

# Mathematics

**Year 3**  
Satisfactory

## WORK SAMPLE PORTFOLIO

Annotated work sample portfolios are provided to support implementation of the Foundation – Year 10 Australian Curriculum.

Each portfolio is an example of evidence of student learning in relation to the achievement standard. Three portfolios are available for each achievement standard, illustrating satisfactory, above satisfactory and below satisfactory student achievement. The set of portfolios assists teachers to make on-balance judgements about the quality of their students' achievement.

Each portfolio comprises a collection of students' work drawn from a range of assessment tasks. There is no pre-determined number of student work samples in a portfolio, nor are they sequenced in any particular order. Each work sample in the portfolio may vary in terms of how much student time was involved in undertaking the task or the degree of support provided by the teacher. The portfolios comprise authentic samples of student work and may contain errors such as spelling mistakes and other inaccuracies. Opinions expressed in student work are those of the student.

The portfolios have been selected, annotated and reviewed by classroom teachers and other curriculum experts. The portfolios will be reviewed over time.

*ACARA acknowledges the contribution of Australian teachers in the development of these work sample portfolios.*

## THIS PORTFOLIO: YEAR 3 MATHEMATICS

This portfolio provides the following student work samples:

Sample 1	Number: Addition and subtraction
Sample 2	Number: All about a fraction
Sample 3	Measurement: How much is there?
Sample 4	Geometry: What is on my island?
Sample 5	Number: Neighbourly numbers
Sample 6	Geometry: Symmetry
Sample 7	Geometry: Smaller than a square
Sample 8	Statistics: Ice-cream flavours
Sample 9	Number: Apple orchard
Sample 10	Algebra: 20 Charlie
Sample 11	Measurement: Time
Sample 12	Number: Market stall
Sample 13	Probability: Chance experiment
Sample 14	Number: Numbers to 10 000

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# Mathematics

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This portfolio of student work demonstrates addition and subtraction computation strategies (WS1, WS12) and the classification of odd and even numbers (WS5). The student identifies and creates number patterns (WS5, WS10) and models unit fractions (WS2). The student measures capacities (WS3), draws maps and locates features (WS4). The student identifies symmetry and angles in their environment (WS6, WS7) and creates tables and graphs from given information (WS8). The student solves problems using multiplication and addition (WS9) and calculates the cost of items in a class shop including giving change from different amounts tendered (WS12). The student creates a presentation to teach others how to tell the time to the minute (WS11). The student conducts a chance experiment and identifies possible outcomes (WS13) and counts to and from 10 000 in different groupings (WS14).

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# Mathematics

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## Number: Addition and subtraction

### Year 3 Mathematics achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

*By the end of Year 3, students recognise the connection between addition and subtraction and solve problems using efficient strategies for multiplication. They model and represent unit fractions. They represent money values in various ways. Students identify symmetry in the environment. They match positions on maps with given information. Students recognise angles in real situations. They interpret and compare data displays.*

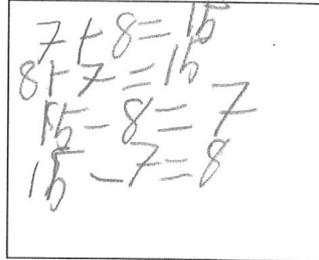
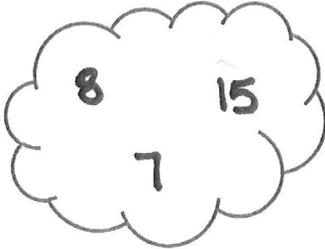
*Students count to and from 10 000. They classify numbers as either odd or even. They recall addition and multiplication facts for single digit numbers. Students correctly count out change from financial transactions. They continue number patterns involving addition and subtraction. Students use metric units for length, mass and capacity. They tell time to the nearest minute. Students make models of three-dimensional objects. Students conduct chance experiments and list possible outcomes. They carry out simple data investigations for categorical variables.*

### Summary of task

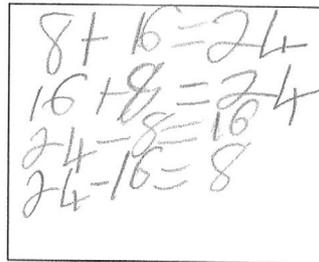
The assessment task was given at the end of a unit of work in which students explored the relationships and connections between addition and subtraction.

