Mathematics

Year 5
Above Satisfactory

WORK SAMPLE PORTFOLIO

The 2012 portfolios are a resource to support teachers in planning and implementation of the Foundation to Year 10 Australian Curriculum in the learning area. Each portfolio comprises a collection of student work illustrating evidence of student learning in relation to the achievement standard. At every year level there are three portfolios illustrating satisfactory, above satisfactory and below satisfactory achievement in relation to the standard.

Each portfolio comprises a collection of different student work selected by state and territory nominees, and annotated and reviewed by classroom teachers and other curriculum experts. Each work sample in the portfolio varies in terms of how much time was available to complete the task and/or the degree of scaffolding provided by the teacher.

There is no pre-determined number of student work samples in a portfolio nor are they sequenced in any particular order. Together as a portfolio, the samples provide evidence of all aspects of the achievement standard unless otherwise specified.

As the Australian Curriculum is progressively implemented in schools, the portfolios will continue to be reviewed and enhanced in relation to their comprehensiveness in coverage of the achievement standard and their representation of the diversity of student work that can be used to highlight evidence of student learning.

THIS PORTFOLIO – Year 5 Mathematics

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

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
Sample10	Geometry – Mapping
Sample 11	Statistics and Probability – Come in spinner

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 makes spinners to assist in carrying out simple probability experiments before evaluating the results (WS 11). 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).

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The annotated samples in this portfolio provide evidence of most (but not necessarily all) aspects of the achievement standard. The following aspect/s of the achievement standard are not evident in this portfolio:

- *explain plans for simple budgets*
- *use appropriate units of measurement for volume, capacity and mass*
- *check the reasonableness of answers using estimation and rounding.*

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Geometry – My angle

Relevant parts of the achievement standard

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.

Students order decimals and unit fractions and locate them on number lines. They add and subtract fractions with the same denominator. Students continue patterns by adding and subtracting fractions and decimals. They find unknown quantities in number sentences. They use appropriate units of measurement for length, area, volume, capacity and mass, and calculate perimeter and area of rectangles. They convert between 12 and 24 hour time. Students use a grid reference system to locate landmarks. They measure and construct different angles. Students list outcomes of chance experiments with equally likely outcomes and assign probabilities between 0 and 1. Students pose questions to gather data, and construct data displays appropriate for the data.

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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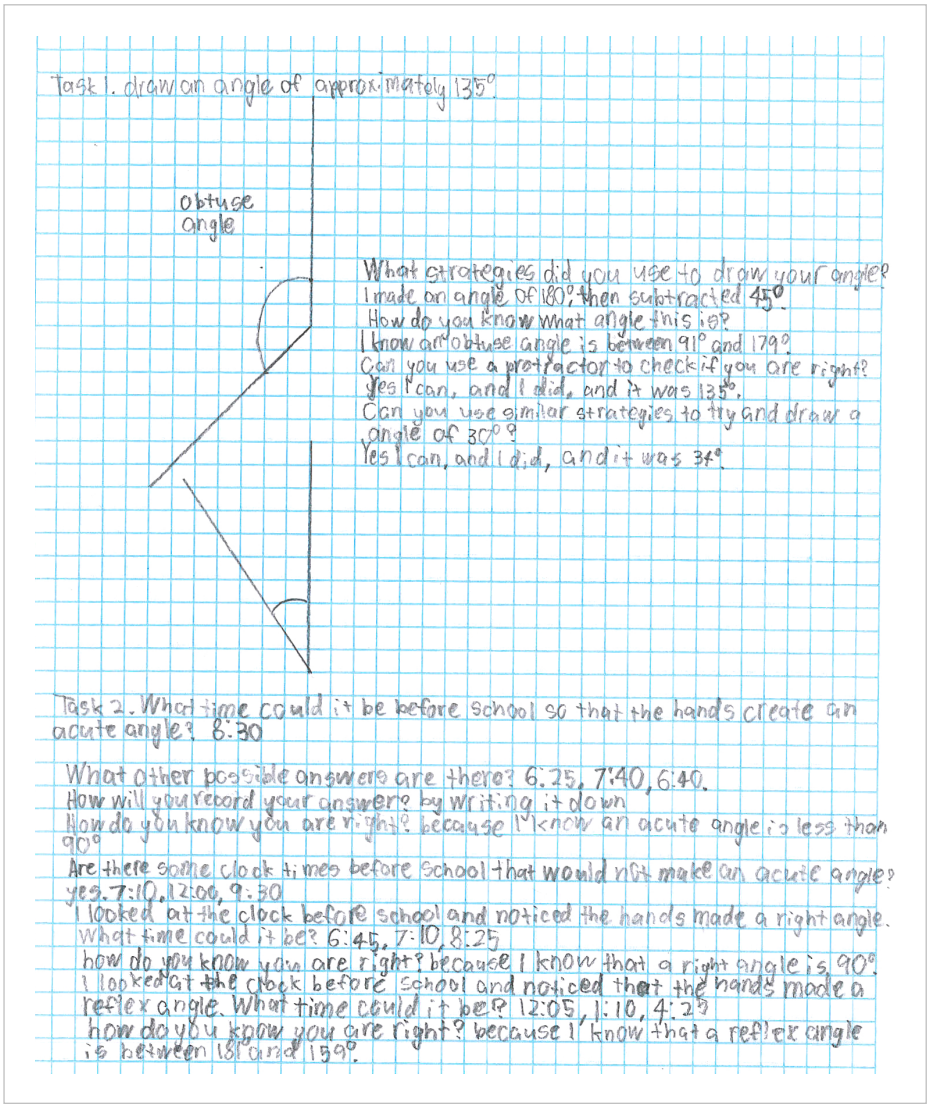
Geometry – My angle



Annotations

Identifies types of angles.

Explains strategies in estimating angles using mathematical language.

Identifies characteristics of angles.

Makes accurate estimations to construct angles.

Uses a protractor to accurately measure angles.

Uses characteristics of angles to support explanations.

Recognises the turn of an angle doesn't change the angle measurement.

Acknowledgement

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Measurement – Garden bed

Relevant parts of the 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?*

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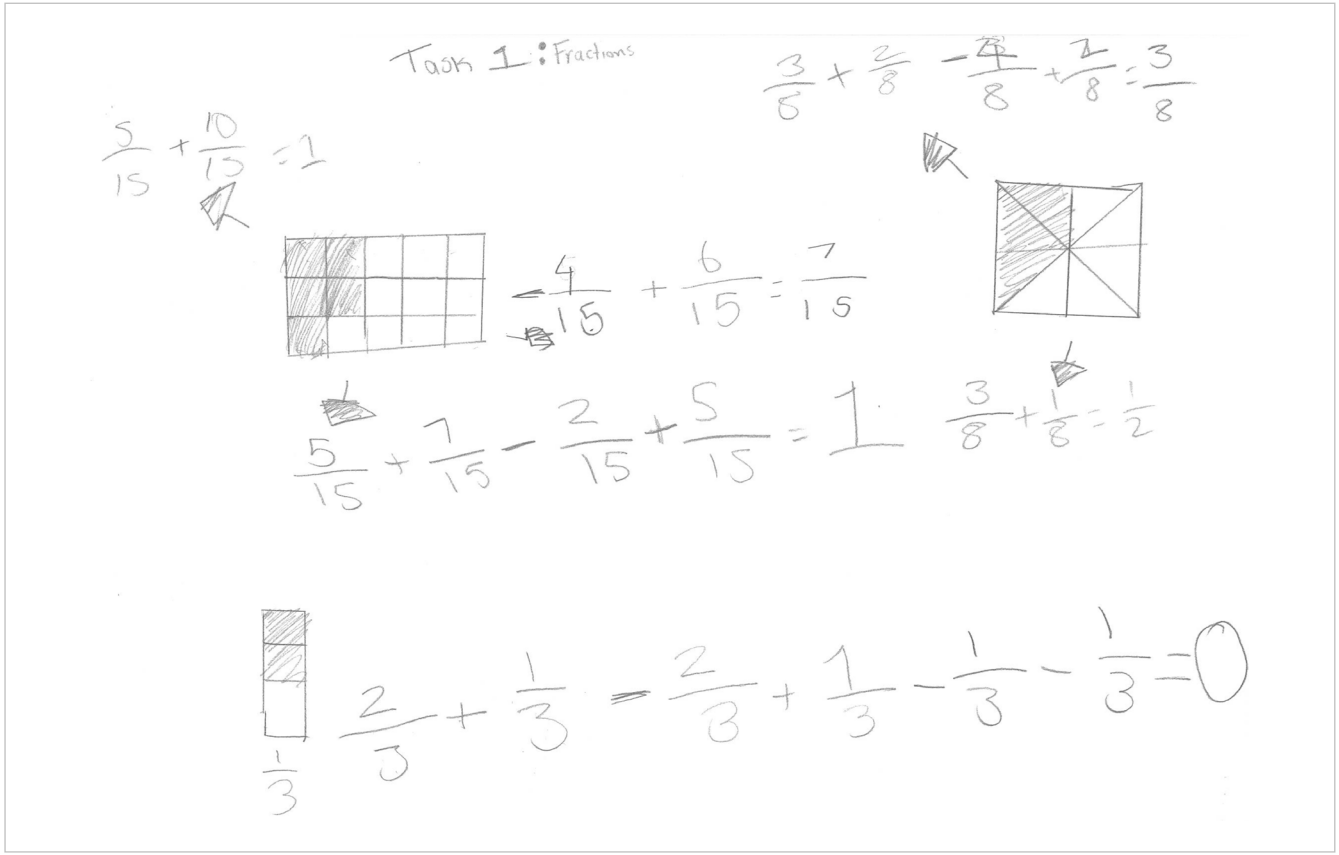
Measurement – Garden bed



