

Mathematics

WORK SAMPLE PORTFOLIOS

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

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

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

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

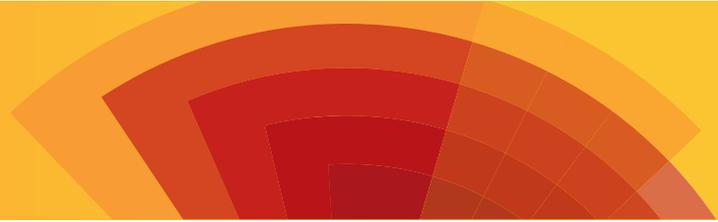
As the Australian Curriculum in English, Mathematics, Science and History is implemented by schools in 2012, the work sample portfolios will be reviewed and enhanced by drawing on classroom practice and will reflect a more systematic collection of evidence from teaching and learning programs.

THIS PORTFOLIO – YEAR 7 MATHEMATICS

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

Sample 1	Chance – Come in spinner
Sample 2	Data representation – Stem-and-leaf plots
Sample 3	Geometric reasoning – Angles
Sample 4	Algebra – Solving equations
Sample 5	Financial transactions – Percentage changes in prices
Sample 6	Real numbers – Let's talk about fractions and decimals
Sample 7	Exploring number patterns – A waiter's nightmare
Sample 8	Units of measurement – Perimeter, area and volume
Sample 9	Measurement and geometry – Classifying Triangles and quadrilaterals

Mathematics



This portfolio of student work shows an ability to use fractions, decimals and percentages and to solve problems (WS5, WS6). The student represents numbers using variables (WS7), represents points on the Cartesian plane and linear relationships using algebra (WS4). The student uses formulas for area, perimeter and volume (WS8) and uses the relationships in angles formed when a transversal crosses two parallel lines (WS3). The student determines the sample space for simple experiments with equally likely outcomes, assigns probabilities to those outcomes and constructs stem-and-leaf plots (WS2). The student classifies triangles and quadrilaterals (WS9).

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

- *solve problems involving the comparison, addition and subtraction of integers*
- *make the connections between whole numbers and index notation and the relationship between perfect squares and square roots*
- *solve problems involving all four operations with decimals*
- *connect the laws and properties for numbers to algebra*
- *describe different views of three-dimensional objects*
- *represent transformations in the Cartesian plane*
- *identify issues involving the collection of continuous data*
- *describe the relationship between the median and mean in data displays*
- *calculate mean, mode, median and range for data sets.*

Mathematics

Work sample 1: Come in spinner

Relevant parts of the achievement standard

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

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Summary of task

Students have been exploring devices and trials that produce equally likely outcomes including spinners, dice, marbles in bags, cards, etc. They have had experience in designing tasks and questions to achieve given goals. Students complete the task over two lessons.

In class, students created their own spinner and recorded the results of 50 spins. They discussed the results and provided reasons for the difference between the predicted outcomes and the actual results. They assigned probabilities to outcomes.

Mathematics

Work sample 1: Come in spinner

CHANCE:

Sample spaces for single-step experiments with equally likely outcomes. Assign probabilities to the outcomes of events and determine probabilities for events

7. i) You are to design a spinner with equally-likely outcomes. **With a minimum of 4 outcomes.** Draw it below in the space provided. Be creative. Explain design your reasoning – you must state the **SAMPLE SPACE!!**

Key:
● = Sharp Pencil as Spinner

I chose a square because it had 4 equal triangles. Therefore it could be 4 equally likely outcome placement.

ii) Make your spinner - Use the coloured paper provided or whatever you desire – to assist.

**** PLEASE REMEMBER to hand it up with your assignment sheets.**

iii) With your spinner, you are to spin it **50** times. Record this below in the frequency table.

Outcome spun on spinner	Tally	Frequency
Tea		11
Coffee		16
Soft Drink		17
Water		6
	Total Frequency:	50

Annotations

Designs a tool that when used has 4 equally likely outcome.

Identifies the resulting sample space.

Mathematics

Work sample 1: Come in spinner

iv) What was most frequently spun outcome? Was there any bias to your spinner that may have assisted this outcome? EXPLAIN with reasoning.