Number: Addition and subtraction

Use the numbers in the cloud to write three different number sentences.

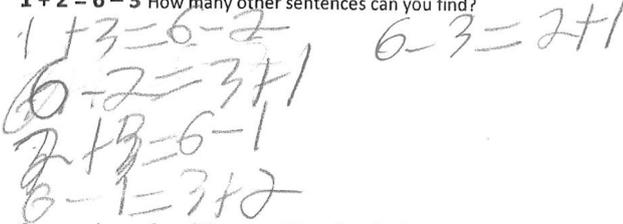


Choose three other numbers that you can use the same pattern to write number sentences.

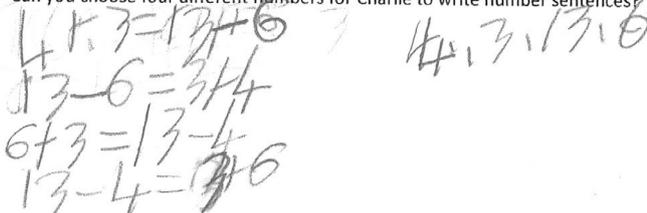


Charlie choose the numbers 1, 2, 3 and 6 and wrote some number sentences. He found out that

$1 + 2 = 6 - 3$  How many other sentences can you find?



Can you choose four different numbers for Charlie to write number sentences?



Can you explain a connection between addition and subtraction?

Addition and subtraction can both equal the same number. There can also be a connection between multiplication and subtraction. And multiplication and addition.

Annotations

Represents addition and related subtraction facts, using the equals sign to indicate the result of an operation.

Selects one- and two-digit numbers to create addition and related subtraction facts.

Generates a range of equivalent number sentences involving addition and subtraction.

Represents the connection between addition and subtraction, using some of the possible equivalent number sentences.

States that addition and subtraction can be connected.

# Mathematics

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## Number: All about a fraction

### Year 3 Mathematics achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

*By the end of Year 3, students recognise the connection between addition and subtraction and solve problems using efficient strategies for multiplication. They model and represent unit fractions. They represent money values in various ways. Students identify symmetry in the environment. They match positions on maps with given information. Students recognise angles in real situations. They interpret and compare data displays.*

*Students count to and from 10 000. They classify numbers as either odd or even. They recall addition and multiplication facts for single digit numbers. Students correctly count out change from financial transactions. They continue number patterns involving addition and subtraction. Students use metric units for length, mass and capacity. They tell time to the nearest minute. Students make models of three-dimensional objects. Students conduct chance experiments and list possible outcomes. They carry out simple data investigations for categorical variables.*

