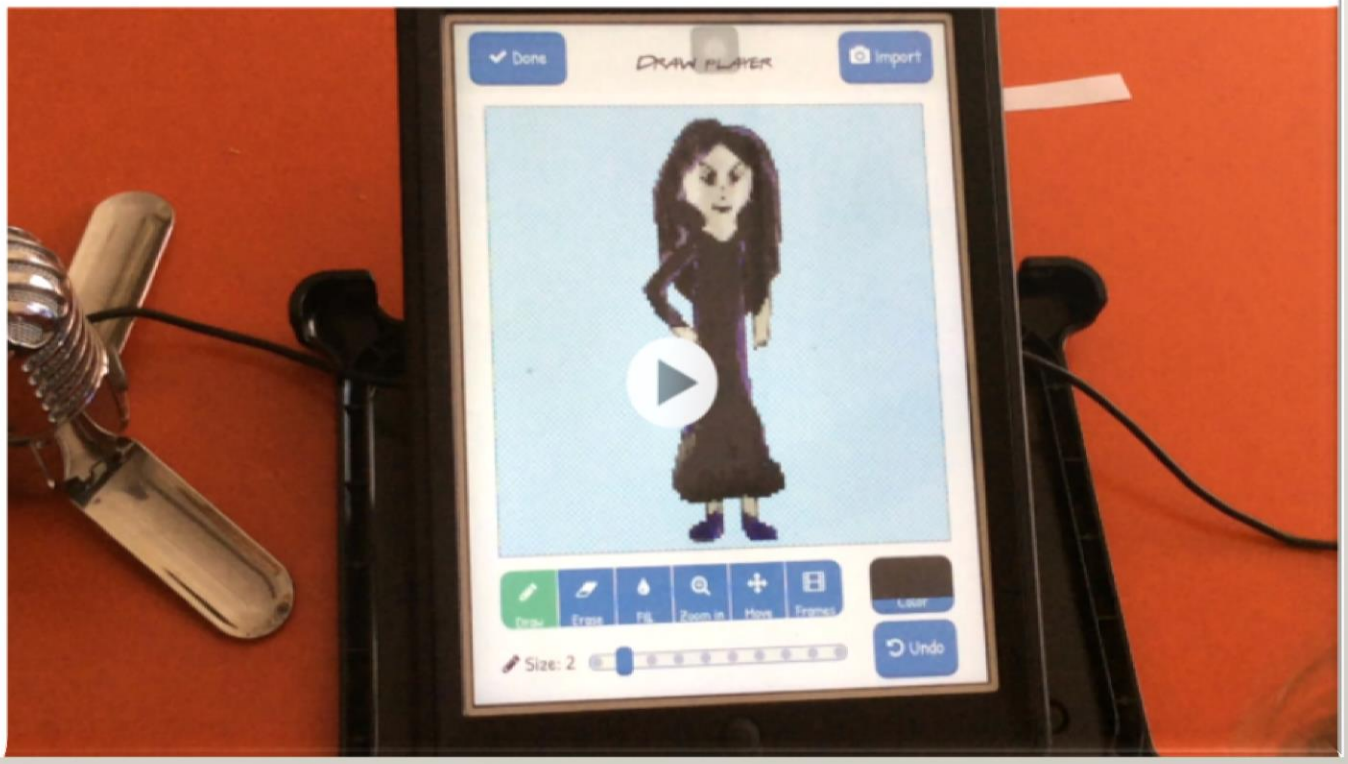
Australian CURRICULUM

Media Arts

Sketch Nation Create

Designing a Game utilising aspects of the Fantasy Genre

May 14, 2016



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Australian CURRICULUM

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Progression of content

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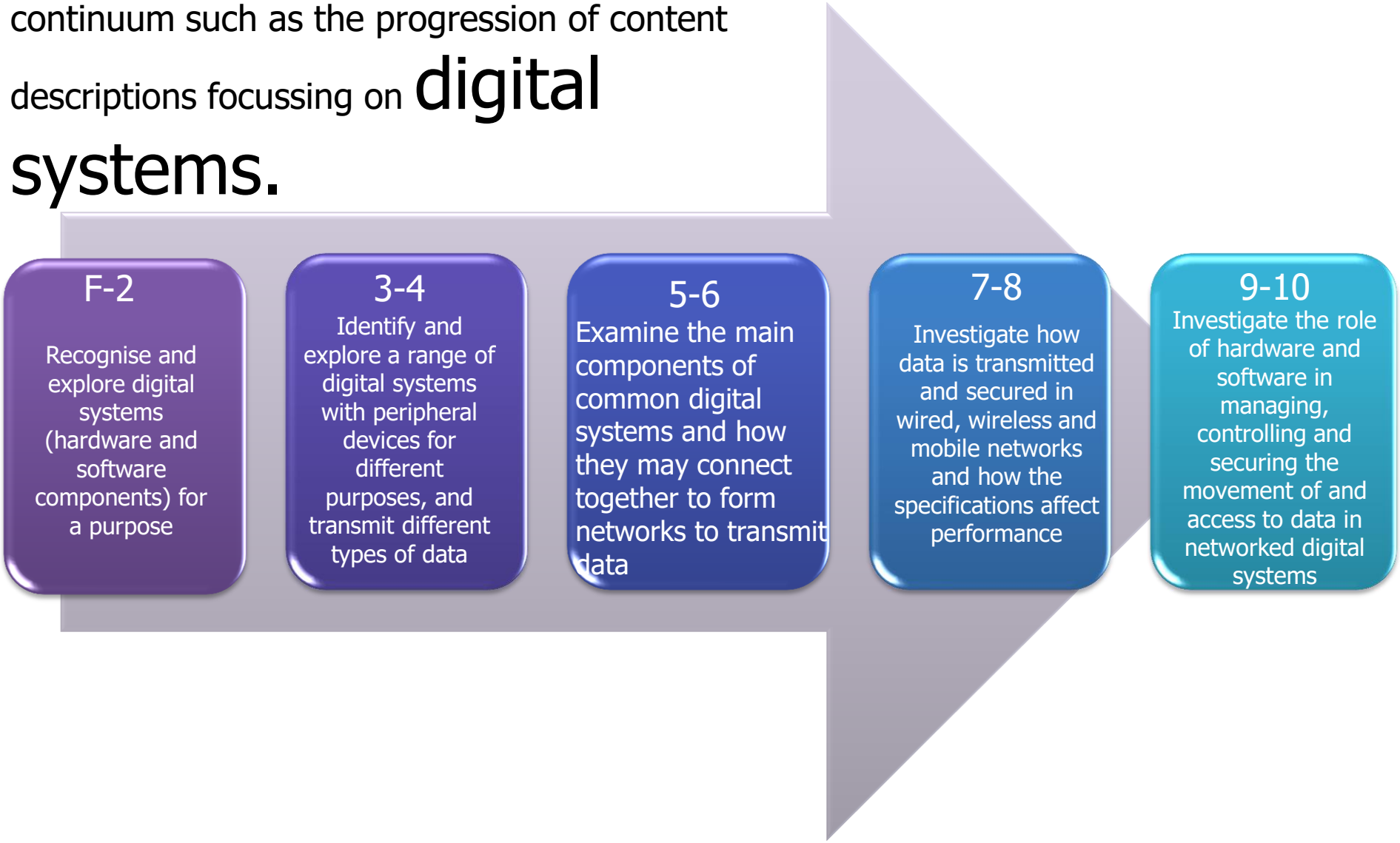


