

# Mathematics

## WORK SAMPLE PORTFOLIOS

These work sample portfolios have been designed to illustrate satisfactory achievement in the relevant aspects of the achievement standard.

The December 2011 work sample portfolios are a resource to support planning and implementation of the Foundation to Year 10 Australian Curriculum in English, Mathematics, Science and History during 2012. They comprise collections of different students' work annotated to highlight evidence of student learning of different aspects of the achievement standard.

The work samples vary in terms of how much time was available to complete the task or the degree of scaffolding provided by the teacher.

There is no pre-determined number of samples required in a portfolio nor are the work samples sequenced in any particular order. These initial work sample portfolios do not constitute a complete set of work samples - they provide evidence of most (but not necessarily all) aspects of the achievement standard.

As the Australian Curriculum in English, Mathematics, Science and History is implemented by schools in 2012, the work sample portfolios will be reviewed and enhanced by drawing on classroom practice and will reflect a more systematic collection of evidence from teaching and learning programs.

## THIS PORTFOLIO – YEAR 2 MATHEMATICS

This portfolio comprises a number of work samples drawn from a range of assessment tasks, namely:

|           |   |
|-----------|---|
| Sample 1  | Data representation – My Smarties box                         |
| Sample 2  | Numbers – Creating a word problem                             |
| Sample 3  | Money – Show me the money                                     |
| Sample 4  | Units of measurement – Patterns in time                       |
| Sample 5  | Fractions – Halves, quarters and eighths                      |
| Sample 6  | Shapes – Two-dimensional shapes and three-dimensional objects |
| Sample 7  | Shapes – My everyday objects                                  |
| Sample 8  | Transformation – Flip, slide and turn                         |
| Sample 9  | Location – Bike track   |
| Sample 10 | Chance – Describing familiar events                           |
| Sample 11 | Place value – Sequencing                                      |
| Sample 12 | Features of three-dimensional objects                         |
| Sample 13 | Numbers - I can multiply                                      |

# Mathematics

This portfolio of student work demonstrates the recognition of increasing and decreasing number sequences involving 2s and 5s and the identification of the missing element in a number sequence (WS11). The student represents multiplication by grouping into sets (WS13), explains calculations and represents the value of Australian money using different combinations of coins and notes (WS3). The student draws two-dimensional shapes, recognises and uses the features of three-dimensional objects (WS6, WS7, WS12) to sort and group them and explains that flipping, sliding or turning an object does not change its size or shape (WS8). The student demonstrates addition and subtraction calculations from word problems (WS2) and understands how to divide a shape into halves, quarters and eighths (WS5). The student tells the time to the quarter hour (WS4). The student classifies everyday events as being certain, possible or impossible (WS10), designs a simple map and uses appropriate language of location to describe a journey on that map (WS9). Information is collected and represented as data in a table and on a column graph (WS1).

The following aspects of the achievement standard are not evident in this portfolio:

- *order shapes and objects using informal units*
- *count to and from 1000*
- *use a calendar to identify the date and the months included in seasons.*

# Mathematics

## Work sample 1: Data representation – My Smarties box

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events.*

*Students collect data from relevant questions to create lists, tables and picture graphs.*

### Summary of task

Students carried out this activity in pairs. They individually represented their findings in a graph.

Students were given the following stimulus:

“Oh, no!” cried Helen. “It’s just not fair,” she complained as she slowly opened a packet of Smarties. Helen loved purple Smarties. “They’re all green,” she moaned.

