**Australian Curriculum:
Digital Technologies**

**Years 3–4**

**Sample assessment task**

 **Classifying living and non-living things**

**Assessment focus:** Australian Curriculum:Digital Technologies
(Data and Creating digital solutions)

**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 data and creating digital solutions. It shows how aspects of the Digital Technologies and Mathematics curriculum related to data 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
		- core concepts (Technologies)
		- core concepts (Digital 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 or unit of work with a focus on data.

**Title: Classifying living and non-living things**

**Assessment focus:** Australian Curriculum: Digital Technologies (Data and Creating digital solutions) and Mathematics (Statistics). This task is also linked to Science. Depending on modifications made, opportunities may exist to link this task to English.

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

**Context:** Living and non-living things (Science)

**Duration:** Dependent on how the task is to be implemented

**Prior learning:** Students will have:

* learned about and created algorithms
* used Scratch
* created digital solutions and shown awareness of the steps involved
* completed activities to enable them to understand the difference between living, non-living and the products of living things; for example, viewing videos, discussions, sorting and classifying activities.

## **Task summary**

Students will:

* collect data about living and non-living flora, fauna and objects in their playground
* classify their collection and explain their reasons for the classifications. For example, insects, lizards, spiders, plants, plant debris (leaves, sticks, seed pods), caterpillars, rocks, sand
* collate their data, for example tally marks, picture graph (100 ants = 1 large ant image)
* sort (order and organise) their data, for example in alphabetical or numerical order
* present the data in different ways:
* column graph
* pie chart
* infographic
* use their collated data to create a ‘living, non-living or product of living’ classification quiz game using a visual programming language such as Scratch.\* Students will be able to:
* define the challenge
* identify the needs to be met by a classification quiz game (with teacher guidance)
* collaborate to design and implement their game using input and branching features of a visual programming language. See sample in *Resources* section of Appendix 2.
* evaluate their classification quiz game by explaining how it meets the identified needs.

\* A classification quiz game in this context is the algorithm (set of instructions) to model a classification system.

The process will be documented using the structure of the Digital Technologies processes and production skills strand for Years 3 and 4: investigating and defining; generating and designing; producing and implementing; evaluating; and collaborating and managing.

**Background information**

**Teacher guidance and support**

Data sets do not need to be large for this activity. The number of insects and other items collected should not impact on student understanding of the difference between living, non-living and products of living things. Data interpretation and representation are the key focus. See *Student task booklet*.

Teachers should:

* do a risk assessment and give a safety briefing to students to ensure they are aware of the risks of living creatures (spiders, ants), products of living things (litter, sharp edges etc.) and understand safe distances
* familiarise themselves with relevant guidelines for animal ethics in local state or territory if students going to interact with living creatures
* provide a printed table or a soft copy for collection of data (see *Student task booklet*)
* provide supervision during playground data collection activity
* lead discussion on location of living, non-living and products of living things, and refer to school map to aid understanding of why creatures might be located in certain areas
* provide guidance for identifying a list of needs the classification quiz game should meet
* provide guidance during design and implementation phase.

**Links to the Australian Curriculum**

Table 1 shows all the related Australian Curriculum (v9) 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 (v9)

|  |  |
| --- | --- |
| **Digital Technologies** ***Achievement standard***Aspects addressed by this task are highlighted. | By the end of Year 4 students create simple digital solutions and use provided design criteria to check if solutions meet user needs. Students process and represent data for different purposes. They follow and describe simple algorithms involving branching and iteration and implement them as visual programs. Students securely access and use digital systems and their peripherals for a range of purposes, including transmitting data. They use the core features of common digital tools to plan, create, locate and share content, and to collaborate, following agreed behaviours. Students identify their personal data stored online and recognise the risks.  |
| ***Strands****Sub strands**\*through Mathematics content* | **Digital Technologies knowledge and understanding** * Digital systems
* Data representation

Digital Technologies processes and production skills * Acquiring, managing and analysing data\*
* Creating designed solutions by
* Investigating and defining
* Generating and designing
* Producing and implementing
* Evaluating
* Collaborating and managing
 |
| ***Content descriptions*** | * explore and describe a range of digital systems and their peripherals for a variety of purposes AC9TDI4K01
* recognise different types of data and explore how the same data can be represented differently depending on the purpose AC9TDI4K03
* define problems with given design criteria and by co-creating user stories AC9TDI4P01
* follow and describe algorithms involving sequencing, comparison operators (branching) and iteration AC9TDI4P02
* generate, communicate and compare designs AC9TDI4P03
* implement simple algorithms as visual programs involving control structures and input AC9TDI4P04
* discuss how existing and student solutions satisfy the design criteria and user stories AC9TDI4P05
* use the core features of common digital tools to create, locate and communicate content, following agreed conventions AC9TDI4P06
* use the core features of common digital tools to share content, plan tasks, and collaborate, following agreed behaviours, supported by trusted adults AC9TDI4P07
 |
| ***Technologies core concepts*** | * Data
* Computational thinking
* Design thinking
* Interactions and impact
 | ***Digital Technologies core concepts***  | * data representation
* data acquisition\*
* data interpretation
* specification
* algorithms
* implementation
 |
| ***Cross-curriculum priorities*** | N/A | ***General capabilities*** | * Digital Literacy
* Literacy
* Numeracy
* Ethical Understanding
* Personal and Social capability
 |

