Mathematics

Year 5
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 5 MATHEMATICS

This portfolio provides the following student work samples:

Sample 1	Geometry: My angle
Sample 2	Measurement: Garden bed
Sample 3	Number: Treasure hunt
Sample 4	Measurement: How many can you make?
Sample 5	Number: Who are the fastest swimmers?
Sample 6	Measurement: Using time
Sample 7	Measurement: Using perimeter and area
Sample 8	Geometry: Location and transformation
Sample 9	Number: Number sentences
Sample 10	Geometry: Mapping
Sample 11	Statistics and Probability: Come in spinner
Sample 12	Number: How do I check my work?
Sample 13	Number: Spring fair

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This portfolio of student work shows the measurement and construction of different angles (WS1), comparison of the sizes of fractions by diagrams and calculations and their representation on a number line (WS2, WS5). The student solves problems using the four operations (WS3, WS9) and explains how they know their answers to calculations are reasonable (WS12). The student makes spinners to assist in carrying out simple probability experiments before evaluating the results (WS11) and creates a simple budget (WS13). The student investigates the areas and perimeters of different rectangles (WS7). The student explains the effect of transformations (WS8), locates axes of symmetry of shapes and describes the features of three-dimensional objects using two-dimensional representations (WS4). The student creates maps, locates landmarks and describes directions to locations (WS10). The student converts between 12 and 24 hour time (WS6).

Geometry: My angle

Year 5 Mathematics achievement standard

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

> *By the end of Year 5, students solve simple problems involving the four operations using a range of strategies. They check the reasonableness of answers using estimation and rounding. Students identify and describe factors and multiples. They explain plans for simple budgets. Students connect three-dimensional objects with their two-dimensional representations. They describe transformations of two-dimensional shapes and identify line and rotational symmetry. Students compare and interpret different data sets.*
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Summary of task

Students had completed a unit of work on angles and their properties. They were given the following problems to solve:

- Can you estimate and draw an angle of approximately 135° without using a protractor?
- I looked at the clock before school and noticed that the hands made an acute angle. What time could it be?
- I looked at the clock before school and noticed that the hands made a right angle. What time could it be? How do you know that you are right?
- I looked at the clock before school and noticed that the hands made a reflex angle. What time could it be? How do you know that you are right?

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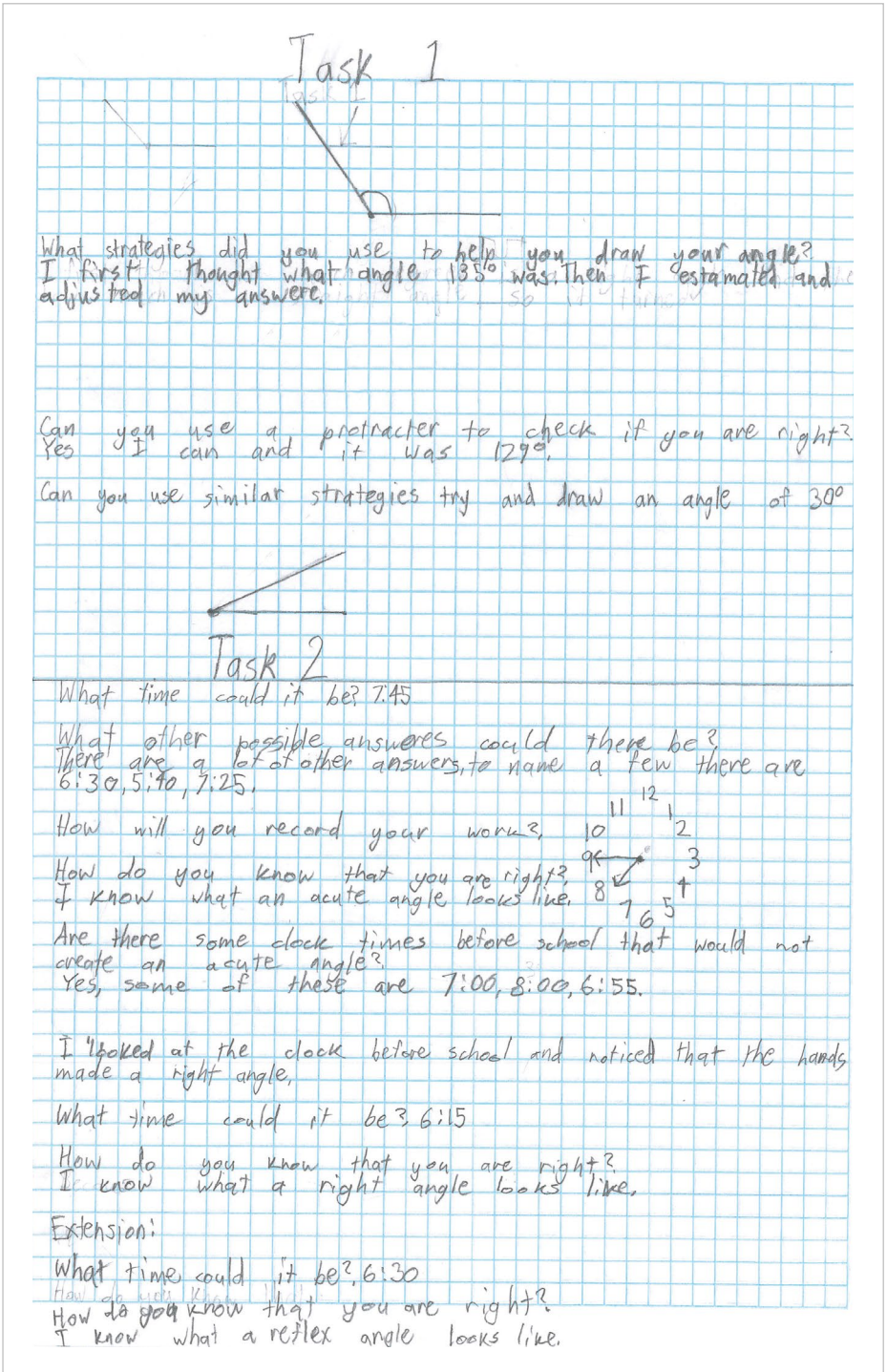
Geometry: My angle



Task 1

What strategies did you use to help you draw your angle?
I first thought what angle 135° was. Then I estamated and adjusted my answere.

Can you use a protracter to check if you are right?
Yes I can and it was 129°.

Can you use similar strategies try and draw an angle of 30°

Task 2

What time could it be? 7:45

What other possible answeres could there be?
There are a lot of other answers, to name a few there are 6:30, 5:40, 7:25.

How will you record your work?

How do you know that you are right?
I know what an acute angle looks like.

Are there some clock times before school that would not create an acute angle?
Yes, some of these are 7:00, 8:00, 6:55.

I looked at the clock before school and noticed that the hands made a right angle.

What time could it be? 6:15

How do you know that you are right?
I know what a right angle looks like.

Extension:

What time could it be? 6:30

How do you know that you are right?
I know what a reflex angle looks like.

Annotations

Estimates and constructs an angle.

Records angles using degrees.

Measures angles with a protractor.

Identifies angles in real-life contexts.