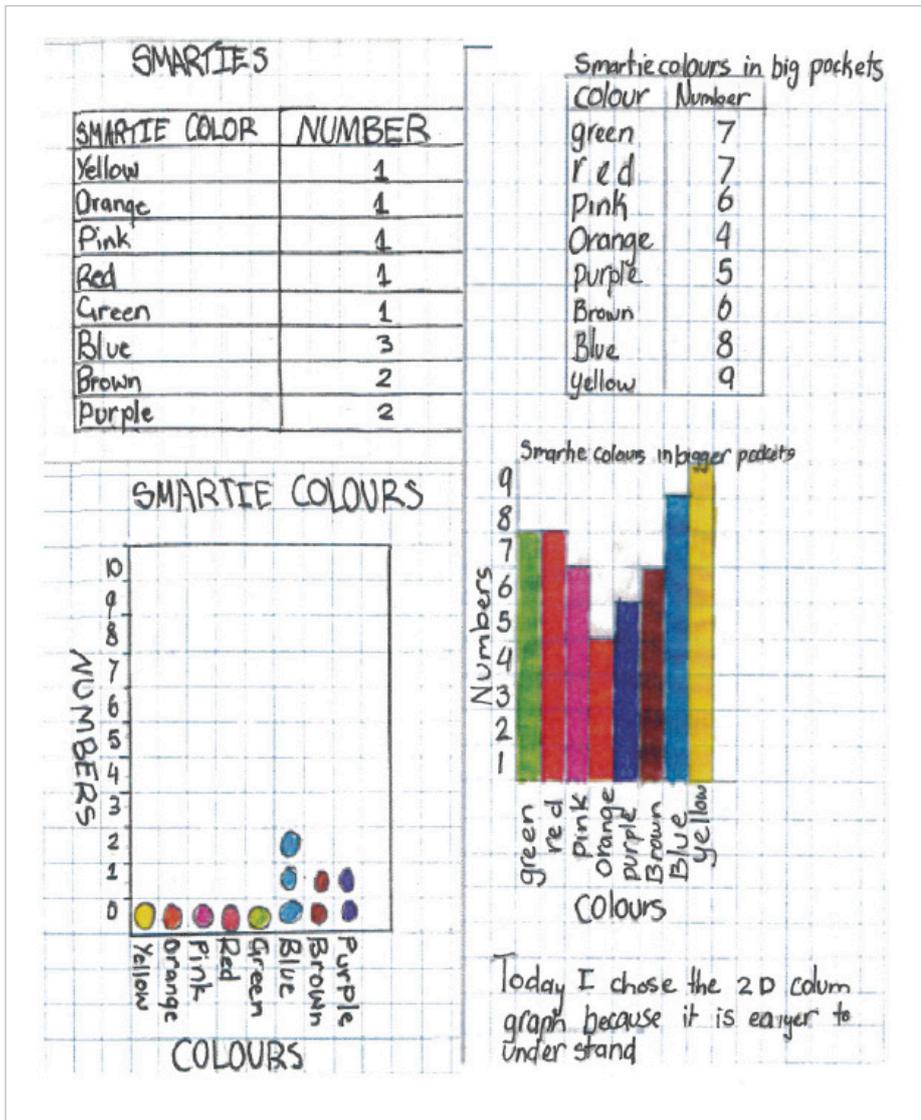
What were the facts? Was Helen right? Were there more green Smarties than purple Smarties?

Students were required to work with a partner to investigate the accuracy of Helen’s claims. They were given the following instructions:

1. Work with a partner to chart the colours of the Smarties in a small pack.
2. Represent the findings in a picture graph.
3. Work with a partner to chart the colours of the smarties in 6 medium packs and 1 large pack.
4. Represent the findings in a graph.
5. Compare your findings with others in the class.

# Mathematics

## Work sample 1: Data representation – My Smarties box



### Annotations

Displays data in a table.

Creates a picture graph based on data collected.

Creates a column graph of the colours in the bigger box.

Makes a decision about the choice of data representation.

**Acknowledgment**

ACARA acknowledges the contribution of trial school teachers and students for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 2: Numbers – Creating a word problem

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events. Students collect data from relevant questions to create lists, tables and picture graphs.*

### Summary of task

Students were asked to use a number story and algorithm to solve a problem.

Students were given a number, in this case 58, and were asked to create both an addition and subtraction word problem with the solution of 58.

# Mathematics

## Work sample 2: Numbers – Creating a word problem

Create an addition word problem  
My answer is 58.  
What is the question?  
I ate 50 ice-creams and my friend Jumbo ate 8.  
How many are there all together.  
→ = 58      50 + 8 =

---

Create a subtraction word problem  
My answer is 58.  
What is the question?  
I had 59 <sup>(99-19)</sup> apples and Jumb ate ~~1~~ 1. How many are there all together left?  
→ = 58      59 - 1 =

### Annotations

*Creates a simple addition word problem, including a correct addition number sentence.*

*Creates a simple subtraction word problem represented by a correct number sentence.*

#### Acknowledgment

ACARA acknowledges the contribution of trial school teachers and students for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 3: Money – Show me the money

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events. Students collect data from relevant questions to create lists, tables and picture graphs.*

