Digital Technologies – 3 and 4_ Data: collect, organise and create

Strand			Knowledge and understanding				Processes and production skills									
			Digital systems		Representation of data		Collecting, managing and analysing data		*Creating digital solutions by:*							
									Investigating and defining		Producing and implementing		Evaluating		Collaborating and managing	
Content Description			Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data (ACTDIK007)		Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008)		Collect, access and present different types of data using simple software to create information and solve problems (ACTDIP009)		Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them (ACTDIP010)		Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)		Explain how student solutions and existing information systems meet common personal, school or community needs (ACTDIP012)		Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols (ACTDIP013)	
Sequence of Lessons / Unit	**Approx. time rq'd**	**Year**	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #
Use data to solve problems	7	4	☐		☐		☑	5	☐		☐		☑	5	☐	

Years F-2 Achievement Standard	**Years 3 and 4 Achievement Standard**	**Years 5 and 6 Achievement Standard**
By the end of Year 2 • Students identify how common digital systems (hardware and software) are used to meet specific purposes. (1) • They use digital systems to represent simple patterns in data in different ways. (2) • Students design solutions to simple problems using a sequence of steps and decisions. (3) • They collect familiar data and display them to convey meaning. (4) • They create and organise ideas and information using information systems, and share information in safe online environments. (5)	By the end of Year 4 • Students describe how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes. (1) • They explain how the same data sets can be represented in different ways. (2) • Students define simple problems, design and implement digital solutions using algorithms that involve decision-making and user input. (3) • They explain how the solutions meet their purposes. (4) • They collect and manipulate different data when creating information and digital solutions. (5) • They safely use and manage information systems for identified needs using agreed protocols and describe how information systems are used. (6)	By the end of Year 6: • Students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks. (1) • They explain how digital systems use whole numbers as a basis for representing a variety of data types. (2) • Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. (3) • They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program. (4) • They explain how information systems and their solutions meet needs and consider sustainability. (5) • Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols. (6)

Topic: Data: representation and presentation

Units

Year 3	**Year 4**
Secret messages and codes 5 hours Explore ways to represent data using the context of secret messages and codes.	**Use data to solve problems** 7 hours Use a meaningful context to collect and organise data to answer a question.

Use data to solve problems

Data is the vital ingredient to creating information and digital solutions. Students should collect different types of data, such as text, numeric, sound and image (still and moving) to answer a meaningful question and then use different software to organise and present data, such as spreadsheets and animation software. Explicitly teach students how to input data into a spreadsheet to organise and present the data. Use different software to present data. Students Explore a range of different formats for presenting data and information.

