Mathematics

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 6 MATHEMATICS

This portfolio provides the following student work samples:

Sample 1   Number: Power
Sample 2   Number: How tall?
Sample 3   Number: Abstract design
Sample 4   Number: Fractions, decimals, percentages and integers
Sample 5   Number: Fifth term
Sample 6   Measurement: Area
Sample 7   Number: Calculations
Sample 8   Geometry: 3D structure
Sample 9   Number: Percentages
Sample 10   Geometry: Sam's square
Sample 11   Statistics and probability: Spinner mania
Sample 12   Measurement: Fill it up
Sample 13   Number: Brackets and the order of operations

Mathematics

This portfolio of student work demonstrates multiplying and dividing decimals by a power of 10 (WS1, WS7) and solving problems involving length and area using decimals (WS2, WS6). The student connects fractions, decimals and percentages as representations of the same value (WS3, WS4). The student describes the use of positive and negative numbers in everyday life (WS4) and calculates the discounted price of sale items (WS9). The student creates a sequence using whole numbers and fractions and explains the rule (WS5). The student performs calculations with whole numbers and decimals using all four operations (WS7). The student draws nets and constructs a prism and a pyramid (WS8) and plots points on a Cartesian plane (WS10). The student uses reasoning to report probability using fractions, percentages and decimals (WS11). The student calculates the volume and capacity of a container (WS12) and creates number sentences using the order of operations and brackets (WS13).

Mathematics

Number: Power

Year 6 Mathematics achievement standard

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

By the end of Year 6, students recognise the properties of prime, composite, square and triangular numbers. They describe the use of integers in everyday contexts. They solve problems involving all four operations with whole numbers. Students connect fractions, decimals and percentages as different representations of the same number. They solve problems involving the addition and subtraction of related fractions. Students make connections between the powers of 10 and the multiplication and division of decimals. They describe rules used in sequences involving whole numbers, fractions and decimals. Students connect decimal representations to the metric system and choose appropriate units of measurement to perform a calculation. They make connections between capacity and volume. They solve problems involving length and area. They interpret timetables. Students describe combinations of transformations. They solve problems using the properties of angles. Students compare observed and expected frequencies. They interpret and compare a variety of data displays including those displays for two categorical variables. They evaluate secondary data displayed in the media.

Students locate fractions and integers on a number line. They calculate a simple fraction of a quantity. They add, subtract and multiply decimals and divide decimals where the result is rational. Students calculate common percentage discounts on sale items. They write correct number sentences using brackets and order of operations. Students locate an ordered pair in any one of the four quadrants on the Cartesian plane. They construct simple prisms and pyramids. Students list and communicate probabilities using simple fractions, decimals and percentages.

Summary of task

Students had completed a unit of work on number involving multiplying decimals by multiples of powers of ten. Students were given an open-ended task to relate their reasoning skills to answer the posed problem. Students were given one class lesson to complete the task.

Mathematics

Year 6
Above satisfactory

Number: Power

Annotations

Year 6 Mathematics Task 2

Number and Algebra

Sam says that when you multiply 7.32 x 100, the answer is 73 200 because you add 2 zeros.

Will says that can't be right and that the answer is 732 because the decimal place moves.

Is anybody correct? yes

Will is correct but he needs more knowlidge to compleat more difficult multiplucations.

- *How do you know who is right?*

I know Will is correct because I know you move the decimal place and the O's are place Keepers.

Demonstrates an understanding that more information is required to calculate the answer.

Demonstrates an understanding of place value when multiplying decimals by a power of 10.

- *Can you try and multiply other decimals by 10, 100 and 1000 and find a pattern with the answers?*

	1,62	4.5
×10	16.2	45
×100	162	450
×1000	1620	4 500

the patten is the decimal point is moved to the right one place for each O in the number you are multipling by.

Explains in detail how to multiply multiples of powers of 10.

- *What is the rule for multiplying decimals by powers of 10?*

for each O in the number move the decimal point One place to the right if there is no decimal point in the number add one O instead.

- *Why does this rule work?*

this works because every time you times a number by 10 the digets move one place to the left in place value we use collems to demenstrate this.

Justifies the rule for multiplying by powers of 10.

Mathematics

Year 6
Above satisfactory

Number: Power

Annotations

- *Can you prove that the rule works for any decimals?*

I can prove that the rule works by getting another student to select 20 random decimals and then a power of 10 to multiply it by.

- *What do you think might happen when you divide decimals by powers of 10?*

I think a simmular thing will happen but it will go the other way. So you would take away one 0 or move the decimal point 1 place to the left.

Demonstrates a thorough understanding of multiplying decimals by powers of 10 by applying it to division.