Measurement: Garden bed

Year 5 Mathematics achievement standard

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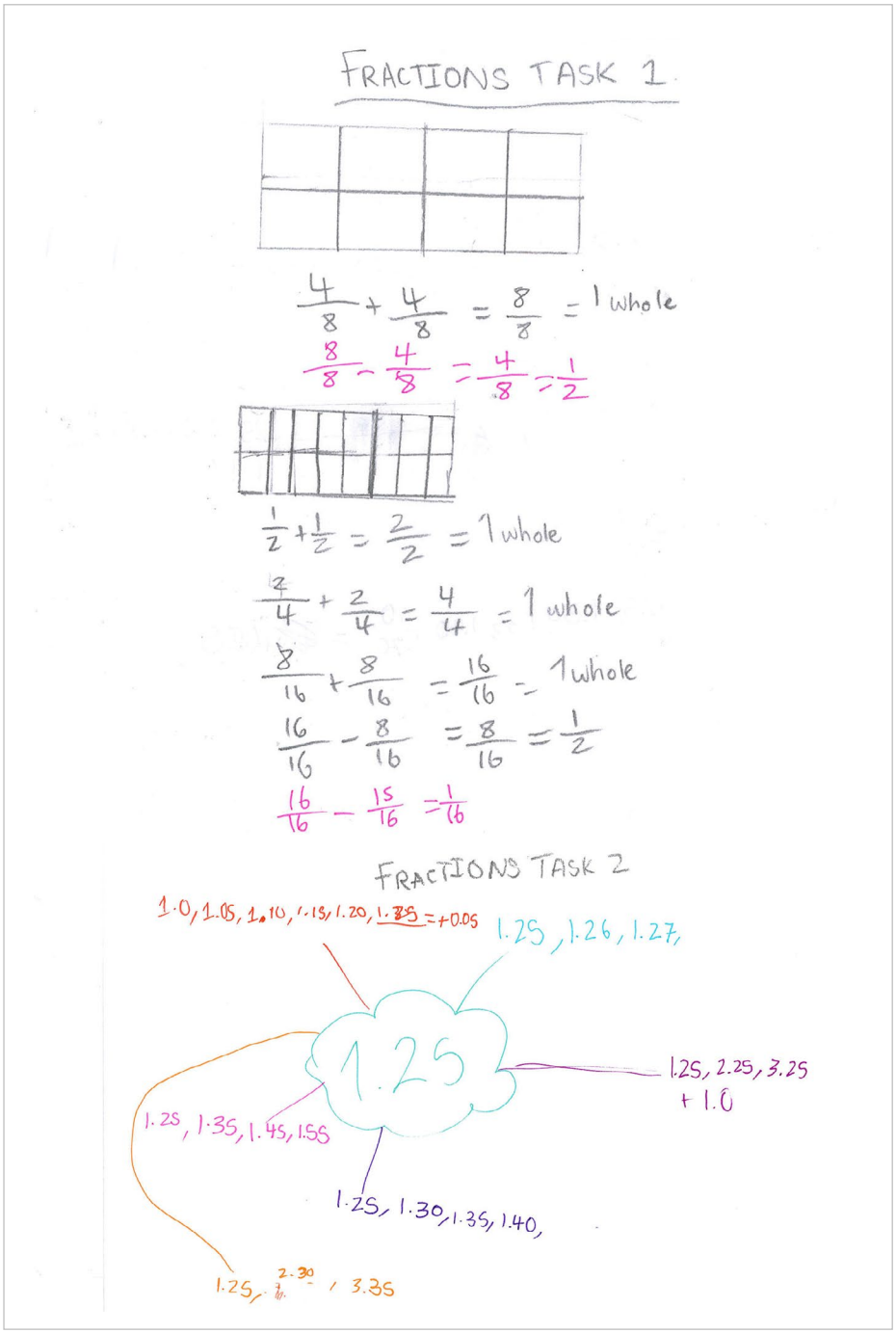
Summary of task

Students had completed a unit of work on fractions and decimals. They were asked to complete two tasks:

- Divide a large rectangular garden bed into a number of equal plots. What addition and subtraction sentences can you create with fractions by looking at your garden?
- Tom created a number pattern which included the decimal 1.25. What could the pattern be?

Measurement: Garden bed



Annotations

Calculates addition and subtraction of fractions with equivalent denominators.

Creates and continues decimal patterns using hundredths, tenths and wholes.

Number: Treasure hunt

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Summary of task

Students were given the following problem to solve after completing a unit of work on multiplication, division, factors and multiples:

- A teacher is planning a treasure hunt for teams of students in Year 5 and Year 6. There are 48 Year 5 students and 60 Year 6 students. Each team has to have equal numbers and team members are from the same year level.
- What are all the possible team sizes that can participate in the treasure hunt?
- What are the largest possible group sizes that our teacher can have?

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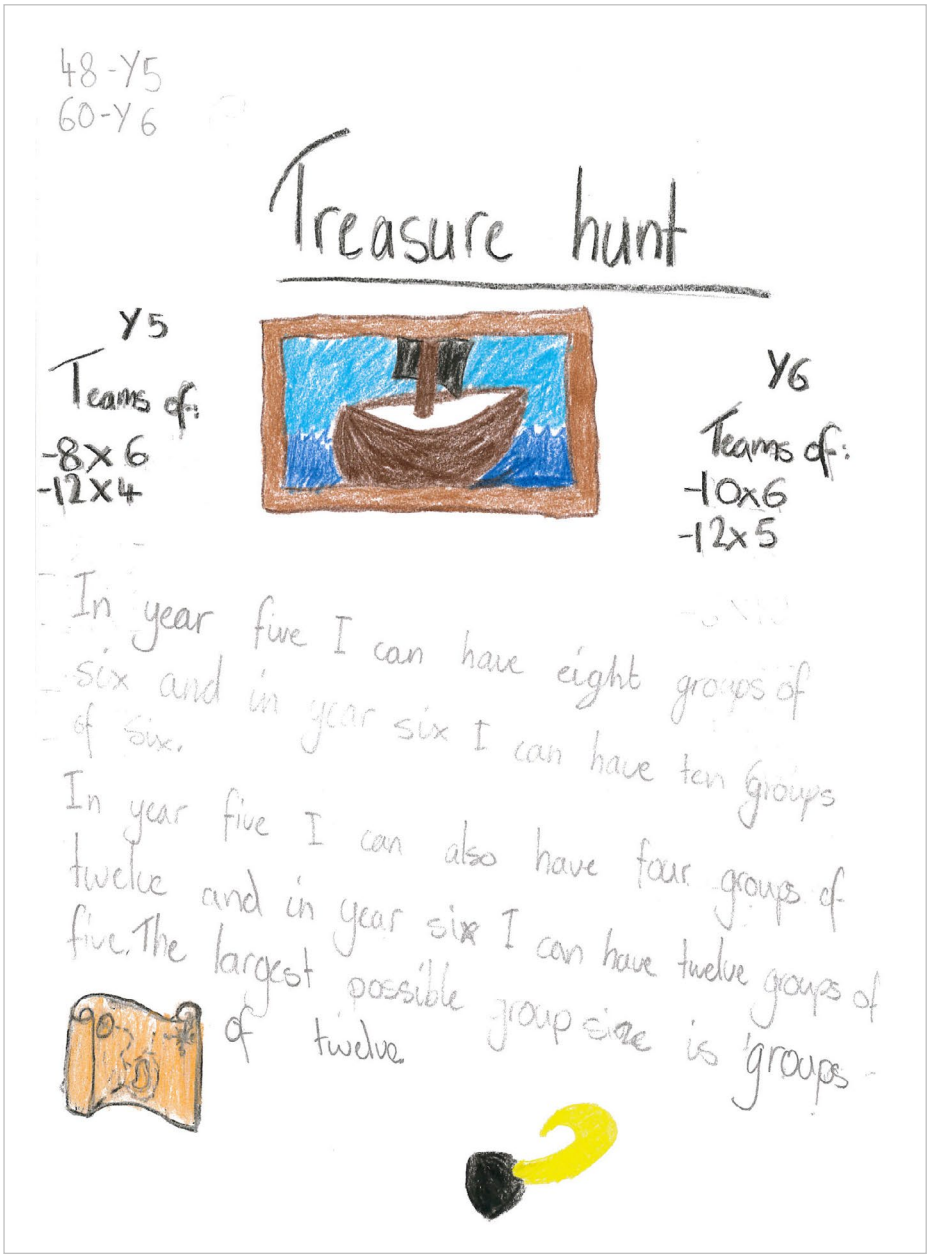
Number: Treasure hunt



Annotations

Identifies factors of a given number.

Describes factors as being groups of the same size.

Measurement: How many can you make?