Annotations

Calculates addition and subtraction of fractions with a variety of denominators.

Divides a shape into a number of different equal parts.

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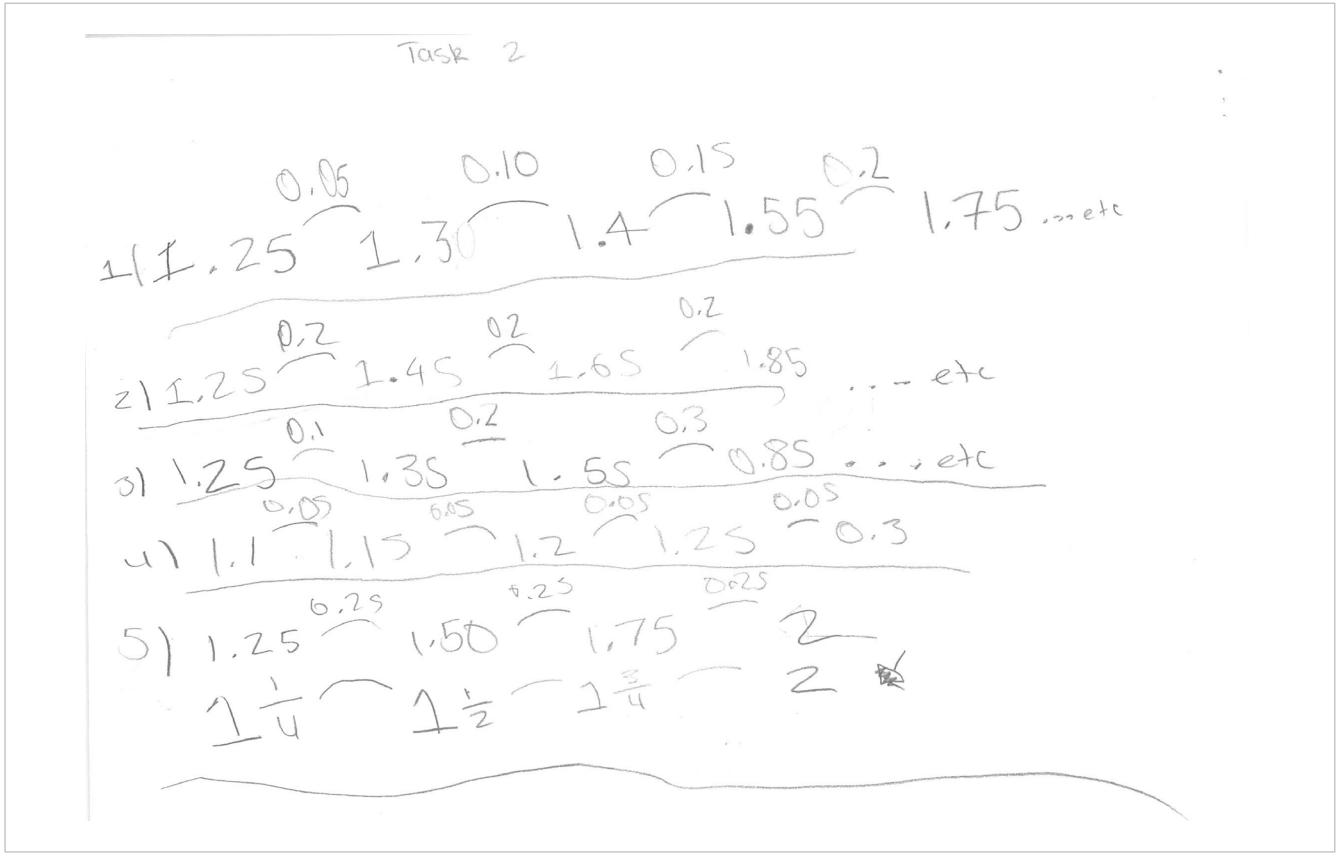
Measurement – Garden bed



Annotations

Creates and continues more complex decimal number patterns using hundredths, tenths and wholes.

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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:

- *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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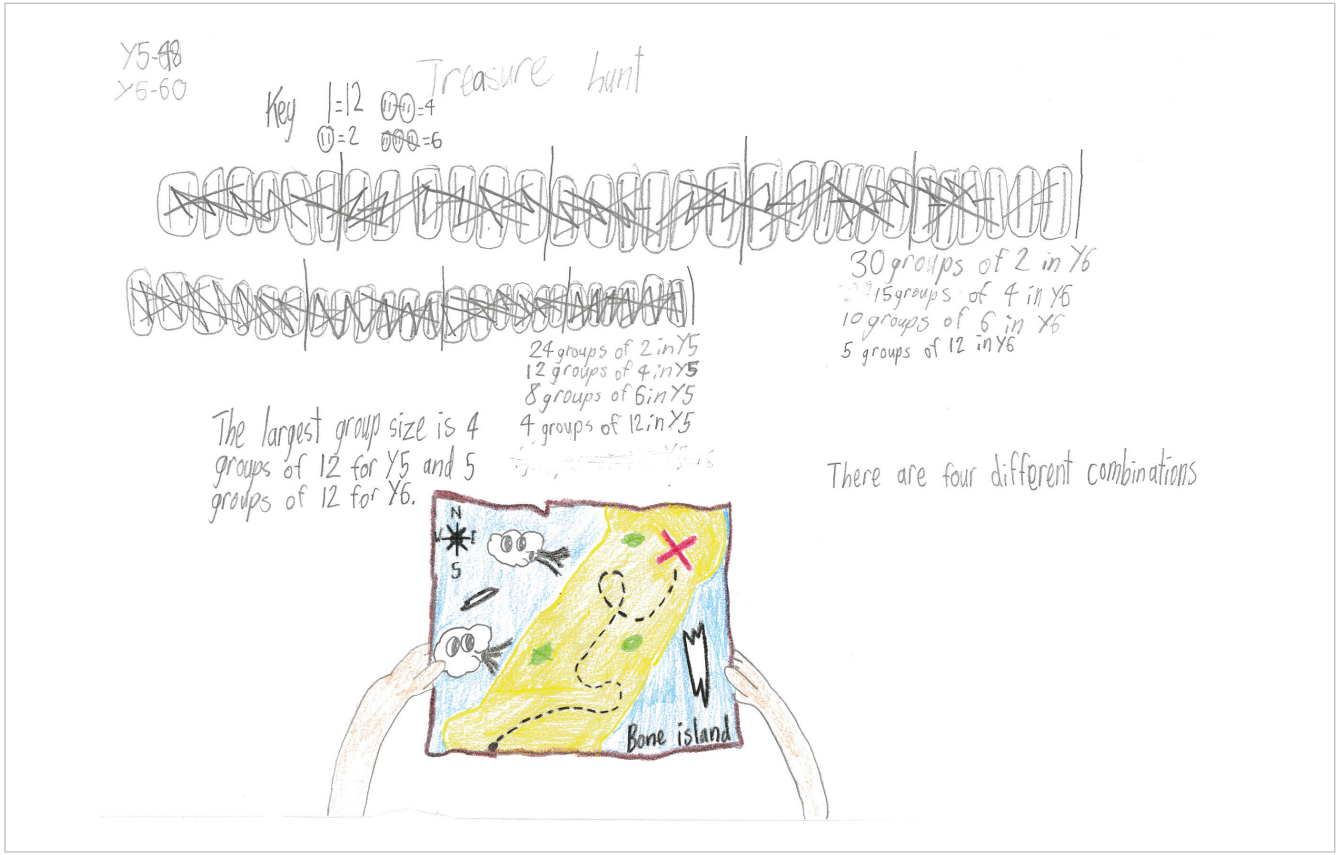
Number – Treasure Hunt