- *Is there a rule for dividing decimals by powers of 10?*

yes there is a rule for dividing decimals by powers of 10 the rule is that you move the decimal point one place to the left for each 0 in the number.

- *Can you prove that your rule works for any decimals?*

I can prove that my rule works by getting another student to select 20 random decimals and than a power fof 10 to devide it by.

- *How can you check if you are right?*

I could check if I am right by using a calculator redo the sum or do the oppercit opperation.

Understands the use of technology to check calculations.

Mathematics

Number: How tall?

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Summary of task

Students had completed a unit of work on decimals and their connection to the metric system. They had solved problems involving length and area using decimals. Students were asked to use their reasoning skills combined with their mathematical knowledge to solve several problems. They were given one lesson to complete the task as an assessment at the end of the unit.

Mathematics

Number: How tall?

Year 6 Mathematics Task 3

Annotations

Measurement and Geometry

Task 3 (a)

Rachel is taller than 140 cm and shorter than 150 cm.

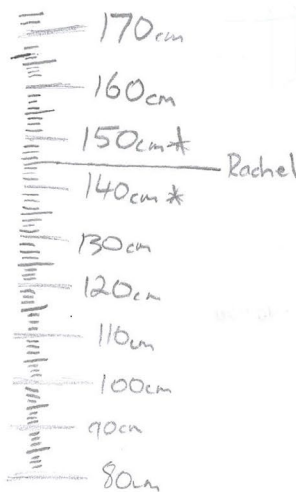*Daniel is 22 cm taller than Rachel.*

Adam is 5 ½ cm shorter than Daniel.

How tall could each of the three friends be in metres?

R 140 — 150
D +22
A — 5.5

Rachel — 1.45m
Daniel — 1.67m
Adam — 1.615m

Calculates answer based on given information.

Calculates height in metres after considering given information.

170cm
160cm
150cm ✳
140cm ✳ — Rachel
130cm
120cm
110cm
100cm
90cm
80cm

- *Are there any other possibilities?*

Yes! Because Rachel could be anywhere from 140 – 150cm there could be many different answers. e.g

R 1.41m	1.415m	1.42 m
D 1.63m	1.635m	1.64 m	ect.
A 1.575	1.58	1.585 m

Calculates all possibilities by demonstrating the rule.

Mathematics

Number: How tall?

Task 3(b)

The area of a rectangle is 30.75 cm².

What could the side lengths be?

10.25×3

- *Are there any other possibilities?*

30.75×1

15.375×2

6.15×5

etc.

- *How do you know you are right?*

Because I found the factors of 30.75 cm² from there I answered the question.

Annotations

Calculates four sets of possible dimensions of a rectangle from a given answer.

Demonstrates an application of a mathematical strategy to solve a problem.

Mathematics

Number: Abstract design

Year 6 Mathematics achievement standard

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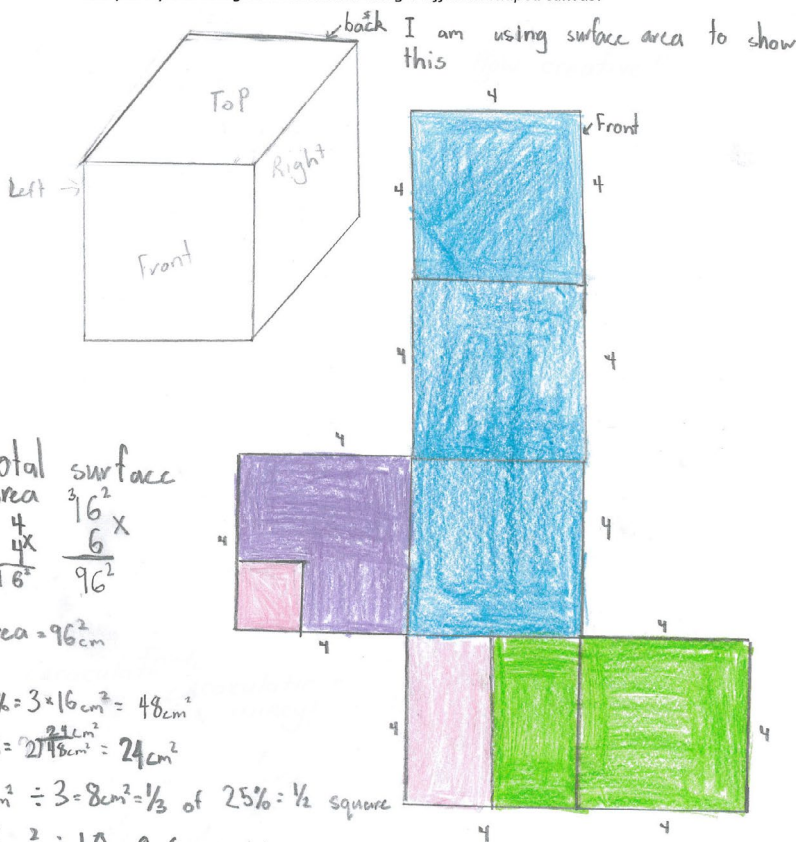
Summary of task

Students had completed a unit of work on equivalent fractions, decimals and percentages. Students were asked to create an abstract design, dividing it into percentage parts and demonstrating a connection with fractions and decimals. Questions were written for the students to help them direct their mathematical thinking.