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Summary of task

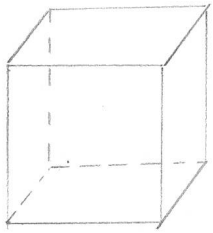
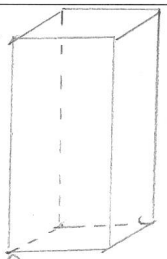
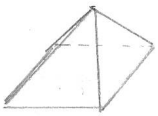
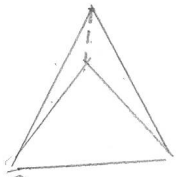
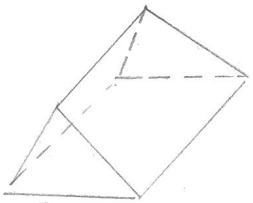
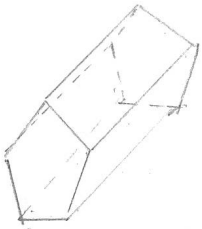
Students had studied three-dimensional objects and their two-dimensional relationships, including nets and features.

Students were given a bag with two-dimensional shapes and asked to make as many three-dimensional objects as they could. They completed the table recoding as much information as they could about the three-dimensional objects. Students were encouraged to use mathematical terms to describe the objects.

Measurement: How many can you make?

HOW MANY CAN YOU MAKE?

Using the ***2D shapes*** in the bag, make as many ***3D objects*** as you can. Once you have constructed your 3D object, using the table below record as much information as you can about the 3D object. Remember to name your objects and to use the correct language. You must work independently to complete this task.

cube	rectangular prism	square pyramid
 6 faces 12 edges 8 vertices	 6 faces 12 edges 8 vertices	 5 faces 8 edges 5 vertices
triangular pyramid	**triangular prism**	**pentagonal prism**
 ~~6~~ 4 faces 6 edges 4 vertices	 5 faces 9 edges 6 vertices	 7 faces 15 edges 10 vertices

Annotations

Identifies and draws 3D objects and lists the attributes.

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Number: Who are the fastest swimmers?

Year 5 Mathematics achievement standard

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Summary of task

Students had been studying a unit of work based on data from the Olympic Games. They had become familiar with ordering decimals on a number line, time in seconds, tenths of seconds and hundredths of seconds.

Students were given tables with information about the results of the Men's 100m Freestyle Semi-Finals from the London Olympic Games. They were asked to order the results from fastest to slowest. They then completed further ordering of decimals and located them on a number line. Students were also asked to think about what could be done in one hundredth of a second.

Number: Who are the fastest swimmers?

Who Were the Fastest 100m Swimmers of 2012?

The tables below contain information from the Men's 100m Freestyle Semi-Finals from the 2012 London Olympic Games.

Task 1
Order the results from fastest to slowest performance, 1st-16th place.

Semi-Final 1

Lane	Athlete	Country	Time in Seconds	Placing
01	GILOT Fabien	France	48.49	11th
02	CIELO Cesar	Brazil	48.17	5th
03	FRASER Brett	Cayman islands	48.92	15th
04	LOUW Gideon	South Africa	48.44	9th
05	MAGNUSSEN James	Australia	47.63	1st
06	LOBINTSEV Nikita	Russia	48.38	8th
07	ROBERTS James	Australia	48.57	12th
08	FRASER Shaune	Cayman Islands	49.07	16th

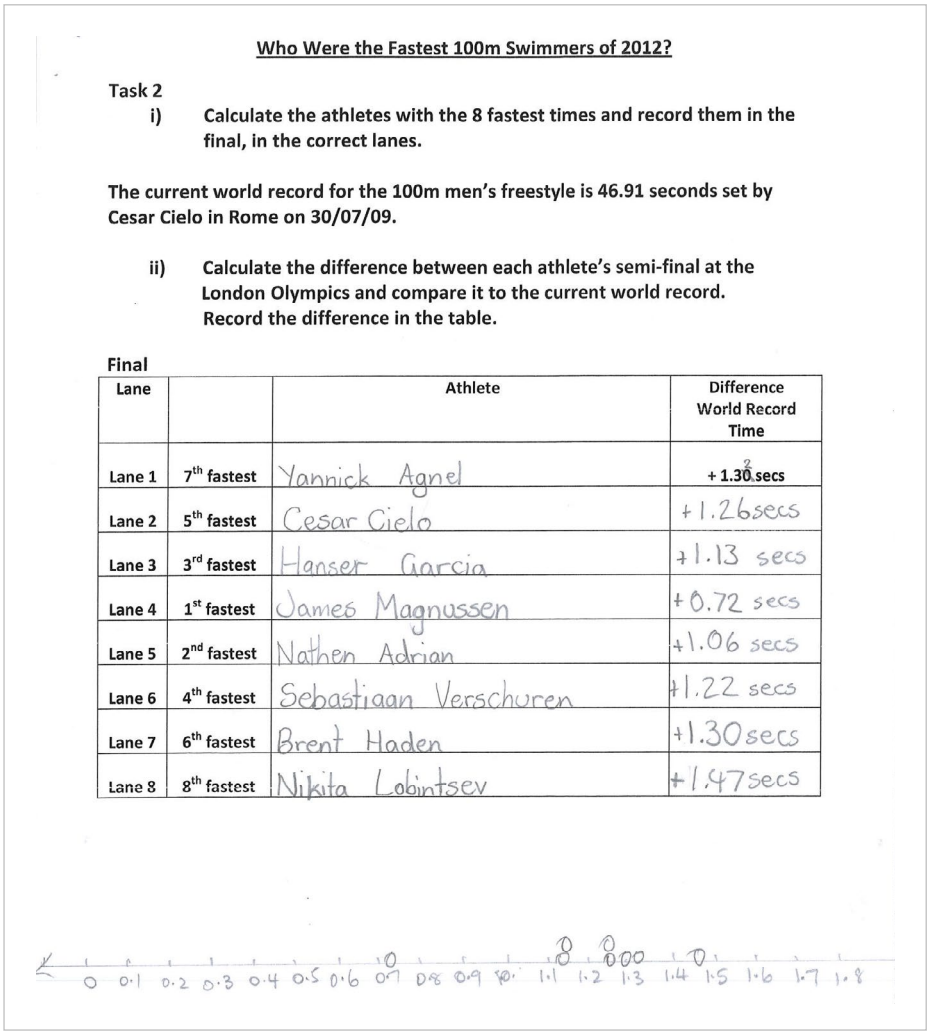
Semi-Final 2

Lane	Athlete	Country	Time in seconds	Placing
01	AGNEL Yannick	France	48.23	7th
02	JONES Cullen	USA	48.60	14th
03	HAYDEN Brent	Canada	48.21	6th
04	ADRIAN Nathan	USA	47.97	2nd
05	VERSCHUREN Sebastiaan	Netherlands	48.13	4th
06	TIMMERS Pieter	Belgium	48.57	12th
07	CZERNIAK Konrad	Poland	48.44	9th
08	GARCIA Hanser	Cuba	48.04	3rd

Annotations

Orders decimal numbers from lowest to highest.

Number: Who are the fastest swimmers?



Who Were the Fastest 100m Swimmers of 2012?

Task 2

i) Calculate the athletes with the 8 fastest times and record them in the final, in the correct lanes.

The current world record for the 100m men's freestyle is 46.91 seconds set by Cesar Cielo in Rome on 30/07/09.

ii) Calculate the difference between each athlete's semi-final at the London Olympics and compare it to the current world record. Record the difference in the table.