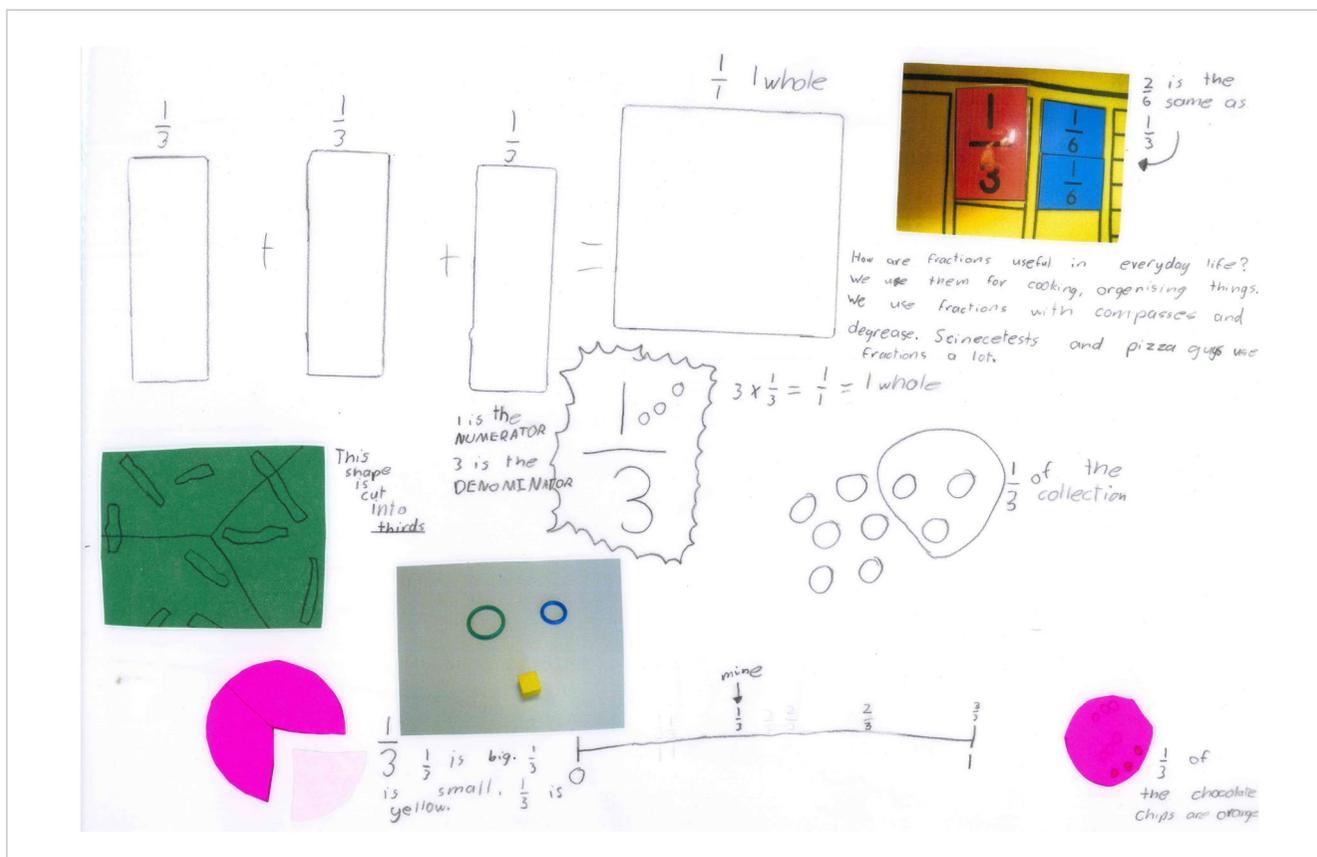
### Summary of task

Students had completed a unit of work on fractions, looking at fractions as part of a whole and fractions as part of a collection. They had also investigated which fractions are bigger and smaller and where they fit on a number line.

Students were asked to choose a fraction and record everything they knew about it. They were given access to all classroom resources to complete the task. They were also asked to answer the following question:

- Explain how fractions are useful in everyday life.

Number: All about a fraction



Annotations

Models and represents the unit fraction 1/3.

Explains the use of fractions in everyday life.

Identifies 1/3 of a collection.

Identifies 1/3 of a shape.

Locates 1/3 on a number line.

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## Measurement: How much is there?

### Year 3 Mathematics achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

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### Summary of task

Students had completed a unit of work on metric units for capacity, including hefting buckets of water, predicting, measuring using scales, reading and working with millilitres and litres.

Students were asked to complete a series of questions based on the previous classwork on estimating and reading capacity levels.

# Measurement: How much is there?

## Millilitres and litres

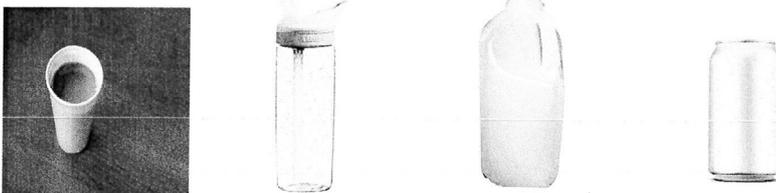
- How many millilitres are in 1 litre? 1000
- How much liquid is in each of the 3 jugs below? Write your answer below each jug.



<u>1200</u> ml <u>1.2</u> L	<u>1450</u> ml <u>1.45</u> L	<u>650</u> ml <u>0.650</u> L
--------------------------------	---------------------------------	---------------------------------

- How much liquid would each container roughly hold below. Write down your estimate (eg: 200ml - 250ml).