\*through Mathematics content descriptions

Table 2: Links from the task to the Australian Curriculum: Mathematics (v9)

|  |  |
| --- | --- |
| **Mathematics*****Year 3 Achievement standard***Aspects addressed by this task are highlighted. | By the end of Year 3, students order and represent natural numbers beyond 10 000. They partition, rearrange and regroup two- and three-digit numbers in different ways to assist in calculations. Students use and extend single-digit addition and related subtraction facts, and apply additive strategies to model and solve problems involving two- and three-digit numbers. They model situations and solve problems involving single-digit multiplication and division, recalling multiplication facts for twos, threes, fives and tens, and using a range of strategies. Students represent unit fractions and their multiples in different ways. They make estimates and determine the reasonableness of financial and other calculations. Students find unknown values in number sentences involving addition and subtraction. They follow and create algorithms to investigate numbers. Students use familiar metric units when estimating, comparing and measuring the attributes of objects and events. They identify angles as measures of turn and compare them to right angles. Students communicate estimates and measures of duration using formal units of time. They represent money values in different ways. Students make, compare and classify objects using key features. They interpret and create two-dimensional representations of environments. Students conduct guided statistical investigations involving categorical and discrete numerical data, and interpret their results in terms of the context. They record, represent and compare data they have collected. Students conduct repeated chance experiments and discuss variation in results.  |
| ***Year 4 Achievement standard***Aspects addressed by this task are highlighted. | By the end of Year 4, students use their understanding of place value to represent tenths and hundredths in decimal form and to multiply natural numbers by multiples of 10. They model financial and other situations, formulating and solving the problem using number sentences, and interpret results in terms of the situation. Students use addition and multiplication facts to add and subtract, multiply and divide numbers efficiently. They choose rounding and estimation strategies to determine whether results of calculations are reasonable. Students use the properties of odd and even numbers. They recognise equivalent fractions and make connections between fraction and decimal notations. Students count and represent fractions on a number line. They find unknown values in numerical equations involving addition and subtraction. Students follow and create algorithms that generate sets of numbers and identify emerging patterns. They use scaled instruments and appropriate units to measure length, mass, capacity and temperature. Students measure and approximate perimeters and areas. They convert between units of time when solving problems involving duration. Students compare angles relative to a right angle using angle names. They represent and approximate complex shapes and objects in the environment. Students create and interpret grid reference maps. They identify line and rotational symmetry in plane shapes and create symmetrical patterns. Students create many-to-one data displays, assess the suitability of displays for representing data and discuss the shape of distributions and variation in data. They use surveys and digital tools to generate categorical or discrete numerical data in statistical investigations and communicate their findings in context. Students order the outcomes of chance events in terms of likelihood and identify whether outcomes are independent or dependent.  |
| ***Strands*** | * Statistics
 |
| ***Year 3 Content descriptions*** | * acquire categorical and discrete numerical data by observing, collecting and accessing data sets; record the data using appropriate methods including frequency tables and spreadsheets; compare data using frequency AC9M3ST01
* create and compare different graphical representations of data sets including using software; interpret the data in terms of the context AC9M3ST02
* conduct guided statistical investigations involving the collection, representation and interpretation of categorical and discrete numerical data with respect to questions of interest AC9M3ST03
 |
| ***Year 4 Content descriptions*** | * acquire categorical and discrete numerical data using digital tools; represent data using many-to-one pictographs, column graphs and other displays or visualisations; interpret and discuss the information that has been created AC9M4ST01
* analyse the effectiveness of different displays or visualisations in illustrating and comparing data distributions, then discuss the shape of distributions and the variation in the data AC9M4ST02
* conduct statistical investigations, collecting data through survey responses and other methods; record and display data using digital tools; interpret the data and communicate the results AC9M4ST03
 |

**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 securely access and use digital systems and their peripherals for a range of purposes.They use the core features of common digital tools to plan, create, locate and share content, and to collaborate, following agreed behaviours.  | * Students demonstrate that they can access digital systems to plan and create a quiz game.
* Students demonstrate that they can collaborate using digital tools.
 |
| Students process and represent data for different purposes.  | * Collated data using symbols or tallies to represent data
* Explanation of how methods or techniques used show how the data can be represented differently
* Infographic, diagram or pie chart
 |
| They follow and describe simple algorithms involving branching and iteration and implement them as visual programs.  | * Summary of what the digital solution should do to meet the provided design criteria; that is, assist user to classify living and non-living things
* A text or diagrammatic description (algorithm) of the steps and decisions that need to be made to create a solution that can classify things on the basis of criteria
* Digital solution (classification quiz game program) that uses a visual programming language to encourage users to classify things (living, non-living or products)
 |
| Students create simple digital solutions and use provided design criteria to check if solutions meet user needs. | * Students check digital solutions against provided design criteria.
 |
| **Mathematics – Year 3** |
| Students conduct guided statistical investigations involving categorical and discrete numerical data, and interpret their results in terms of the context. They record, represent and compare data they have collected.  | * Records of data set observed in playground (photos, text) using frequency tables or spreadsheets
* Comparisons of numbers of living, non-living and products of living things
* Infographic or diagram that shows student understanding of the data
 |
| **Mathematics – Year 4** |
| Students create many-to-one data displays, assess the suitability of displays for representing data and discuss the shape of distributions and variation in data. They use surveys and digital tools to generate categorical or discrete numerical data in statistical investigations and communicate their findings in context.  | * Records of data set observed in playground (photos, text) and represented with pictographs or column graphs
* Comparisons of numbers of living, non-living and products of living things
* Infographic or diagram that shows student understanding of the data
 |