Final

Lane		Athlete	Difference World Record Time
Lane 1	7th fastest	Yannick Agnel	+ 1.30 secs
Lane 2	5th fastest	Cesar Cielo	+1.26secs
Lane 3	3rd fastest	Hanser Garcia	+1.13 secs
Lane 4	1st fastest	James Magnussen	+0.72 secs
Lane 5	2nd fastest	Nathen Adrian	+1.06 secs
Lane 6	4th fastest	Sebastiaan Verschuren	+1.22 secs
Lane 7	6th fastest	Brent Haden	+1.30secs
Lane 8	8th fastest	Nikita Lobintsev	+1.47secs

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8

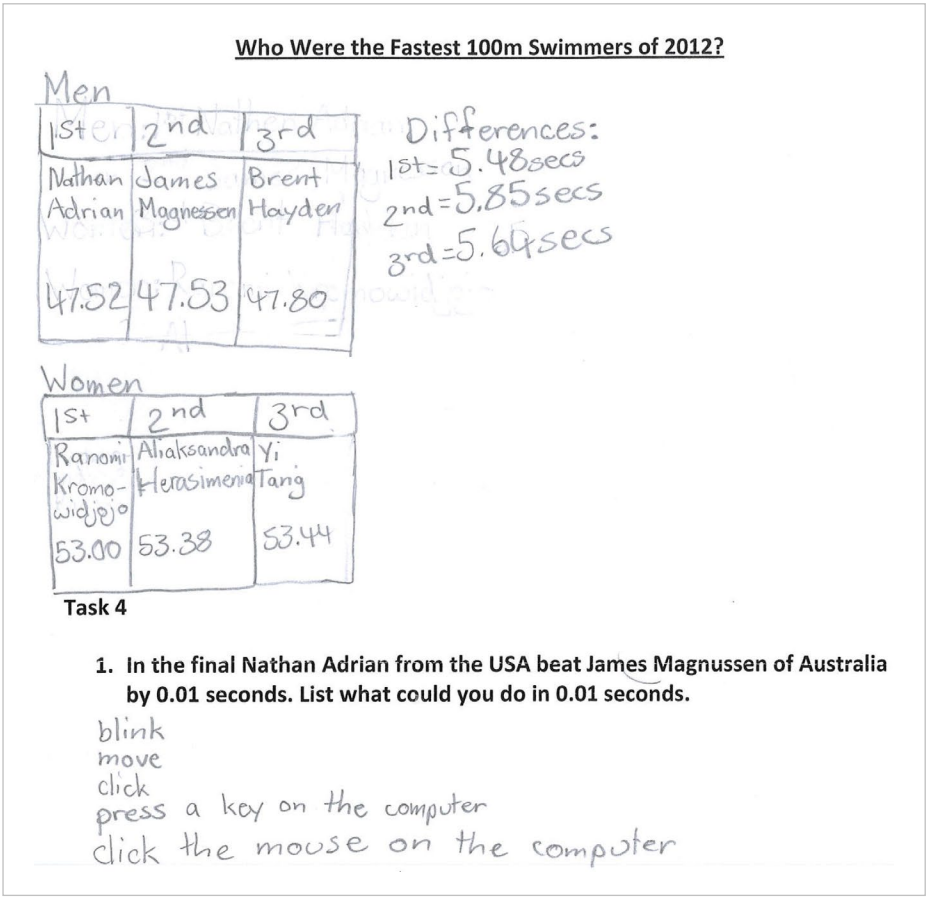
Annotations

Compares two decimals to calculate the difference.

Constructs and orders decimals on a number line.

Locates decimals on a number line appropriately.

Number: Who are the fastest swimmers?



Who Were the Fastest 100m Swimmers of 2012?

Men

1st	2nd	3rd
Nathan Adrian	James Magnessen	Brent Hayden
47.52	47.53	47.80

Differences:
1st = 5.48secs
2nd = 5.85secs
3rd = 5.64secs

Women

1st	2nd	3rd
Ranomi Kromo-widjojo	Aliaksandra Herasimenia	Yi Tang
53.00	53.38	53.44

Task 4

1. **In the final Nathan Adrian from the USA beat James Magnussen of Australia by 0.01 seconds. List what could you do in 0.01 seconds.**

blink
move
click
press a key on the computer
click the mouse on the computer

Annotations

Compares data to calculate the difference.

Gathers secondary data and constructs a table to represent data.

Lists activities that can be performed within a given time.

Mathematics

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Measurement: Using time

Year 5 Mathematics achievement standard

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Summary of task

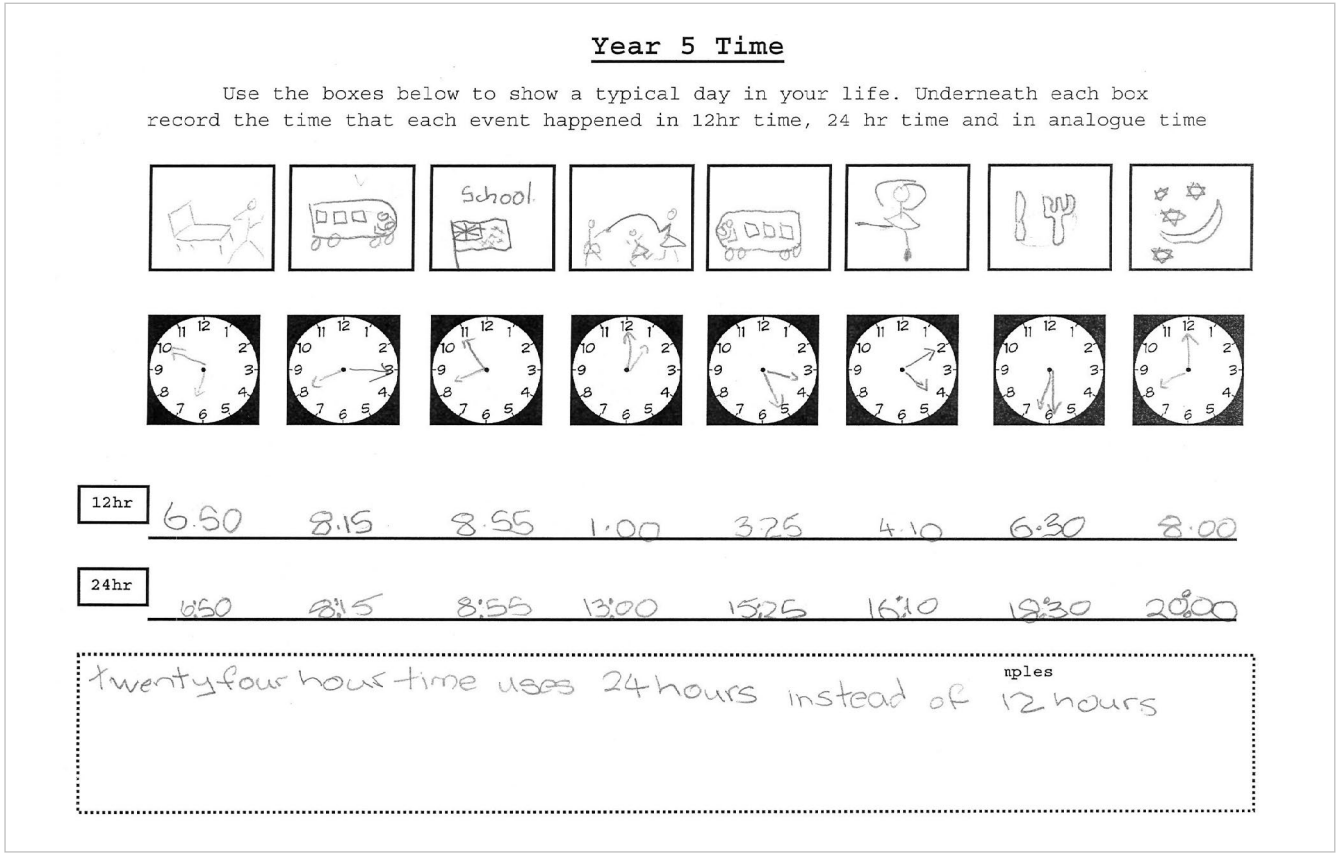
Students had spent a week focusing on comparing and representing 12 and 24 hour time.

They were asked to create a timeline of a typical day in their lives in 12 and 24 hour time and record their day using both digital and analog time. They completed this task in a half an hour time slot.

Mathematics

Year 5
Satisfactory

Measurement: Using time



Year 5 Time

Use the boxes below to show a typical day in your life. Underneath each box record the time that each event happened in 12hr time, 24 hr time and in analogue time

Annotations

Converts 12 hour to 24 hour time and gives an explanation of 24 hour time.

Measurement: Using perimeter and area

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Summary of task

Students had completed a unit of work on perimeter and area. They had been given opportunities to practise measuring objects using millimetres, centimetres, metres and calculate area using cm^2 and m^2.

Students were asked to define area and perimeter and explain how each is calculated. They were then asked to choose shapes to measure and to calculate the perimeter and area of each. They were also asked to identify what units should be used to measure the length of items.