Mathematics

Number: Abstract design

Annotations

Can you create an abstract design that is 50% blue, 25% green, 15% purple and 10% pink?

What shape might be best for your design?
Can you express your percentages as fractions and decimals?
How do you know that you are right?
Can you try and design another mural using a different shaped canvas?

Calculates the surface area of a cube.

Uses calculations to accurately divide a net into percentages.

Calculates the area of each percentage in a net.

Uses appropriate units to make calculations.

Uses equations to justify and solve problems.

Mathematics

Year 6
Above satisfactory

Number: Fractions, decimals, percentages and integers

Year 6 Mathematics achievement standard

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Summary of task

Students completed a unit of work on fractions, decimals, percentages and the connections between them. They also investigated positive and negative numbers in everyday contexts.

Students were given a task to assess their understanding that consisted of two parts:

Part 1: Select two fractions, determine which one has the larger value and explain why.

Part 2: Select three positive numbers and three negative numbers, place them on a number line and use <, >, = to create number sentences with them.

Mathematics

Year 6
Above satisfactory

Number: Fractions, decimals, percentages and integers

Annotations

Select 2 fractions with different denominators and a numerator which is greater than 1.
(Eg. ⅔ and ⅘)
Which is larger?

How can you prove you are right?
Can you rename any of your fractions as decimals and/or percentages?

3/4   4/6   3/4 = 75%   2/3
0.75   4/6 = 66.6%

3/4 > 4/6

3/12   3/7
3/12 = 1/4 = 0.25   3/7 = 42.9%
25%

3/7 > 3/12

4/11   5/15
4/11 = 36.36%   5/15 = 33.3%

4/11 > 5/15

Simplifies fractions.

Represents fractions as percentages and decimals.

Draws two rectangles of equal length, aligned at the ends and divides them into six and four equal parts respectively so that a clear comparison of the relative fraction size can be shown.

Compares fractions by considering their percentage equivalents.

Uses mathematical symbol (>) to record comparisons of relative size.

Uses mathematical symbol (>) to record comparisons of relative size.

Mathematics

Number: Fractions, decimals, percentages and integers

Annotations

Select 3 positive integers and 3 negative integers and place them all on a number line.
Can you use <, > and = to create some true sentences using some of your integers?
(Eg. 3 > -2)

1. How do you know where to place your numbers on the number line?
2. Why does 0 hold a place on a number line?
3. When do we use negative integers in real life? Can you describe what some of these mean?

Integers.

$-3 < 5$ 5 is bigger than -3

$-5 < 1$ 1 is bigger than -5

$-4 < 2$ 2 is bigger than -4

$1 < 1$

$-4 < -3$ -3 is bigger than -4

$-2 < -1$ -1 is bigger than -2

$-3 > -5$ -3 is bigger than -5

2. it holds a place on the number line because it goes from 10 down on right and than to 0 than it keeps going down to negative 0 is bigger than -1.

3. When we are in dept, temputers, bank, when you are in dept say you have negative $26.

In temputers because like in the snow it goes minus degrees.

$5 - 10 = -5$
$6 - 12 = -6$
$10 - 23 = -13$
$11 - 19 = -8$
$17 - 100 = -93$
$9 - 12 = -3$

$14 - 17 = -3$
$8 - 15 = -7$
$13 - 19 = -6$
$15 - 18 = -3 ✓$
$37 - 40 = -3,$

$-5 + 9 = 4$
$-20 + 30 = 10$
$-10 + 12 = 2$
$-6 + 8 = 2$
$-4 + 10 = 6$
$-1 + 15 = 14$

$-2 + 3 = 1$
$-6 + 13 = 7$
$-9 + 10 = 1$
$-11 + 20 = 9$
$-15 + 22 = 5$
$-19 + 24 = 5$

Identifies positive numbers as being bigger than negative numbers.

Describes the place of 0 on a number line that includes positive and negative numbers.

Correctly compares pairs of negative numbers.

