

DTiF

Digital Technologies in focus

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acara AUSTRALIAN CURRICULUM,
ASSESSMENT AND
REPORTING AUTHORITY

CLASSROOM IDEAS: YEARS 3 – 4

Collecting data about litter in the community

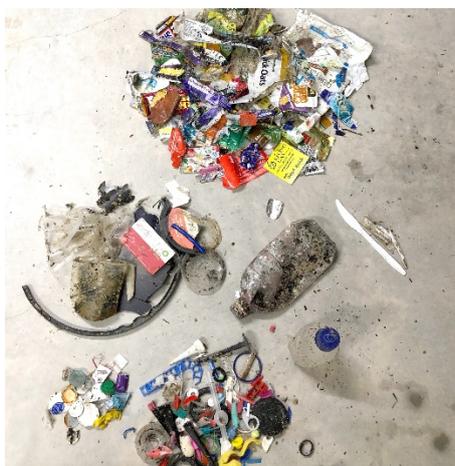


Figure 1: Litter collected from a local beach



Figure 2: Arranging litter for interpretation

The waste we find in our local environment can provide a good source of data. Litter can be found in the bush, on the beach and in our waterways as well as in public places and schools. The interpretation of data can help us answer a range of inquiry questions such as:

- What are people throwing away?
- How much of what we see littered can be recycled?
- What kinds of items do we find and where?
- What can we do to reduce littering or promote recycling?

In Digital Technologies, students collect and manipulate different data (through Mathematics content descriptions) when creating information and digital solutions. Year 3–4 students could use waste from their local environment to:

- explore how the same data can be represented in different ways
 - Since data can be collected and represented as text, images or audio, how many ways can your data be represented?
- collect and present data using simple software
 - How could you present these data to an audience?
 - What are the best ways to show other people what you have discovered through your data collection; for example:
 - How much has been collected?
 - What items were most commonly collected?
 - What software could be used to represent these data? How could you highlight different findings such as by number of items, type or weight?
- define a problem and describe a sequence of steps and decisions (algorithms) needed to solve it
 - What steps could be taken to reduce the waste collected?
 - What might a waste reduction procedure or set of guidelines look like? How could you communicate this?
 - How could a waste reduction algorithm be presented as an infographic, poster, flowchart or advertising message?

Links to the Australian Curriculum

Table 1: Aspects of the Australian Curriculum: Digital Technologies version 9 Years 3 and 4 which may be addressed depending upon the task.

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| <p>Digital Technologies</p> <p>Achievement standard</p> | <p>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.</p> |
| <p>Strand</p> <p>Sub-strand</p> | <p>Digital Technologies knowledge and understanding</p> <ul style="list-style-type: none"> • Digital systems • Data representation <p>Digital Technologies processes and production skills</p> <ul style="list-style-type: none"> • Generating and designing |
| <p>Content descriptions</p> | <ul style="list-style-type: none"> • 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 • follow and describe algorithms involving sequencing, comparison operators (branching) and iteration AC9TDI4P02 |
| <p>Year 3 Mathematics</p> <p>Achievement standard</p> | <p>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 extend and use single-digit addition and related subtraction facts and apply additive strategies to model and solve problems involving two- and three-digit numbers. They use mathematical modelling to solve practical problems involving single-digit multiplication and division, recalling multiplication facts for twos, threes, fours, 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 create algorithms to investigate numbers and explore simple patterns.</p> <p>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 estimate and compare 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 familiar environments.</p> <p>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 use practical activities, observation or experiment to identify and describe outcomes and the likelihood of everyday events explaining reasoning. They conduct repeated chance experiments and discuss variation in results.</p> |
| <p>Strand</p> | <ul style="list-style-type: none"> • Statistics |
| <p>Year 3</p> <p>Content</p> | <ul style="list-style-type: none"> • acquire data for categorical and discrete numerical variables to address a question of interest or purpose by observing, collecting and accessing data sets; record the data using appropriate methods including frequency tables |

| | | | |
|--|--|---|--|
| descriptions | <p>and spreadsheets AC9M3ST01</p> <ul style="list-style-type: none"> • create and compare different graphical representations of data sets including using software where appropriate; interpret the data in terms of the context AC9M3ST02 • conduct guided statistical investigations involving the collection, representation and interpretation of data for categorical and discrete numerical variables with respect to questions of interest AC9M3ST03 | | |
| Year 4 Mathematics Achievement standard | <p>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 use mathematical modelling to solve financial and other practical problems, formulating the problem using number sentences, solving the problem choosing efficient strategies and interpreting the results in terms of the situation. Students use their proficiency with 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.</p> <p>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 shapes and objects in the environment. Students create and interpret grid references. They identify line and rotational symmetry in plane shapes and create symmetrical patterns.</p> <p>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 events or the outcomes of chance experiments in terms of likelihood and identify whether events are independent or dependent. They conduct repeated chance experiments and describe the variation in results.</p> | | |
| Strand | <ul style="list-style-type: none"> • Statistics | | |
| Year 4 Content descriptions | <ul style="list-style-type: none"> • acquire data for categorical and discrete numerical variables to address a question of interest or purpose 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 | | |
| Technologies Core concepts | <ul style="list-style-type: none"> • Systems • Systems thinking • Computational thinking | Digital Technologies Core concepts | <ul style="list-style-type: none"> • Digital systems • Data representation • Data collection (through Mathematics content descriptions) • Data interpretation (through |

| | | | |
|------------------------------------|---|---|---|
| | <ul style="list-style-type: none"> • Data • Interactions and Impact | | Mathematics content descriptions) <ul style="list-style-type: none"> • Abstraction • Algorithms |
| | | General capabilities | <ul style="list-style-type: none"> • Digital Literacy • Literacy • Numeracy |
| Cross-curriculum priorities | <ul style="list-style-type: none"> • Sustainability | Learning area or subject connections | <ul style="list-style-type: none"> • HASS (Geography) |

Data can help us answer inquiry questions:

- How is wildlife affected by litter in the environment?
- Why do our local councils recycle some items and not others?
- Which areas in our local environment are most littered? Why? What can be done to change this?

In what ways could a waste collection activity link to other learning areas?



Figure 3: Discarded plastics arranged to create an artwork and waste and recycling bins.

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