A cup of coffee      A water bottle      A bottle of milk      A can of fizzy cordial



375ml      600ml      2 L      375ml

### Annotations

*Demonstrates an awareness of the relationship between metric units.*

*Reads and records simple capacity measurements.*

*Estimates capacity of familiar items with some accuracy.*

## Measurement: How much is there?

4. The jugs below can hold 1 litre each when filled to the top. Colour in each jug for each different measurement below:



1 L



500ml



250 ml



750 ml

### Annotations

*Estimates relative capacity with some accuracy.*

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## Geometry: What is on my island?

### Year 3 Mathematics achievement standard

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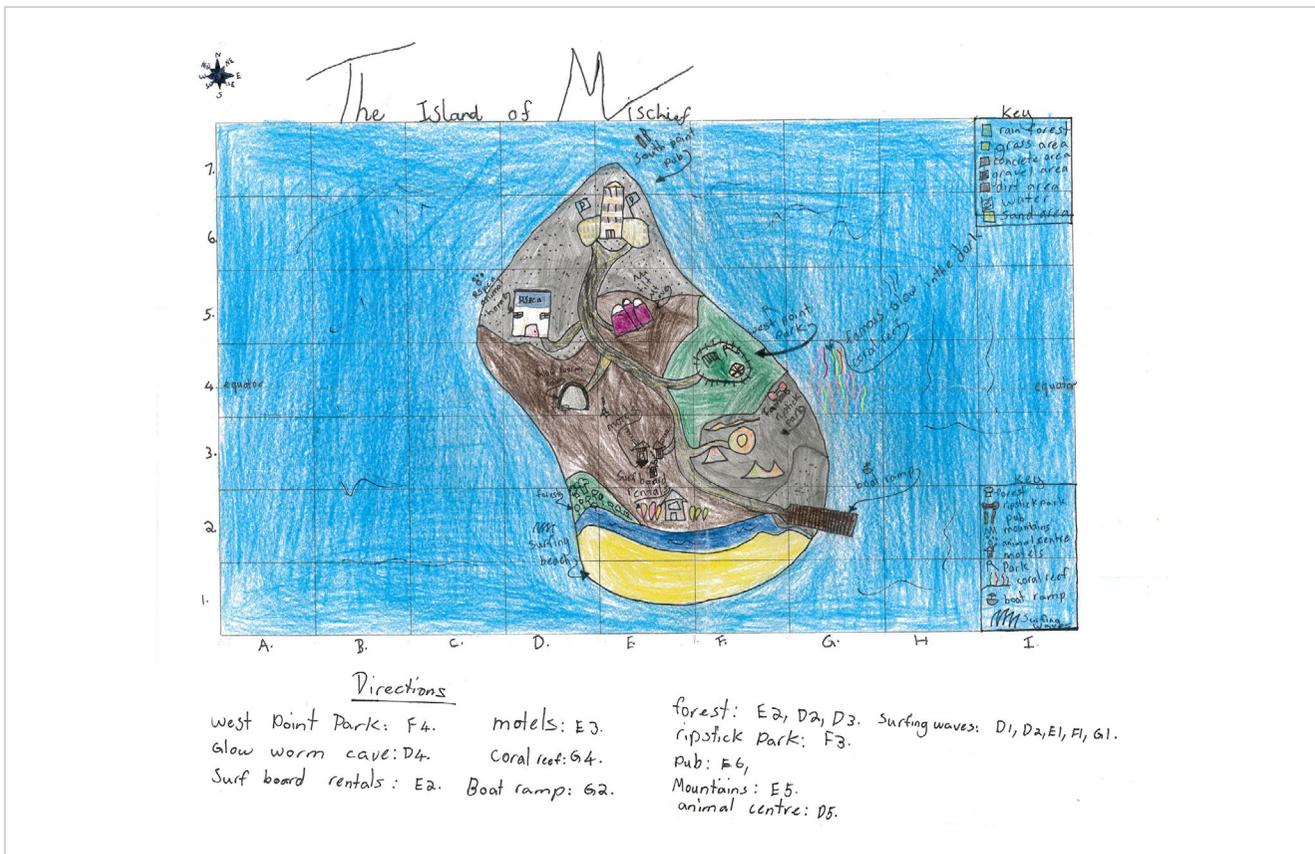
### Summary of task

Students had completed a unit of work on mapping that involved exploration of a range of maps with interactive whiteboard activities, atlases and games such as Battleships.