Describes how negative numbers are used in everyday contexts.
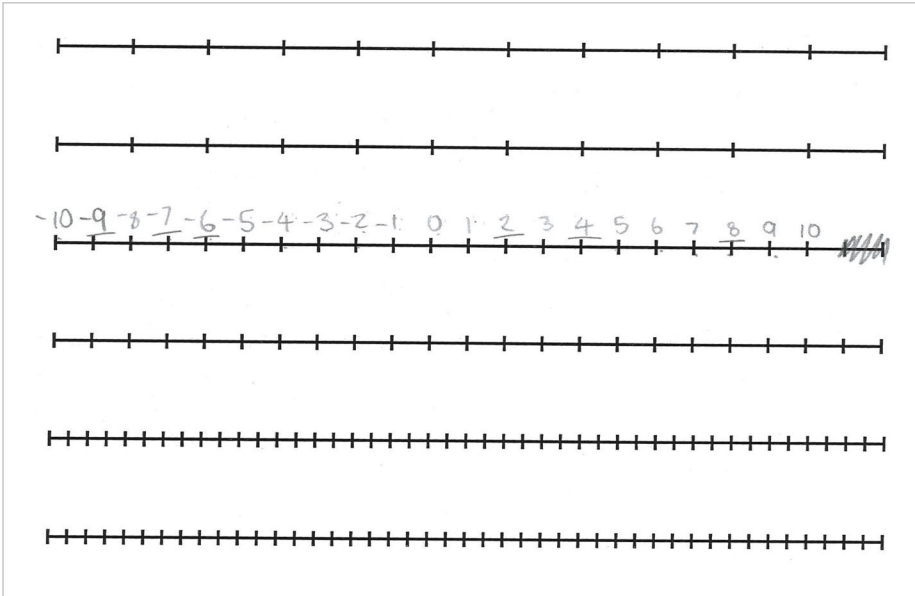
Locates integers on a number line.

Writes number sentences.

Mathematics

Number: Fractions, decimals, percentages and integers

Annotations

~10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Constructs a number line with positive and negative numbers.

Mathematics

Number: Fifth term

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Summary of task

Throughout the term students had completed several units of work, one on the addition and subtraction of fractions with different denominators and another on creating and identifying patterns in number sequences. Students were given the following question as an assessment of concepts at the end of both units of work.

> Kate created a subtraction pattern using fractions with different denominators. If the fifth term in Kate's pattern was 1, what could her pattern look like?

The teacher asked the following questions to guide students through their thinking and working:

- What is the rule for your pattern?
- How did you work it out?
- What other patterns can you create where 1 is the fifth term?
- Can you convert any of your fractions to decimals?

Mathematics

Number: Fifth term

Annotations

Creates a subtraction pattern involving mixed numbers and proper fractions with denominators that are multiples of three.

Writes all terms of the pattern in simplest form.

Demonstrates understanding of equivalent fractions and uses them to record the formation of the pattern.

Mathematics

Measurement: Area

Year 6 Mathematics achievement standard

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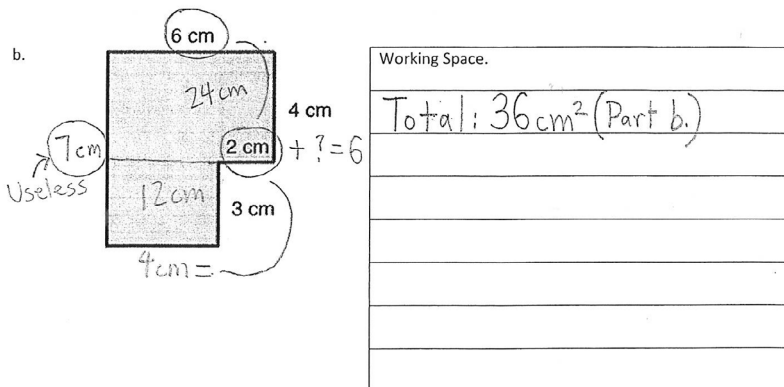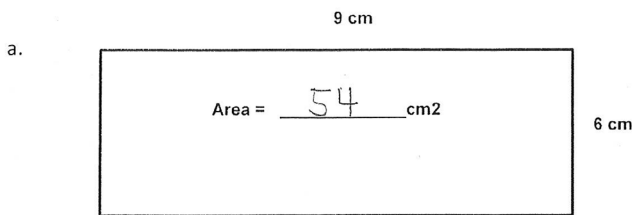
Summary of task

Students had started a unit of work on calculating the area of rectangles. The task was used to assess understanding during the unit so that it could be used to guide the next phase of teaching.

The students were required to calculate the area of rectangles and explain their thinking when calculating an area that could be split into rectangles. The students were asked to complete the task in 10 minutes.

Mathematics

Measurement: Area

Calculate the area of the following shapes.

a.

9 cm

Area = _54_ cm2

6 cm

Annotations

Calculates the area of a rectangle.

b.