Prep - 2	History	Digital Technologies (By the end of Year 2)
Strand	**Inquiry and skills**	**Digital Technologies Processes and Production Skills**
	Analysing	
Content Description	Compare objects from the past with those from the present and consider how places have changed over time	Explore how people safely use common information systems to meet information, communication and recreation needs
		

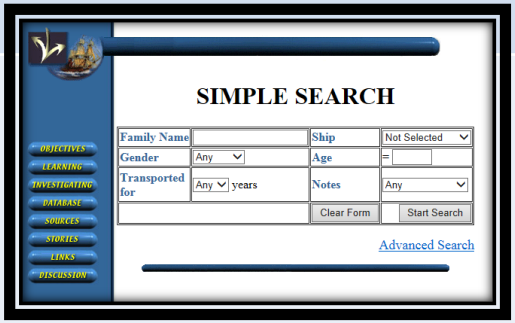
DIGITAL TECHNOLOGIES HUB

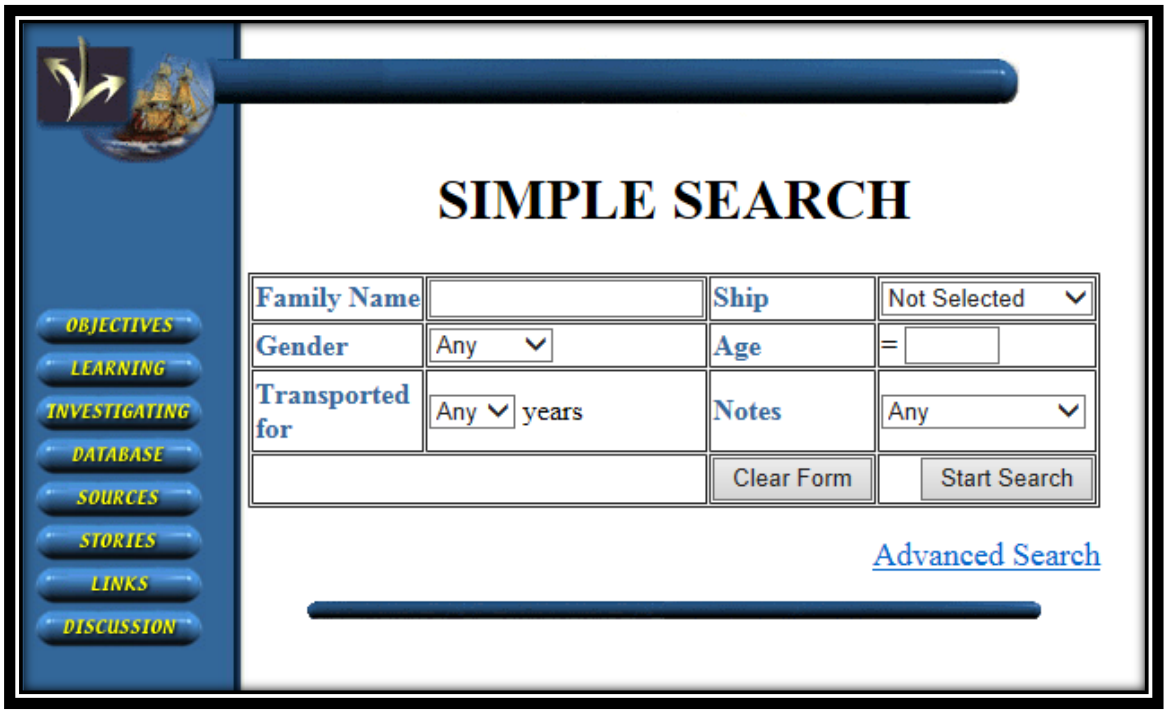
Clever computers

In this sequence of lessons explore how to help students understand the elements of a digital system including hardware, software and some commonly used peripheral devices. Investigate how these elements work together.

Year Level Bands F-2


12:45 PM
How are you?
Great thanks.

Year 4	History	Digital Technologies (By the end of Year 5)
Strand	**Knowledge and Understanding**	**Digital Technologies knowledge and understanding**
	Stories of the First Fleet, including reasons for the journey, who travelled to Australia, and their experiences following arrival	Explain how existing information systems meet common personal, school or community needs
Content Description	Locate and collect information and data from different sources, including observations	Collect, access and present different types of data using simple software to create information and solve problems
	• investigating reasons for the First Fleet journey, including an examination of the wide range of crimes punishable by transportation, and looking at the groups who were	


OBJECTIVES
LEARNING
INVESTIGATING
DATABASE
SOURCES
STORIES
LINKS
DISCUSSION
SIMPLE SEARCH
Family Name
Ship
Not Selected
Gender
Any
Age
=
Transported for
Any
years
Notes
Any
Clear Form
Start Search
Advanced Search


Convict Records
Search Records
Search
Convicts
Timeline
Ships
Crimes
Contributions
Community
Resources
Convict Records > Home
Like
Share
3.5K
Tweet
Print
Share
1.8K
Convict Records of Australia
Search convict names, aliases, ship names and years
Search Records

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Data

Data Representation

Data Collection, Management and Analysis

Data Representation

F-2

Data is represented as pictures, numbers and words

3-4

Anything we can store in a computer is 'data' and we can show the same data in different formats

