**Australian Curriculum:
Digital Technologies**

**Years 3–4**

**Sample assessment task**

 **Cooling the school**

**Assessment focus:** Australian Curriculum:Digital Technologies
(digital systems)

**About this assessment task**

This sample assessment task has been prepared to assist teachers with the implementation of the Australian Curriculum: Digital Technologies, with a focus on *digital systems*. It shows how aspects of the Digital Technologies curriculum related to digital systems can be assessed using contexts from other learning areas and subjects. These contexts may be content that students have recently completed or are learning concurrently. This approach should enhance the manageability of the curriculum while still providing a targeted focus on Digital Technologies.

**Purpose**

The sample task aims to:

* demonstrate meaningful curriculum links to:
* Digital Technologies curriculum:
	+ - achievement standard
		- content descriptions
		- content strands
		- key concepts
		- key ideas (Technologies)
* general capabilities
* cross-curriculum priorities
* other learning areas. See Appendix 1 for specific links for this task.
* provide teacher support materials, suggested adjustments for students with diverse needs and resources. See Appendix 2.
* provide a template to create your own assessment task. See Appendix 3.

**How to use this sample task**

The sample task can be implemented as a standalone task or it can be used to inform planning of a:

* unit of work that might accompany the sample task
* similar task and/or unit of work with a focus on digital systems.

Title: Cooling the school

**Assessment focus:** Australian Curriculum: Digital Technologies (Digital systems – identify and explore digital systems for different purposes, and transmit different types of data). This task is also linked to HASS. Depending on modifications made to this task, opportunities may exist to link it to Literacy and Numeracy.

**Band:** Years 3 and 4

**Context:** Students explore how a range of digital systems can be useful in the school environment (integrating Digital Technologies and HASS).

**Duration:** 4–8 weeks dependent on prior learning

**Prior learning:** Students will have:

* recognised and explored digital systems (hardware and software components) for
a purpose
* participated in a number of design, computational and systems thinking tasks in F–2
* created maps with physical and drawn materials
* understood the difference between 2-dimensional and 3-dimensional objects
* been introduced to the term: ‘bird’s-eye view’
* had an opportunity to locate their home on a digital map, for example, Google or
Apple maps
* identified landmarks from their local area on a digital map, for example, parks, beach, shopping centre roads, bike track
* had opportunities in class to draw their own map to interpret their place in the world
* been introduced to the importance of direction, scale and key on a map
* had opportunities to represent features on a map from ones created by themselves or by seeing how cartographers (map makers) have represented features
* been engaged in descriptive writing tasks
* explored different ways of measuring environmental conditions in the past that are not digital, for example, a rain gauge, sundial.

## **Task summary**

**Key inquiry question:**

* How could we cool the school environment?

**Focus questions:**

* How do maps help us to understand our environment?
* How could we use data to help us cool the school environment?

**Students will:**

* understand the components of a digital system
* understand that the same data can be represented in different ways
* use digital mapping software to access data about the school environment
* collect and manipulate different data about the school environment using a variety of tools
* make generalisations about data
* interpret and use data to plan a solution to cool their school
* reflect on the way their planned solution will meet needs.

## **Task features**

**Students work in pairs or groups of 3 to:**

* compare and contrast the representations of landscapes and their own environment with those of maps from earlier years and today
* determine how their school environment can be refined and enhanced with more specific details not found on larger scale maps, for example, the best place for hiding in hide and seek; the coolest place to be on a hot day; the best corner of the school to find a quiet place to read
* compare objects from the world around them with their school environment using systems thinking and discuss how their school can be represented as a system
* examine the components of an old computer, explore an image of the inside of a computer that shows its component parts or explore this [interactive image – inside a computer with explanatory labels](https://www.thinglink.com/scene/522420444112879618). Students could break it down into a system of integrated parts, for example, keyboard, mouse, circuit board, fan, screen
* discuss how these individual parts that make up a computer as an integrated design compare to the school environment/system, for example: Could a cool area of the school with a pond be compared to the fan in an older computer? How do they compare (similarities and differences)?
* describe how digital systems could help us capture data about our environment, for example, take photos with a tablet device to show shady and sunny areas in the playground, use a lux meter app to identify the light levels in different areas
* identify a range of recording tools that could be used to collect data around the school, for example, use a digital thermometer to measure the temperature under a tree and in full sun, a floating thermometer to measure the temperature of a pond, a rain gauge to measure rainfall, a camera to photograph the number of areas with and without shade, a lux meter app to measure light levels in the shade and in full sun, a digital weather station to gather weather data over a chosen period of time
* identify how they might use the data to plan how to cool their school
* identify different areas to measure on a digital map
* identify what is worth measuring and therefore what are the most meaningful data that can be collected
* determine the best means of sharing their data
* collect and record their data\* in such a way that others can interpret what they are recording, for example titles
* mark areas on a map of their school environment to show where each recording
was taken
* present their data and recommendation as a poster, video or slideshow presentation to others with a plan to increase ways of cooling the school, for example, plant more trees on the western side of the oval.