Mathematics

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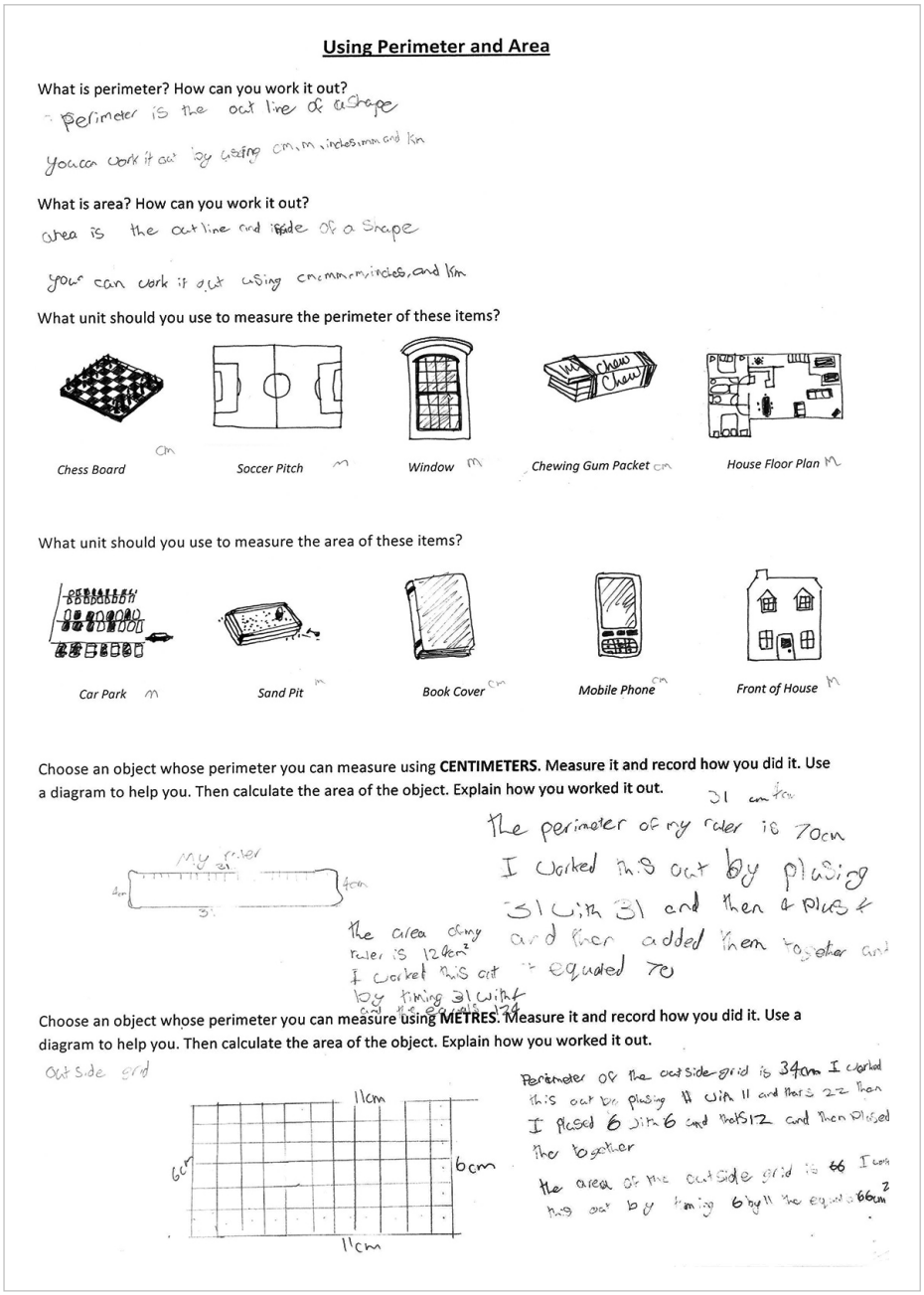
Satisfactory

Measurement: Using perimeter and area



Using Perimeter and Area

What is perimeter? How can you work it out?

perimeter is the out line of a shape

You can work it out by using cm, m, inches, mm and km

What is area? How can you work it out?

area is the outline and inside of a shape

your can work it out using cm, mm, m, inches, and km

What unit should you use to measure the perimeter of these items?

Chess Board cm | Soccer Pitch m | Window m | Chewing Gum Packet cm | House Floor Plan m

What unit should you use to measure the area of these items?

Car Park m | Sand Pit m | Book Cover cm | Mobile Phone cm | Front of House m

Choose an object whose perimeter you can measure using **CENTIMETERS**. Measure it and record how you did it. Use a diagram to help you. Then calculate the area of the object. Explain how you worked it out.

31 cm for
The perimeter of my ruler is 70cm
I worked this out by plusing 31 with 31 and then 4 plus 4 and then added them together and equated to 70

The area of my ruler is 124cm²
I worked this out by timing 31 with 4 and it equals 124

Choose an object whose perimeter you can measure using **METRES**. Measure it and record how you did it. Use a diagram to help you. Then calculate the area of the object. Explain how you worked it out.

Out side grid

Perimeter of the out side grid is 34cm I worked this out by plusing 11 with 11 and that's 22 then I plused 6 with 6 and that's 12 and then plused the together

the area of the out side grid is 66 I worked this out by timing 6 by 11 the equal is 66cm²

Annotations

Gives a basic explanation of perimeter and area.

Chooses appropriate units to measure items.

Calculates area and perimeter of four-sided figures.

Geometry: Location and transformation

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Summary of task

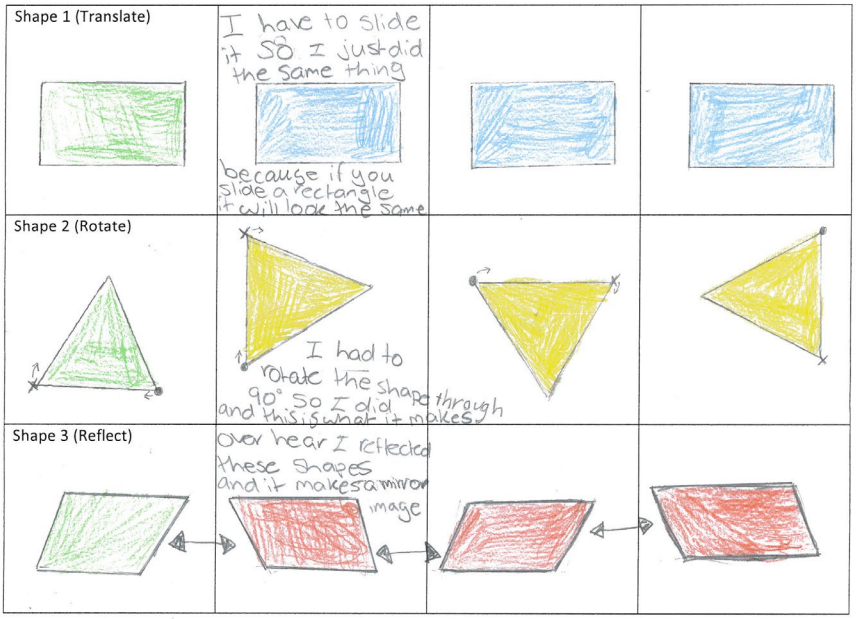
Students had completed a unit of work about line and rotational symmetry, translation, rotation, reflection and the enlargement transformation of two-dimensional shapes.

Students were asked to draw two-dimensional shapes and follow the language of position to transform, enlarge and record the lines of symmetry in the shapes. They were then asked to enlarge a two-dimensional shape using grid paper.