5-6

Computers use whole numbers to store 'data'. Numbers, text, images, audio and video are all stored as 0s and 1s

Data Collection, Management & Analysis

F-2

Collect, sort and present data creatively

3-4

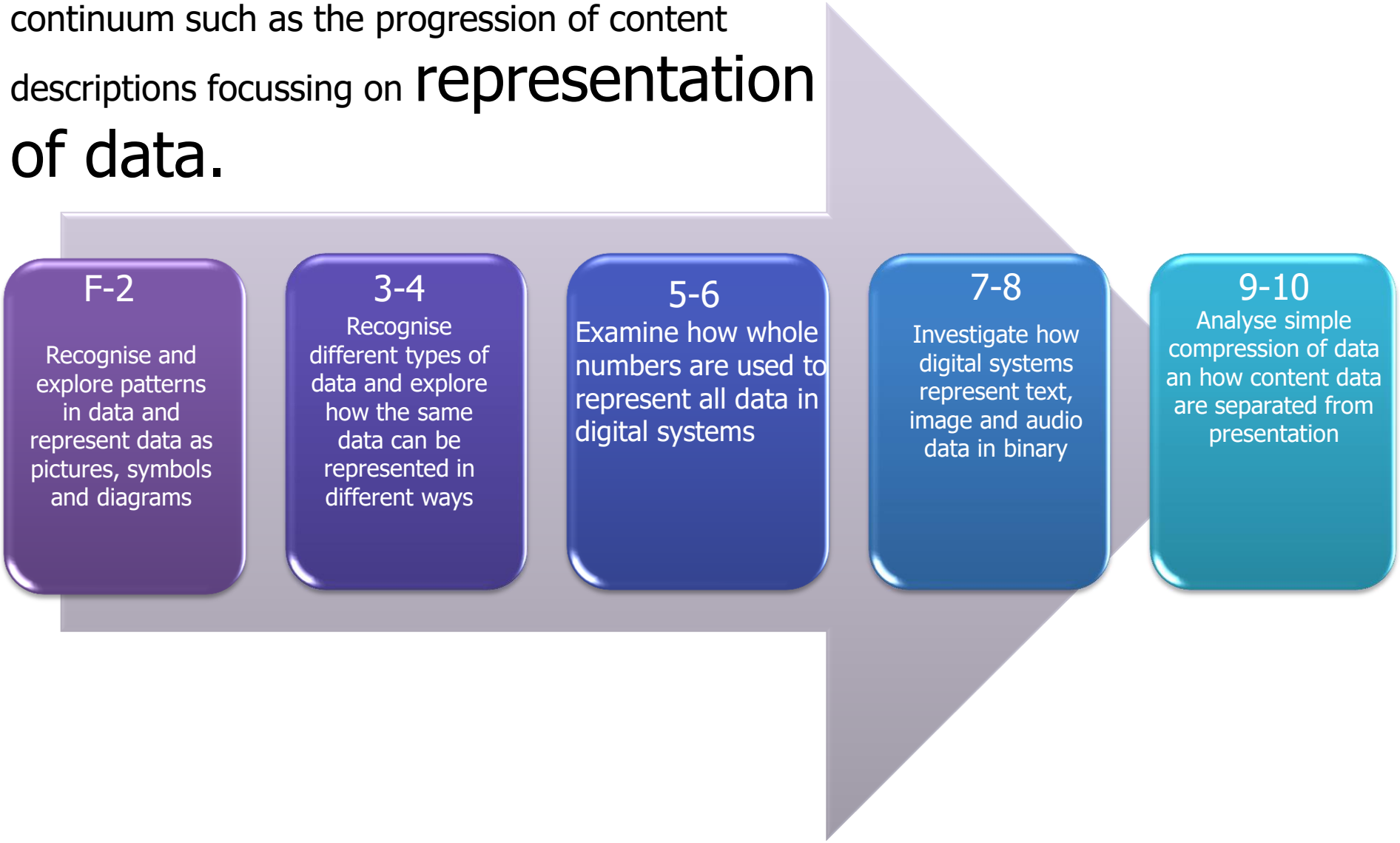
Collect and present data to create information and solve problems

5-6

Acquire, store and validate data and use software to interpret and visualize data to create information and solve problems.

Progression of content

Knowledge and skills are represented as a continuum such as the progression of content descriptions focussing on representation of data.



Across the primary school years, students develop their knowledge and understanding of data through exploring and examining the ***representation of data***. They develop processes and skills for handling data as they collect, sort and present data using digital systems.

How do I teach data representation within the other Learning Areas?

F- 2: Data is represented as pictures, numbers and words

The following learning experiences can be used to develop students understanding of data through the exploration and examining the representation of data.

The Arts

Visual Arts

Create and display artworks to communicate ideas to an audience

sharing ideas with their classmates about the representational choices they made in their artwork

Media Arts

Use media technologies to capture and edit images, sounds and text for a purpose (ACAMAM055)

Mathematics

Statistics and Probability

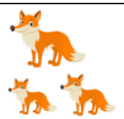
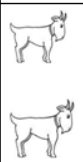
Data representation and interpretation

Represent data with objects and drawings where one object or drawing represents one data value. Describe the displays

Activity: Different representations of the same data

Green Eggs and Ham (example text below)

Read the text 'Green Eggs and Ham.' Invite the students to listen to the story and respond each time an animal (word) is named. Record the number using pictures, tally marks and numbers (see below). Discuss the different ways the data is ***represented.***

Mouse	Fox	Goat
		
||||	|||	||
M M M M	FFF	GG
4	3	2

ICT Capability

Students can use the Draw and Tell App to record their animal numbers.

They can use the voice record function to explain their displays. Symbols and tally marks can also be used to record the animal numbers. Invite students to share their digital display with the whole class e.g.

About Me

Emoji Fun

Activity Is it a pig or a dog?