Note: Be sure to mark time and date on each data set (this will be important in interpreting the data as seasons and time of day will change results and assist in designing a cool school).

**Background information**

**Teacher guidance and support**

Share with students a range of maps including historical maps – physical and digital – to see how they have developed over time (see figures 1–4). For example, compare a historic map of the Australasian region with a recent cartographic representation. Compare these maps with digital representations such as Google Maps, OpenStreetMap and virtual songlines

Scribble Maps can be used as an interactive platform for students to record data of their own school environment. This allows students to take measurements and record on the digital map.

Useful links:

[maps.google.com](https://acaraonline.sharepoint.com/sites/digital-technologies-in-focus/Administration/Planning/Assessment%20task%20trials/Systems%20assessment%20tasks/3-4/www.maps.google.com)

[openstreetmap.org](https://acaraonline.sharepoint.com/sites/digital-technologies-in-focus/Administration/Planning/Assessment%20task%20trials/Systems%20assessment%20tasks/3-4/www.openstreetmap.org)

[virtualsonglines.org/](https://www.virtualsonglines.org/)

[scribblemaps.com](https://acaraonline.sharepoint.com/sites/digital-technologies-in-focus/Administration/Planning/Assessment%20task%20trials/Systems%20assessment%20tasks/3-4/www.scribblemaps.com)

Teachers should:

* allow time for discussion and encourage comparison of a digital system and a school environment
* allow time for exploration and searching of analog and digital maps
* provide time for the students to map their school environment, marking in places where recording of data would best take place
* encourage students to refer to the information they were discussing in class on ‘what makes up a system’ and look for systems in their built and natural environments around the school or at home
* give students opportunities to capture and record data (temperature in full sun, under trees, in ponds, rainfall, etc.) and refer to recorded data, if available, from previous years
* ask students:
	+ Do you see a pattern in the seasonal data?
	+ Can you predict future trends from the records?
	+ How will the data determine the task you have been set of ‘Cooling the school’?
	+ Why do you think it is important to gather data from as many sources as you can before planning ways to cool the school?

|  |
| --- |
| **Sample historical maps** |
| Diagram  Description automatically generated |  |
| Figure 1: Abel Tasman’s *Karte von Australien* (map of Australia), c. 1644 (published 1870) *Image source: flickr.com/photos/12403504@N02/11245652285* | Figure 2: Matthew Flinders’ general chart of Terra Australis or Australia showing the parts explored between 1798 and 1803 (published 1814)*Image source:* *nla.gov.au/nla.obj-232588549* |
| Diagram  Description automatically generated | Online map showing First Nations’ perspectives: [The AIATSIS Map of Indigenous Australia](https://aiatsis.gov.au/explore/map-indigenous-australia) |
| Figure 3: Digitised image from a geography textbook published in 1893*Image source: flickr.com/photos/britishlibrary/11224235365/in/album-72157650512420799/* | *Online Map location: https://aiatsis.gov.au/explore/map-indigenous-australia* |

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**Links to the Australian Curriculum**

Table 1 shows all the related Australian Curriculum: Digital Technologies links to this task. For a more in-depth exploration of the links to the curriculum, see Appendix 1.

Table 1: Links from the task to the Australian Curriculum: Digital Technologies

|  |  |
| --- | --- |
| **Digital Technologies** ***Achievement standard***Aspects addressed by this task are highlighted. | 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. They explain how the same data sets can be represented in different ways.Students define simple problems, design and implement digital solutions using algorithms that involve decision-making and user input. They explain how the solutions meet their purposes. They collect and manipulate different data when creating information and digital solutions. They safely use and manage information systems for identified needs using agreed protocols and describe how information systems are used. |
| ***Strands*** | Digital Technologies knowledge and understanding * Digital systems