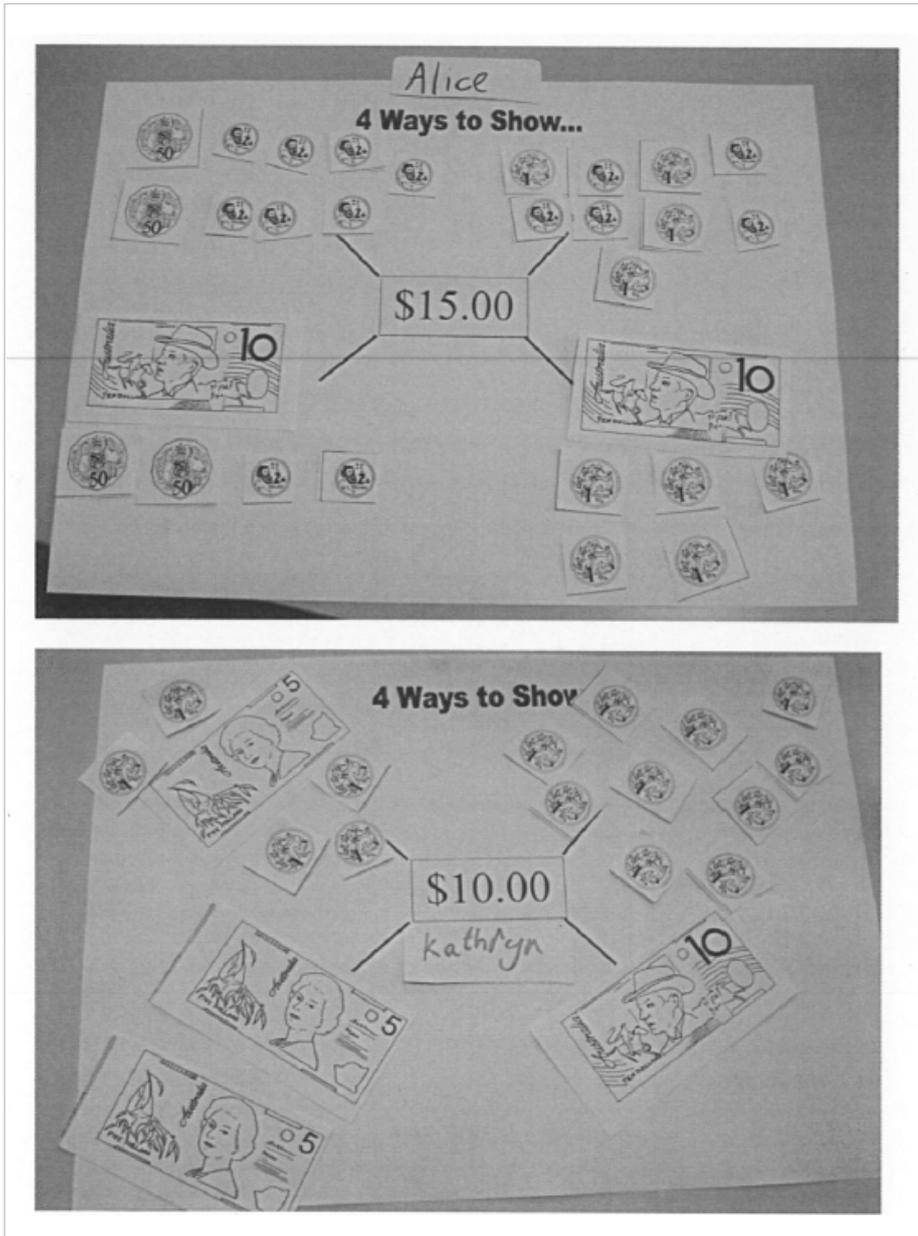
### Summary of task

Students used addition strategies in order to determine the total value. This task is intended to lead into multiplication strategies.

Students were provided with an amount of money and were asked to represent the value in four different ways. They were asked to display their findings in poster format.

# Mathematics

## Work sample 3: Money – Show me the money



### Annotations

*Demonstrates equivalent amounts of money using different denominations, for example \$10 can be made up of ten \$1 coins or one \$5 note and five \$1 coins.*

#### Acknowledgment

ACARA acknowledges the contribution of trial school teachers and students for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 4: Units of measurement – Patterns in time

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events. Students collect data from relevant questions to create lists, tables and picture graphs.*