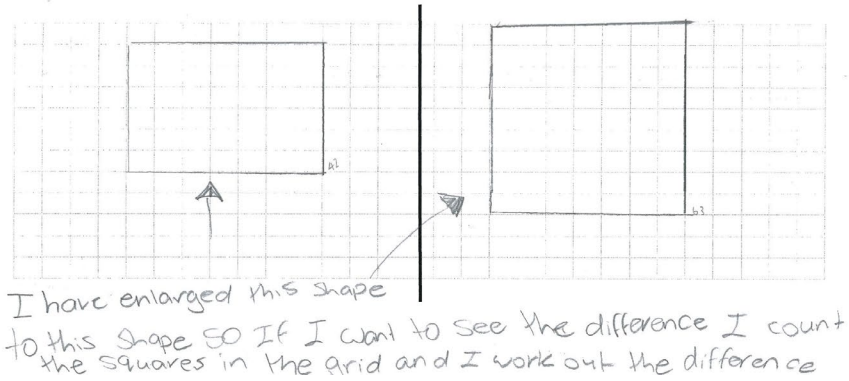
Geometry: Location and transformation

Location & Transformation – Year 5

- Draw three different 2 dimensional shapes in the first column.
- In the first row, show how the shape can be translated in different ways. Describe what you did.
- In the second row, show how the shape can be rotated in different ways. Describe what you did.
- In the third row, show how the shape can be reflected. Describe what you did.
- Show how many lines of symmetry each shape has.



On the left side of the grid draw a simple picture. Enlarge the same picture on the right side of the grid. By how much have you enlarged it? Explain your thinking.



Annotations

Demonstrates that shape remains the same under translation.

Understands that rotating changes position but not shape.

Explains the effects of reflection.

Attempts to explain how the enlarged figure was created.

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Number: Number sentences

Year 5 Mathematics achievement standard

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Summary of task

Students had completed class tasks involving number sentences and unknown quantities.

Students were asked to complete a task to describe numbers in a number sentence in a variety of ways. This task was completed under timed conditions.

Number: Number sentences

Number Sentences

Instructions!

- Choose 15 different numbers between 0 and 100
- Express each number in two different ways using mixed operations

	Number	First way	Second way
	Eg. 3	3= 6 x 4 – 3 x 7	3 = 56÷7÷2 - 1
1.	10	10 = 2×3+4	10 = 5×5 – 15
2	12	12 = 5×2+2	12 = 4×5 – 8
3	20	20 = 5×5–5	20 = 4×4 + 4
4	35	35 = 6×5+5	35 = 7×7 – 2×7
5	48	48 = 9×5 + 3×1	48 = 10×10 – 26×2
6	50	50 = 1000÷10÷2	50 = 10 + 20×2
7	55	55 = 10×5+5	55 = 5×12 –5
8	75	75 = 10×10–5×5	75 = 2×35 + 5
9	80	80 = 2×2×2×10	80 = 2×2×4×5
10	85	85 = 100 – 3×5	85 = 2×10×4+5
11	25	25 = 4×2+17×1	25 = 3×10 – 5
12	40	40 = 2×2×2×5	40 = 10×10 – 3×2×10
13	56	56 = 5×12 – 2×2	56 = 25×2 + 2×3
14	72	72 = 10×10–4×7	72 = 2×2×2×3×3
15	100	100 = 2×2×5×5	100 = 1000 000 ÷ 10000

Annotations

Uses more than one operation to make the number.

Performs operations in the correct order.

Geometry: Mapping

Year 5 Mathematics achievement standard

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

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Summary of task

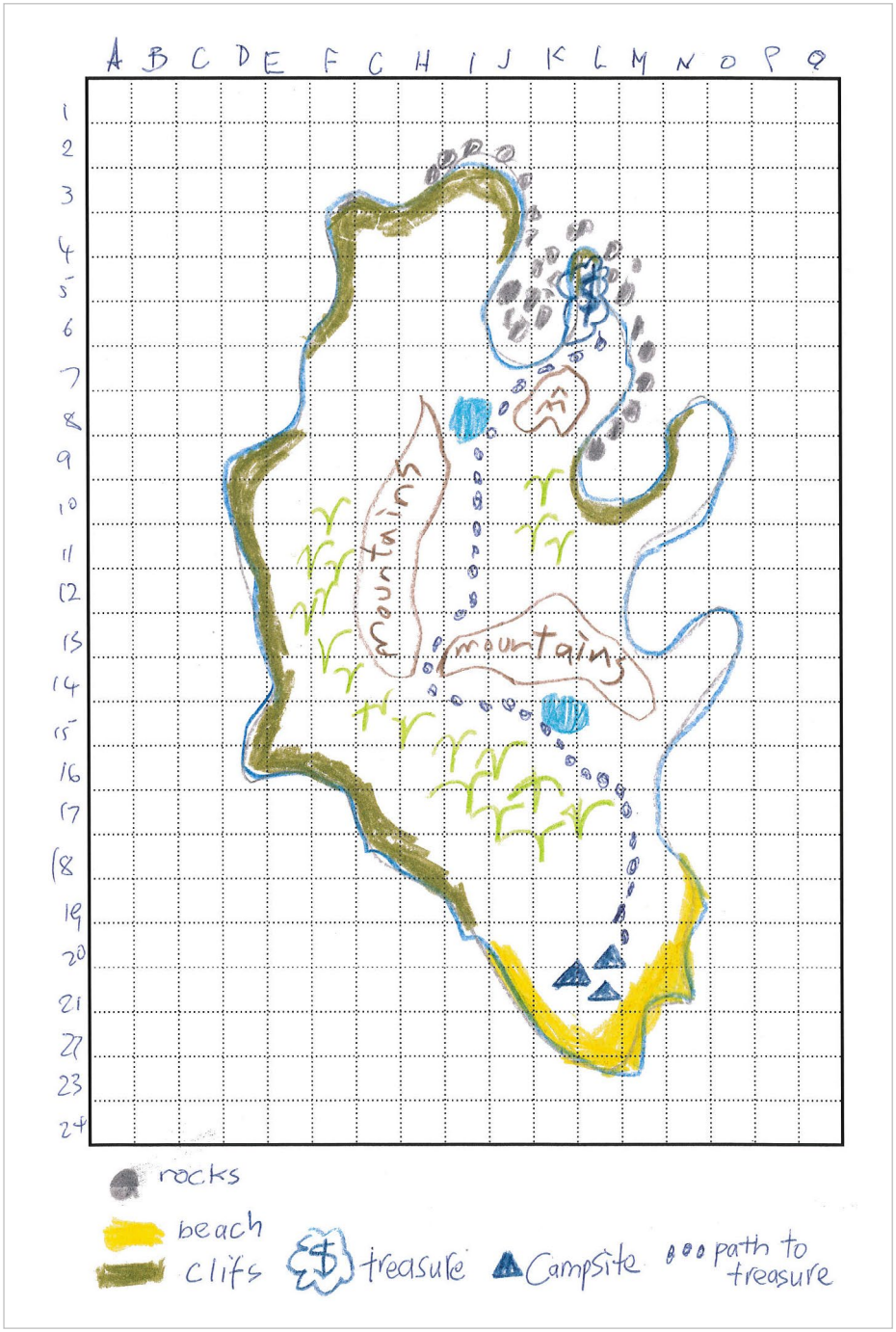
Students had studied maps and used a compass.

Students were asked to draw a treasure island map, to create a scale and compass rose, and to impose a grid and coordinates. They were required to write a set of directions, using compass points or grid coordinates, to the location of a hidden treasure on their map. Students exchanged maps and followed the directions to find the treasure. They were encouraged to comment on the scale used.

Mathematics

Year 5
Satisfactory

Geometry: Mapping



Annotations

Identifies landmarks on map.

Uses a legend to describe landmarks on map.