Digital Technologies processes and production skills * Collecting, managing and analysing data
* Creating designed solutions by
* evaluating
* collaborating and managing
 |
| ***Content descriptions*** | * Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data ([ACTDIK007](http://www.scootle.edu.au/ec/search?accContentId=ACTDIK007))
* Recognise different types of data and explore how the same data can be represented in different ways [(ACTDIK008)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIK008)
* Collect, access and present different types of data using simple software to create information and solve problems [(ACTDIP009)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP009)
* Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them [(ACTDIP010)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP010)
* Explain how student solutions and existing information systems meet common personal, school or community needs ([ACTDIP012)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP012)
* Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols ([ACTDIP013](https://www.scootle.edu.au/ec/search?accContentId=ACTDIP013))
 |
| ***Key concepts*** | * digital systems
* data representation
* data collection
* data interpretation
* impact
* interactions
 | ***Key ideas***  | * Thinking in Technologies
* systems thinking
* computational thinking
* design thinking
 |
| ***Cross-curriculum priorities*** | * Sustainability
 | ***General capabilities*** | * Information and Communication Technology (ICT) Capability
* Literacy
* Numeracy
* Critical and Creative Thinking
* Personal and Social capability
 |

**Assessment planner**

|  |  |
| --- | --- |
| **Achievement standard**(relevant aspect of the achievement standard to be assessed) | **Student evidence** (what student evidence will be considered to judge if the achievement standard aspect has been met) |
| **Digital Technologies** |
| Students describe how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes.  | * Students describe the components of a digital system and how they connect to form a system.
 |
| They describe how information systems are used. | * Students interact with a variety of digital maps and describe the similarities and differences.
* Students can interpret a range of maps of their school to identify features that would support their desire to create cool spaces for themselves and friends.
 |
| They collect and manipulate different data when creating information and digital solutions. | * Students identify areas within their built and natural environments that are cooler using a range of measuring devices.
 |
| Students explain how the same data sets can be represented in different ways. | * Students demonstrate an understanding of how to represent data either digitally or unplugged.
* Students record the various data inputs and compare and contrast the information to inform their plans to cool the school.
* Students identify patterns in the data.
 |
| They safely use and manage information systems for identified needs using agreed protocols.  | * Students design either on paper or with physical objects their school environment using aerial data from a range of maps, both aerial and topographic, that represent their school environment. They include direction, scale and key in their designs.
* Students share their recommendations as a podcast, interviews with experts or peers, a video guide or as a word-processed document that allows them to present their solutions for a cool school to their peers.
 |

## **Assessment rubric**

The rubric below shows only Digital Technologies. **Note:** There are opportunities to include HASS, Literacy and Numeracy in the assessment.

|  |  |  |  |
| --- | --- | --- | --- |
| **Digital Technologies** | **Below standard*****Students*:** | **At standard*****Students*:** | **Above standard*****Students*:** |
| **Digital systems** | identify common digital systems (hardware and or software) for a given purpose | describe how a range of digital systems (hardware and software) and their peripheral devices can be used to collect, sort and display data | provide a detailed description using a variety of examples of how a range of digital systems (hardware and software) and their peripheral devices can be used to collect, sort and display data |
| **Representing data** | identify how the same data sets can be represented in different ways | explain how the same data sets can be represented in different ways | provide detailed explanation with examples about how the same data sets can be represented in different ways considering 2 different measures |
| **Data collection** | use digital mapping software with support | use digital mapping software to access data about the school environment with support | independently use digital mapping software to access data about the school environment, considering a variety of data and locations |
| collect simple data | collect and manipulate different data about the school environment using a variety of tools | independently use digital systems and peripheral devices to collect and manipulate data needed to plan a solution |
| **Data interpretation** | make observations about data | make generalisations about data  | use data to compare and contrast the findings and visualise data in different ways  |
| use data to assist in planning a solution | interpret and use data to plan a solution | interpret and use data to visualise their learning and their planned solution |
| **Impact** | reflect on what they like about their planned solution | reflect on the way their planned solution will meet needs | independently reflect on the way their planned solution will meet needs now and into the future |

**Appendix 1**

 **Australian Curriculum links (in detail)**

**Links to the Australian Curriculum**

**Digital Technologies**

**Achievement standard**

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. They explain how the same data sets can be represented in different ways.

Students define simple problems, design and implement digital solutions using algorithms that involve decision-making and user input. They explain how the solutions meet their purposes. They collect and manipulate different data when creating information and digital solutions. They safely use and manage information systems for identified needs using agreed protocols and describe how information systems are used. **Content descriptions**

|  |
| --- |
| Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data ([ACTDIK007](http://www.scootle.edu.au/ec/search?accContentId=ACTDIK007))Recognise different types of data and explore how the same data can be represented in different ways [(ACTDIK008)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIK008)Collect, access and present different types of data using simple software to create information and solve problems [(ACTDIP009)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP009)Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them [(ACTDIP010)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP010)Explain how student solutions and existing information systems meet common personal, school or community needs ([ACTDIP012)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP012)Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols ([ACTDIP013](https://www.scootle.edu.au/ec/search?accContentId=ACTDIP013)) |