Students were given grid references linked to entry and exit points of locations on a map. From the information given, they had to draw a map and write directions for locations on the map.

# Geometry: What is on my island?

## Annotations



Creates a legend to convey information on a map.

Uses coordinates to indicate location of features on a map.

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# Mathematics

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## Number: Neighbourly numbers

### Year 3 Mathematics achievement standard

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### Summary of task

Students had investigated odd and even numbers and whether they could be grouped into twos. They had also investigated the results of adding two even and two odd numbers.

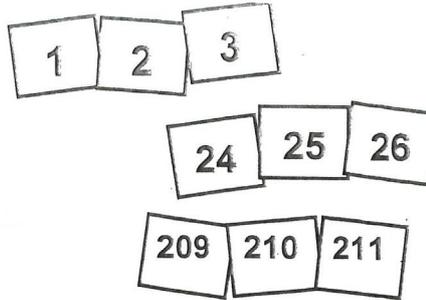
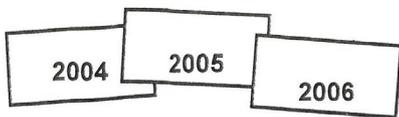
Students brainstormed all they knew about odd and even numbers. They then completed the task. They were encouraged to try adding mentally first and to check their total using a calculator for larger calculations. Students used colour to highlight patterns that they identified. Neighbourly numbers had been discussed and investigated.

# Mathematics

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## Number: Neighbourly numbers

My neighbourly numbers



What happens when you add three numbers in a row?  
Use blocks or square paper or just add up in your head!  
Choose your own numbers and write down the sums you make.

1	2	3	6
4	5	6	15
7	8	9	24
10	20	11	31
30	40	201	271
24	25	26	75
26	27	28	81
30	31	32	93
40	41	42	123

201	202	203	606
298	299	300	897
398	399	400	197
198	199	200	597
498	499	500	1497
598	599	600	1797
2004	2005	2006	6015
2400	2401	2402	7023
1099	2000	2001	6000

### Annotations

Classifies numbers as odd or even.

Number: Neighbourly numbers

**ODD and Even numbers**

Even

0 2 4 6 8

Odd

1 3 5 7 9

Even

(0000) → 😊  
(0000) → 😊

Odd

(12) (00) (00) → 😊  
(00) (00) (00) → 😊  
(00) (00) (00) → 😊

Don't worry about the number(s) in front, worry about the number on the end.

Even

22 20 4  
2x 6 38  
40 8  
10 18  
14 12 6  
26 2 6  
30 32 34  
36 44 50

2x

2x1=2  
2x2=4  
2x3=6  
2x4=8  
2x5=10  
2x6=12  
2x7=14  
2x8=16  
2x9=18  
2x10=20  
2x11=22  
2x12=24

Even numbers can be shared equally in ones, but odd numbers have to be split to have equal numbers.

Even

(00) → 😊  
(00) → 😊

Odd

(00) → 😊  
(0) → 😊

Annotations

Identifies odd and even digits.

Identifies how to classify a number as odd or even.

Demonstrates understanding of the concept of odd and even.

# Mathematics

Year 3  
Satisfactory

## Geometry: Symmetry

### Year 3 Mathematics achievement standard

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### Summary of task

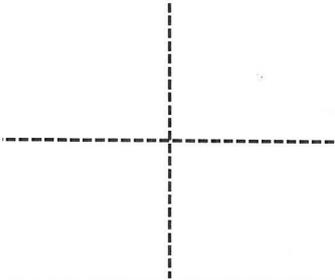
Students had completed a unit of work on identifying symmetry in shapes and objects in the environment.

Students were given two lines of symmetry and asked to find shapes and objects that had the lines of symmetry and to record their findings.

# Geometry: Symmetry

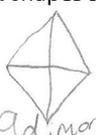
## Annotations

Here are 2 lines of symmetry.

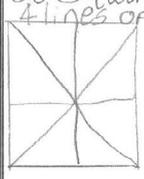


What shapes and objects can you find that they could belong to?

A diamond has 2 lines of symmetry



a square has 4 lines of symmetry



The circle has 5 lines of symmetry but it could have more



this love heart



only has 1 line of symmetry

this shape has 2 lines of symmetry



Makes connections that a circle has infinite lines of symmetry.