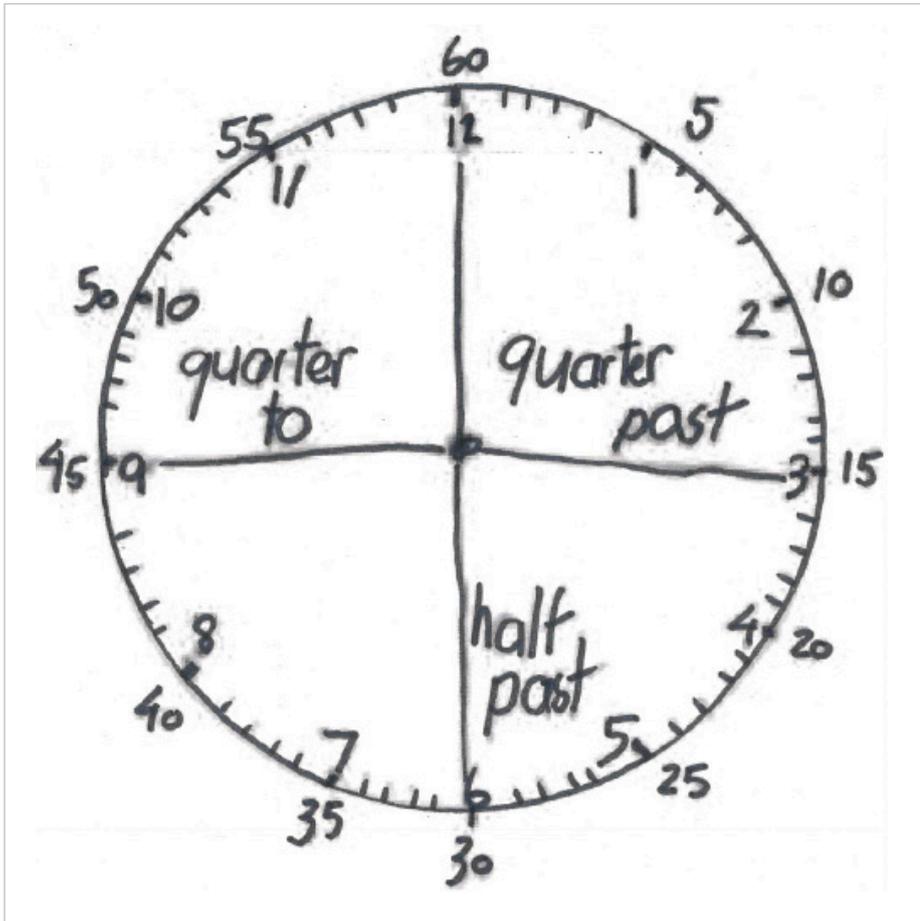
### Summary of task

Students wrote the minutes around an analogue clock and described the number patterns created e.g. 5, 10, 15...

Students divided the clock into quarters and highlighted numbers related to 'half past', 'quarter to' and 'quarter past'.

# Mathematics

## Work sample 4: Units of measurement – Patterns in time



### Annotations

*Associates the numerals 3, 6 and 9 with 15, 30 and 45 minutes and uses the terms 'quarter past' and 'quarter to'.*

#### Acknowledgment

ACARA acknowledges the contribution of the NSW Department of Education and Communities for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 5: Fractions – Halves, quarters and eighths

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

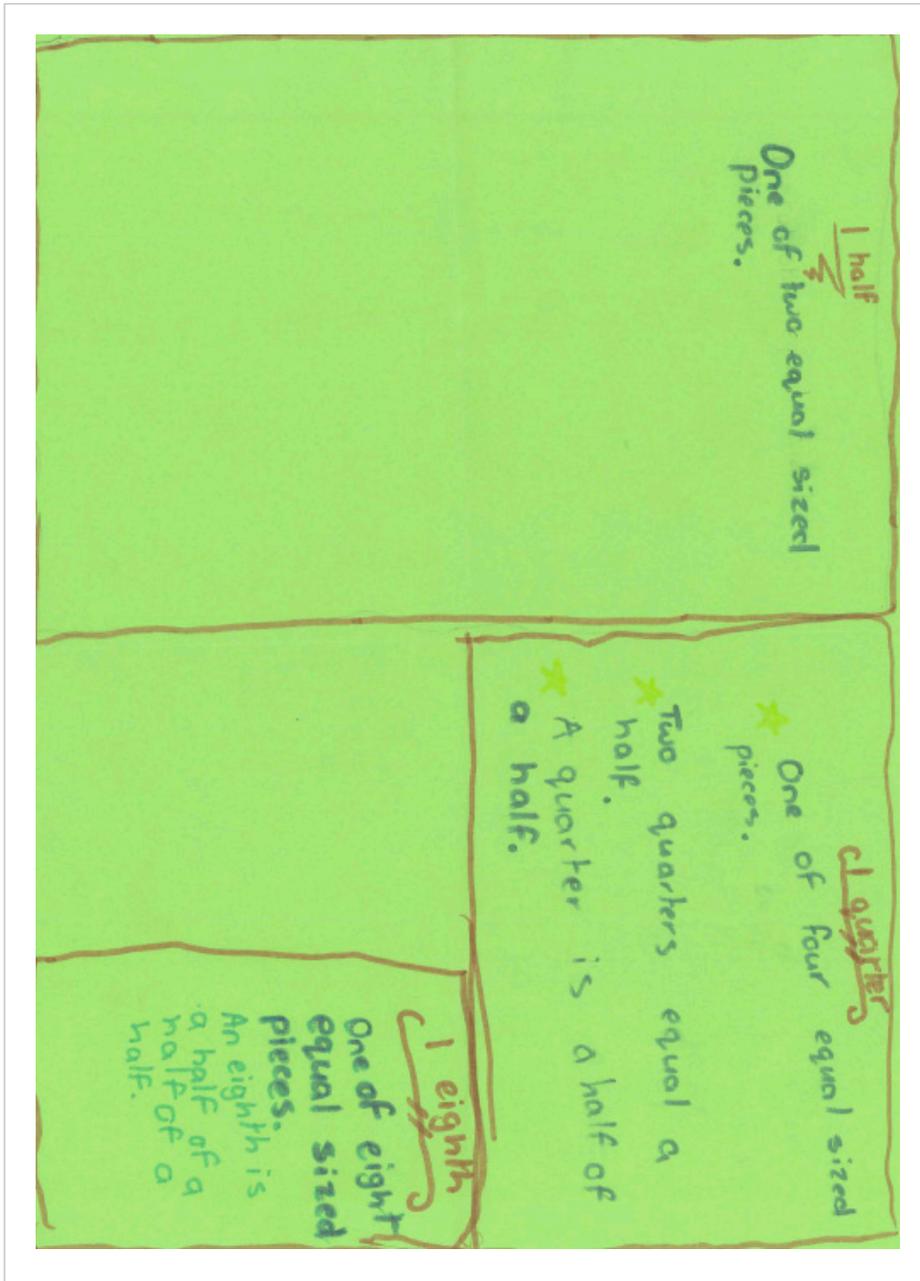
*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events. Students collect data from relevant questions to create lists, tables and picture graphs.*