## **Assessment rubric**

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Digital Technologies** | **Above standard*****Students*:** | **At standard*****Students*:** | **Below standard*****Students*:** |
| process and represent data for different purposes. |
| **Data representation** | use a variety of tools to classify data setsjustify why different data representations suit different contexts | classify data sets explain how the data sets can be represented in different ways for different purposes | classify data sets with support demonstrate limited understanding of how the data sets can be represented differently  |
| follow and describe simple algorithms involving branching and iteration  |
| **Algorithms** | describe the algorithms needed for a classification quiz game program which automatically progresses through quiz questions  | describe the algorithms needed for a classification quiz game program  | describe some steps in a sequence needed for a classification quiz game program  |
| implement them as visual programscreate simple digital solutions and use provided design criteria to check if solutions meet user needs. Students securely access and use digital systems and their peripherals for a range of purposes.  |
| **Digital systems and Producing and implementing** | Securely access and use digital systems to effectively implement algorithms as a visual program by creating a classification quiz game program that involves decision-making, user input and variables  | Securely access and use digital systems to implement algorithms as a visual program by creating a classification quiz game program using algorithms and check to ensure game meets provided design criteria  | Securely access and use digital systems to commence implementation of algorithm sequence with a visual program by creating a simplified classification quiz game program using a visual programming language |
| use the core features of common digital tools to plan, create, locate and share content, and to collaborate, following agreed behaviours. |
| **Collaborating and managing** | use and manage digital tools collaboratively and independently to create their classification quiz game, supporting their peers where appropriate | use and manage digital tools to collaboratively create their classification quiz game | use and manage digital tools collaboratively with support |
| **Mathematics** | **Above standard*****Students*:** | **At standard*****Students*:** | **Below standard*****Students*:** |
| **Year 3** conduct guided statistical investigations involving categorical and discrete numerical data, and interpret their results in terms of the context. record, represent and compare data they have collected.  |
| **Statistics** | Collect, manipulate and interpret different data independently and explain reasons for choice of information to aid construction of a digital solution | Collect, manipulate and interpret different data and create information to aid construction of a digital solution | Collect and manipulate different data when creating information and a digital solution with support |
| **Year 4** create many-to-one data displays, assess the suitability of displays for representing data and discuss the shape of distributions and variation in data. use surveys and digital tools to generate categorical or discrete numerical data in statistical investigations and communicate their findings in context. |
| **Statistics** | Collect, manipulate, interpret and justify choice of representation of different data and information independently to aid construction of a digital solution | Collect, manipulate, interpret and justify choice of representation of different data and information to aid construction of a digital solution | Collect, manipulate and interpret different data when creating information and a digital solution with support |

**Appendix 1**

 **Australian Curriculum links (in detail)**

**Links to the Australian Curriculum**

**Digital Technologies (v9)**

**Achievement standard**

By the end of Year 4 students create simple digital solutions and use provided design criteria to check if solutions meet user needs. Students process and represent data for different purposes. They follow and describe simple algorithms involving branching and iteration and implement them as visual programs. Students securely access and use digital systems and their peripherals for a range of purposes, including transmitting data. They use the core features of common digital tools to plan, create, locate and share content, and to collaborate, following agreed behaviours. Students identify their personal data stored online and recognise the risks.

**Content descriptions**

|  |
| --- |
| * explore and describe a range of digital systems and their peripherals for a variety of purposes AC9TDI4K01
* recognise different types of data and explore how the same data can be represented differently depending on the purpose AC9TDI4K03
* define problems with given design criteria and by co-creating user stories AC9TDI4P01
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* implement simple algorithms as visual programs involving control structures and input AC9TDI4P04
* discuss how existing and student solutions satisfy the design criteria and user stories AC9TDI4P05
* use the core features of common digital tools to create, locate and communicate content, following agreed conventions AC9TDI4P06
* use the core features of common digital tools to share content, plan tasks, and collaborate, following agreed behaviours, supported by trusted adults AC9TDI4P07
 |

**Mathematics v9**

**Year 3 Achievement standard**

By the end of Year 3, students order and represent natural numbers beyond 10 000. They partition, rearrange and regroup two- and three-digit numbers in different ways to assist in calculations. Students use and extend single-digit addition and related subtraction facts, and apply additive strategies to model and solve problems involving two- and three-digit numbers. They model situations and solve problems involving single-digit multiplication and division, recalling multiplication facts for twos, threes, fives and tens, and using a range of strategies. Students represent unit fractions and their multiples in different ways. They make estimates and determine the reasonableness of financial and other calculations. Students find unknown values in number sentences involving addition and subtraction. They follow and create algorithms to investigate numbers.

Students use familiar metric units when estimating, comparing and measuring the attributes of objects and events. They identify angles as measures of turn and compare them to right angles. Students communicate estimates and measures of duration using formal units of time. They represent money values in different ways. Students make, compare and classify objects using key features. They interpret and create two-dimensional representations of environments.