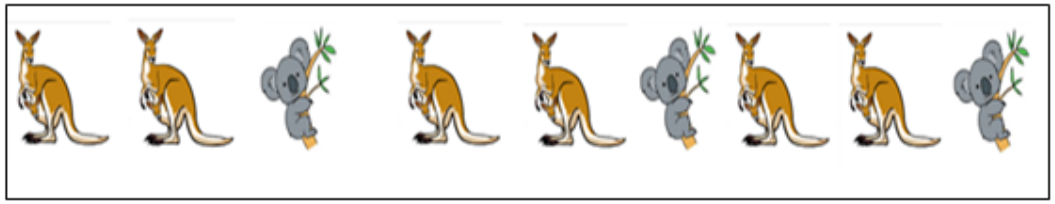
Activity: **People Pattern Game**

Play the ***'People Pattern'*** game. Students are called by name to form a long line. Use student attributes to create a pattern and invite students to guess the pattern e.g. boy, girl, boy, girl

Or

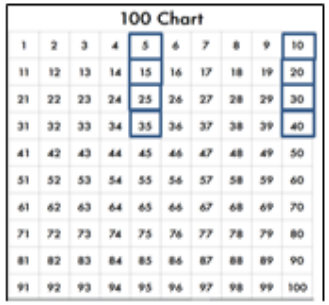
Boy, boy, girl, boy, boy, girl

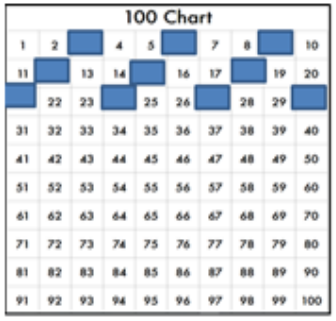
Invite students to consider other ways of create people patterns e.g. brown hair, blonde hair.

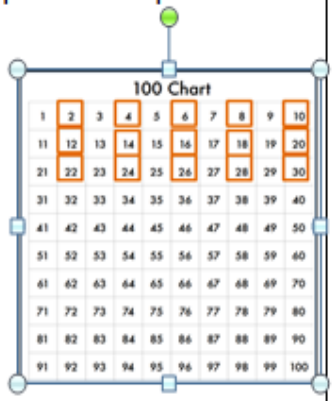
Activity – Playing with Patterns	**Curriculum Links**	
	Mathematics	**Digital Technologies**
Digital Technologies focus: Pattern recognition is the ability to notice similarities or common differences. Through recognising patterns we are able to make predictions. / Provide students with a series of picture and number patterns. Discuss the patterns and ask students to identify and describe the patterns. Ask students to continue the patterns. For example:   2, 4, 6, 8, 10, _ _ _ _ 1, 3, 6, 10, 15, 21 _ _ _ _ _ 25, 23, 21, 19, _ _ _ _ 6, 13, 20, 27, 34, 41, _ _ _ _ Ask students to create and explain their own patterns using objects, shapes, pictures and numbers.	**Patterns and algebra** Sort and classify familiar objects and explain the basis for these classifications. Copy, continue and create patterns with objects and drawings **Patterns and algebra** Investigate and describe number patterns formed by skip-counting and patterns with objects (ACMNA018) **Patterns and algebra** Describe patterns with numbers and identify missing elements (ACMNA035)	Recognise and explore patterns in data and represent data as pictures, symbols and diagrams **(ACTDIK002)** Collect, explore and sort data, and use digital systems to present the data creatively **ICT Capability** Students can create their number patterns online and record, explain and share their patterns using an app such as Shadow Puppet Edu.

Skip Counting

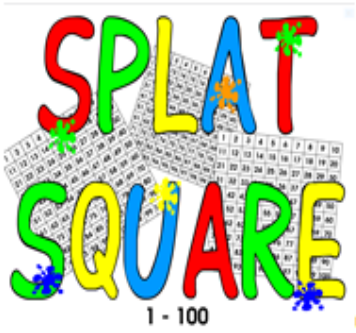
- Ask students to look for patterns and use the pattern to predict the next numbers in the sequence.







- Encourage students to look for other number patterns that emerge when creating skip patterns for numbers.



Online Interactive Number Board

Mathematics

Number and place value

Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero (ACMNA012)

Number and place value

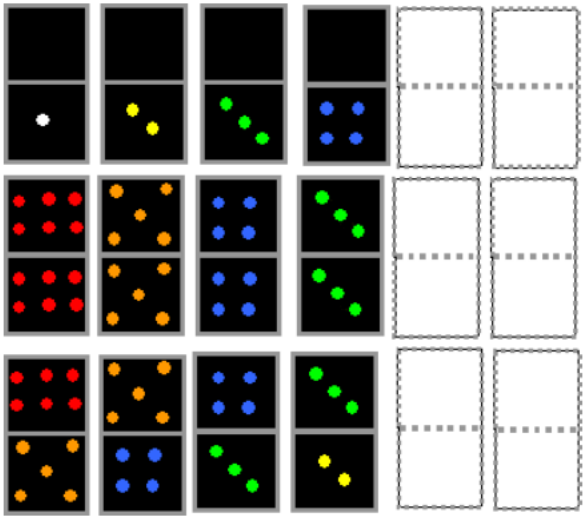
Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and tens from any starting point, then moving to other sequences (ACMNA026)

Digital Technologies

Recognise and explore patterns in data and represent data as pictures, symbols and diagrams **(ACTDIK002)**

- http://www.primarygames.co.uk/pg2/splat/splatsq100.html

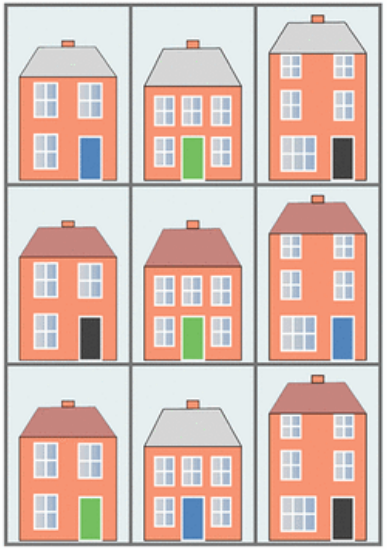
Which comes next in each pattern of dominoes?