Statistics and Probability: Come in spinner

Year 5 Mathematics achievement standard

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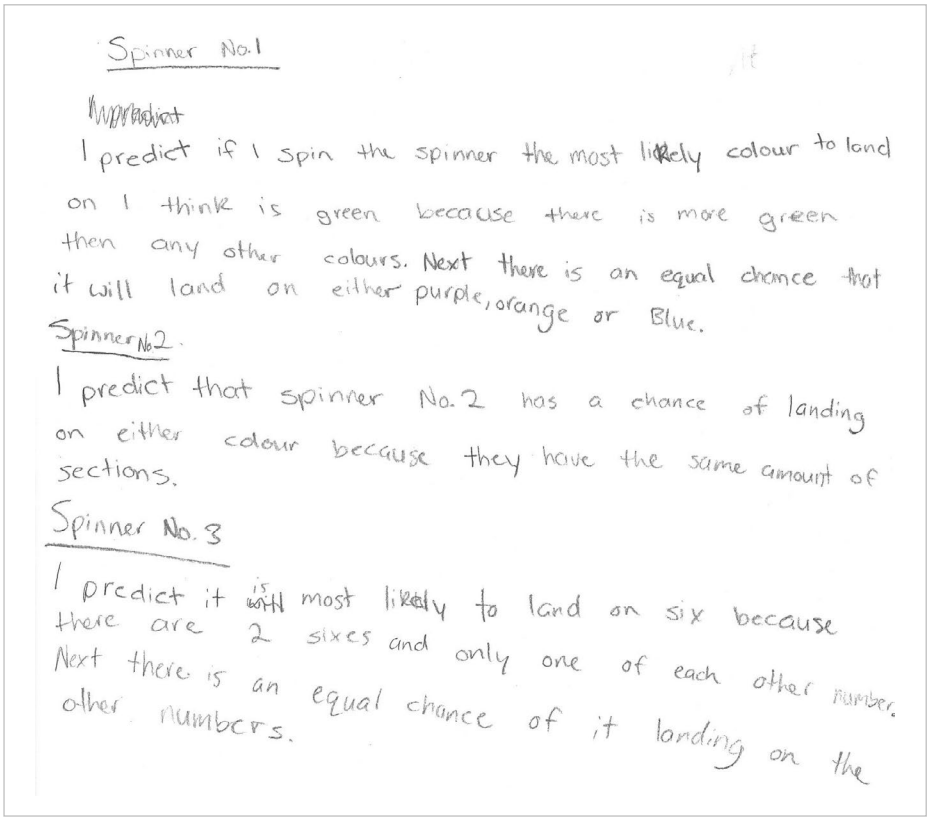
Summary of task

This task was the culmination of a series of activities dealing initially with the language of chance and then conducting simple chance experiments. The students had discussed fair and unfair spinners and the numerical chance of a particular result happening.

Students were required to make three spinners. One of the spinners had four colours but there was not an equal chance of spinning each colour. The second spinner had six numbers on it with an equal chance of spinning each number and the third spinner had six numbers on it with an unequal chance of spinning each of the numbers. Students were required to pose questions, predict the chance of the outcomes and then conduct the task. Students were asked to record all answers in tables and graphs. After completing the task students compared their results with other class members and interpreted the results.

Statistics and Probability: Come in spinner



Spinner No.1

~~Mypredict~~

I predict if I spin the spinner the most likely colour to land on I think is green because there is more green then any other colours. Next there is an equal chance that it will land on either purple, orange or Blue.

Spinner No.2.

I predict that spinner No. 2 has a chance of landing on either colour because they have the same amount of sections.

Spinner No. 3

I predict it is with most likely to land on six because there are 2 sixes and only one of each other number. Next there is an equal chance of it landing on the other numbers.

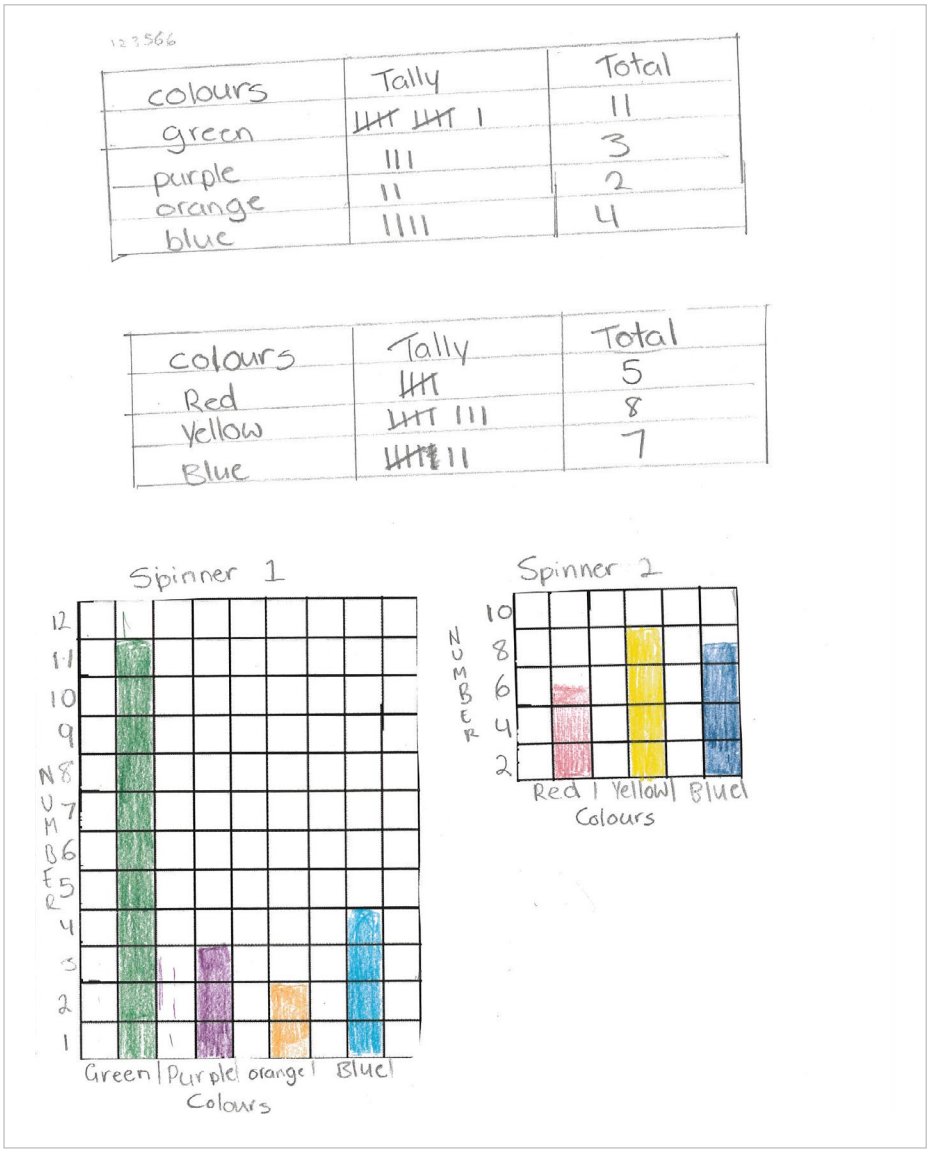
Annotations

Makes informed predictions about the possible results of the experiment for different specified spinners.