6 cm

24 cm

7 cm
Useless

2 cm) + ? = 6

4 cm

12 cm

3 cm

4 cm =

Working Space.

Total: $36\,cm^2$ (Part b.)

Calculates unknown side lengths and realises that some are not required to answer the question.

Partitions a composite shape into rectangles in order to find its area.

Explain how you solved the problem above.

First, I looked at the shape and found out that there was 2 sides with unknown centimetres. There was clues to help me find the missing parts, though. Then I chose a spot to change the irreglur shape to 2 reglur shapes. After that, I times(×) the length and the width for both shapes, then I added them together and I got the answer.

Clearly explains the process of calculating the area of a composite shape.

Mathematics

Number: Calculations

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Summary of task

Students had completed several units of work involving problem-solving with addition, subtraction, multiplication and division of whole numbers and decimals. Students on this occasion were given a formal pen and paper test that covered many of the concepts in the unit. They were required to estimate answers and demonstrate their thinking, using addition, subtraction, multiplication and division in single and multi-step problems.

Mathematics

Number: Calculations

Solve these problems.

Addition

a.
$$
\begin{array}{r}
^1 4\ 7\ .\ 2 \\
+\ 2\ 6\ .\ 0\ 7 \\
\hline
7\ 3\ .\ 2\ 7
\end{array}
$$

b.
$$
\begin{array}{r}
^1 4\ ^1 5\ .\ ^1 7\ 8 \\
+\ 3\ 6\ .\ 5\ 5 \\
\hline
8\ 2\ .\ 3\ 3
\end{array}
$$

Subtraction

a.
$$
\begin{array}{r}
\ ^3 \\
4\ ^1 2\ .\ 5 \\
-\ 3\ 4\ .\ 4 \\
\hline
8\ .\ 1
\end{array}
$$

b.
$$
\begin{array}{r}
\ ^5 \\
8\ 6\ .\ ^1 2 \\
-\ 3\ 4\ .\ 6 \\
\hline
5\ 1\ .\ 6
\end{array}
$$

Multiplication

a.
$$
\begin{array}{r}
^2 3\ .\ 7 \\
\times\ \ \ \ 4 \\
\hline
1\ 4\ .\ 8
\end{array}
$$

b.
$$
\begin{array}{r}
^2 2\ ^3 4\ .\ 5 \\
\times\ \ \ \ \ 6 \\
\hline
1\ 4\ 7\ .\ 0
\end{array}
$$

Division

a.
$$
8\ \overline{)\ 8\ 5\ .\ 6\ }\quad 1\ 0\ .\ 7
$$

b.
$$
5\ \overline{)\ 4\ 7\ .\ ^2 0\ }\quad 0\ 9\ .\ 4
$$

Multiply these decimals by 10, 100 and 1000. Estimate first.

	×10	×100	×1000
0.5	5	50	500
0.25	2.5	25	250
0.37	3.7	37	370
1.2	12	120	1200
7.34	73.4	734	7340

Divide these numbers by 10, 100 and 1000. Estimate first.

	÷10	÷100	÷1000
50	5	0.5	0.05
25	2.5	0.25	0.025
37.2	3.72	0.372	0.0372
48.5	4.85	0.485	0.0485
542	54.2	5.42	0.542

Annotations

Calculates addition and subtraction problems involving decimals.

Performs calculations involving the multiplication of decimals by whole numbers.

Calculates answers to problems involving the division of decimals by whole numbers.

Uses knowledge of powers of 10 to multiply and divide decimals.

Mathematics

Number: Calculations

For the following operations you are required to complete three steps.

1. Estimate an answer and explain how you arrived at your estimate.
2. Calculate an answer.
3. Comment on whether your answer appears reasonable.

Addition

a.

1 cola	$2.80
1 lime milkshake	$3.25
4 dim sims	$4.80
3 crab cakes	$2.60
Total	13.45

My estimate is $13

How did you get your estimate?

because I used the 'frontline' strategy, and adjusted my answer up a bit because 3 of the numbers would round up, and 2+3+4+2=11. So I estimated $13.

Is your answer reasonable? Explain

Yes, I believe my answer is reasonable because there is a fraction of difference between my estimate and my answer (45c to be exact).

Subtraction

b. What is the difference between 3.4 and 7.171?

$$7.171 - 3.400 = 3.771$$

My estimate is 3.5

How did you get your estimate?

I looked logically at the problem and saw 7-3, which is 4, but in the tenths collum the top number is lower than the bottom, so I'd have to 'borrow'.

Is your answer reasonable? Explain.

Yes, my answer is reasonable because between my estimate and my answer, there is a minimal difference of .271, so I believe my answer is reasonable

Annotations

Provides estimations when calculating with decimals.