### Summary of task

Students were provided with a sheet of paper and were asked to describe and demonstrate by folding, representations of a half, quarter and an eighth.

# Mathematics

## Work sample 5: Fractions – Halves, quarters and eighths



### Annotations

*Describes and demonstrates their understanding of one half, one quarter and one eighth.*

#### Acknowledgment

ACARA acknowledges the contribution of Education and Training Directorate, ACT for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 6: Geometry – Two-dimensional shapes and three- dimensional objects

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events. Students collect data from relevant questions to create lists, tables and picture graphs.*

### Summary of task

Students have been exposed to both two-dimensional shapes and three-dimensional objects in the classroom and playground. Students were given 50 minutes to complete the task below.

Students were asked to identify and describe the geometric features of a two-dimensional shape and three-dimensional object. They were required to:

- create a rhyme, riddle or set of instructions that describes a two-dimensional shape and three-dimensional object of their choice using the computer
- record their rhyme, riddle or set of instructions using any combination of text or drawings on the computer.

Students were allowed to view or hold their chosen shape or object as they created their rhyme, riddle or set of instructions.

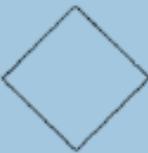
# Mathematics

## Work sample 6: Geometry – Two-dimensional shapes and three-dimensional objects

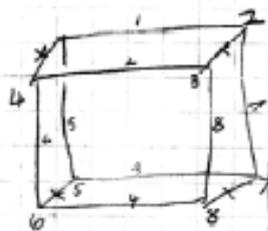
### What am I?

1. I have 4 sides .
2. I am a 2d shap.
3. I have 4 corner.
4. and they r all the sam lath.
5. Im like a sqaru but I am on my sid.

I am a diamend



I have 8 <sup>12-</sup>edgens.  
I have 8 cornis.  
What shape am I?



cube  
or  
prism

### Annotations

*Creates and types riddle on a computer.*

*Constructs a two-dimensional shape using information technology.*

*Describes some features of a three-dimensional object.*

#### Acknowledgment

ACARA acknowledges the contribution of trial school teachers and students for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 7: Shapes – My everyday objects

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events. Students collect data from relevant questions to create lists, tables and picture graphs.*

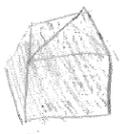
### Summary of task

Students were asked to draw and describe three dimensional objects that they encounter in their classroom.

# Mathematics

## Work sample 7: Shapes – My everyday objects

CUBE - JOKE BOX



The joke box is a cube because it has six faces.



The glue stick is a cylinder because it is curvy.



A Tissue box is a rectangle because it doesn't have the same sides.



The globe is a sphere because it is round.