## **Content strands**

|  |  |
| --- | --- |
| **Digital Technologies knowledge and understanding** | **Digital Technologies processes and production skills** |
| Digital systems  | X | Collecting, managing and analysing data | X |
| Representation of data | X | Creating digital solutions by: |  |
|  | * investigating and defining
 | X |
| * generating and designing
 |  |
| * producing and implementing
 |  |
| * evaluating
 | X |
|  | * collaborating and managing
 | X |

## **Links to the key ideas**

|  |  |  |
| --- | --- | --- |
| **Creating preferred futures** | Students develop solutions to meet needs considering impacts on liveability, economic prosperity and environmental sustainability. | X |
| **Project management** | Students will develop skills to manage projects to successful completion through planning, organising and monitoring timelines, activities and the use of resources. | X |
| **Thinking in Technologies** |  |  |
| * Systems thinking
 | Systems thinking is a holistic approach to the identification and solving of problems where the focal points are treated as components of a system, and their interactions and interrelationships are analysed individually to see how they influence the functioning of the entire system. | X |
| * Design thinking
 | Design thinking involves the use of strategies for understanding design needs and opportunities, visualising and generating creative and innovative ideas, planning, and analysing and evaluating those ideas that best meet the criteria for success. | X |
| * Computational thinking
 | Computational thinking is a problem-solving method that is applied to create solutions that can be implemented using digital technologies. It involves integrating strategies, such as organising data logically, breaking down problems into parts, interpreting patterns and models and designing and implementing algorithms. | X |

Read more about the [key ideas in the Australian Curriculum: Technologies](https://www.australiancurriculum.edu.au/f-10-curriculum/technologies/key-ideas/).

**Links to the key concepts**

The [key concepts](https://www.australiancurriculum.edu.au/f-10-curriculum/technologies/digital-technologies/structure/)that underpin the Digital Technologies curriculum establish a way of thinking about problems, opportunities and information systems and provide a framework for knowledge and practice. (Colour coding is based on the [Australian Computing Academy scheme](https://aca.edu.au/#what-is-the-digital-technologies-curriculum).)

|  |  |  |
| --- | --- | --- |
|  | **abstraction** | underpins all content, particularly the content descriptions relating to the concepts of data representation; and specification; algorithms; and implementation  |
|  | **data collection**  | (properties, sources and collection of data)* *Students collect and analyse data from digital maps and gather temperature data from around the school to inform the design of solutions to cool the school environment.*
 | X |
|  | **data representation**  | (symbolism and separation)* *The same data are represented differently depending on their purpose.*
* *Data can be represented in many ways, for example, photographs, tally marks, maps.*
 | X |
|  | **data interpretation** | (patterns and contexts) * *Data help us build understanding of key concepts from other curriculum areas.*
* *The way we present data helps us interpret them to create meaning.*
 | X |
|  | **specification** | (descriptions and techniques)* *Students identify how geographic information systems (digital maps) help us.*
* *Students specify ways that will promote cooling in the school environment as determined by the data collected from the geographic information systems.*
 | X |
|  | **algorithms** | (following and describing) |  |
|  | **implementation** | (translating and programming) |  |
|  | **digital systems**  | (hardware, software, and networks and the internet)* *Students identify how digital components connect to form systems.*
* *Students interact with geographic information systems (digital maps).*
 | X |
|  | **interactions** | (people and digital systems, data and processes)* *Students develop an understanding of the way information systems can be used to help people.*
 | X |
|  | **impact** | (sustainability and empowerment)* *Students develop an understanding of how they can design solutions that can be used to help people.*
 | X |

## **Cross-curriculum priorities** [Read more…](https://www.australiancurriculum.edu.au/f-10-curriculum/cross-curriculum-priorities/)

|  |  |  |
| --- | --- | --- |
| **Aboriginal and Torres Strait Islander histories and cultures** | **Asia and Australia’s engagement with Asia** | **Sustainability** |
|  |  | X |

## **General capabilities** [Read more…](https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Literacy** | **Numeracy** | **ICT Capability** | **Critical and Creative Thinking** | **Ethical Understanding** | **Personal and Social capability** | **Intercultural Understanding** |
| X | X | X |  |  |  |  |

**Links to ICT Capability continuum: Level 3**

Depending on the year level this activity is being used with, adjust content to the appropriate level, for example Level 1a, 2.