Starting number 7 [x 3 - 3] gives 18

Now we use 18..... [x 3 - 3] gives 51

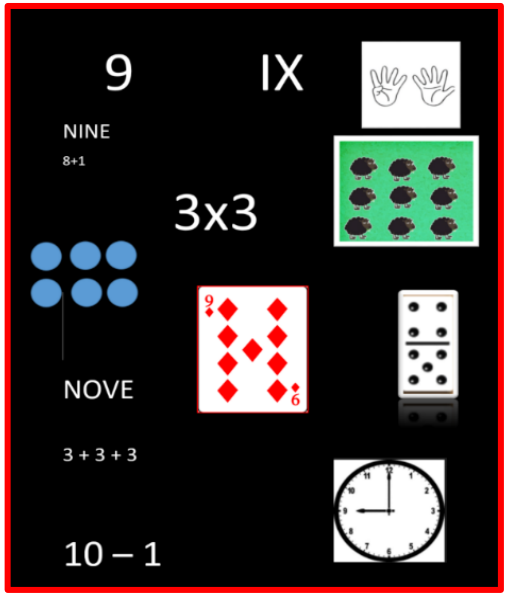
Now we use 51..... [x 3 - 3] gives 150



```
                7
              1 8
              5 1
            1 5 0
            4 4 7
          1 3 3 8
          4 0 1 1
        1 2 0 3 0
        3 6 0 8 7
    1 0 8 2 5 8
    3 2 4 7 7 1
    9 7 4 3 1 0
2 9 2 2 9 2 7
8 7 6 8 7 7 8
```

Digital Technologies Focus:

Data is raw information such as a collection of facts. Before it can be meaningful it must be processed. When it is processed, organised or presented in a context that makes it useful it becomes information. Data can presented to us as information in a variety of different ways. For example, data can be presented as pictures, numbers and words. We can present the same data in different ways.



Number and place value

Recognise, model, represent and order numbers to at least 1000 (ACMNA027)

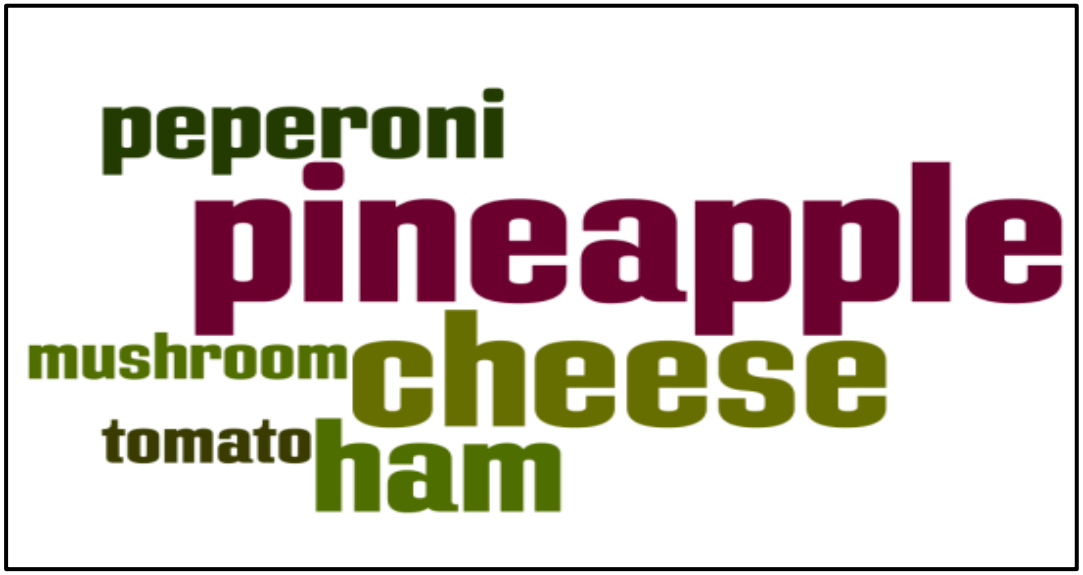
recognising there are different ways of representing numbers and identifying patterns going beyond 100

Creating Word Clouds – Wordle

Digital Technologies Focus:

Before it has meaning data must be processed. Software applications are created to process data. Data processing software accepts data as input and produces information as output.
Data representation is not limited to numbers. Some software can be used to explore and analyse texts e.g. Wordle
http://www.wordle.net/