The most frequently spun outcome was soft drink beating coffee by one spin. I do believe there was some mistakes in getting my data, because my spinner was made out of paper and my fan in my room near my desk kept forcing air near the end of my desk giving 3 of my outcomes a better chance.

v) With your results, assign probabilities to the outcomes on your spinner.

Prob (of outcome) = No. of outcomes where event occurs / total no of outcomes

(Remember to include each outcome on your spinner!!)

Water: lin 6 chance (1/5) (11/50)
Tea lin 4 chance (1/4) 16/30
Coffee lin 3 chance (1/3) 17/40
Soft Drinks lin 3: (1/2) (6/30)

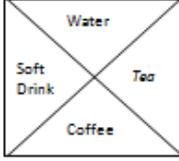
Annotations

Uses their calculations to state probabilities.

Mathematics

Work sample 1: Come in spinner

vi) With your spinner design, adjust this to illustrate the following. Draw this in the space provided and how it results in this outcome.

Probability of outcome	Spinner adjusted with outcomes and explanation
<p>Certain</p> 	 <p>4/4 are tea</p> <p><u>As all outcomes are tea you are certain to flip 4</u></p>
<p>Equal</p> 	 <p>2/4 are water</p> <p><u>There are 2 outcomes so you have equal probability</u></p>
<p>Impossible</p> 	 <p>0/4 are juice</p> <p><u>There are no outcomes for juice so it is impossible</u></p>

vii) With the above changed spinners what are the SAMPLE SPACE for the above

- i) **CERTAIN** Tea
- ii) **EQUAL** Water/Coffee
- iii) **IMPOSSIBLE** Tea/Soft Drink/Coffee/Water

Annotations

Calculates the probability events that are certain, equally likely or impossible.

Uses fractions to demonstrate the probability.

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Work sample 2: Data representation stem and leaf plots

Relevant parts of the achievement standard

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

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Summary of task

Students have been exploring how to sample to collect data and how to record and present it and then interpret it including stem-and-leaf plots. They have discussed issues about rounding continuous measurements.

Students were asked to complete a task requiring them to construct a stem-and-leaf plot.

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Work sample 2: Data representation stem and leaf plots

Here is some more data that I collected from various people in my community and their ages.

32, 54, 76, 21, 11, 34, 56, 78, 87, 65, 43, 1, 27, 34, 89, 50, 47, 34, 35, 39, 20, 18, 26, 35, 48, 62, 99, 53, 23, 26, 90, 84, 63, 51, 36, 30, 27, 23, 38, 40, 18, 14, 2, 11, 13, 28, 1, 21, 27, 39, 29, 48, 71, 27, 34, 36, 20, 58, 54, 73, 51, 29, 42, 82, 41, 30, 29, 51, 28, 30, 51, 81, 90, 1, 62, 41, 72, 93, 52, 88, 12, 27, 35, 44, 41, 26, 50, 73, 15, 33, 3, 45, 69, 7, 41, 36, 72, 11, 35, 37, 39, 44, 51, 31, 36, 44, 52, 5, 44, 56, 32, 12, 22, 34, 78, 90, 9, 67, 54, 22, 34, 10, 3, 45, 56, 67, 7, 81, 28, 29, 22, 10

i) What type of data is this? Continuous or (Discrete) Circle the correct one.

ii) Place the above data (of ages) into the below stem-and-leaf plot

STEM	LEAF
0	1, 1, 2, 3, 3, 5, 7, 7, 9
1	0, 0, 1, 1, 1, 2, 2, 3, 4, 5, 8, 8
2	0, 0, 1, 1, 1, 2, 2, 2, 3, 3, 5, 6, 6, 7, 7, 7, 7, 8, 8, 8, 9, 9, 9, 9
3	0, 0, 0, 1, 2, 2, 3, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 6, 6, 6, 6, 7, 8, 9, 9, 9
4	0, 1, 1, 1, 1, 2, 3, 4, 4, 4, 4, 5, 5, 7, 8, 8
5	0, 0, 1, 1, 1, 1, 1, 2, 2, 3, 4, 4, 4, 6, 6, 6, 8
6	2, 2, 3, 5, 4, 4, 9
7	1, 2, 2, 3, 3, 6, 8, 8
8	1, 1, 2, 4, 7, 8, 9
9	0, 0, 0, 3, 9

Annotations

Correctly constructs an ordered stem-and-leaf plot including the stem.