|  |
| --- |
| **Applying social and ethical protocols and practices when using ICT** |
| acknowledge when they use digital products created by someone else, and start to indicate the source  |  |
| independently apply standard guidelines and techniques for particular digital systems to secure digital information | X |
| apply standard guidelines and take action to avoid the common dangers to personal security when using ICT and apply appropriate basic social protocols when using ICT to communicate with unknown audiences  |  |
| identify the value and role of ICT use at home and school  |  |
| **Investigating with ICT** |
| use ICT to plan an information search or generation of information, recognising some pattern within the information | X |
| locate, retrieve or generate information from a range of digital sources  | X |
| explain why located data or information was selected  | X |
| **Creating with ICT** |
| use ICT to generate ideas and plan solutions | X |
| create and modify simple digital solutions, creative outputs or data representation/transformation for particular purposes | X |
| **Communicating with ICT** |
| use appropriate ICT tools safely to share and exchange information with appropriate known audiences | X |
| understand that computer mediated communications are directed to an audience for a purpose  |  |
| **Managing and operating ICT** |
| identify and independently operate a range of devices, software, functions and commands, taking into consideration ergonomics when operating appropriate ICT systems, and seek solutions when encountering a problem  | X |
| identify and compare the use of the main components of different ICT systems  | X |
| manage and maintain digital data using common methods  | X |

**Links to Literacy**

In this task, students have the opportunity to develop literacy by comprehending texts through listening, reading and viewing; composing texts through speaking, writing and creating; and using text, grammar, word and visual knowledge. They practise literacy skills as they navigate, read and review different text types; listen to instructions and to identify and respond to key information in spoken and multimodal texts; interpret, analyse, compose and edit learning area texts; and use language to interact with others. As students define problems, manipulate data, connect and express ideas, and give explanations, they apply their knowledge of text cohesion, grammar and spelling; and use subject-specific vocabulary. Students also identify how choices in visual elements create meaning.

Visit Literacy general capability <https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/literacy/>

Visit National Literacy Learning Progression <https://www.australiancurriculum.edu.au/resources/national-literacy-and-numeracy-learning-progressions/national-literacy-learning-progression/>

**Links to Numeracy**

In this task, students have the opportunity to develop numeracy by estimating and calculating with whole numbers, recognising and using patterns and relationships, using spatial reasoning, and interpreting statistical information. In using software, materials, tools and equipment, students have opportunities to model, represent, order and use numbers in real-life situations; and to solve everyday addition and share stories. In implementing digital solutions, they collect and record data; identify and describe trends in everyday patterns; interpret information on diagrams; and display data as tables, diagrams and graphs.

Visit Numeracy general capability <https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/numeracy/>

Visit National Numeracy Learning Progression

<https://www.australiancurriculum.edu.au/resources/national-literacy-and-numeracy-learning-progressions/national-numeracy-learning-progression/>

## **Links to the HASS learning area**

|  |
| --- |
| **HASS** |
| By the end of Year 4, students recognise the significance of events in bringing about change and the importance of the environment. They explain how and why life changed in the past and identify aspects of the past that have remained the same. They describe the experiences of an individual or group in the past. They describe and compare the diverse characteristics of different places at local to national scales. Students identify the interconnections between components of the environment and between people and the environment. They identify structures that support their local community and recognise the importance of laws in society. They describe factors that shape a person’s identity and sense of belonging. They identify different views on how to respond to an issue or challenge.Students develop questions to investigate. They locate and collect information and data from different sources, including observations to answer these questions. When examining information, they distinguish between facts and opinions and detect points of view. They interpret data and information to identify and describe distributions and simple patterns and draw conclusions. They share their points of view, respecting the views of others. Students sequence information about events and the lives of individuals in chronological order with reference to key dates. They sort, record and represent data in different formats, including large-scale maps using basic cartographic conventions. They reflect on their learning to propose action in response to an issue or challenge, and identify the possible effects of their proposed action. Students present ideas, findings and conclusions using discipline-specific terms in a range of communication forms. |

## **Appendix 2**

## **Support materials**

## Things to think about

 *Rich questions and discussion starters*

Students with diverse needs

## **Resources**

## **Support materials**

## **Things to think about**

This task is about collecting and representing data. Digital Technologies, Mathematics and Science have a shared focus on data. For example, data collection and interpretation can include numeric data such as data counted in whole numbers and categorical data such as symbols, charts and groupings.

The term data representation can mean something different in each of these learning areas. Consider what representation can look like in Science, for example students will often use models such as the water cycle to represent their thinking and to help with analysis.

In Mathematics, data representation refers to the way data is symbolised, visually treated or provided in audio. The connections with Mathematics support students to gain the knowledge, understanding and skills that underpin patterns and data visualisation, while Digital Technologies has a specific focus on how digital systems represent data.