Annotations

Uses diagrams as a strategy to identify factors of a number.

Lists the factors of a given number.

Demonstrates understanding of multiplication as being groups of the same size.

Recognises there are different factor combinations in multiplication.

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Measurement – How many can you make?

Relevant parts of the achievement standard

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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 recording as much information as they could about the three-dimensional objects. Students were encouraged to use mathematical terms to describe the objects.

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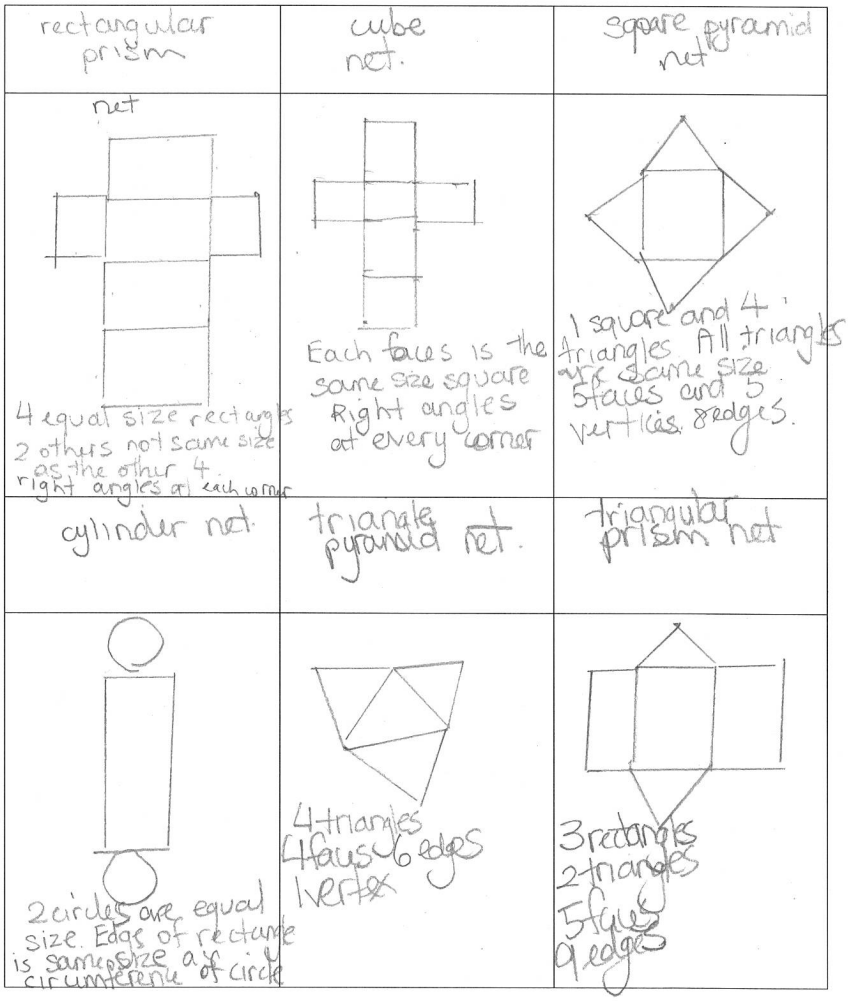
Measurement – How many can you make?

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.



Annotations

Identifies and draws nets of 3D objects and lists the attributes.

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Number – Who are the fastest swimmers?

Relevant parts of the 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, complete some further ordering of decimals and locate them on a number line. Students were also asked to think about what could be done in one hundredth of a second.

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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	10th
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 decimals from lowest to highest.

Acknowledgement
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Number – Who are the fastest swimmers?

Who Were the Fastest 100m Swimmers of 2012?

Task 2

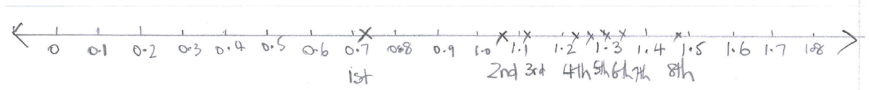
i) **Calculate the athletes with the 8 fastest times and record them in the final, in the correct lanes.**

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	Agnel Yannick	+1.32 +1.30 secs
Lane 2	5th fastest	Cesar Cielo	+1.26
Lane 3	3rd fastest	Hanser Garcia	+1.13
Lane 4	1st fastest	James Magnussen	+0.72
Lane 5	2nd fastest	Nathan Adrian	+1.06
Lane 6	4th fastest	Sebastiaan Verschuren	+1.22
Lane 7	6th fastest	Brent Haden	+1.30
Lane 8	8th fastest	Nikita Lobentsev	+1.47



Annotations

Compares two decimals to calculate the difference.

Constructs and orders decimals on a number line to the hundredth place.

Locates decimals accurately on a number line.

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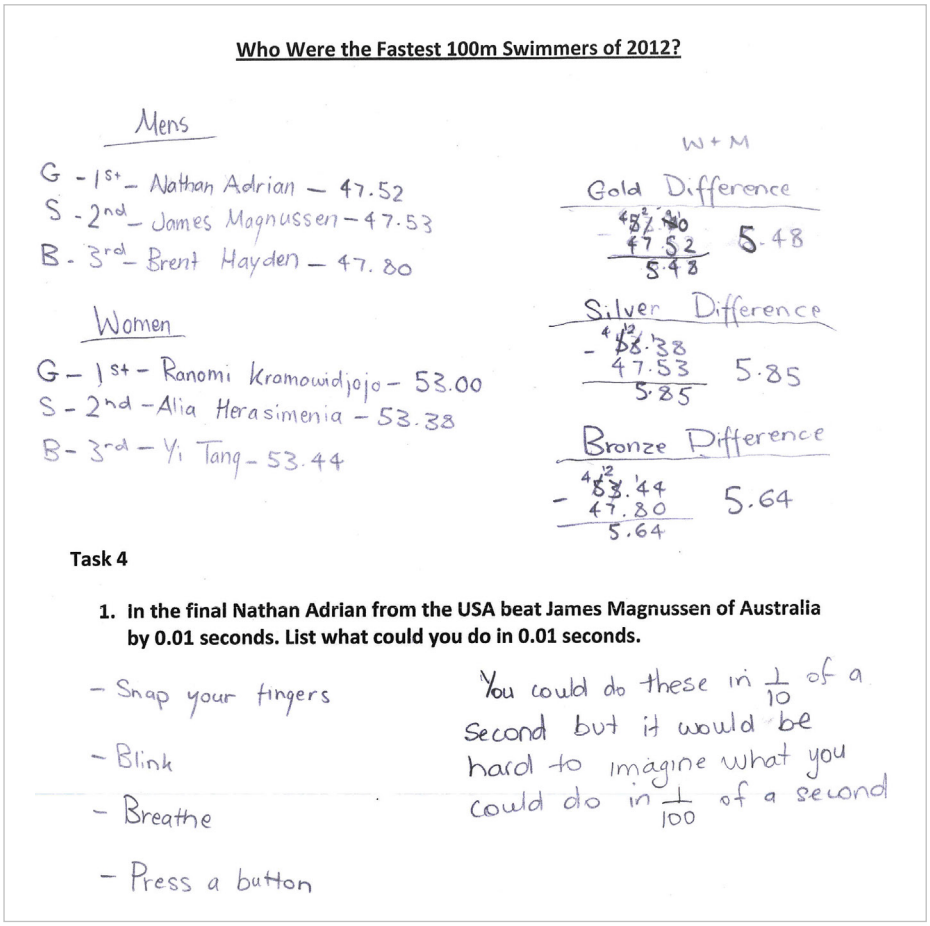
Number – Who are the fastest swimmers?