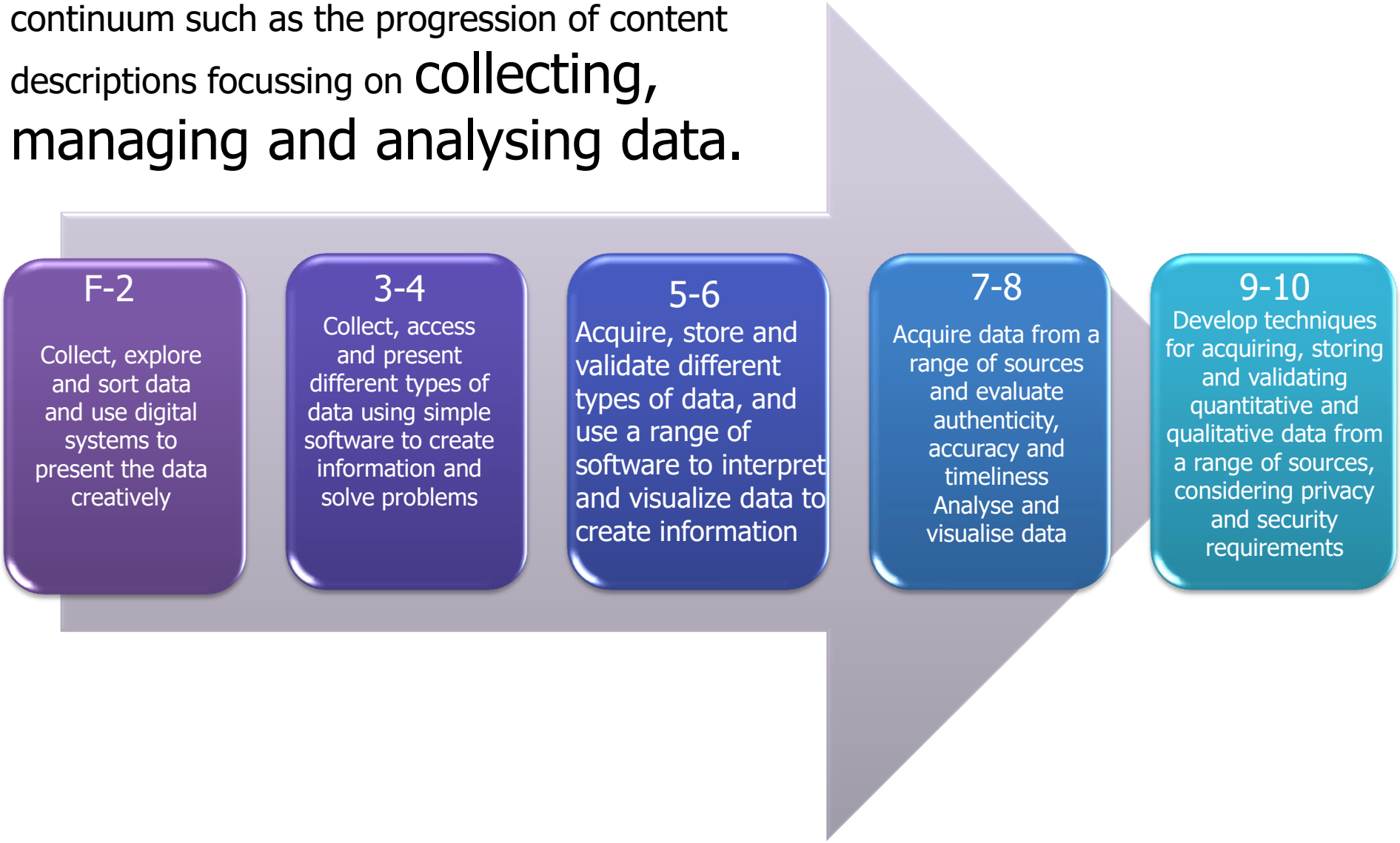
Favourite pizza topping



Activity **Creating and interpreting QR Codes**	**Curriculum Links**	
	English	**Digital Technologies**
Students write book descriptions and use a QR Code creator to create the QR codes for the descriptions. Students can use a QR Code reader such as i-nigma to read the book descriptions.  Charlotte's Web is a story about a pig named Wilbur and his friendship with a spider named Charlotte. When Wilbur is in danger of being slaughtered by the farmer, Charlotte writes messages in her web in order to persuade the farmer to let him live. This a great book to read.	**Creating texts** Plan, draft and publish imaginative, informative and persuasive texts demonstrating increasing control over text structures and language features and selecting print, and multimodal elements appropriate to the audience and purpose (ACELY1682)	Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008) **ICT Capability** **Generate solutions to challenges and learning area tasks** create and modify simple digital solutions, creative outputs or data representation/transformation for particular purposes **http://zxing.appspot.com/generator/**

Progression of content

Knowledge and skills are represented as a continuum such as the progression of content descriptions focussing on collecting, managing and analysing data.



We can collect number data and text data

When data becomes information it can help us make decisions.

What is the most common pet?

How will I find this information?

DIGITAL TECHNOLOGIES HUB

Data detective

In this sequence of lessons students conduct a simple survey to collect, organise and present data. In doing so, they demonstrate their understanding of how to use patterns to represent data symbolically.

Year Level Bands F-2

Australian Curriculum Mathematics

Record sheet: Example 1

Name	Animal
Jane	
Tony	
Sally	
Tina	

Data detective

Favourite pets: Example 2

	1	2	3	4	5	6
Dog						
Mouse						
Cat						
Goldfish						
Horse						
Guinea pig						

Data detective

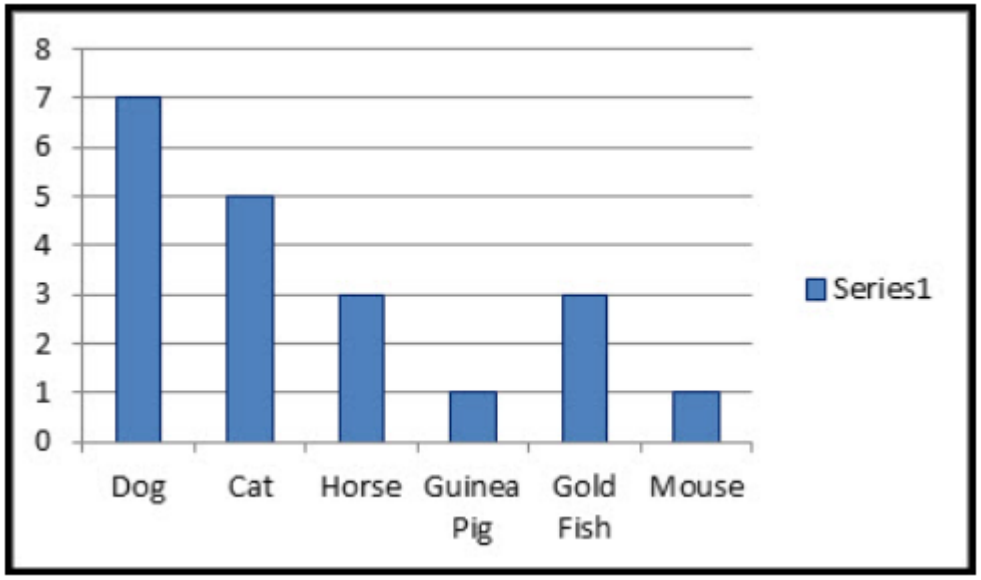
Total Number of Pets in Year 1B: Example 1

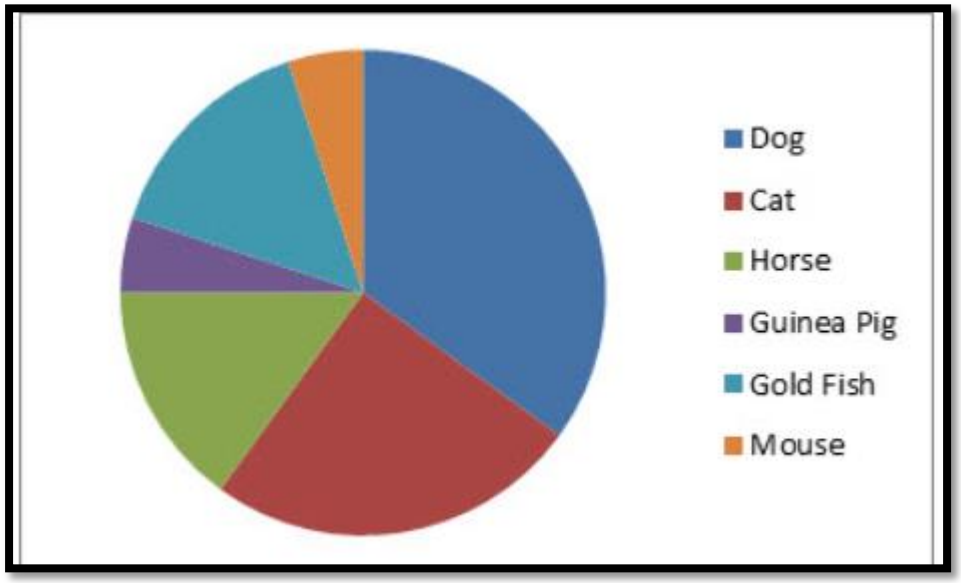
Cat 	Dog	Horse
Guinea pig	Goldfish 	Mouse