## **Rich questions and discussion starters**

Asking the right type of questions helps establish what students know about data and also what they can interpret from them. Use open-ended and probing questions (usually beginning with how, who, when, where and why) to promote critical thinking. For example:

* What patterns or themes emerge from the data?
* What proof exists for …?
* How would \_\_\_\_\_\_\_\_\_\_\_\_\_ affect or influence \_\_\_\_\_\_\_\_\_\_\_?
* How would you translate \_\_\_\_\_\_\_ into visual form?

## See <https://www.lavc.edu/profdev/library/docs/promotethink.aspx>.

## **Students with diverse needs**

Students might need **scaffolded support materials**. Adjustments to this task might include:

* placing students in groups with students who can support them with encouraging questions and ideas during the analysis and design phase
* grouping students with peer-mentors who can support their literacy or numeracy needs (including training students who find the task too easy to be effective peer-mentors)
* having students with literacy support needs answer questions using video or recorded voice rather than writing or typing
* using teacher assistants to support literacy demands of a task to enable student to show evidence of digital technologies learning
* encouraging students to communicate via online secure chat for those who rarely speak up during group work
* checking in at frequent intervals to determine students understanding of the task
* focusing on what students can do rather than what they cannot do when providing feedback.

Use professional judgement to provide rapid support when students are struggling with a task due to the literacy or numeracy demands of the task.

Specific adjustments:

**Data collection:**

* Collecting data in your field of view from one static, pre-determined or pre-measured location.
* Focus on collecting data in a visual form such as in video, photographic, drawn or tally
mark format.

**Data representation and interpretation:**

* Consider purpose of representation, for example people with low vision may need an auditory representation such as using clapping or sound volume to convey the amount of something.
* Use of concrete materials, for example, 29 counters could be used to represent 29°C. Bundling sticks or maths attribute blocks could also be used.

**Algorithms and implementation:**

* Demonstrate an understanding of the task through use of a simple, drawn flow chart instead of with a digital solution.

Students might need opportunities for **extension**. Adjustments to this task might include:

* the use of micro:bits to collect data on temperature fluctuations in different shade and
non-shade areas in the school
* the design and implementation of digital survey tools to survey members of the school community about the temperature of areas in the school
* giving students training in mentorship and having them support other students with encouraging questions and ideas.

Change the approach to delivery of this task if a student is disengaged or is finding activities too easy or too hard.

See also: <https://evidenceforlearning.org.au/guidance-reports/improving-literacy-in-lower-primary-school/>

Specific adjustments:

**Data collection:**

* Expand the times at which you collect data, which will ensure a thorough investigation of the data and allow for variations due to differing weather patterns.

**Data representation and interpretation:**

* Brainstorm ways that people with diverse needs might experience this data, for example how could this be represented to people with low vision? with hearing impairment?

**Algorithms and implementation:**

* Increase complexity requirements of the presentation of the proposed solution.

## **Resources**

Students should be able to explain how different areas of their school might be compared to a digital system that they have had a chance to pull apart, if possible, or view in a broken-down schemata of a computer of other digital devices.

# [Video – Inside your computer – Bettina Bair](https://youtu.be/AkFi90lZmXA)

# [Interactive image – inside a computer with explanatory labels](https://www.thinglink.com/scene/522420444112879618)

# [ACARA document – Classroom ideas: Digital systems](https://www.australiancurriculum.edu.au/media/5901/classroom-ideas-3-4-digital-systems.pdf)

# [Video – What does what in your computer? Computer parts explained](https://youtu.be/ExxFxD4OSZ0)

When discussing systems with students it can be helpful to refer to prior knowledge of what makes up a computer with its individual components of a mouse, a CPU, keyboard, monitor and so on. When discussing the make-up of a computer as a system you can ask students to think of other ‘systems’ that depend on individual parts to make up the whole. For example, a garden is a system, made up of the soil, the microbes and bacteria in the soil, the input from the sun and rain, the plants that thrive in the particular soil type and so on.

The ACARA DTiF project has created a helpful video that explains the make-up of a digital system that can be used in a garden: <https://youtu.be/TrjCLS-W7aM>

Introduce ways of measuring a school environment with apps available on a phone, for example:

* Sound/noise meter: <https://apps.apple.com/au/app/decibel-x-db-noise-meter-slm/id448155923> measures decibels
* Light meter: <https://apps.apple.com/au/app/lux-light-meter-free/id1171685960>
* Thermometer: <https://apps.apple.com/au/app/real-thermometer/id1272049393>
* The Learnometer <https://gratnellslearnometer.com/> is a digital device that records a range of environmental readings. The students may like to see what each of the different data sets might be and how they could relate to their school environment. Although not linked to this unit for the measurement of outdoor elements such as temperature, it could be a useful exercise to modify the task and explore the use of a digital system for collecting indoor environmental data and making recommendations for improved indoor conditions.