Identifies the number of axes of symmetry.

Identifies shapes with symmetry.

## Mathematics

Year 3  
Satisfactory**Geometry: Smaller than a square****Year 3 Mathematics achievement standard**

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**Summary of task**

Students had completed a unit of work on identifying angles as measures of turn and the comparison of angle sizes.

Students were asked to identify angles that were smaller than, the same as and larger than a corner of a square.

## Geometry: Smaller than a square

What angles can you find that are smaller than the corner of a square?

an obtuse angle is bigger than a right angle.

this is a square

these corners are right angles

the outside of angle this is an obtuse angle

these angles are smaller than a square

obtuse

acute

right angle

acute

an acute angle is smaller than a right angle.

### Annotations

Describes an obtuse angle.

Uses the mathematical symbol to represent a right angle.

Identifies acute and obtuse angles involving everyday objects.

Describes an acute angle.

# Mathematics

Year 3  
Satisfactory

## Statistics: Ice-cream flavours

### Year 3 Mathematics achievement standard

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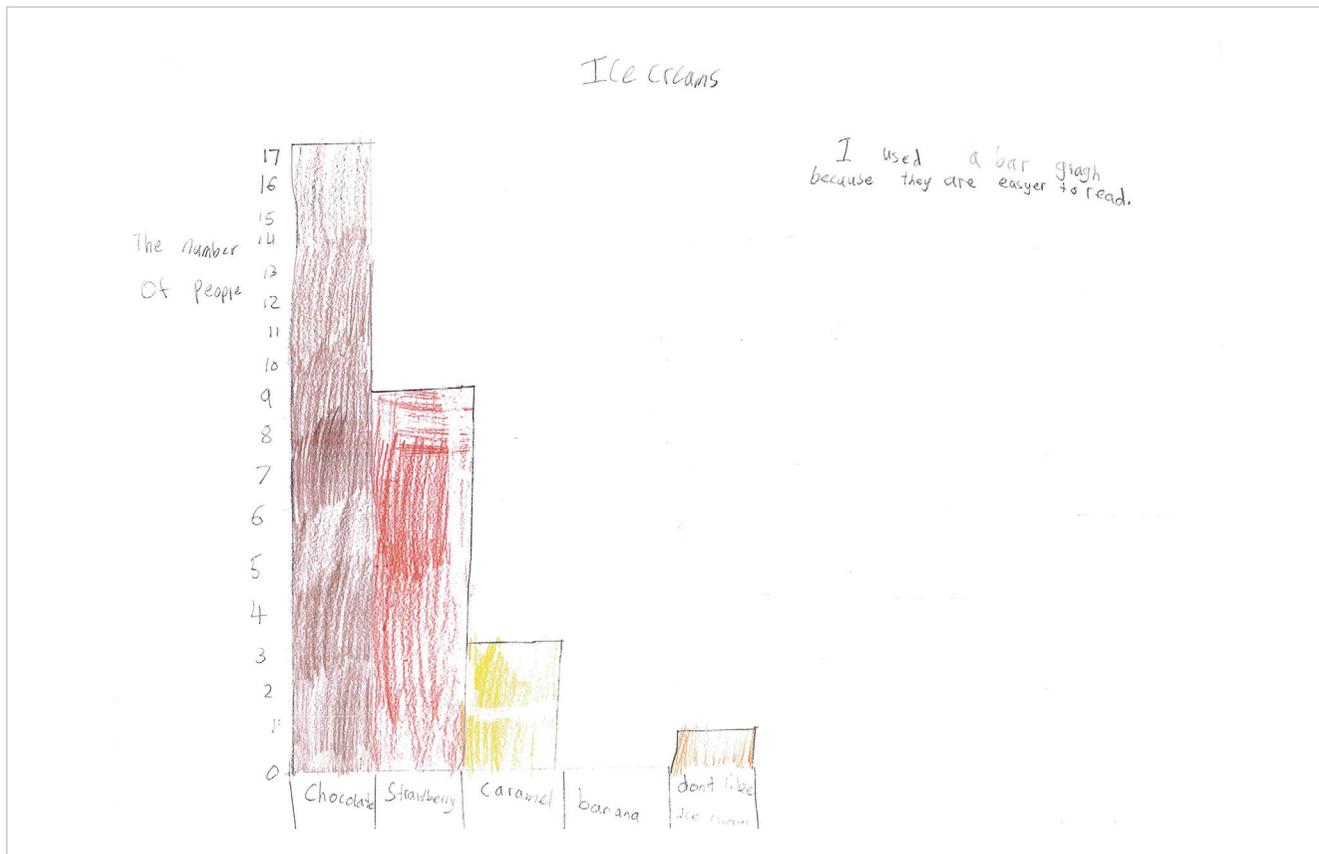
### Summary of task

Students had completed a unit of work that included collecting data, drawing tables and graphs and discussing their findings compared with other students.