Describes strategies used in estimating the calculation of decimals.

Calculates the addition of numerous decimals.

Compares estimations and calculated answers to check reasonableness of answers.

Uses a range of strategies suitable to the operation to estimate calculation of decimals.

Mathematics

Number: Calculations

c. Multiplication

$$\overset{6\ \ 5\ \ 3}{1\ 8\ .\ 7\ 5}$$
$$\underline{\times \qquad 7}$$
$$1\ 3\ 1\ .\ 2\ 5$$

My estimate is 135

How did you get your estimate?

because I rounded 18.75 to 20, and 20 × 7 = 140, but I adjusted my answer down because I rounded up, so 140 would be too high.

Is your answer reasonable? Explain.

Yes, I do think my answer is reasonable since the marginal difference between the two numbers is only approximately 4.

d. Division

0 2 5 8 . 7 5
8) 2 0⁴7 7 0 . ⁶0 ⁴0

My estimate is 269

How did you get your estimate?

I got this by thinking that 8 goes into '2000' 250 times, and it goes into 70 just under nine times, so I rounded the last digit (the 'ones' digit) to 9.

Is your answer reasonable? Explain.

I believe my answer is reasonable because the difference between the two numbers is a quarter of a whole number, or .25.

Annotations

Multiplies a decimal by a single-digit whole number.

Justifies estimation by explaining appropriate mathematical thinking.

Divides a four-digit whole number by a single-digit whole number to obtain a decimal answer.

Estimates and explains mathematical thinking.

Mathematics

Number: Calculations

Annotations

You and your friends are going to the movies and it's your shout. Look at the price list below and use a multiplication strategy of your choice to answer the following questions. Show your thinking:

a How much will it cost you for 4 "Under 13" tickets?

$(10 \times 4 = 40) + (.50 \times 4) = \$42$

$\$42$

Records calculations.

Solves everyday multiplication problems involving decimals.

Ticket prices

Under 13	$10.50
Adult	$14.50

Refreshments

Popcorn	S	$2.50
	M	$3.50
	L	$4.50
Drink	S	$2.50
	M	$3.00
	L	$3.50
Chocolate bar		$1.95
Choc top		$3.25
Water		$1.95
Chips/Crisps		$2.95

b Two of your friends each want a large drink and a medium popcorn. What will that cost you?

$3.50 \times 4 = \$14.00$

$\$14.00$

c You and your other friend want a choc top and a large drink each. What will that cost?

$(3.50 \times 2) + (3.25 \times 2) = \$13.50$

$\$13.50$

Records number sentences using brackets and calculates answer using order of operations.

d Halfway through the movie, you are all dying of thirst and you go out and buy 4 bottles of water. You pay for them with a $20 note. How much change do you receive?

1.95×4
$\$7.80$

$\$20.00 - 7.80 = 12.20$

$\$12.20$

Solves problems requiring multiple steps and operations.

Mathematics

Geometry: 3D structure

Year 6 Mathematics achievement standard

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

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Students locate fractions and integers on a number line. They calculate a simple fraction of a quantity. They add, subtract and multiply decimals and divide decimals where the result is rational. Students calculate common percentage discounts on sale items. They write correct number sentences using brackets and order of operations. Students locate an ordered pair in any one of the four quadrants on the Cartesian plane. They construct simple prisms and pyramids. Students list and communicate probabilities using simple fractions, decimals and percentages.

Summary of task

Students had completed a unit of work on shape that involved constructing nets, three-dimensional objects and identifying two-dimensional shapes within three-dimensional objects.

The task was given to the students the week after they had finished the unit of work to assess their knowledge of three-dimensional objects. Students were asked to construct the net of a prism and a pyramid and create the object using straws. This task took several lessons to complete.
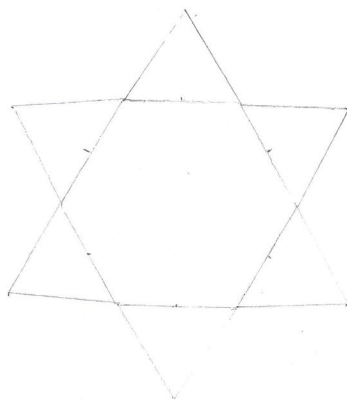
Australian CURRICULUM

Mathematics

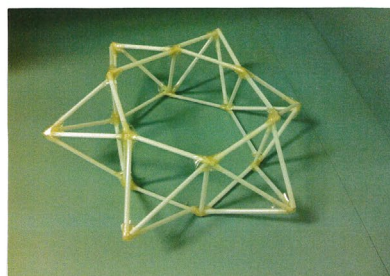## Year 6
Above satisfactory

Geometry: 3D structure

Design and build a three dimensional structure

Design your structure here

1x hexagonal prism.
6x square based pyramids.