There are also some excellent resources in the CSER MOOCs created for teachers new to Digital Technologies: <https://csermoocs.adelaide.edu.au/available-moocs>

Assessment and further resources are available from the Digital Technologies Hub:

* [Digital Technologies Hub guides and templates](https://www.digitaltechnologieshub.edu.au/teachers/assessment/guides-and-templates)

## **Appendix 3**

## **Digital systems task planning template**

This template is a suggested step-by-step approach that teachers might use to consider whether *all* or *any* of these links apply to an assessment task they develop themselves to better reflect the learning needs of their students and the context of their classroom and school.

**Planning template suggested approach**

Below is a broad outline of how to use the assessment task planning template on the following pages. It reflects the work of Wiggins and McTighe (2012) on Understanding by Design, which features a backward design approach.

1. Begin with Digital Technologies:
	1. determine the aspects of the achievement standard that will be the focus of the task
	2. highlight the relevant aspects of the standard
	3. identify what knowledge and skills students will need in order to demonstrate the achievement standards (content descriptions)
	4. identify the strands and threads that will need to be addressed.
2. As Digital Technologies is the driving learning area, it is suggested that only the key ideas for this learning area be identified.
3. Indicate the key concepts of Digital Technologies that will be addressed and how.
4. Scan the Australian Curriculum to find meaningful connections between:
	1. learning areas (two learning areas helps keep learning focused; avoid more than three)
	2. general capabilities
	3. cross-curriculum priorities.

For example, connections could be established on the grounds of:

* 1. common concepts/key ideas, such as data/design/ways of thinking
	2. common words, such as ‘create’, ‘communicate’ and ‘control’
	3. contexts, from learning areas such as Science, HASS, HPE, The Arts.
1. Indicate what general capabilities and cross-curriculum priorities can be meaningfully addressed in the assessment task.
2. Construct a task that allows for discrimination in performance and includes:
	* title
	* band level
	* duration
	* task summary, including prior learning
	* achievement standards and content descriptions
	* task
	* assessment rubric.

Search for xxxx and replace with your own text.

**Title: xxxx**

**Assessment focus:** Australian Curriculum: Digital Technologies
(Digital systems). This task is also linked to xxxx. Depending on modifications made to this task, opportunities may exist to link this task to xxxx and or xxxx.

**Band:** Years 3 and 4 (intended cohort Year xxxx)

**Context:** xxxx

**Duration:** xxxx

**Prior learning:** Students will have:

* participated in a number of design, computational and systems thinking tasks in F–2
* completed activities to enable them to understand xxxx. For example, xxxx.
* xxxx

## **Task summary**

**Key inquiry question:**

* xxxx

**Focus questions:**

* xxxx

**Students will:**

* xxxx

Task features

Students will be asked to complete the following:

* xxxx

**Digital Technologies**

**Achievement standard**

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. They explain how the same data sets can be represented in different ways.

Students define simple problems, design and implement digital solutions using algorithms that involve decision-making and user input. They explain how the solutions meet their purposes. They collect and manipulate different data when creating information and digital solutions. They safely use and manage information systems for identified needs using agreed protocols and describe how information systems are used. **Content descriptions**

|  |
| --- |
| Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data ([ACTDIK007](http://www.scootle.edu.au/ec/search?accContentId=ACTDIK007))Recognise different types of data and explore how the same data can be represented in different ways [(ACTDIK008)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIK008)Collect, access and present different types of data using simple software to create information and solve problems [(ACTDIP009)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP009)Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them [(ACTDIP010)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP010)Explain how student solutions and existing information systems meet common personal, school or community needs ([ACTDIP012)](http://www.scootle.edu.au/ec/search?accContentId=ACTDIP012)Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols ([ACTDIP013](https://www.scootle.edu.au/ec/search?accContentId=ACTDIP013)) |

## **Content strands** [X any that apply]

|  |  |
| --- | --- |
| **Digital Technologies knowledge and understanding** | **Digital Technologies processes and production skills** |
| Digital systemsRepresentation of data | X | Collecting, managing and analysing dataCreating digital solutions by:* investigating and defining
* generating and designing
* producing and implementing
* evaluating
* collaborating and managing
 |   |

## **Links to the key ideas** [X any that apply]

Read more about the [key ideas in the Australian Curriculum: Technologies](https://www.australiancurriculum.edu.au/f-10-curriculum/technologies/key-ideas/).