Students conduct guided statistical investigations involving categorical and discrete numerical data, and interpret their results in terms of the context. They record, represent and compare data they have collected. Students conduct repeated chance experiments and discuss variation in results.

**Year 3 Content descriptions**

|  |
| --- |
| acquire categorical and discrete numerical data by observing, collecting and accessing data sets; record the data using appropriate methods including frequency tables and spreadsheets; compare data using frequency AC9M3ST01 create and compare different graphical representations of data sets including using software; interpret the data in terms of the context AC9M3ST02 conduct guided statistical investigations involving the collection, representation and interpretation of categorical and discrete numerical data with respect to questions of interest AC9M3ST03 |

**Year 4 Achievement standard**

By the end of Year 4, students use their understanding of place value to represent tenths and hundredths in decimal form and to multiply natural numbers by multiples of 10. They model financial and other situations, formulating and solving the problem using number sentences, and interpret results in terms of the situation. Students use addition and multiplication facts to add and subtract, multiply and divide numbers efficiently. They choose rounding and estimation strategies to determine whether results of calculations are reasonable. Students use the properties of odd and even numbers. They recognise equivalent fractions and make connections between fraction and decimal notations. Students count and represent fractions on a number line. They find unknown values in numerical equations involving addition and subtraction. Students follow and create algorithms that generate sets of numbers and identify emerging patterns.

They use scaled instruments and appropriate units to measure length, mass, capacity and temperature. Students measure and approximate perimeters and areas. They convert between units of time when solving problems involving duration. Students compare angles relative to a right angle using angle names. They represent and approximate complex shapes and objects in the environment. Students create and interpret grid reference maps. They identify line and rotational symmetry in plane shapes and create symmetrical patterns.

Students create many-to-one data displays, assess the suitability of displays for representing data and discuss the shape of distributions and variation in data. They use surveys and digital tools to generate categorical or discrete numerical data in statistical investigations and communicate their findings in context. Students order the outcomes of chance events in terms of likelihood and identify whether outcomes are independent or dependent.

**Year 4 Content descriptions**

|  |
| --- |
| acquire categorical and discrete numerical data using digital tools; represent data using many-to-one pictographs, column graphs and other displays or visualisations; interpret and discuss the information that has been created AC9M4ST01 analyse the effectiveness of different displays or visualisations in illustrating and comparing data distributions, then discuss the shape of distributions and the variation in the data AC9M4ST02 conduct statistical investigations, collecting data through survey responses and other methods; record and display data using digital tools; interpret the data and communicate the results AC9M4ST03 |

## **Content strands and sub-strands (v9)**

|  |  |
| --- | --- |
| **Digital Technologies knowledge and understanding** | **Digital Technologies processes and production skills** |
| Digital systems  |  | Creating digital solutions by: |  |
| Data representation | X | investigating and defining | X |
|  | * generating and designing
 | X |
| * producing and implementing
 | X |
| * evaluating
 | X |
| * collaborating and managing
 | X |

## **Links to Technologies core concepts (v9)**

|  |  |  |
| --- | --- | --- |
| Creating preferred futures | Creating preferred futures is the overarching core concept. It involves identifying compelling visions of the future and making considered design decisions taking into account diversity; ethics; and economic, environmental and social sustainability factors. This overarching core concept is developed through the Technologies core concepts. | X |
| Systems | Systems comprise the structure, properties, behaviour and interactivity of people and components (inputs, processes and outputs) within and between natural, managed, constructed and digital environments.  | X |
| Data | Data can be acquired, interpreted and represented to help inform decision-making and can be manipulated, stored and communicated by digital systems.  | X |
| Interactions and impact | Interactions and impact need to be considered when creating solutions; this involves examining the relationships between components of technologies systems, sustainability and the effects of design decisions on users.  | X |
| Systems thinking  | Systems thinking helps people to think holistically about the interactions and interconnections that shape the behaviour of systems.  |  |
| Computational thinking | Computational thinking helps people to organise data logically by breaking down problems into parts; defining abstract concepts; and designing and using algorithms, patterns and models.  | X |
| Design thinking | Design thinking helps people to empathise and understand needs, opportunities and problems; generate, iterate and represent innovative, user-centred ideas; and analyse and evaluate those ideas.  | X |
| Technologies processes and production skills | Technologies processes and production skills help people to safely create solutions for a range of purposes and involve investigating and defining, generating and designing, producing and implementing, evaluating, and collaborating and managing.  | X |
| Project management skills | Project management skills help people to successfully and efficiently plan, manage and complete projects to meet identified design criteria.  | X |
| Enterprise skills and innovation | Enterprise skills and innovation helps people to identify opportunities to take action and create change; follow through on initiatives; and generate new ideas, processes and solutions.  | X |