Students were given a task to survey the class about their favourite icecream flavour. Using the data they had collected they were asked the following questions:

- Can you create a table and a graph to show what these findings could look like?
- What type of graph is most suitable and why?
- How will you record your work?
- How can you explain your graph?
- How do your results compare with others?

Statistics: Ice-cream flavours



Annotations

Records why a column graph was used to represent data.

Uses data from a table to construct a simple column graph.

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Statistics: Ice-cream flavours

Ice Cream

Chocolate	
Strawberry	
Caramel	
banana	
Dont like Ice cream	

Annotations

*Interprets and organises data in a table using tally marks.*

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# Mathematics

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## Number: Apple orchard

### Year 3 Mathematics achievement standard

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### Summary of task

Students had completed a unit of work on addition, multiplication and their connection and on using efficient mental and written strategies to solve problems.

Students were asked to solve the following problem:

- Sandie grew apple trees in orchards. One sunny Sunday she picked 24 apples from the trees in one of her orchards. Each tree had the same number of apples on it. How many trees could be in that orchard and how many apples on each tree?

Number: Apple orchard



Annotations

*Draws pictures to demonstrate some of the possible answers to the problem.*

*Demonstrates an understanding that repeated addition and multiplication can be used to solve the problem.*

*Demonstrates a connection between a picture representation and a multiplication number sentence.*

*Uses multiplication to solve the problem.*

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# Mathematics

Year 3  
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## Algebra: 20 Charlie

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### Summary of task

Students had completed a unit of work identifying the rules for number patterns and continuing or creating patterns.

Students were asked to solve the following problem:

- Charlie created an addition number pattern which contained the number 20. What could the pattern be?
- What other possibilities are there? Can you describe the rules for each of your patterns? How do you know if you have found all of the possibilities? What if your pattern also had to contain the number 36? If you had to create a subtraction pattern containing the number 20, explain why or why not the patterns could be the same as before.

Algebra: 20 Charlie

Charlie created an addition number pattern which contained the number 20.

What could the pattern be?

2, 4, 6, 8, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36  
I added 2 each time Rule = +2

---

4, 8, 12, 16, 20, 24, 28, 32, 36  
I added 4 each time

---

2, 6, 8, 12, 14, 18, 20, 24, 26, 30, 32, 36  
I added 2 then 4 each time

---

10, 20, 30, 40, 50, 60, 70, 80, 90, 100  
I added 10 each time

---

3, 5, 8, 10, 13, 15, 18, 20, 23, 25, 28, 30  
I added 3 then 2 each time

---

5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60.  
I added 5 each time.

---

5, 10, 16, 20, 24, 30, 34, 40  
I added 6 then 4 each time.

Annotations

Creates and continues a number pattern involving addition.

Identifies the rule in number patterns.

Creates and continues a number pattern with two addition values.

Algebra: 20 Charlie

40, 38, 36, 34, 32, 30, 28, 26, 24, 22, 20, 18, 16  
 I tacked away 2 each time.

100, 90, 80, 70, 60, 50, 40, 30, 20, 10  
 I tacked away 10 each time

The difference to the other ones is  
 you take away and the numbers  
 get smaller

Annotations

Creates and continues a number pattern involving subtraction.

Identifies the difference in number patterns involving addition and subtraction.

# Mathematics

Year 3  
Satisfactory

## Measurement: Time

### Year 3 Mathematics achievement standard

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### Summary of task

Students completed a unit of work involving o'clock, half past, quarter to and quarter past, as students didn't have this prior knowledge. Then the class progressed to telling the time to five-minute intervals and to the minute.

Students were asked to use an interactive environment to teach someone how to tell the time to the minute.