Mathematics

Year 5
Satisfactory

Statistics and Probability: Come in spinner



123566

colours	Tally	Total
green	𝍸 𝍸 I	11
purple	III	3
orange	II	2
blue	IIII	4

colours	Tally	Total
Red	𝍸	5
Yellow	𝍸 III	8
Blue	𝍸 II	7

Annotations

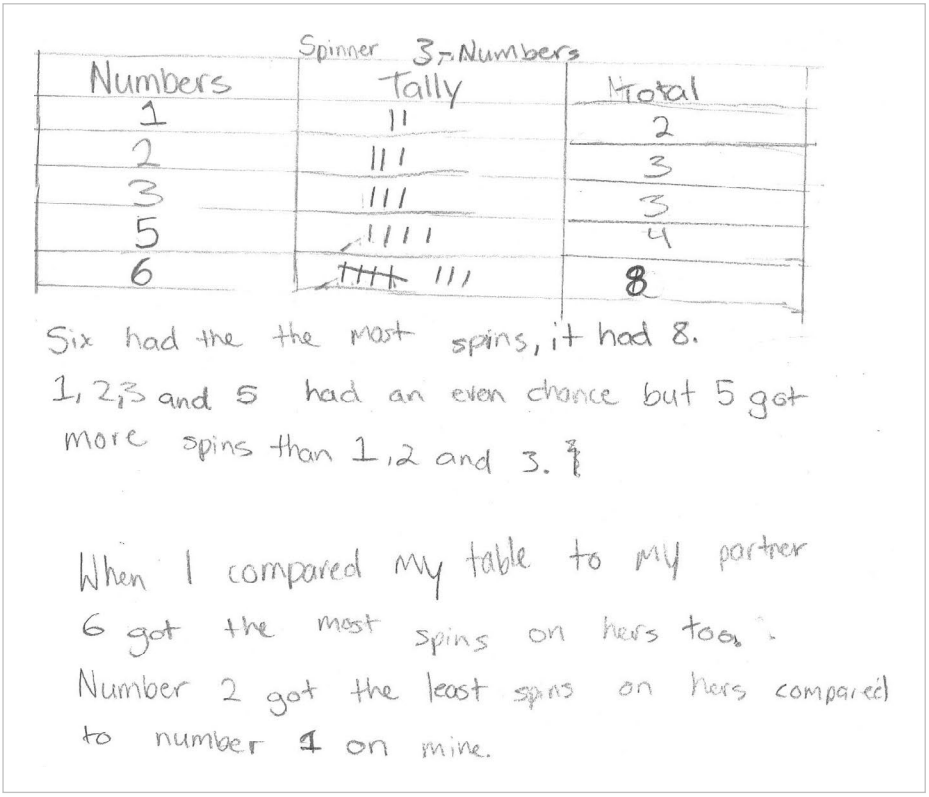
Records the results of the experiment using tally marks and totals.

Displays data correctly in a column graph.

Mathematics

Year 5
Satisfactory

Statistics and Probability: Come in spinner



Spinner 3 Numbers

Numbers	Tally	Total
1	II	2
2	III	3
3	III	3
5	IIII	4
6	~~IIII~~ III	8

Six had the the most spins, it had 8.
1, 2, 3 and 5 had an even chance but 5 got more spins than 1, 2 and 3.

When I compared my table to my partner 6 got the most spins on hers too. Number 2 got the least spins on hers compared to number 1 on mine.

Annotations

Compares results of chance experiments.

Mathematics

Year 5
Satisfactory

Number: How do I check my work?

Year 5 Mathematics achievement standard

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

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Summary of task

Throughout the year, students had completed many mental calculation sessions as an introduction to mathematics lessons. They had been explicitly taught a variety of strategies to check their answers to calculations and to explain how these worked.

Students were given three calculations to complete and were asked to explain the reasonableness of their answers, in a 20-minute timeframe.

Mathematics

Year 5
Satisfactory

Number: How do I check my work?

Work out the following algorithms, and then explain how you checked the reasonableness of your answer.

5456 X 19 4104 4560 8664	This is a reasonable answer because 456x19 is most likely going to be a big number because it is close to being 19000 which is a pretty big number
26347 - 9828 16519	This is a reasonable answer because 26347-9828 would not go below 10,000 but also would not be above 20,000 just because its logic
2514 + 357 + 5249 + 12345 12345 5249 2514 + 357 20465	This is a reasonable answer because 2514+357+5249+12345 is going to be big

Annotations

Calculates the answer to a multiplication algorithm involving a three-digit number and a two-digit number.

Calculates the answer to a subtraction algorithm involving trading.

Demonstrates understanding that rounding and estimation can be used to check the answer to a calculation.

Calculates the answer to an addition algorithm involving more than two addends with different numbers of digits.

Number: Spring fair

Year 5 Mathematics achievement standard

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Summary of task

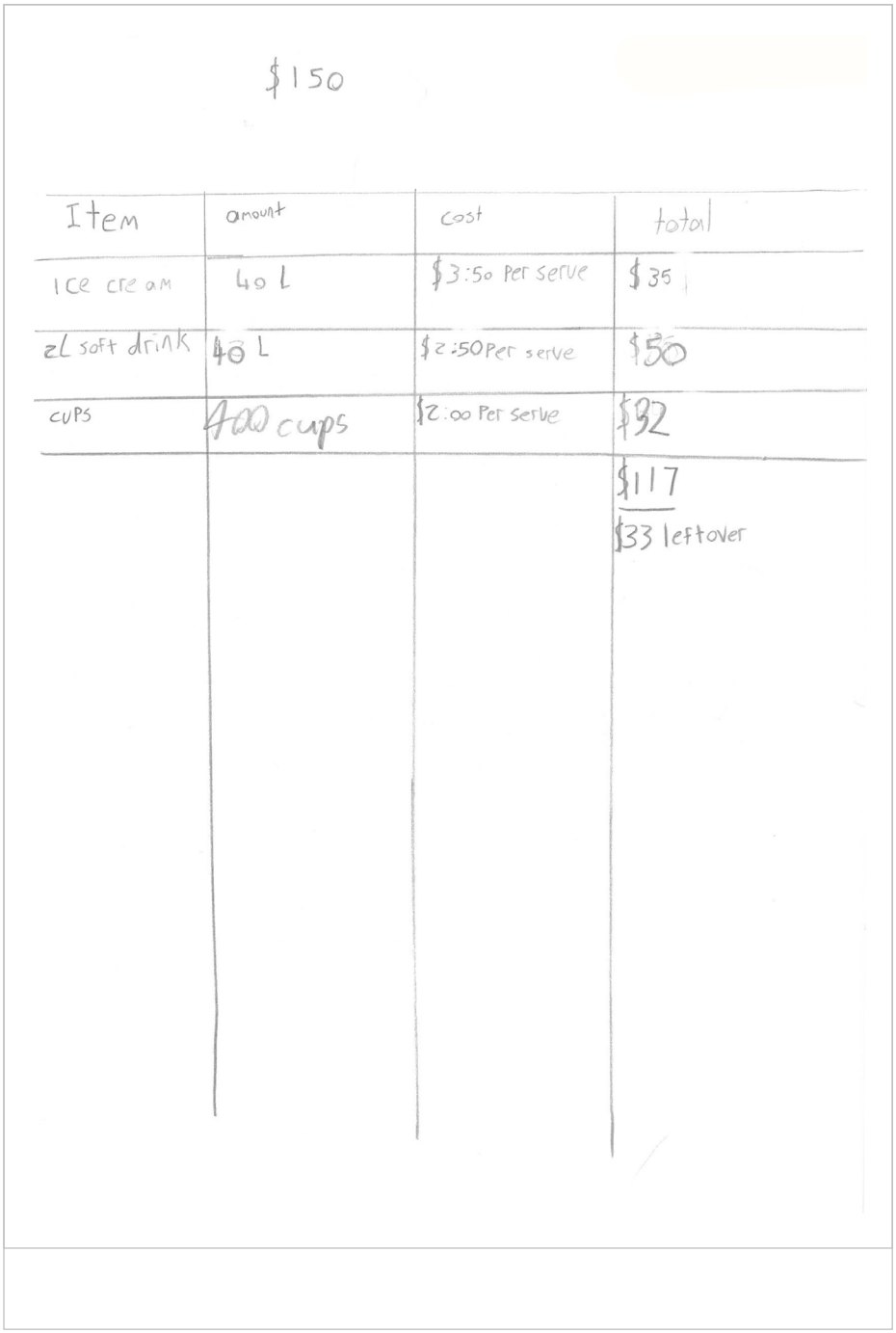
Students were preparing to run a stall selling ‘spider drinks’ at the school spring fair. They were asked to create a simple budget to run the stall and work out how much ice-cream, soft drink and cups they could buy within their budget. The cost of ingredients and cups were provided to the students as follows:

- Total funds: $150.00
- Ice-cream: $3.50 per 4-litre container
- Soft drink: $2.00 per 1-litre or $2.50 for 2 litres
- Plastic cups: $1.99 for 25 cups.

Mathematics

Year 5
Satisfactory

Number: Spring fair



$150

Item	amount	cost	total
ice cream	40 L	$3:50 per serve	$35
2L soft drink	40 L	$2:50 Per serve	$50
cups	400 cups	$2:00 Per serve	$32
			$117
			$33 leftover

Annotations

Creates a simple table to record information about a budget.

Lists the quantity and cost of each item to be purchased.

Selects the soft drink size that represents better value.

Calculates the cost of purchasing multiple quantities of items.

Calculates the total expenditure for the items listed.

Demonstrates understanding of the mathematical concept of keeping costs within a budget.