### Annotations

*Sketches and names three-dimensional objects and describes some features.*

#### Acknowledgment

ACARA acknowledges the contribution of the Catholic Education Archdiocese of Brisbane for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 8: Transformation – Flip, slide and turn

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

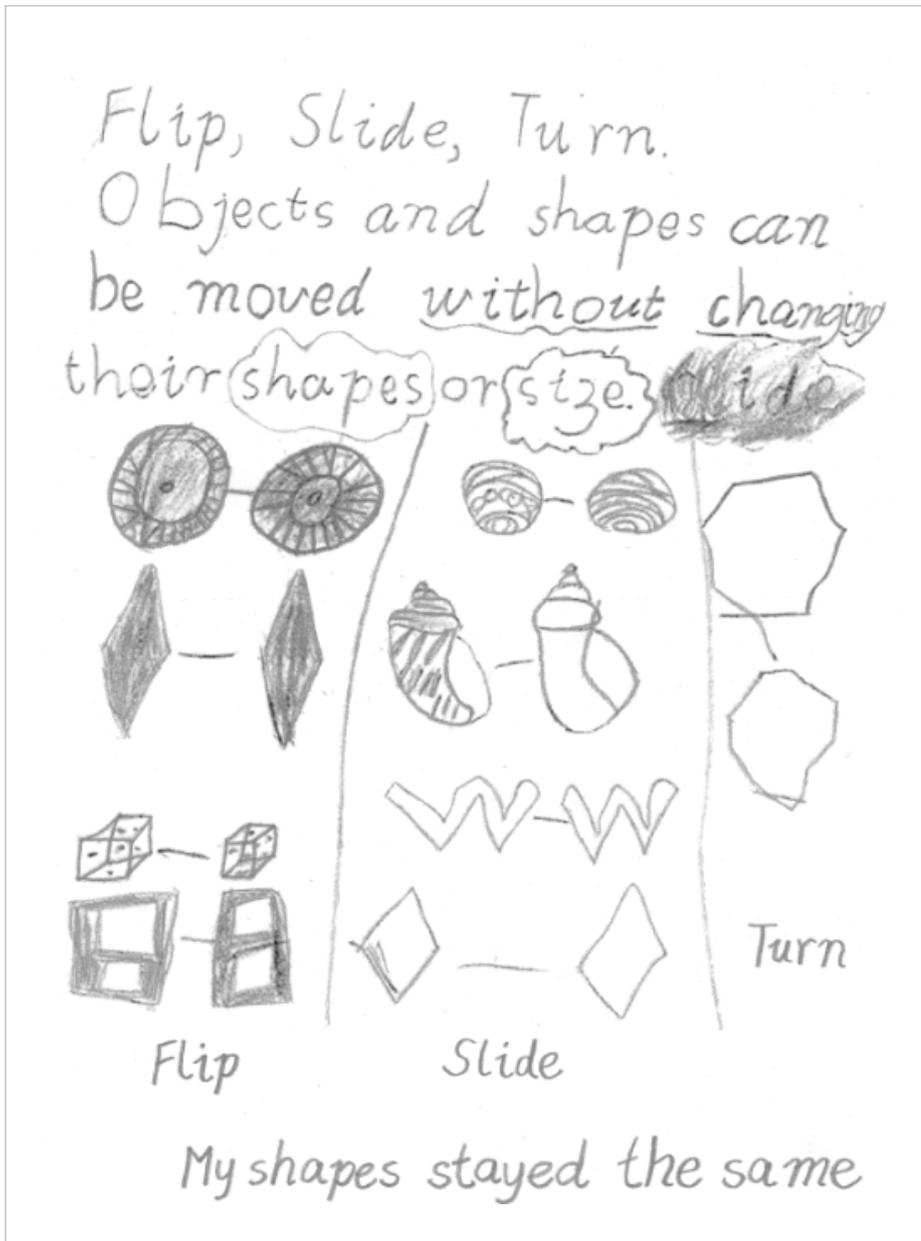
*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events. Students collect data from relevant questions to create lists, tables and picture graphs.*

### Summary of task

Students were asked to describe a transformation by using diagrams and words.

# Mathematics

## Work sample 8: Transformation – Flip, slide and turn



### Annotations

*Demonstrates that after transformations (turn, flip and slide) the object still remains the same size, has the same area and lines are of equal length.*

**Acknowledgment**

ACARA acknowledges the contribution of the Catholic Education Archdiocese of Brisbane for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 9: Location – Bike track