**Links to the Digital Technologies core concepts (v9)**

The core conceptsthat underpin the Digital Technologies curriculum establish a way of thinking about problems, opportunities and digital systems and provide a framework for knowledge and practice. (Colour coding is based on the v8.4 [Australian Computing Academy scheme](https://aca.edu.au/#what-is-the-digital-technologies-curriculum).)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **digital systems**  | processing data in binary, made up of hardware, controlled by software, and connected to form networks  |  |
|  | **data representation**  | data being represented and structured symbolically for storage, use and communication, by people and in digital systems * *The same data are represented differently depending on their purpose.*
 | X |
|  | **data acquisition\***  | numerical, categorical or structured values acquired or calculated to create information * *Students acquire and analyse data from around the school to inform the design of solutions to quiz knowledge about living things.*
 | X |
|  | **data interpretation\*** | extracting meaning from data * *Data help us build understanding of core concepts from other curriculum areas.*
* *The way we visualise data helps us interpret them to create meaning*
 | X |
|  | **abstraction** | reducing complexity by hiding details so that the main idea, problem or solution can be defined and focus can be on a manageable number of aspects * *Students reduce the complexity of their data to use in their digital solution and ensure their algorithms and visual programs for their digital solution are efficient*
 | X |
|  | **specification** | defining a problem precisely and clearly, identifying the requirements, and breaking the problem into manageable pieces * *Students specify ways that their digital solution meets the design criteria*
 | X |
|  | **algorithms** | the precise sequences of steps and decisions needed to solve a problem, often involving iterative (repeated) processes * *Students design the algorithms that will control their digital solution*
 | X |
|  | **implementation** | the automation of an algorithm, typically by writing a computer program or using appropriate software * *Students implement the algorithms through a visual program to control their digital solution*
 | X |
|  | **privacy and security** | the protection of data when it is stored or transmitted through digital systems |  |

\*Through Mathematics content

## **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 (v9)** [Read more…](https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/)

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

**Links to Digital Literacy continuum (v9): Level 3**

Depending on the year level this activity is being used with, adjust content to the appropriate level;
for example, Level 1, 2, 4.

|  |
| --- |
| **Practising digital safety and wellbeing** |
| Manage online safety* report negative or harmful online behaviour by seeking help from trusted adults
 |  |
| Manage digital privacy and identity* identify their digital footprint (personal data stored by online tools). Recognise their digital identity represents them online and can give a negative impression
* give and seek consent before sharing online with peers and trusted adults
 |  |
| Manage digital wellbeing* follow an agreed code of conduct for the healthy use of digital tools
 |  |
| **Investigating**  |
| Locate information* locate information through search engines and in documents by applying specific search terms, and select and retrieve relevant information from multiple of sources
 |  |
| Acquire and collate data* collect and access data using a range of digital tools and methods in response to a defined question
 | X |
| Interpret data* organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions
 | X |
| **Creating and exchanging** |
| Plan* use familiar digital tools to develop and follow a basic plan to complete a task
 | X |
| Create, communicate and collaborate* use the core features of a range of digital tools to create content and communicate and collaborate with peers and trusted adults
 | X |
| Respect intellectual property* respect products created by someone else by acknowledging when they use them and use strategies such as indicating the source
 |  |
| **Managing and operating** |
| Manage content * save and retrieve content in agreed locations with an appropriate name
 | X |
| Protect content* save and access content in shared folders using their individual school account
 | X |
| Select and operate tools* select and use a range of digital tools to complete tasks and attempt to solve a problem individually and with peers before seeking help
 | 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.

**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.

## **Links to the Science learning area (v9)**

|  |
| --- |
| **Science**  |
| **Year 3 Science achievement standard**By the end of Year 3 students classify and compare living and non-living things and different life cycles. They describe the observable properties of soils, rocks and minerals and describe their importance as resources. They identify sources of heat energy and examples of heat transfer and explain changes in the temperature of objects. They classify solids and liquids based on observable properties and describe how to cause a change of state. They describe how people use data to develop explanations. They identify solutions that use scientific explanations. Students pose questions to explore patterns and relationships and make predictions based on observations. They use scaffolds to plan safe investigations and fair tests. They use familiar classroom instruments to make measurements. They organise data and information using provided scaffolds and identify patterns and relationships. They compare their findings with those of others, explain how they kept their investigation fair, identify further questions and draw conclusions. They communicate ideas and findings for an identified purpose, including using scientific vocabulary when appropriate. *Suggested content – Science – living and non-living***Science understanding*** compare characteristics of living and non- living things and examine the differences between the life cycles of plants and animals AC9S3U01
* sorting living and non-living things based on characteristics
* exploring differences between living, once living and products of living things

**Science as a human endeavour*** examine how people use data to develop scientific explanations AC9S3H01

**Use and influence of science*** consider how people use scientific explanations to meet a need or solve a problem AC9S3H02

**Science inquiry** *Questioning and predicting** pose questions to explore observed patterns and relationships and make predictions based on observations AC9S3I01

*Planning and conducting** use provided scaffolds to plan and conduct investigations to answer questions or test predictions, including identifying the elements of fair tests, and considering the safe use of materials and equipment AC9S3I02
* follow procedures to make and record observations, including making formal measurements using familiar scaled instruments and using digital tools as appropriate AC9S3I03

*Processing, modelling and analysing** construct and use representations, including tables, simple column graphs and visual or physical models, to organise data and information, show simple relationships and identify patterns AC9S3I04

*Evaluating** compare findings with those of others, consider if investigations were fair, identify questions for further investigation and draw conclusions AC9S3I05

*Communicating** write and create texts to communicate findings and ideas for identified purposes and audiences, using scientific vocabulary and digital tools as appropriate AC9S3I06
 |

## **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 acquiring and representing data. Digital Technologies, Mathematics and Science have a shared focus on data. For example, data acquisiton 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 it. 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?