Add a photo of your completed structure here

Describe the design features of your structure here

I made a star using 9.75cm straws to make one hexagonal prism and six square based pyramids.
My shape can be used as a big christmas tree decoration.

Annotations

Identifies the number and type of three-dimensional objects to make their structure.

Constructs a complex three-dimensional object using a prism and pyramids.

Designs a plan to construct a three-dimensional object.

Accurately measures length of straws.

Identifies uses for the three-dimensional object.

Mathematics

Number: Percentages

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Summary of task

Students had completed several units of work on fractions, decimals and percentages. One component was to calculate percentages of whole numbers, typically using shopping items on sale. Students were given the task to complete during a lesson.

Mathematics

Number: Percentages

6. Explain how you would calculate 20% of 250.

I method

1. $20 = \frac{1}{5}$, $250 \div 5 = 50$
2. $20 = \frac{2}{10}$, $250 \div 10 \times 2 = 50$
3. $20 = \frac{20}{100}$, $250 \div 100 \times 20 = 50$

7. Calculate the discounted prices for these items.

a	b	c	d	e
10% off	25% off	75% off	20% off	50% off
$300	$200	$120	$50	$60
$ 270	$ 150	$ 30	$ 40	$ 30

$$4\overline{)120} \;\; \frac{30}{} \qquad 30 \times 3 = 90 \qquad 120 - 90 = 30$$

Annotations

Explains how to calculate a common percentage of a quantity by describing three methods.

Calculates the amount of sale discount using common percentages.

Shows mathematical working to calculate the discounted price of an item.

Mathematics

Geometry: Sam's square

Year 6 Mathematics achievement standard

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Summary of task

Students had completed a unit of work on integers and coordinates on the Cartesian plane. At the end of the unit they were given the task to complete during one lesson.

Teacher questioning with task:

- Are there other possibilities?
- Is there a pattern in your answers?
- How will you record your responses?
- What if he created other types of quadrilaterals? What would the coordinates be?

Mathematics

Geometry: Sam's square

Sam plotted one point in each quadrant of a Cartesian plane. When he drew lines joining the points, they formed a square. What could the coordinates be?

The first square is $(1,1)(1,-1)(-1,1)(-1,-1)$ then you can relate square number thinking, So there is a pattern you increase the number by one on each axis and the coordinates all have to be the same.
Other quadrilaterals can be plotted my rectangle is $(3,1)(3,-1)(-3,1)(-3,-1)$.
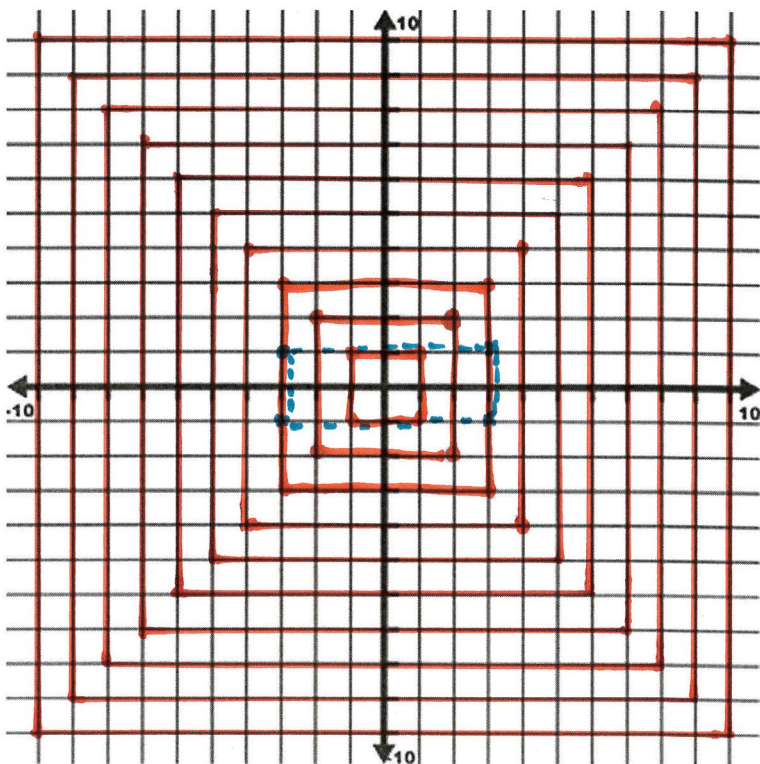
Annotations

Calculates the coordinates for a square on the Cartesian plane.

Relates mathematical knowledge to explain the pattern.

Plots a rectangle on a Cartesian plane.

Plots squares on a Cartesian plane.