Who Were the Fastest 100m Swimmers of 2012?

Mens

G - 1st - Nathan Adrian – 47.52
S - 2nd - James Magnussen – 47.53
B - 3rd - Brent Hayden – 47.80

Women

G – 1st - Ranomi Kromowidjojo – 53.00
S - 2nd - Alia Herasimenia – 53.38
B - 3rd – Yi Tang - 53.44

W + M

Gold Difference

47.52
5.48

Silver Difference

47.53
5.85

Bronze Difference

47.80
5.64

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.**

- Snap your fingers
- Blink
- Breathe
- Press a button

You could do these in $\frac{1}{10}$ of a second but it would be hard to imagine what you could do in $\frac{1}{100}$ of a second

Annotations

Gathers secondary data and constructs a list to represent data.

Compares data to calculate the difference in data records.

Records calculations.

Makes connections between fractions and decimal numbers.

Lists activities that can be performed in a given time.

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Mathematics

Year 5
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Measurement – Using time

Relevant parts of the 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 analogue time. They completed this task in a half hour time slot.

Mathematics

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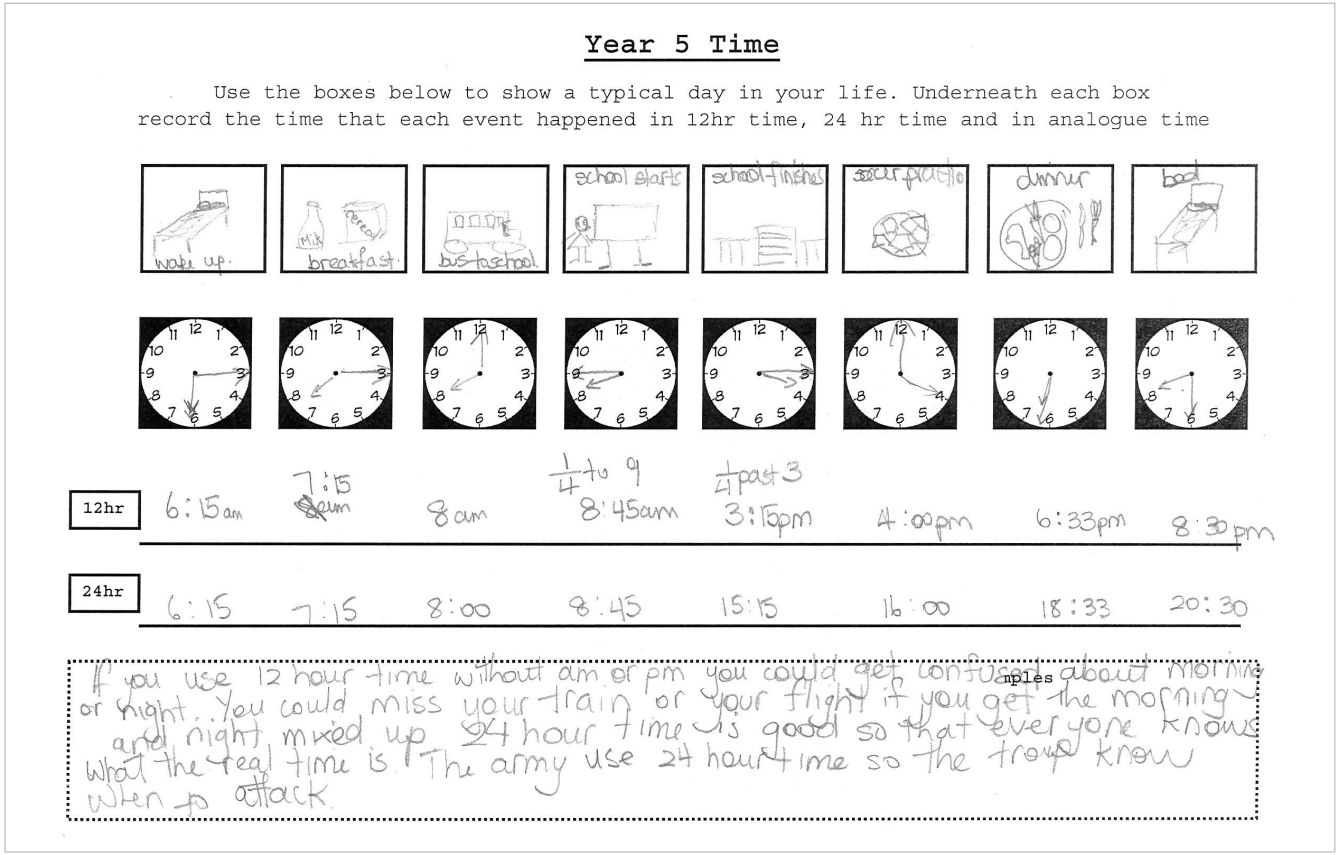
Above Satisfactory

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

12hr	6:15am	7:15 ~~8am~~	8am	$\frac{1}{4}$ to 9 8:45am	$\frac{1}{4}$ past 3 3:15pm	4:00pm	6:33pm	8:30pm
24hr	6:15	7:15	8:00	8:45	15:15	16:00	18:33	20:30

If you use 12 hour time without am or pm you could get confused about morning or night. You could miss your train or your flight if you get the morning and night mixed up. 24 hour time is good so that everyone knows what the real time is. The army use 24 hour time so the troops know when to attack.

mples

Annotations

Records and converts 12 hour to 24 hour time.

Explains the reason for the use of 24 hour time.

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Mathematics

Year 5

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Measurement – Using perimeter and area