|  |  |  |
| --- | --- | --- |
| **Creating preferred futures** | Students develop solutions to meet needs considering impacts on liveability, economic prosperity and environmental sustainability. |  |
| **Project management** | Students will develop skills to manage projects to successful completion through planning, organising and monitoring timelines, activities and the use of resources. |   |
| **Thinking in Technologies** |  |  |
| * Systems thinking
 | Systems thinking is a holistic approach to the identification and solving of problems where the focal points are treated as components of a system, and their interactions and interrelationships are analysed individually to see how they influence the functioning of the entire system. |  |
| * Design thinking
 | Design thinking involves the use of strategies for understanding design needs and opportunities, visualising and generating creative and innovative ideas, planning, and analysing and evaluating those ideas that best meet the criteria for success. |  |
| * Computational thinking
 | Computational thinking is a problem-solving method that is applied to create solutions that can be implemented using digital technologies. It involves integrating strategies, such as organising data logically, breaking down problems into parts, interpreting patterns and models and designing and implementing algorithms. |  |

**Links to the key concepts**[X any that apply and insert ideas about how they could be addressed]

The [key concepts](https://www.australiancurriculum.edu.au/f-10-curriculum/technologies/digital-technologies/structure/)that underpin the Digital Technologies curriculum establish a way of thinking about problems, opportunities and information systems and provide a framework for knowledge and practice. (Colour coding is based on the [Australian Computing Academy scheme](https://aca.edu.au/#what-is-the-digital-technologies-curriculum).)

|  |  |  |
| --- | --- | --- |
|  | **abstraction** | underpins all content, particularly the content descriptions relating to the concepts of data representation; and specification; algorithms; and implementation  |
|  | **data collection**  | (properties, sources and collection of data) |  |
|  | **data representation**  | (symbolism and separation) |  |
|  | **data interpretation** | (patterns and contexts)  |  |
|  | **specification** | (descriptions and techniques) |  |
|  | **algorithms** | (following and describing) |  |
|  | **implementation** | (translating and programming) |  |
|  | **digital systems**  | (hardware, software, and networks and the internet) |  |
|  | **interactions** | (people and digital systems, data and processes) |  |
|  | **impact** | (sustainability and empowerment) |  |

**Cross-curriculum priorities** [X any that apply] [Read more…](https://www.australiancurriculum.edu.au/f-10-curriculum/cross-curriculum-priorities/)

|  |  |  |
| --- | --- | --- |
| **Aboriginal and Torres Strait Islander histories and cultures** | **Asia and Australia’s engagement with Asia** | **Sustainability** |
|  |  |   |

## **General capabilities** [X any that apply] [Read more…](https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/information-and-communication-technology-ict-capability/)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Literacy** | **Numeracy** | **ICT Capability** | **Critical and Creative Thinking** | **Ethical Understanding** | **Personal and Social Capability** | **Intercultural Understanding** |
|   |   |   |  |   |   |  |

## **Links to ICT Capability continuum: Level [ insert ]** [X any that apply][Read more…](https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/information-and-communication-technology-ict-capability/)

Depending on the year level this activity is being used with, adjust content to the appropriate level.

|  |
| --- |
| **Applying social and ethical protocols and practices when using ICT** |
| acknowledge when they use digital products created by someone else, and start to indicate the source  |  |
| independently apply standard guidelines and techniques for particular digital systems to secure digital information |  |
| apply standard guidelines and take action to avoid the common dangers to personal security when using ICT and apply appropriate basic social protocols when using ICT to communicate with unknown audiences  |  |
| identify the value and role of ICT use at home and school  |  |
| **Investigating with ICT** |
| use ICT to plan an information search or generation of information, recognising some pattern within the information |  |
| locate, retrieve or generate information from a range of digital sources  |  |
| explain why located data or information was selected  |  |
| **Creating with ICT** |
| use ICT to generate ideas and plan solutions |  |
| create and modify simple digital solutions, creative outputs or data representation/transformation for particular purposes |  |
| **Communicating with ICT** |
| use appropriate ICT tools safely to share and exchange information with appropriate known audiences  |  |
| understand that computer mediated communications are directed to an audience for a purpose  |  |
| **Managing and operating ICT** |
| identify and independently operate a range of devices, software, functions and commands, taking into consideration ergonomics when operating appropriate ICT systems, and seek solutions when encountering a problem  |  |
| identify and compare the use of the main components of different ICT systems  |  |
| manage and maintain digital data using common methods  |  |

**Links to Literacy and Numeracy**

Depending on the year level this activity is being used with, adjust content to appropriate level.

Links to Literacy

Xxxx

Links to Numeracy

xxxx