Acknowledgment

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

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Work sample 3: Geometric reasoning – Angles

Relevant parts of the achievement standard

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Summary of task

Students have explored the concepts of angle sizes in transversals crossing parallel lines and the associated properties. They then practised calculating angle sizes in these situations given an angle size.

Students were asked to calculate the missing angles in each diagram formed by transversal crossing a pair of parallel lines.

Mathematics

Work sample 3: Geometric reasoning – Angles

<p>alternate angles</p>	
<p>co-interior</p>	
<p>corresponding</p>	<p>straight angle</p>

Annotations

Uses properties of transversal passing through parallel to find the size of the angles contained.

Labels pairs of complementary, co-interior and alternate angles.

Demonstrates angles on a straight line have an angle sum of 180.

Acknowledgment

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Work sample 4: Solving equations

Relevant parts of the achievement standard

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

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Summary of task

Students were asked to solve a variety of linear equations in class time.

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Work sample 4: Solving equations

Question 1. Solve the following equations (2 marks each)
SHOW ALL WORKING

<p>a) $p+7=20$ $\quad -7 \quad -7$ $\therefore p=13$</p>	<p>b) $\frac{n}{4}=3$ $\quad \times 4 \quad \times 4$ $\therefore n=12$</p>
<p>c) $x-12=15$ $\quad +12 \quad +12$ $\therefore x=27$</p>	<p>d) $8p=56$ $\quad \div 8 \quad \div 8$ $\therefore p=7$</p>
<p>e) $4n=24$ $\quad \div 4 \quad \div 4$ $\therefore n=6$</p>	<p>f) $k-3=-4$ $\quad +3 \quad +3$ $\therefore k=-1$</p>

SHOW ALL WORKING

<p>a) $2a+7=13$ $\quad -7 \quad -7$ $2a=6$ $\quad \div 2 \quad \div 2$ $\therefore a=3$</p>	<p>b) $4x-9=23$ $\quad +9 \quad +9$ $4x=32$ $\quad \div 4 \quad \div 4$ $\therefore x=8$</p>
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Annotations

Accurately solves simple linear equations.

Acknowledgment

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

Mathematics

Work sample 5: Financial transactions – Percentage changes in prices

Relevant parts of the achievement standard

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

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Summary of task

Students have been working on calculating percentages and comparing percentage amounts.

As part of an assessment on financial transactions students completed two questions on percentage change with financial decisions.

Mathematics

Work sample 5: Financial transactions – Percentage changes in prices

In 2006, gold was priced at \$40 (per gram). In 2007, it rose by 10%, in 2008 it rose again by 10% and in 2009 it fell by 10%.

a) What is the price of gold at the end of 2009?

$$\begin{aligned}
 &= 0.1 \times 40 = 4 \\
 &= 40 + 4 = 44 \\
 &= 0.1 \times 44 = 4.4 \\
 &= 44 + 4.4 \\
 &= 48.4 \\
 &= 100\% - 10\% \\
 &= 90\% \\
 &= 0.9 \times 48.4 \\
 &= \$43.56 \text{ per gram}
 \end{aligned}$$

Annotations

Solves problems involving percentages.

Uses percentages and their equivalences.

Correctly uses knowledge of percentages to find the gold price at the end of 2009.

Acknowledgment

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Mathematics

Work sample 6: Real Numbers – Fractions and decimals

Relevant parts of the achievement standard

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

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Summary of task

Students were asked to complete a revision worksheet encompassing their knowledge and understanding of fractions and decimals and the relationship between the two.

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Work sample 6: Real Numbers – Fractions and decimals

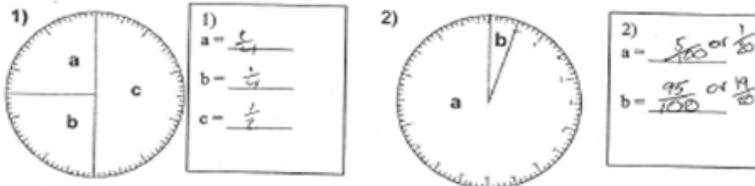
Annotations

1. Complete the table by using **fractions** and diagrams.

The first one has been done for you.