Relevant parts of the achievement standard

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Summary of task

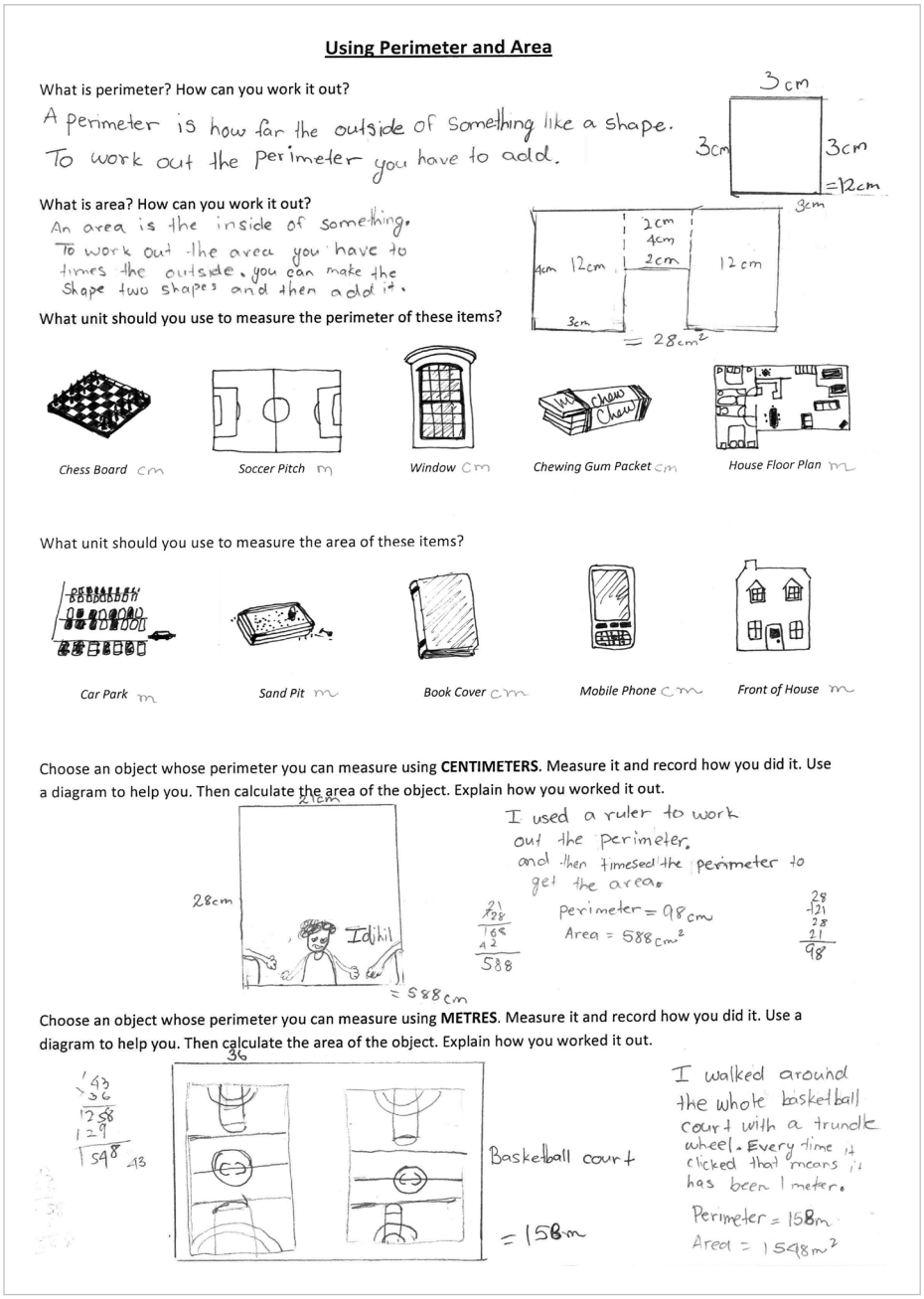
Students had completed a unit of work on perimeter and area. They had been given opportunities to practise measuring objects using millimetres, centimetres, metres and calculate area using cm^2 and m^2.

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

Year 5
Above Satisfactory

Measurement – Using perimeter and area



Using Perimeter and Area

What is perimeter? How can you work it out?

A perimeter is how far the outside of something like a shape. To work out the perimeter you have to add.

3cm, 3cm, 3cm, =12cm

What is area? How can you work it out?

An area is the inside of something. To work out the area you have to times the outside, you can make the shape two shapes and then add it.

2cm, 4cm, 2cm, 4cm, 12cm, 12cm, 3cm, = 28cm²

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

Chess Board cm | Soccer Pitch m | Window cm | 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.

21cm, 28cm, Idjhil, = 588cm

I used a ruler to work out the perimeter, and then timesed the perimeter to get the area.

Perimeter = 98cm

Area = 588cm²

588

98

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.

36, Basketball court, = 158m

I walked around the whole basketball court with a trundle wheel. Every time it clicked that means it has been 1 meter.

Perimeter = 158m

Area = 1548m²

1548

Annotations

Explains how to calculate area and perimeter.

Calculates area and perimeter of more complex shapes.

Chooses appropriate units to measure items.

Calculates area and perimeter of four sided figures.

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Geometry – Location and transformation

Relevant parts of the achievement standard

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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.

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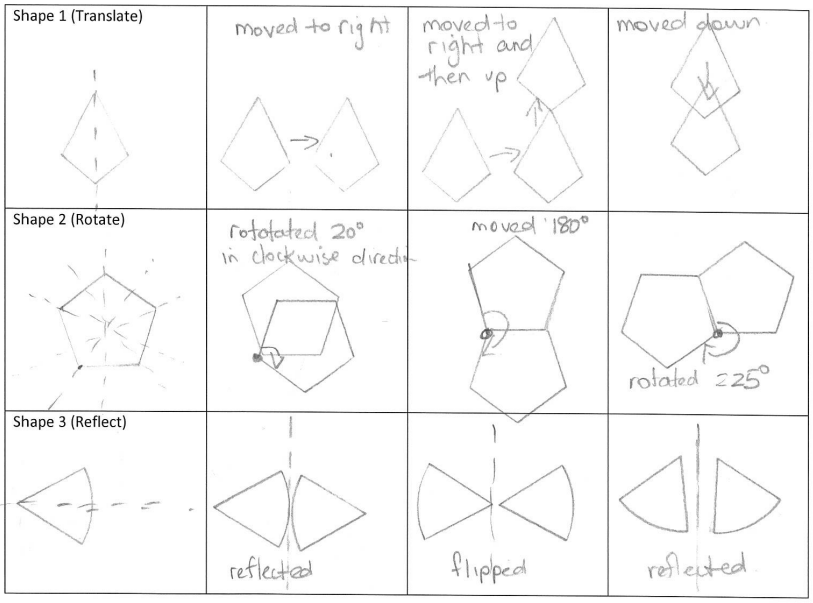
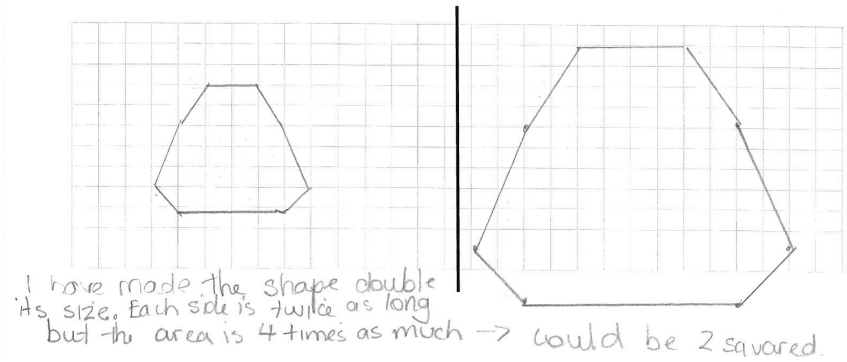
Geometry – Location and transformation

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 various ways to translate. Recognises that the shape remains constant.

Demonstrates rotation around a point and nominates the angle through which the rotation has occurred.

Displays various ways that a reflection can be done.

Demonstrates an insightful approach into what happens to area when a shape is enlarged.

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Location & Transformation – Year 5

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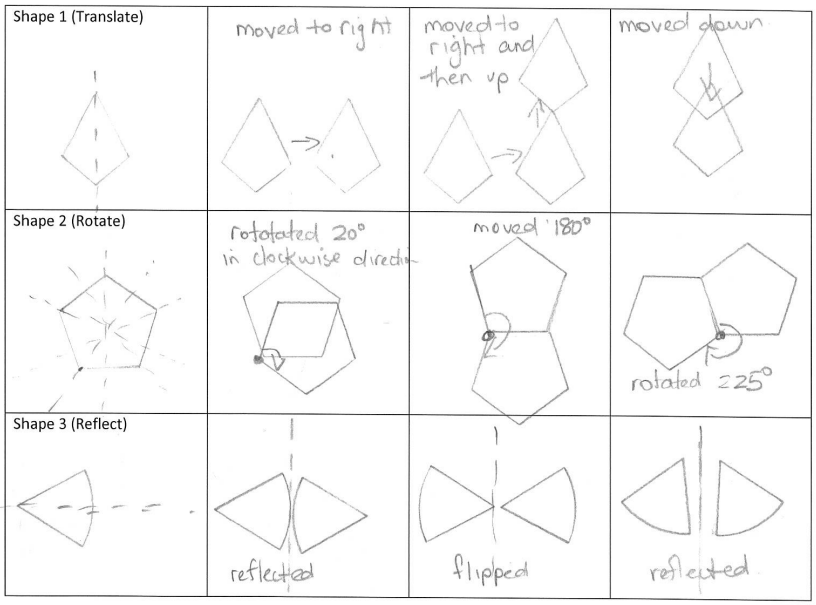
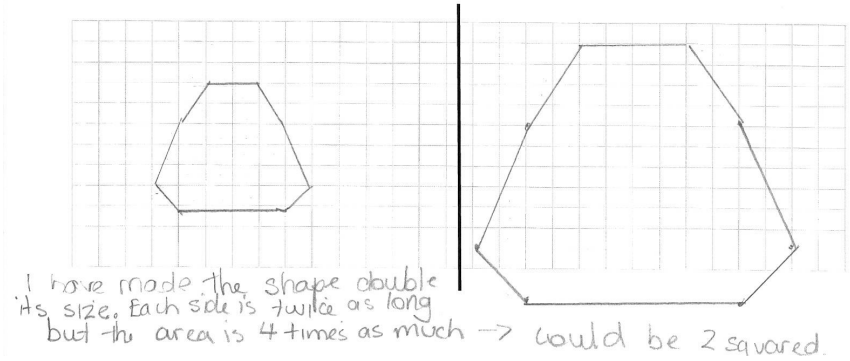
- Show how many lines of symmetry each shape has.