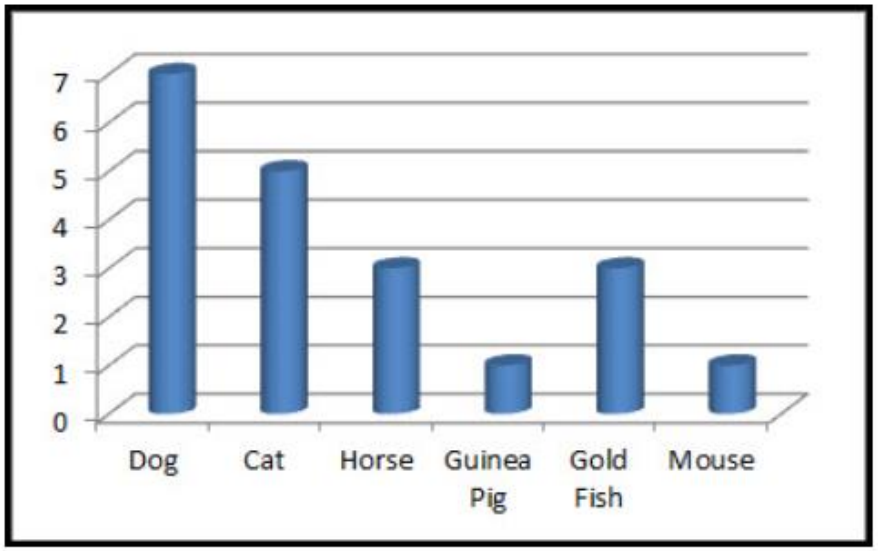
Data detective

Pictograph

Dog							
Cat							
Guinea pig							
Goldfish							
Horse							
Mouse							





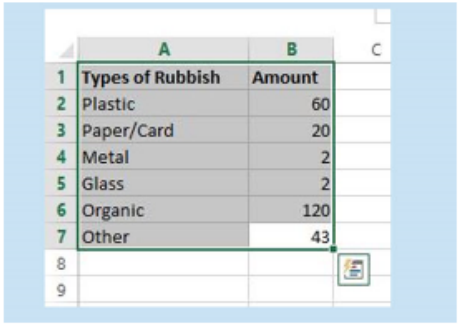


DIGITAL TECHNOLOGIES HUB

Rubbish recording and reduction: Part 2

In this lesson sequence students use Excel to represent data in a variety of ways.

Year Level Bands 3-4
Australian Curriculum Humanities and Social Sciences, Science, Mathematics

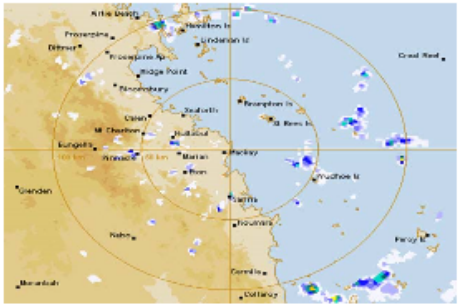


	A	B	C
1	Types of Rubbish	Amount	
2	Plastic	60	
3	Paper/Card	20	
4	Metal	2	
5	Glass	2	
6	Organic	120	
7	Other	43	
8			
9			

Rubbish recording and reduction: Part 1

In this lesson sequence students survey and collect data concerning what is brought to school each day and subsequently becomes rubbish. They then use Excel to represent that data in a variety of different ways.

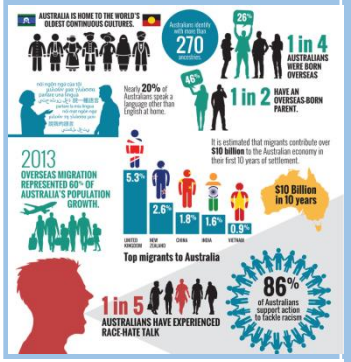
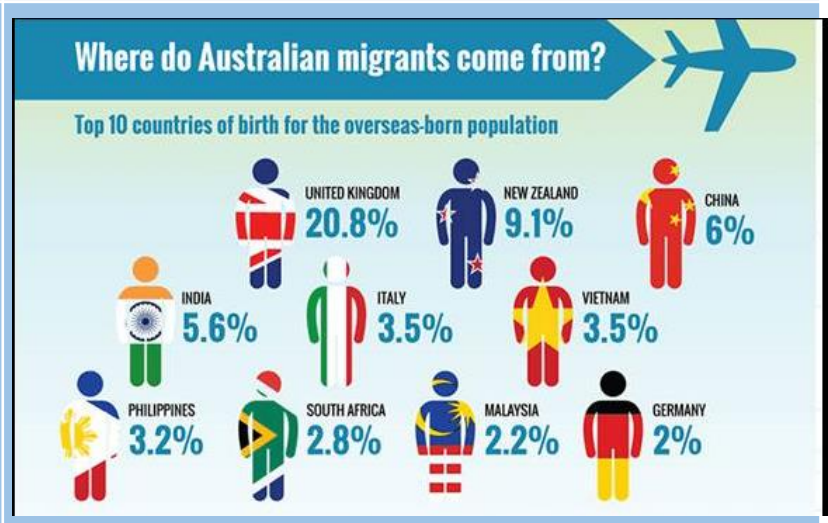
Year Level Bands 3-4
Australian Curriculum Humanities and Social Sciences, Science, Mathematics