## Measurement: Time



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### Annotations

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# Mathematics

Year 3  
Satisfactory

## Number: Market stall

### Year 3 Mathematics achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

*By the end of Year 3, students recognise the connection between addition and subtraction and solve problems using efficient strategies for multiplication. They model and represent unit fractions. They represent money values in various ways. Students identify symmetry in the environment. They match positions on maps with given information. Students recognise angles in real situations. They interpret and compare data displays.*

*Students count to and from 10 000. They classify numbers as either odd or even. They recall addition and multiplication facts for single digit numbers. Students correctly count out change from financial transactions. They continue number patterns involving addition and subtraction. Students use metric units for length, mass and capacity. They tell time to the nearest minute. Students make models of three-dimensional objects. Students conduct chance experiments and list possible outcomes. They carry out simple data investigations for categorical variables.*

### Summary of task

Students had completed a unit of work on developing effective mental and written methods to solve addition and subtraction problems and exploring money.

Students investigated how many ways they could make \$1. They discussed the most appropriate choice of coins, explaining their choices. They investigated and represented different ways to show money values up to \$20. They counted money collections and explored money problems involving addition and subtraction. They created and solved 'spending stories' choosing and using their own methods.

For this particular task students first took part in a class market stall afternoon where they ran their own shop along with two of their peers. They were given the opportunity to shop at other stalls as well as run their own stall. They were encouraged to buy multiple items to give the opportunity for the addition of money. There was also a bank where stallholders could change their money if they wished to have more coins.

### Market stall role play

Students were asked to individually run the class market stall. They were told they could use mental strategies or the whiteboard provided to assist them in their calculations. The customer (their teacher) would come to purchase some items.

Each student was asked to solve a transaction problem involving a single item (calculating change: subtraction) and then a transaction involving two items (adding together values and then calculating change, or two subsequent subtractions). They were also asked to explain their thinking and asked how to give the change in a different way (representing money values in various ways).

# Mathematics

Year 3  
Satisfactory

## Number: Market stall



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# Mathematics

Year 3  
Satisfactory

## Probability: Chance experiment

### Year 3 Mathematics achievement standard

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### Summary of task

The assessment task was given at the end of a unit of work in which students had completed different experiments to identify the possible outcomes of events. They were introduced to the mathematical term 'outcome'. The students were instructed to play a game of chance using two dice and then investigate if the game was fair.

Probability: Chance experiment

Chance Experiment.....

Is it Fair?



Game: This is a 2 person game. You and your partner roll 2 ordinary six-faced dice at the same time and then add the two numbers together.

Player A wins if  $7, 8, 9, 10, 11, 12$   
 Player B wins if  $2, 3, 4, 5, 6$   
 (I will reveal these totals after you have answered the questions below.)

Before you start: List some of the results you could get.

$2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12$   
 $2, 3, 4, 5, 6$

Does this game seem fair to you?

Yes. Because we have the same amount of numbers.  
 No. Because it is harder to get  $2, 3, 4, 5, 6$

Play the game: The first person to 10 throws is the overall winner.  
 Record your results below:

(A) A  $\text{|||||}$   
 B  $\text{|||||}$

Share the results with your group. Record your groups results below:

A = 20  
 B = 20

What do you think now? Was this game fair?

I am still not sure

Do you have more chance of getting one answer than any other? If so, what is that answer? And why?

7 because you can roll  $3+4, 1+6, 5+2$   
 $2, 4, 6, 8, 10, 12$  because it has less chance

Annotations

Identifies all possible outcomes of a chance experiment.

Provides an opinion about the fairness of a game and explains their thinking.

Conducts a simple chance experiment and records a tally of the results.

Explains some of the reasoning behind the chance of rolling a number.

# Mathematics

Year 3  
Satisfactory

## Number: Numbers to 10 000

### Year 3 Mathematics achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

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### Summary of task

This task was designed as a one-to-one interview between the student and the teacher so the teacher could assess the student's knowledge of counting to and from 10 000 and her ability to continue number patterns involving addition and subtraction. The teacher asked the student a series of questions which also incorporated the proficiency strands of understanding, fluency and reasoning.

# Mathematics

Year 3  
Satisfactory

## Number: Numbers to 10 000



### Annotations

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