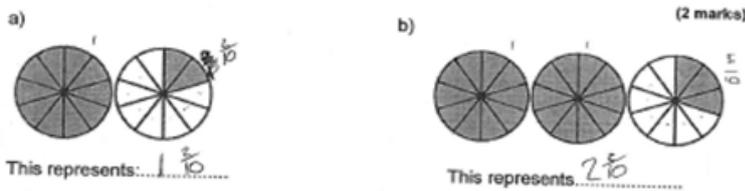
Symbols	Diagram
$\frac{1}{2}$	
$\frac{5}{8}$	
$\frac{8}{10}$	
$\frac{6}{14}$ or $\frac{3}{7}$	
$1\frac{2}{3}$	

2. Write down the **fraction** that each part of the circle represents (5 marks)



Represents and recognises pictorial representations of common fractions.

3. If a whole circle is equal to 1 whole, write the **parts of a whole** represented in each picture.



Mathematics

Work sample 6: Real Numbers – Fractions and decimals

a) $\frac{3}{4}$ of the grid b) $\frac{1}{3}$ of the clock face. c) $\frac{3}{4}$ of this shape

5. Place these fractions on the following number line.

$\frac{1}{2}$ $1\frac{1}{4}$ $\frac{7}{4}$ $\frac{5}{8}$

6. Which fraction has the **smallest** value?
Show your working to support how you made your decision

a) $\frac{2}{5}$ $\frac{1}{2}$ $\frac{3}{10}$ $\frac{1 \times 2}{2 \times 5} = \frac{2}{10}$ or $\frac{2 \times 2}{5 \times 2} = \frac{4}{10}$ or $\frac{5 \times 2}{10}$ or $\frac{4}{10}$ or $\frac{3}{10} = \frac{3}{10}$

$\frac{3}{10}$ is the smallest

b) $\frac{1}{3}$ $\frac{3}{4}$ $\frac{1}{2}$ $\frac{1 \times 4}{3 \times 4} = \frac{4}{12}$ or $\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$ or $\frac{9}{12}$ $\frac{4}{12}$ or $\frac{1 \times 6}{2 \times 6} = \frac{6}{12}$

$\frac{1}{3}$ is the smallest

Annotations

Represents equivalencies of fractions, for example $\square = 4/12$ through pictorial representation.

Mathematics

Work sample 6: Real Numbers – Fractions and decimals

Annotations

Translates mixed numbers into improper fractions.

7. Convert the following mixed numbers to improper fractions.

a) $2\frac{1}{3} = 2 \times 3 + 1 = \frac{7}{3}$

b) $1\frac{2}{7} = 1 \times 7 + 2 = \frac{9}{7}$

8. Calculate the following:

a) $\frac{1}{7} + \frac{2}{7} = \frac{3}{7}$

b) $\frac{11}{40} - \frac{4}{40} = \frac{7}{40}$

c) $\frac{2\frac{1}{2} + 1}{10 \div 5} = \frac{\frac{1}{2} + 1}{2} = \frac{2}{2} = 1$

d) $\frac{1\frac{1}{4} - 1\frac{1}{6}}{\frac{6}{24} - \frac{4}{24}} = \frac{\frac{3}{12} - \frac{2}{12}}{\frac{2}{24}} = \frac{\frac{1}{12}}{\frac{1}{12}} = 1$

e) $\frac{3}{5} \times \frac{1}{7} = \frac{3}{35}$

f) $\frac{5 + 1}{\frac{5}{10} \times \frac{2}{1} = \frac{10}{11}}$

LO2: Selects, extends and applies mathematical knowledge

There are lots of different ways to find the answers to the problems below. You can use numbers, symbols, diagrams or anything else you can think of to solve the problem. Please put enough information so that we know which method you have used.

1. Phillip was comparing two of his test results. He scored $\frac{22}{25}$ on the first test and $\frac{45}{50}$ on the second. On which test did Phillip perform better?

$\frac{22}{25} = \frac{44}{50}$ or $\frac{45}{50}$
 $\frac{44}{50}$ or $\frac{45}{50}$ phillip did better on

Applies their knowledge of fractions to solve problems.