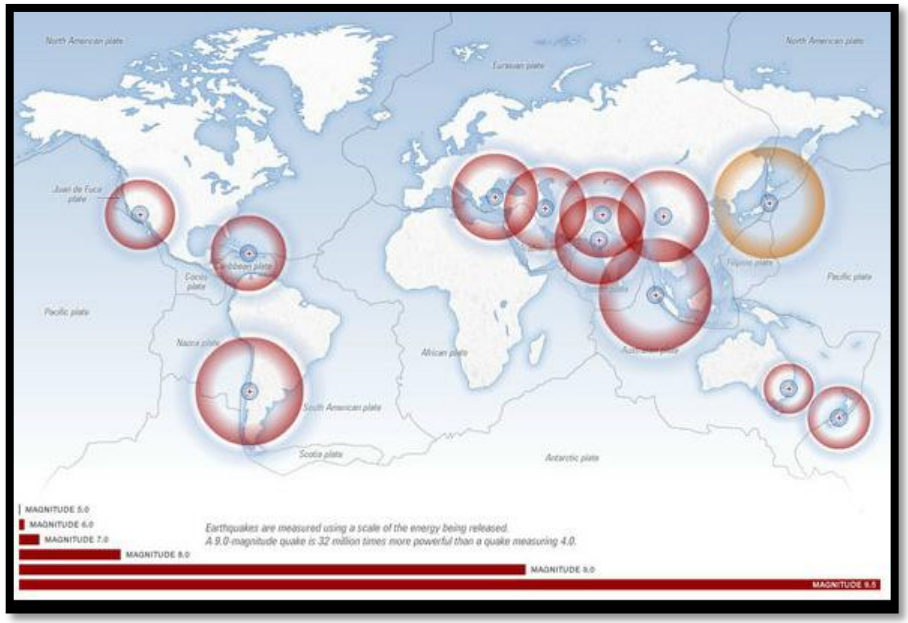
Is it going to rain today?

In this lesson sequence students understand the importance of data in effective decision-making, and are able to find, sort and interpret Bureau of Meteorology (BOM) rainfall data, and to collect their own data and analyse the resulting datasets.

Year Level Bands 5-6
Australian Curriculum Science, Humanities and Social Sciences
Unplugged

5-6	History	Digital Technologies (By the end of Year 2)
Strand	**Knowledge and Understanding** **Inquiry and skills**	**Digital Technologies Processes and Production Skills**
Content Description	**Inquiry Questions** The reasons people migrated to Australia and the experiences and contributions of a particular migrant group within a colony (The role that a significant individual or group played in shaping a colony **Researching** Organise and represent data in a range of formats including tables, graphs and large- and small-scale maps, using discipline-appropriate conventions	Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information
 www.humanrights.gov.au/face-facts	constructing maps, tables and graphs using appropriate digital applications and conventions to display data and information (for example, information about the population growth of; **cultural and religious groups** in Australia at different times)	

Geography and History



UNI DEGREES

X 1 in 4 | Y 1 in 3 | Z 1 in 2*

MOBILITY

5 CAREERS | 15 HOMES | 17 JOBS

IN A LIFETIME*

EFFECTIVE ENGAGEMENT

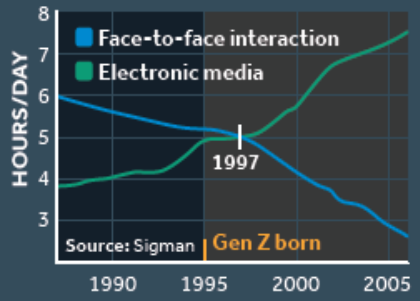
BB	Z
Verbal	Visual
Sit & listen	Try & see
Teacher	Facilitator
Job security	Flexibility
Commanding	Collaborating
Curriculum centred	Learner centric
Closed book exams	Open book world
Books & paper	Glass & devices

TOP NAMES

Oliver	1	Charlotte
William	2	Olivia
Jack	3	Amelia
Noah	4	Ava
Thomas	5	Mia

2,500,000 Gen Alphas born globally each week

SCREENAGERS



GENERATION CONNECTED • iGEN • SCREENAGERS
GEN Z ZED
EST. 1995
DIGITAL INTEGRATORS • THE ZEDS • DOT COM KIDS

TOP 6 POPULATIONS...

...if social media sites were countries

1	Facebook	1600 mil.
2	China	1380 mil.
3	India	1320 mil.
4	Instagram	400 mil.
5	United States	325 mil.
6	Twitter	320 mil.

UPAGERS • GENERATION GLASS
GEN ALPHA
EST. α 2010
GLOBAL GEN • MULTI-MODALS

LEADERSHIP STYLES

GLOBAL

2,000,000,000

2 BILLION GEN Zs

GEN Y PARENTS

- Age at first birth: M 33.0 F 30.8
- Life expectancy:^ M 80.1 F 84.3
- Age at first marriage: M 29.9 F 28.3
- Total Fertility Rate: **1.9**

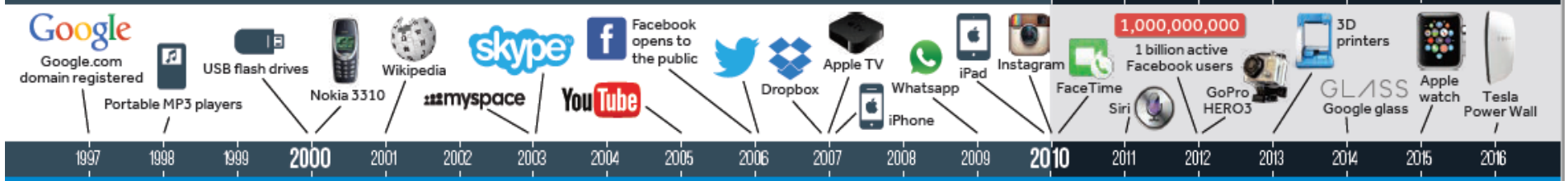
REDEFINED LIFESTAGES

20th CENTURY	CHILDHOOD	TEENAGER	ADULTHOOD					
TODAY	CHILDHOOD	TWEEN	TEENAGER	YOUNG ADULT	KIPPERS	ADULTHOOD	CAREER-CHANGER	DOWNAGER

WORKFORCE OF 2025

Kids In Parents Pockets Eroding Retirement Savings

MEME OF THE YEAR	Photo-bombing	Planking	Gangnam Style	The Fox	Icebucket Challenge	Blue & Black/ White & Gold			
WORD OF THE YEAR	App	Cloud	Hashtag	Selfie	YOLO	😂			



*Future forecasts, ^Life expectancy of Gen Alpha at birth


Start Somewhere
Start Small
Start where success is most likely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