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 various ways to translate. Recognises that the shape remains constant.

Demonstrates rotation around a point and nominates the angle through which the rotation has occurred.

Displays various ways that a reflection can be done.

Demonstrates an insightful approach into what happens to area when a shape is enlarged.

Acknowledgement
ACARA acknowledges the contribution of Australian teachers and education authorities in providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

Mathematics

Year 5
Above Satisfactory

Number – Number sentences

Relevant parts of the achievement standard

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.

Students order decimals and unit fractions and locate them on number lines. They add and subtract fractions with the same denominator. Students continue patterns by adding and subtracting fractions and decimals. They find unknown quantities in number sentences. They use appropriate units of measurement for length, area, volume, capacity and mass, and calculate perimeter and area of rectangles. They convert between 12 and 24 hour time. Students use a grid reference system to locate landmarks. They measure and construct different angles. Students list outcomes of chance experiments with equally likely outcomes and assign probabilities between 0 and 1. Students pose questions to gather data, and construct data displays appropriate for the data.

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.

Mathematics

Year 5

Above Satisfactory

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.	11	= 9x9 – 10x7	= 15+29÷4
2	22	= 9x8 – 5x10.	= 11x4 – 11x2
3	33	= 28+53 – 8x6	= 121÷11x3.
4	44	= 2x2x11	= 136÷17÷2x11
5	55	= 7+4x3+2	= 222–123–44
6	66	= 9x9 – 15	= 90÷3x2+6.
7	77	= 7x3+7x8	= 21÷3 x 15–4
8	88	= 14+8x4	= 360÷2÷6+58
9	99	= 228÷2–15	= 3x11x3
10	80	= 12x10 –40	= 100+100 – 30x4
11	70	= 7x7+21	= 10x10 –30.
12	60	= 99÷3÷11x20	= 5x6x2
13	50	= 120÷12x5	= 10–5 x 13–3
14	40	= 88÷4+8+10	= 2x2x10
15	30	= 2x6+3x6	= 60÷10x5

Annotations

Chooses varied ways to describe a number.

Adheres to order of operations conventions.

Acknowledgement
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Mathematics

Year 5

Above Satisfactory

Geometry – Mapping

Relevant parts of the achievement standard

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Summary of task

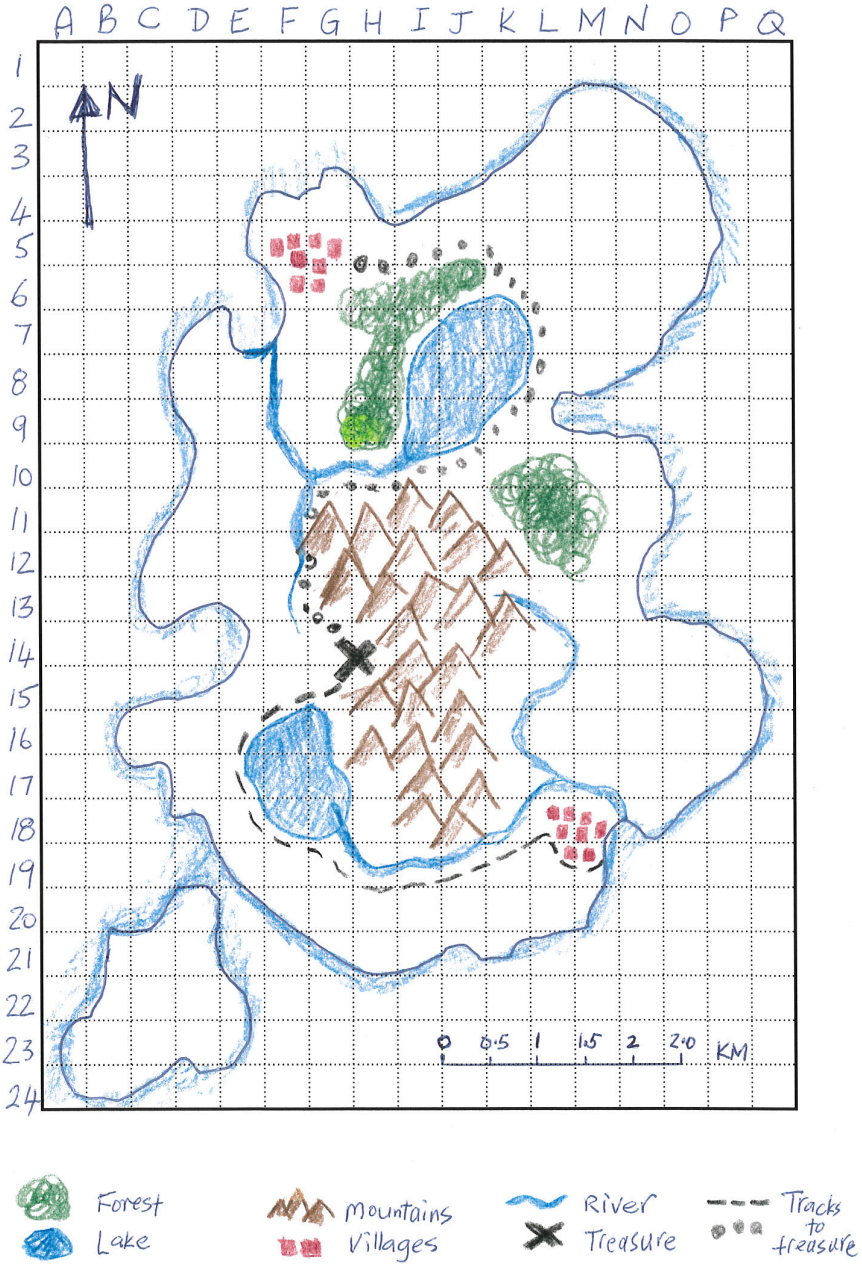
Students had studied maps and used a compass.

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
Above Satisfactory

Geometry – Mapping



Annotations

Indicates different features of the map.

Uses a scale to describe the map.

Uses a legend to describe landmarks.