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

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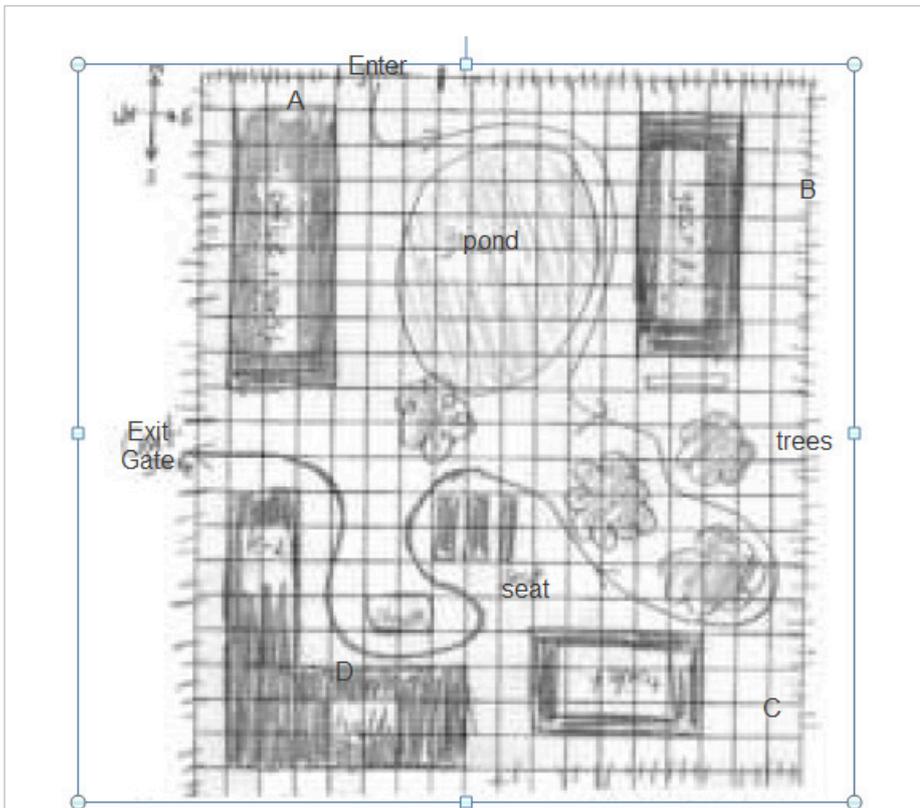
### Summary of task

Students, in pairs were provided with grid paper to design a bike track within the school grounds or the local park. Students discussed their layout, such as ensuring the route did not cross itself and provided an entry/exit to the school grounds.

Students drew a grid over their map and were asked to describe their bike tracks using positional language, in relation to other structures or pathways.

# Mathematics

## Work sample 9: Location – Bike track



Come in the gate go left . . .  
at the pond. Keep going south to  
the trees. go round the seat and  
go south to building C. Then turn  
round, go north and out gate .

### Annotations

*Designs and positions objects on a grid reference.*

*Uses positional language to write a description of how to navigate through school grounds.*

#### Acknowledgment

ACARA acknowledges the contribution of the NSW Department of Education and Communities for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 10: Chance – Describing familiar events

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

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### Summary of task

Students were asked to describe familiar events that occurred during their day and whether they were certain, possible or impossible.

# Mathematics

## Work sample 10: Chance – Describing familiar events

I might read a book when I get home.



|   |   |  |
|---|---|--|
| <p><b>Certain</b><br/>Recess<br/>Lunch<br/>Playing<br/>reading<br/>kids<br/>walking</p> | <p><b>Possible</b><br/>children singing<br/>rollercoaster<br/>visiting<br/>-people eating<br/>grass</p> | <p><b>Impossible</b><br/>-riding a<br/>bike in<br/>cars room<br/>Sox talking</p> |
|---|---|--|

### Annotations

*Accurately records events which are considered to be certain, possible or impossible.*

#### Acknowledgment

ACARA acknowledges the contribution of NSW Department of Education and Communities for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 11: Place value – Sequencing

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

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### Summary of task

In this activity students worked in pairs and were given a set of number cards representing a particular number pattern where:

- one number is missing, for example 2, 4, 6, 8, 12, 14, or
- a mistake has been made, for example 2, 4, 6, 9, 10, 12, 14.

Students sequenced the numbers on the cards and identified the missing number (or mistake). Students found a mistake in the answer and explained the method to their partner.

Students then created their own set of number cards for their partners to sequence.

# Mathematics

## Work sample 11: Place value – Sequencing



### Annotations

*Correctly sequences a set of numbers increasing by twos and identifies the missing number in a number sequence.*

#### Acknowledgment

ACARA acknowledges the contribution of NSW Department of Education and Communities for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 12: Features of three-dimensional objects

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

*Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths. Students order shapes and objects using informal units. They tell time to the quarter hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes. They list outcomes for everyday events. Students collect data from relevant questions to create lists, tables and picture graphs.*