## **Students with diverse needs**

Students may need **simplified, 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 acquisition:**

* 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 a physical representation such as using clapping or sound volume to convey amount of something.
* Use of concrete materials, for example 17 toothpicks might represent 17 ants.

**Algorithms and implementation:**

* Simplify the classification requirements and or allow for a classification scheme that might not be perfect, for example to determine if something is living, a good question might be: ‘Does it move?’ and an adequate response to determine a living or non-living object may be a simple yes or no.
* Show an understanding of the task through use of a simple, drawn flowchart instead of with a digital solution.

Students might need opportunities for **extension**. Adjustments for such students might include:

**Data acquisition:**

* After discussion with students, *expand scope of data collected* to include a wider variety of things that need further categorisation and sub-categorisation. For example, for non-living things such as rubbish, these may be then sub-categorised by manufactured or naturally occurring, or recyclable or non-recyclable. For living things, these might include several sub‑types; for example, eggs, larvae, as well as juvenile and adult insects.
* *Expand the times at which you observe or collect data,* which will change the type of living or non-living things that are found (variable). Certain birds may only be seen in the afternoon. Rubbish may appear only after school break times.

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 representation and interpretation:**

* Students brainstorm and represent the same information in a range of different ways; for example, 17 ants might be represented by 1 giant ant which equals or measures 17 smaller ones.
* Represent total mass or physical properties of the items identified; for example, how can a representation be made when comparing size and weight of an ant and a tree?
* 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 classification goals to reflect a wider and more sub‑categorised data set that might reflect more detail about the living and non-living things; for example, dead ant or live ant, rubbish or rock.

## **Glossary**

**Classification quiz game** – an automated program designed to classify things into categories. In the context of this assessment task, the classification quiz game is created by students using the Scratch visual programming platform. It responds to user input (students click an image) and asks a question. Students type in a response to classify an item as living, non-living or product of a living thing. The classification quiz game program then gives feedback on whether the answer is correct or not. This type of quiz program can be adapted to many different contexts and can be used to reinforce knowledge and understanding of subjects from different learning areas.

**Infographic** – a collection of images, graphs and text that give a visual overview of a topic that aids understanding. It differs from a poster in that it often contains data and is presented in a way that makes the data easy to digest with bold colours and lots of white space. Some examples of infographics can be found at [venngage.com/templates/infographics](https://venngage.com/templates/infographics).

For further terms, refer to the Australian Curriculum: Technologies glossary [www.australiancurriculum.edu.au/f-10-curriculum/technologies/glossary/](https://www.australiancurriculum.edu.au/f-10-curriculum/technologies/glossary/)

## **Resources**

* Sample classification quiz game using Scratch [scratch.mit.edu/projects/288604818/](https://scratch.mit.edu/projects/288604818/)
* Sample classification quiz game using Scratch (advanced) [scratch.mit.edu/projects/288596012/](https://scratch.mit.edu/projects/288596012/)
* Scratch tutorial – how to build a basic quiz game (by girls code it, 14 min): [www.youtube.com/watch?v=uRPX1lzvbVk](https://www.youtube.com/watch?v=uRPX1lzvbVk)
* Code Club Scratch tutorials [www.codeclubau.org/projects/languages/scratch/](https://www.codeclubau.org/projects/languages/scratch/) and

[www.codeclubau.org/projects/cow-culate-the-methane/](https://www.codeclubau.org/projects/cow-culate-the-methane/)

* Primary Connection Science Unit: Feathers, Fur or Leaves [www.primaryconnections.org.au/resources-and-pedagogies/curriculum-units/feathers-fur-or-leaves](http://www.primaryconnections.org.au/resources-and-pedagogies/curriculum-units/feathers-fur-or-leaves)
* Living and non-living things (Science Web Australia) [scienceweb.asta.edu.au/years-3-4/unit2/overview/yr34-unit2-overview.html](http://scienceweb.asta.edu.au/years-3-4/unit2/overview/yr34-unit2-overview.html)
* Year 5 ACA (now Grok Academy) Blockly Biology example (biology animal identification) as input game with branching for living – non-living – products of living things [aca.edu.au/resources/blockly-biology/](https://aca.edu.au/resources/blockly-biology/)
* Sorting data in Years 3 and 4 lesson [www.digitaltechnologieshub.edu.au/resourcedetail?id=d49e4898-09f9-6792-a599-ff0000f327dd - /](https://www.digitaltechnologieshub.edu.au/resourcedetail?id=d49e4898-09f9-6792-a599-ff0000f327dd#/)
* An unplugged sorting activity [classic.csunplugged.org/databases/](https://classic.csunplugged.org/databases/)
* The Digital Technologies Hub [www.digitaltechnologieshub.edu.au/](https://www.digitaltechnologieshub.edu.au/) has a number of resources to support assessment and reporting of the Digital Technologies curriculum. These include:
* Assessment in Digital Technologies webinar: [www.digitaltechnologieshub.edu.au/teachers/professional-learning/webinars/assessment-for-digital-technologies](https://www.digitaltechnologieshub.edu.au/teachers/professional-learning/webinars/assessment-for-digital-technologies)
* Webinar handout [www.digitaltechnologieshub.edu.au/docs/default-source/webinar-slides-and-handouts/dt-hub-webinar-19\_assessment\_handout.pdf](https://www.digitaltechnologieshub.edu.au/docs/default-source/webinar-slides-and-handouts/dt-hub-webinar-19_assessment_handout.pdf)
* Planning for assessment [www.digitaltechnologieshub.edu.au/teachers/assessment/planning-for-assessment](https://www.digitaltechnologieshub.edu.au/teachers/assessment/planning-for-assessment)
* Unpacking assessment [www.digitaltechnologieshub.edu.au/teachers/assessment/unpacking-assessment](https://www.digitaltechnologieshub.edu.au/teachers/assessment/unpacking-assessment)
A series of video presentations by Dr Rebecca Vivian with discussions including formative and summative assessment opportunities and rationale.
* A demonstration of building skills in critiquing – looking with the eyes of a scientist. Ron Berger critiquing example (6.5 min) [youtu.be/hqh1MRWZjms](https://youtu.be/hqh1MRWZjms)
* Create your own assessment task rubric [www.digitaltechnologieshub.edu.au/docs/default-source/webinar-slides-and-handouts/dt-hub-webinar-19\_assessment\_assessment-3-0.pdf](https://www.digitaltechnologieshub.edu.au/docs/default-source/webinar-slides-and-handouts/dt-hub-webinar-19_assessment_assessment-3-0.pdf)