Mathematics

Statistics and probability: Spinner mania

Year 6 Mathematics achievement standard

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Summary of task

Students had completed lessons on relating probability to fractions, decimals and percentages so they could calculate the theoretical probability of an event occurring.

Students were asked to create a spinner using colours so that the colours had an unequal chance of occurring when it was spun. They were asked to calculate the probability of each colour being spun and then spin the spinner a number of times and record the observed frequency of each colour. Students were asked to graph the expected results and the observed results and then compare and explain any differences.
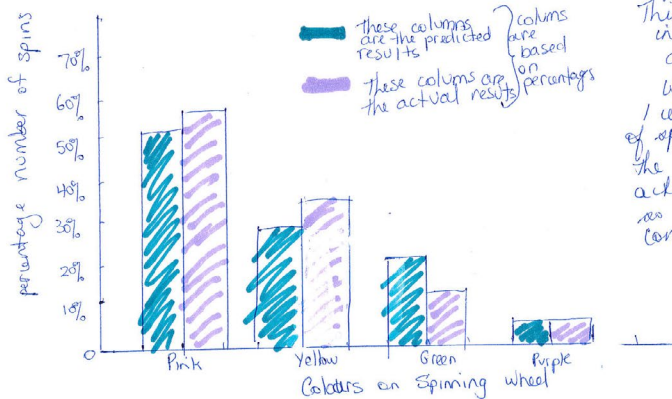
Mathematics

Statistics and probability: Spinner mania

Annotations

Describes probability using percentages.

Connects percentages, fractions and decimals.

Calculates a percentage and decimal from the results of a chance experiment.

Uses tally marks to record results of chance experiment.

Explains the results of compared expected frequencies with observed frequencies.

Draws a side-by-side column graph to compare expected frequencies with observed frequencies.

Mathematics

Statistics and probability: Spinner mania

Annotations

Mathematics

Measurement: Fill it up

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Summary of task

Students were asked to explain how to measure the capacity of a snap lock bag. When they had explained their reasoning, they were asked to measure the capacity and make a connection with volume.

Mathematics

Measurement: Fill it up

FILL IT UP!

$1cm^3 = 1ml$

$1cm^3 = 1ml$

First I will fill up the plastic bag with water. I will then pour the water into a milimeter mesuring cup, to see the amount of mils that can fit in the bag. I will do that because $1ml = 1cm^3$ so the amount of milimeters igives me the amount of $1cm^3$ and that is the volume. I will check my answer by filling my bag with $1cm^3$ cubes.

$\rightarrow$ $1ml = 1cm^3$

Annotations

Explains how to measure the capacity of a snap lock bag.

Makes a connection between capacity and volume.

Draws a diagram to demonstrate how to measure the capacity and convert to the volume of a snap lock bag.

Mathematics

Number: Brackets and the order of operations

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Summary of task

Students had completed a unit of work on the order of operations and brackets. At the end of the unit, students were given an open-ended assessment task to demonstrate their understanding. The questions asked were:

- What different number sentences can you create that equal 35?
- Can you include brackets and order of operations in your number sentences?
- Can you explain the rules for the order of operations?
- Can you now try and create number sentences that equal 11?
- How do you know each of your number sentences is right?
- Can you use any decimals?

Mathematics

Number: Brackets and the order of operations

What different number sentences can you create that equal 35?

$$15 + 20 = 35$$
$$60 - 25 = 35$$
$$70 - 35 = 35$$
$$20 + 5 + 10 = 35$$
$$5 \times 7 = 35$$
$$((3 \times 2) + 1) \times 5 = 35$$

Can you include brackets and order of operations in your number sentences? Yes

$$\left(\left((7 \times 9) + 1\right) \div 2\right) + 3 = 35$$

Can you explain the rules for order of operations?

In the rules of operation is that you always start with the number sentence in the brackets, followed by division, multiplication, then addition and substraction.

Can you now try and create number sentences that equal 11?

$$6 \times 2 - 1 = 11$$
$$7 \times 7 - 6 \times 8 + 10 = 11$$

How do you know each of your number sentences is right?

You can double check by working backwards or just redo the number sentence again.

Can you use any decimals?

Yes

$$1.5 \times 2 = 3$$

$$0.33333° \times 3 = 0.99999°$$

Annotations

Generates number sentences using a range of different operations.

Demonstrates understanding of the use of brackets and the order of operations when constructing number sentences involving several different operations.

Uses multiple pairs of nested brackets to indicate the order in which operations must be performed in the number sentence.

Explains the order of operations.

Understands that multiplication needs to be performed before addition and subtraction even though brackets are not used to indicate this.

Explains strategies to check that working is correct.

Multiplies a decimal by a one-digit number.

Indicates knowledge of the concept of a recurring decimal.