### Summary of task

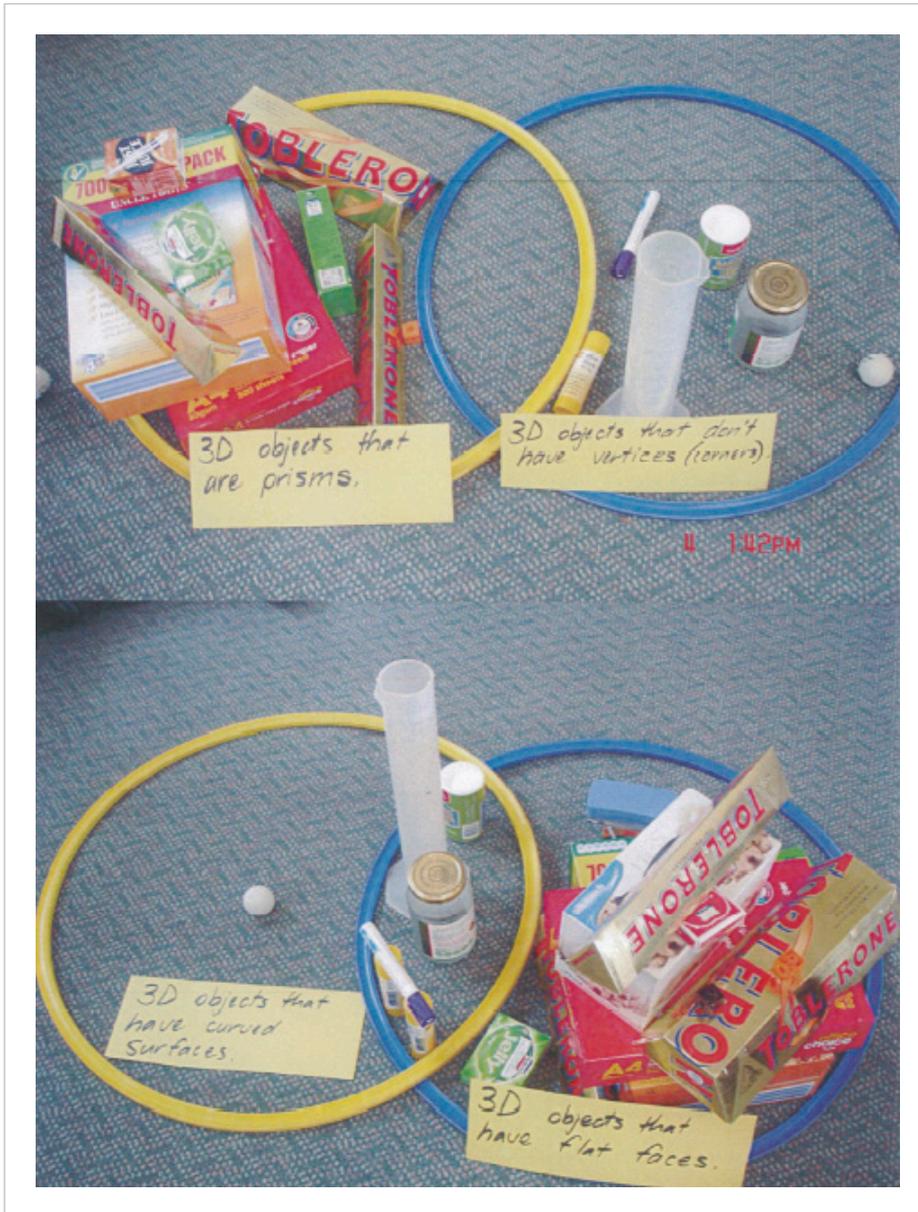
Students have had prior experience with three-dimensional shapes and use of correct terminology. They have used Venn diagrams.

Students were asked to group collections of three-dimensional objects which demonstrated the following features:

- three-dimensional objects that are prisms
- three-dimensional objects without vertices
- three-dimensional objects with curved surfaces
- three-dimensional objects with flat surfaces.

# Mathematics

## Work sample 12: Features of three-dimensional objects



### Annotations

*Groups and identifies the similarities and differences of three-dimensional objects, for example flat surfaces, curved surfaces, corner.*

#### Acknowledgment

ACARA acknowledges the contribution of trial school teachers and students for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

# Mathematics

## Work sample 13: Numbers – I can multiply

### Relevant parts of the achievement standard

*By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence. Students recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. They explain the effects of one-step transformations. Students make sense of collected information.*

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### Summary of task

Students represented multiplication in this activity by grouping objects into sets. Students were given access to a variety of materials to model and solve the problems.

Students posed their own multiplication problems for others to solve. Students discussed the strategy they used to solve their multiplication problem.

# Mathematics

## Work sample 13: Numbers – I can multiply

**Cats**

If I had 5 chairs with 4 cats on each chair.

I grouped them into 4s and counted all groups.

How many cats do I have altogether? 20

### Annotations

*Groups objects into sets, uses language and drawings to explain multiplication strategies.*

**Acknowledgment**

ACARA acknowledges the contribution of the NSW Department of Education and Communities for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.