## **Appendix 3**

## **Data 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 sub-strands 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 core concepts, 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.
* Indicate what general capabilities and cross-curriculum priorities can be meaningfully addressed in the assessment task.
* 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
(Data and Creating digital solutions). 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 x)

**Context:** xxxx

**Duration:** xxxx

**Prior learning:** Students will have:

* learned about and created algorithms
* used Scratch
* created digital solutions and be aware of the steps involved
* completed activities to enable them to understand xxxx. For example, xxxx.

## **Task summary**

Students will:

* xxxx

Task features

Students will be asked to complete the following:

* xxxx

**Digital Technologies (v9)**

**Achievement standard**

By the end of Year 4 students create simple digital solutions and use provided design criteria to check if solutions meet user needs. Students process and represent data for different purposes. They follow and describe simple algorithms involving branching and iteration and implement them as visual programs. Students securely access and use digital systems and their peripherals for a range of purposes, including transmitting data. They use the core features of common digital tools to plan, create, locate and share content, and to collaborate, following agreed behaviours. Students identify their personal data stored online and recognise the risks.

**Content descriptions**

|  |
| --- |
| explore and describe a range of digital systems and their peripherals for a variety of purposes AC9TDI4K01 explore transmitting different types of data between digital systems AC9TDI4K02 recognise different types of data and explore how the same data can be represented differently depending on the purpose AC9TDI4K03 define problems with given design criteria and by co-creating user stories AC9TDI4P01 follow and describe algorithms involving sequencing, comparison operators (branching) and iteration AC9TDI4P02 generate, communicate and compare designs AC9TDI4P03 implement simple algorithms as visual programs involving control structures and input AC9TDI4P04 discuss how existing and student solutions satisfy the design criteria and user stories AC9TDI4P05 use the core features of common digital tools to create, locate and communicate content, following agreed conventions AC9TDI4P06 use the core features of common digital tools to share content, plan tasks, and collaborate, following agreed behaviours, supported by trusted adults AC9TDI4P07 |

**Mathematics v9**

**Year 3 Achievement standard**

By the end of Year 3, students order and represent natural numbers beyond 10 000. They partition, rearrange and regroup two- and three-digit numbers in different ways to assist in calculations. Students use and extend single-digit addition and related subtraction facts, and apply additive strategies to model and solve problems involving two- and three-digit numbers. They model situations and solve problems involving single-digit multiplication and division, recalling multiplication facts for twos, threes, fives and tens, and using a range of strategies. Students represent unit fractions and their multiples in different ways. They make estimates and determine the reasonableness of financial and other calculations. Students find unknown values in number sentences involving addition and subtraction. They follow and create algorithms to investigate numbers.

Students use familiar metric units when estimating, comparing and measuring the attributes of objects and events. They identify angles as measures of turn and compare them to right angles. Students communicate estimates and measures of duration using formal units of time. They represent money values in different ways. Students make, compare and classify objects using key features. They interpret and create two-dimensional representations of environments.

Students conduct guided statistical investigations involving categorical and discrete numerical data, and interpret their results in terms of the context. They record, represent and compare data they have collected. Students conduct repeated chance experiments and discuss variation in results.

**Year 3 Content descriptions [**add as required**]**

|  |
| --- |
| x |

**Year 4 Achievement standard**

By the end of Year 4, students use their understanding of place value to represent tenths and hundredths in decimal form and to multiply natural numbers by multiples of 10. They model financial and other situations, formulating and solving the problem using number sentences, and interpret results in terms of the situation. Students use addition and multiplication facts to add and subtract, multiply and divide numbers efficiently. They choose rounding and estimation strategies to determine whether results of calculations are reasonable. Students use the properties of odd and even numbers. They recognise equivalent fractions and make connections between fraction and decimal notations. Students count and represent fractions on a number line. They find unknown values in numerical equations involving addition and subtraction. Students follow and create algorithms that generate sets of numbers and identify emerging patterns.

They use scaled instruments and appropriate units to measure length, mass, capacity and temperature. Students measure and approximate perimeters and areas. They convert between units of time when solving problems involving duration. Students compare angles relative to a right angle using angle names. They represent and approximate complex shapes and objects in the environment. Students create and interpret grid reference maps. They identify line and rotational symmetry in plane shapes and create symmetrical patterns.