Acknowledgement
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Mathematics

Year 5

Above Satisfactory

Statistics and Probability – Come in spinner

Relevant parts of the achievement standard

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

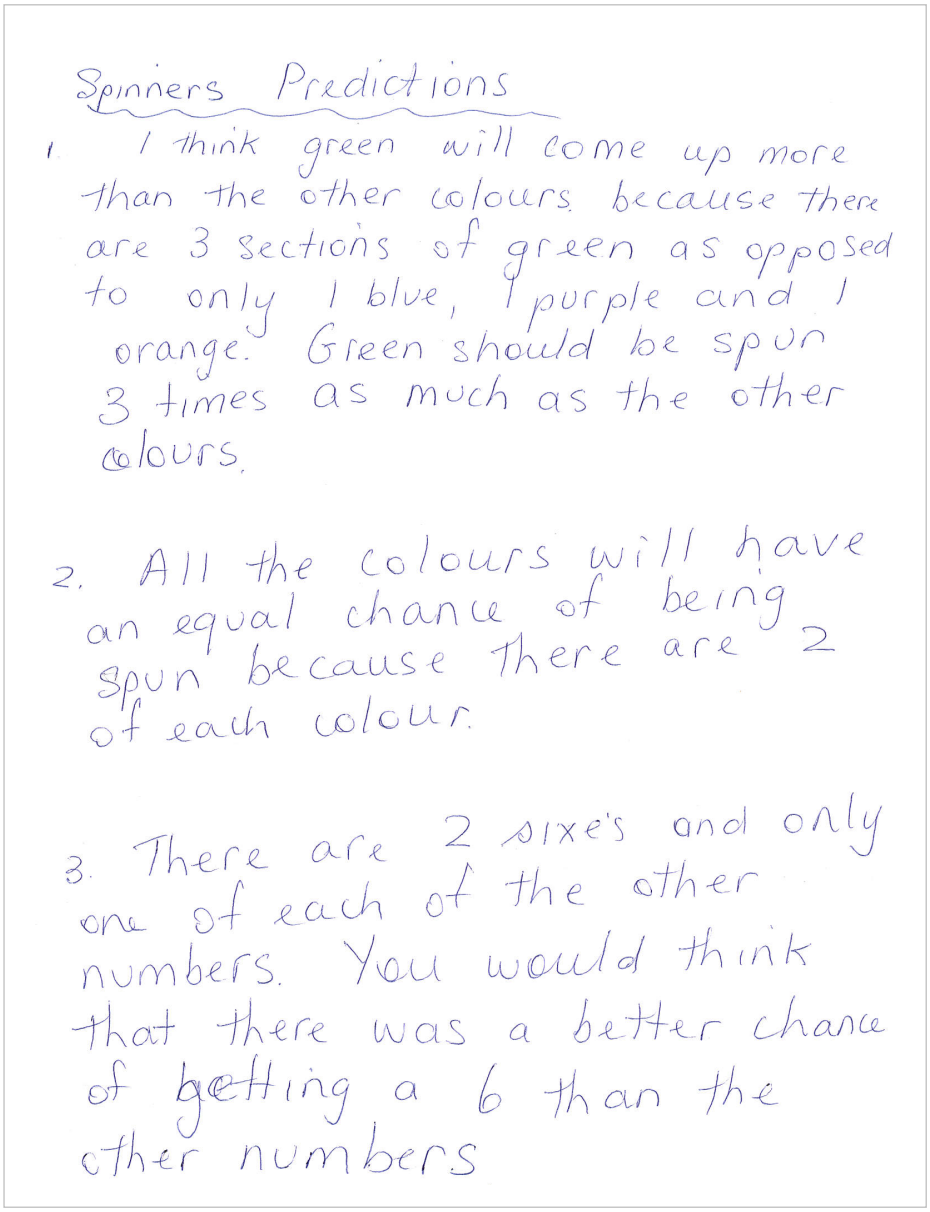
This task was the culmination of a series of activities dealing initially with the language of chance and then conducting simple chance experiments. The students had discussed fair and unfair spinners and the numerical chance of a particular result happening.

Students were required to make 3 spinners. One of the spinners had 4 colours but there was not an equal chance of spinning each colour. The second spinner had 6 numbers on it with an equal chance of spinning each number and the third spinner had 6 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 to other class members and interpreted the results.

Mathematics

Year 5
Above Satisfactory

Statistics and Probability – Come in spinner



Spinners Predictions

1. I think green will come up more than the other colours because there are 3 sections of green as opposed to only 1 blue, 1 purple and 1 orange. Green should be spun 3 times as much as the other colours.

2. All the colours will have an equal chance of being spun because there are 2 of each colour.

3. There are 2 sixe's and only one of each of the other numbers. You would think that there was a better chance of getting a 6 than the other numbers

Annotations

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

Acknowledgement
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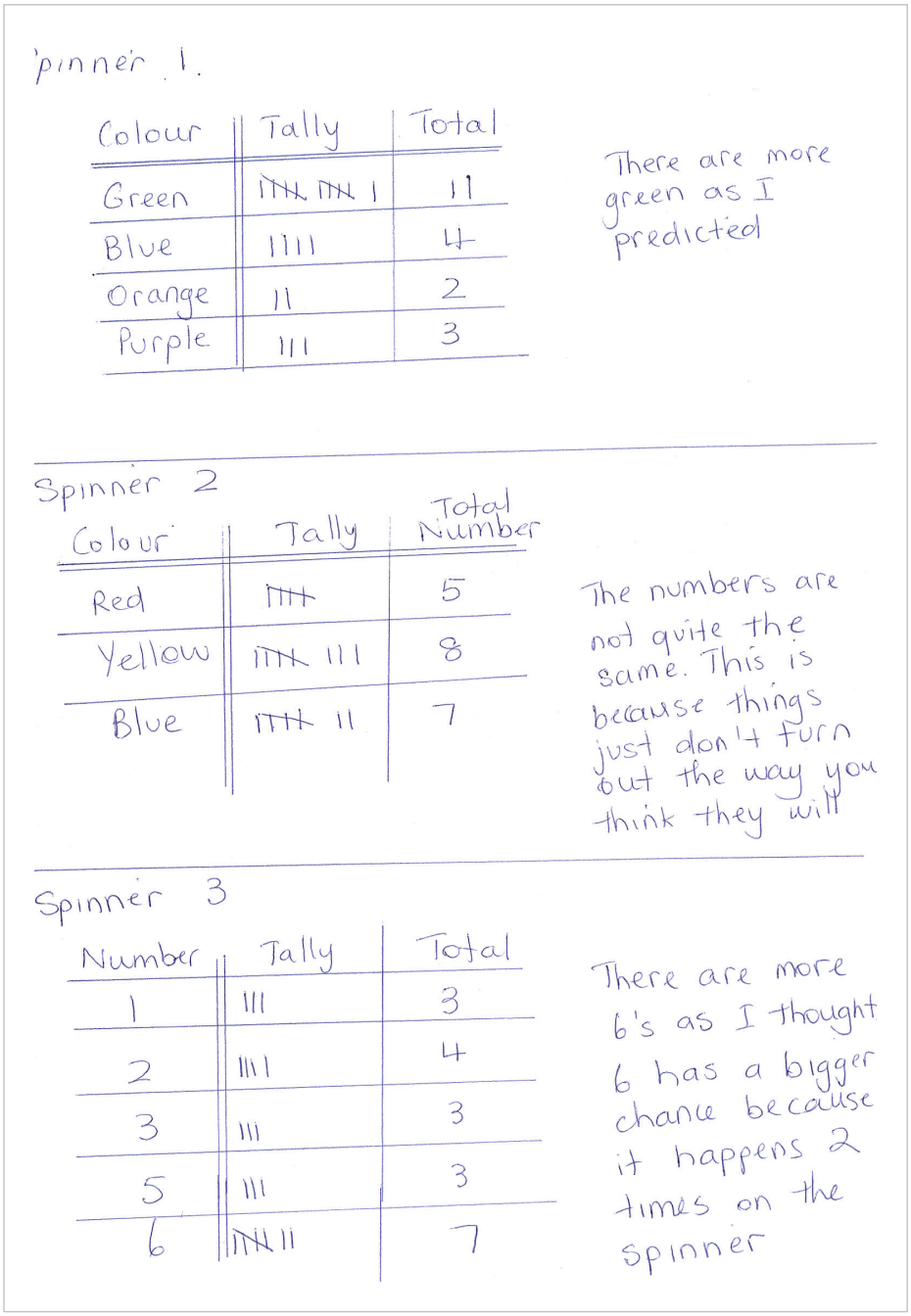
Mathematics

Year 5
Above Satisfactory

Statistics and Probability – Come in spinner



'pinner 1.

Colour	Tally	Total
Green	𝍸 𝍸 I	11
Blue	IIII	4
Orange	II	2
Purple	III	3

There are more green as I predicted

Spinner 2

Colour	Tally	Total Number
Red	𝍸	5
Yellow	𝍸 III	8
Blue	𝍸 II	7

The numbers are not quite the same. This is because things just don't turn out the way you think they will

Spinner 3

Number	Tally	Total
1	III	3
2	IIII	4
3	III	3
5	III	3
6	𝍸 II	7

There are more 6's as I thought 6 has a bigger chance because it happens 2 times on the spinner

Annotations

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

Analyses results and relates them to the chance each had of occurring.