Flow of activities				
Questions to guide exploration	*How do we organise data?*	*How do you use a spreadsheet?*	*What software should I use to present data?*	*How do I inform others?*
Short text	Collecting and organising data Use a meaningful context for collecting data to answer a question.	Using a spreadsheet Input data into a spreadsheet to organise and present the data.	Presenting data Use different software to present data.	Formats for presenting data Explore different formats for presenting data and information.
AC Alignment	Collecting, managing and presenting data (ACTDIP009)	Collecting, managing and presenting data (ACTDIP009)	Collecting, managing and presenting data (ACTDIP009)	Collecting, managing and presenting data (ACTDIP009)
What's this about	Data can be classified into groups according to common characteristics present in the data. Data can be classified according to a range of factors, such as: • attributes, for example country of origin, gender, eye or hair colour, animal type or car type • amounts/values: for example, height, age, weight, number of family members, cost ($) • geographic location; for example, state or territory, country or postcode • time occurrence; for example, days, weeks, months or years.	Spreadsheet software is particularly useful for manipulating numbers by methods such as sorting, filtering, calculating. Spreadsheet software includes MS Excel for windows, Numbers for iOS and Apache OpenOffice as an open source alternative. When entering data into a spreadsheet, it is important to think about how the data is to be organised; for example, what headings and what format will each cell require – numbers, text, etc? Guidelines may include these instructions: 1. Put one piece of data in per cell. 2. Put similar items in the same column. 3. Use column labels to identify data. 4. Use cell borders to distinguish data. 5. Use colour when presenting a table, to assist with analysis. Charts are used to display series of numeric data in a graphical format, to make the data easier to understand and to clarify any relationships between the different series of data.	Different types of software that we use have certain functions that make them suitable for particular purposes. Spreadsheet software enables us to organise, find patterns in data and present the data as information. Image editing software enables photographs to be modified to suit a purpose. Photographs, for example, can be increased or decreased in size, repositioned or have their brightness adjusted.	Y charts, Venn diagrams and T charts are some useful ways to present simple information visually and to organise thinking. Infographics are a way to visually present data, and are intended to give a simple overview of a complex subject. They may include charts, graphics and, usually, minimal text.
The focus of the learning (in simple terms)	1. Look at a range of data sets and discuss the use of text and numbers. 2. Use a meaningful context for collecting data to answer a question. For example, waste and recycling is a topic that can be used to integrate HAAS: Geography with data collection and presentation. 3. Collect data via interviews or surveys, or use existing data sets. For example, using the context of waste and recycling, set up ways to acquire the data and then guide students in ways to organise the data – such as, by: • **attribute –** sort data into waste types. • **amount** (kgs) of waste disposed or recycled, estimated on bin size • **geographical location –** sort waste data by state and territory • **time occurrence –** sort waste data by weeks or months.	1. Input data into a spreadsheet, placing related data into the same column (as you would in a column within a table). Use the spreadsheet to organise and present the data. 2. Discuss how creating a chart from the spreadsheet data will show patterns or trends and allow the viewer of it to make interpretations. 3. Explicitly teach students how to make a chart using spreadsheet software. Discuss the most appropriate type of graph to present the information. 4. Create a graph of data using conventional processes of hand drawing and colouring. Compare the same data set and modify data, sort the data or organise the data in a different way to show the benefits of	1. Explore different types of software to present data that includes word processing, slideshow, spreadsheet, animation, movie and sound. 2. Focus on how to sort data using a spreadsheet. For example, using the context of personal data you could sort and/or filter a spreadsheet of information by: • **attributes**, such as eye or hair colour; a specific eye colour and specific hair colour • **values**, such as height or age • **geographical location:** such as country of birth. Discuss the power of computing. Contrast this with doing the sorting by hand. 3. Explicitly teach students how to edit, save, insert new data. Also teach them	Explore some of the formats used to present information, such as charts, tables, infographics, digital presentations, digital stories and videos. Decide on a suitable way to present information to a particular audience for a purpose. For example, using the context of waste and recycling: 1. a **Y chart** to show the what it feels like, looks like and sounds like to be an effective recycler 2. an **infographic** displayed in the office to show visitors the school's approach to recycling – and its progress 3. a **video** created to show students what to recycle, and explaining the benefits of using data as evidence 4. a **presentation** made to school council to organise bin placement around the school, based on litter data 5. a **digital story** for a young child, aiming to help them understand about littering.

	4. Discuss how data can be presented; for example as an image (photos/collage), text (notice for information kiosk or daily bulletin), or numbers, presented in a table or as a kind of chart.	using a computer and spreadsheet software. 5. Ask students: What information can we create from the data?	any shortcuts that would increase the efficiency and accuracy of the information or digital solution. 4. Create a presentation, using presentation software such as PowerPoint, Google slides or Keynote, that represents information in some form. For example, using the context of waste, display a graph of the type of rubbish from heaviest to lightest, then from most numerous to least numerous, then from length of time to breakdown etc. 5. You could also explicitly teach students some conventions regarding different styles for the presentation of information. For example, charts should have their axes labelled and have a heading. Slideshows should have text that is at least 18 pt in size and each page should not be full of text. Word processing documents, where appropriate, should use such items as headings or a number sequence to help organise the information.	
Supporting resources and tools and purpose/context for use.	Rubbish recording and reduction: Part 1 This lesson idea focuses on how students survey and collect data about what is brought to school each day and subsequently becomes rubbish. Google Forms This site provides easy ways to create and organise information, including surveys and quizzes.	Rubbish recording and reduction: Part 2 This lesson idea focuses on how students use Excel to present data in a variety of ways. Kids' Zone: Create a graph This is an online, easy-to use graphing tool that provides five different graphs and charts for students to explore and use.	Google slides Free online presentation software. Enables students to collaborate on one document.	Picktochart This provides easy ways to make infographics.
Assessment	**Suggested approaches may include:** • Data acquired and then organised into relevant headings and columns. Look for different ways to classify the data. **Achievement standard** **Collect** and **manipulate** different data when creating information and digital solutions.	**Suggested approaches may include:** • A table of data and its corresponding graph. **Achievement standard** **Collect** and **manipulate** different data when creating information and digital solutions.	**Suggested approaches may include:** • Presentation or demonstration. • Presenting some 'finished' pieces of information and then asking students to annotate the information using an agreed process. **Achievement standard** **Collect** and **manipulate** different data when creating information and digital solutions.	**Suggested approaches may include:** • Presentation showing at least three different ways of presenting the same data. **Achievement standard** **Collect** and **manipulate** different data when creating information and digital solutions.