Students create many-to-one data displays, assess the suitability of displays for representing data and discuss the shape of distributions and variation in data. They use surveys and digital tools to generate categorical or discrete numerical data in statistical investigations and communicate their findings in context. Students order the outcomes of chance events in terms of likelihood and identify whether outcomes are independent or dependent.

**Year 4 Content descriptions [**add as required**]**

|  |
| --- |
| x |

## **Content strands and sub-strands (v9)** [X any that apply]

|  |  |
| --- | --- |
| **Digital Technologies knowledge and understanding** | **Digital Technologies processes and production skills** |
| Digital systems  |  | Creating digital solutions by: |  |
| Data representation |  | investigating and defining |  |
|  | * generating and designing
 |  |
| * producing and implementing
 |  |
| * evaluating
 |  |
| * collaborating and managing
 |  |

## **Links to Technologies core concepts (v9)** [X any that apply]

|  |  |  |
| --- | --- | --- |
| Creating preferred futures | Creating preferred futures is the overarching core concept. It involves identifying compelling visions of the future and making considered design decisions taking into account diversity; ethics; and economic, environmental and social sustainability factors. This overarching core concept is developed through the Technologies core concepts. |  |
| Systems | Systems comprise the structure, properties, behaviour and interactivity of people and components (inputs, processes and outputs) within and between natural, managed, constructed and digital environments.  |  |
| Data | Data can be acquired, interpreted and represented to help inform decision-making and can be manipulated, stored and communicated by digital systems.  |  |
| Interactions and impact | Interactions and impact need to be considered when creating solutions; this involves examining the relationships between components of technologies systems, sustainability and the effects of design decisions on users.  |  |
| Systems thinking  | Systems thinking helps people to think holistically about the interactions and interconnections that shape the behaviour of systems.  |  |
| Computational thinking | Computational thinking helps people to organise data logically by breaking down problems into parts; defining abstract concepts; and designing and using algorithms, patterns and models.  |  |
| Design thinking | Design thinking helps people to empathise and understand needs, opportunities and problems; generate, iterate and represent innovative, user-centred ideas; and analyse and evaluate those ideas.  |  |
| Technologies processes and production skills | Technologies processes and production skills help people to safely create solutions for a range of purposes and involve investigating and defining, generating and designing, producing and implementing, evaluating, and collaborating and managing.  |  |
| Project management skills | Project management skills help people to successfully and efficiently plan, manage and complete projects to meet identified design criteria.  |  |
| Enterprise skills and innovation | Enterprise skills and innovation helps people to identify opportunities to take action and create change; follow through on initiatives; and generate new ideas, processes and solutions.  |  |

**Links to the Digital Technologies core concepts (v9)** [X any that apply and provide contextual details.]

The core conceptsthat underpin the Digital Technologies curriculum establish a way of thinking about problems, opportunities and digital systems and provide a framework for knowledge and practice. (Colour coding is based on the v8.4 [Australian Computing Academy scheme](https://aca.edu.au/#what-is-the-digital-technologies-curriculum).)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **digital systems**  | processing data in binary, made up of hardware, controlled by software, and connected to form networks  |  |
|  | **data representation**  | data being represented and structured symbolically for storage, use and communication, by people and in digital systems  |  |
|  | **data acquisition\***  | numerical, categorical or structured values acquired or calculated to create information  |  |
|  | **data interpretation\*** | extracting meaning from data |  |
|  | **abstraction** | reducing complexity by hiding details so that the main idea, problem or solution can be defined and focus can be on a manageable number of aspects  |  |
|  | **specification** | defining a problem precisely and clearly, identifying the requirements, and breaking the problem into manageable pieces  |  |
|  | **algorithms** | the precise sequences of steps and decisions needed to solve a problem, often involving iterative (repeated) processes  |  |
|  | **implementation** | the automation of an algorithm, typically by writing a computer program or using appropriate software  |  |
|  | **privacy and security** | the protection of data when it is stored or transmitted through digital systems |  |

\*Through Mathematics content

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

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

## **General capabilities (v9)** [Read more…](https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/) [X any that apply]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Literacy** | **Numeracy** | **Digital Literacy** | **Critical and Creative Thinking** | **Ethical Understanding** | **Personal and Social capability** | **Intercultural Understanding** |
|  |  |  |  |  |  |  |

**Links to Digital Literacy continuum (v9): Level [**X**]**

[X any that apply. Add relevant descriptions]

Depending on the year level this activity is being used with, adjust content to the appropriate level;
for example, Level 1, 2, 3, 4.

|  |
| --- |
| **Practising digital safety and wellbeing** |
| Manage online safety* x
 |  |
| Manage digital privacy and identity* x
 |  |
| Manage digital wellbeing* x
 |  |
| **Investigating**  |
| Locate information* x
 |  |
| Acquire and collate data* x
 |  |
| Interpret data* x
 |  |
| **Creating and exchanging** |
| Plan* x
 |  |
| Create, communicate and collaborate* x
 |  |
| Respect intellectual property* x
 |  |
| **Managing and operating** |
| Manage content * x
 |  |
| Protect content* x
 |  |
| Select and operate tools* x
 |  |

**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

## **Links to the** XXXX **Learning area**

xxxx