Acknowledgement
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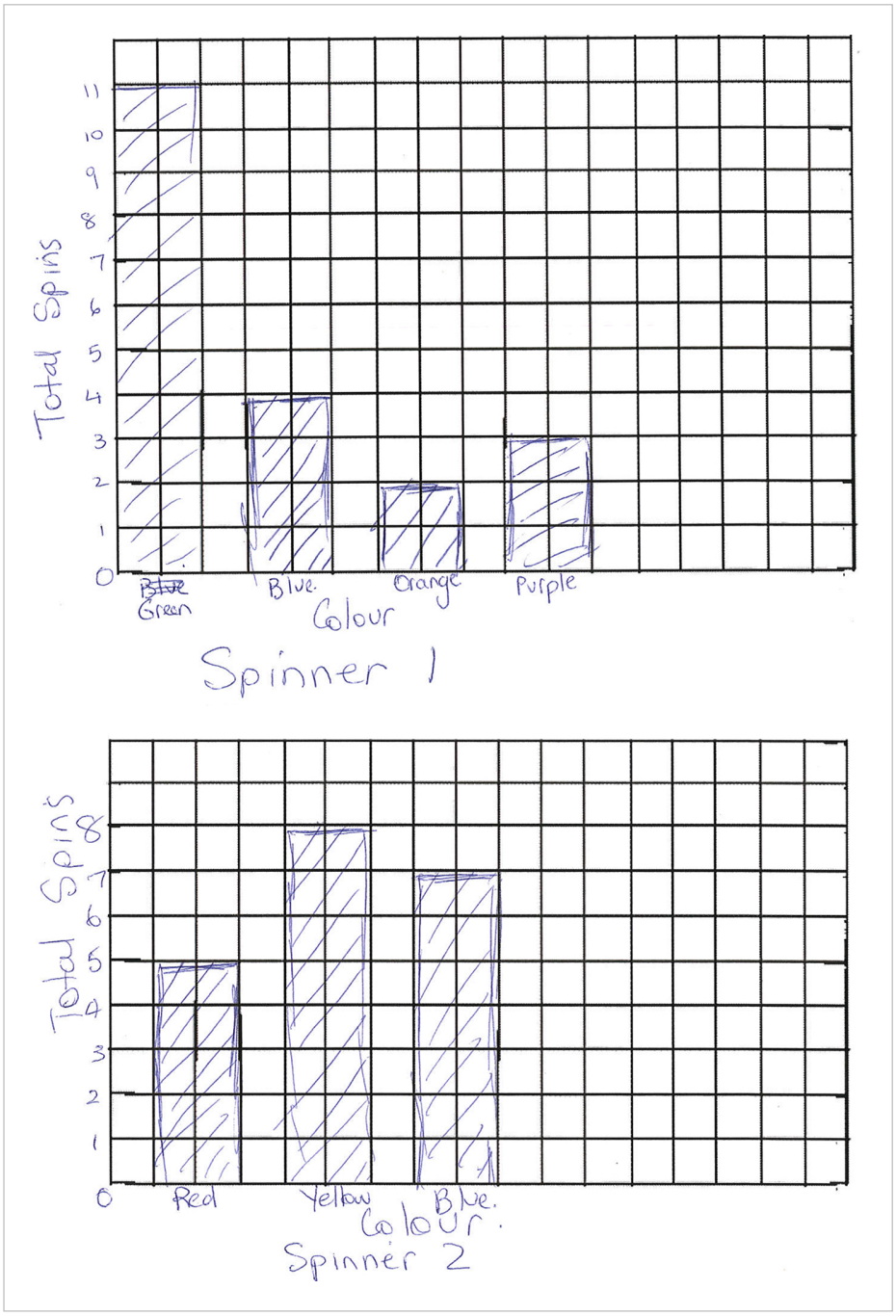
Mathematics

Year 5
Above Satisfactory

Statistics and Probability – Come in spinner



Annotations

Displays data correctly in a column graph.

Acknowledgement
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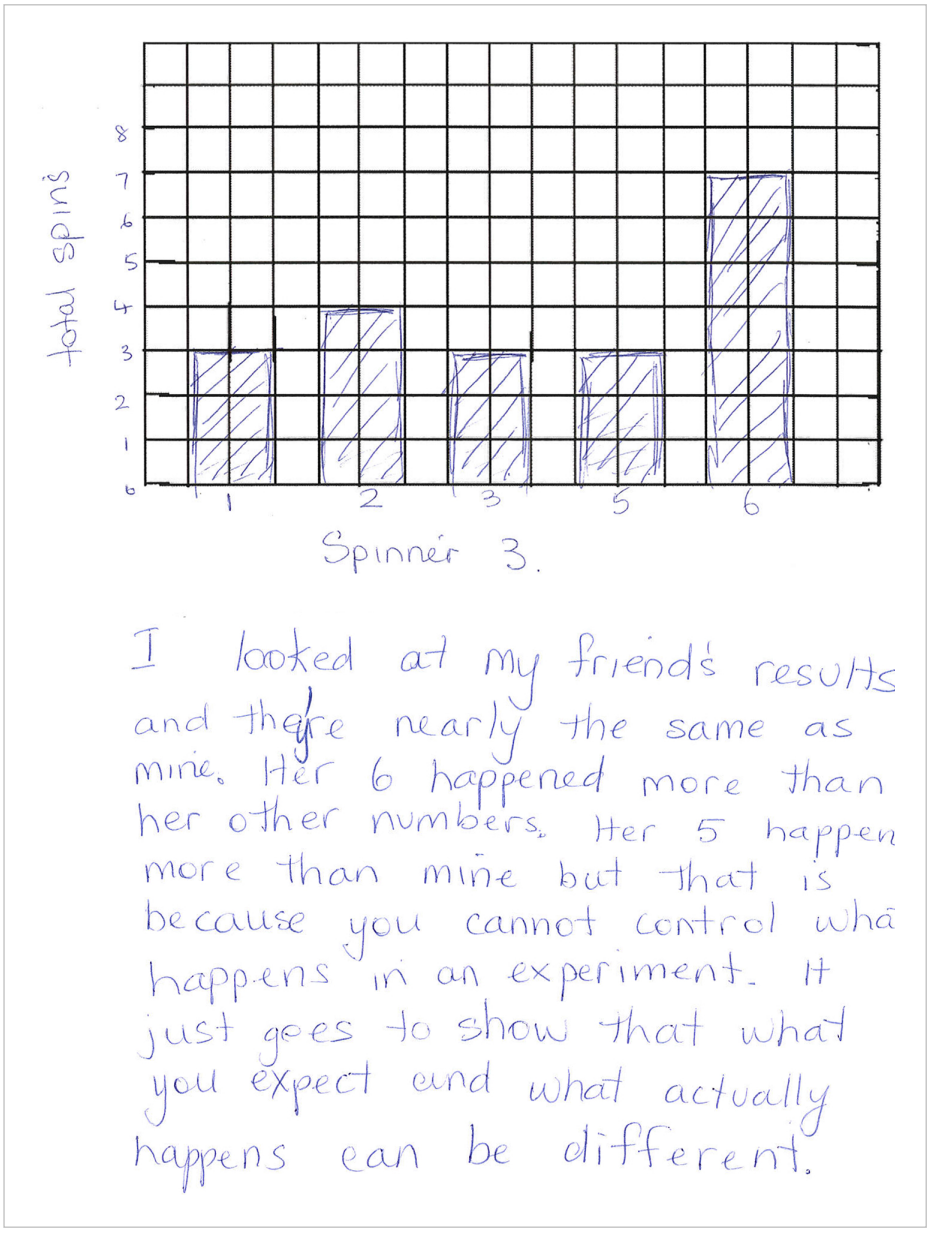
Mathematics

Year 5
Above Satisfactory

Statistics and Probability – Come in spinner



Annotations

Compares and contrasts results of chance experiments.

Acknowledgement
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