Mathematics

Work sample 6: Real Numbers – Fractions and decimals

2. Liam and Ben were eating a pizza. The pizza was cut into 8 slices.

Liam ate $\frac{1}{4}$ of the pizza and Ben, who was very hungry, ate $\frac{1}{2}$ of the pizza.

How much of the pizza was left over?

$$\frac{8}{8} - \frac{1}{4} = \frac{7}{4}$$

$$\frac{7}{4} - \frac{1}{2} = \frac{6}{4} = \frac{3}{2}$$

$$\frac{3}{2} \text{ or } \frac{6}{4} \text{ or } \frac{3}{2}$$

$\frac{2}{8}$ or $\frac{1}{4}$ of the pizza was left over

3. When Penny walks at her quickest rate to school she takes half an hour. At her normal pace she takes an extra one-third of an hour. How long does Penny take walking at her normal pace?

$$\text{half an hour} = \frac{30}{60}$$

$$\frac{1}{3} \text{ of an hour} = \frac{20}{60}$$

$$\frac{30}{60} + \frac{20}{60} = \frac{50}{60}$$

Penny takes 50mins at her normal p

4. The rent-a-stall horse barn has stalls for 1000 horses. On Tuesday, there were 200 ponies and some Clydesdale horses at the horse barn. The horse barn was $\frac{3}{4}$ full.

How many Clydesdale horses were in the stalls?

$$\frac{3}{4} \text{ of } 1000 = 750$$

$$750 - 200 = 550$$

550 Clydesdale horse were in the stalls

- 21) 200 sausages, in total, were required for a barbecue. One-tenth of them have been donated by a parent, 50 had been left in the freezer from a previous occasion and the local supermarket donated $\frac{1}{4}$ of the total. The rest had to be bought at the local butcher. What fraction was bought?

$$\frac{1}{10} \text{ of } 200 = 20$$

$$\frac{1}{4} \text{ of } 200 = 50 + 50 + 20 = 120$$

Annotations

Uses all four operations to express quantities as fractions of another quantity and to calculate fractions of a numerical value.

Solves problems involving percentages and all four operations with fractions and decimals.

Mathematics

Work sample 7: Exploring number patterns – A waiter's nightmare

Relevant parts of the achievement standard

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

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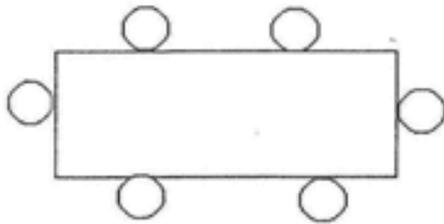
Summary of task

Students were required to analyse numeric patterns. They described the patterns, recorded them in table form and analysed the results. They used their results to develop a linear relationship. Students represented their results on a number plane. They drew conclusions based on their results.

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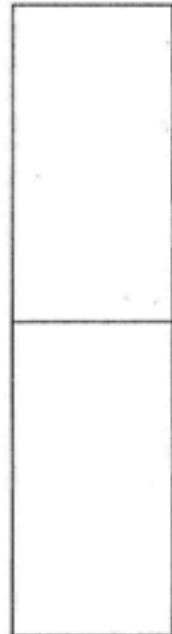
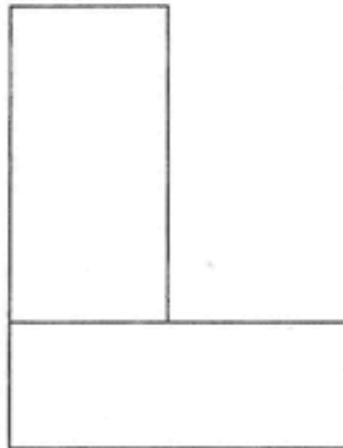
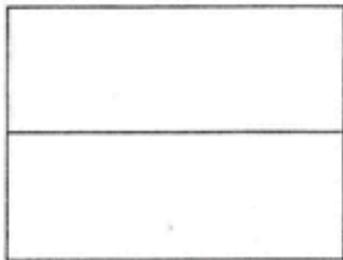
Work sample 7: Exploring number patterns – A waiter’s nightmare

A waiters' nightmare



A single rectangular table can seat 6 guests as shown left.

Two rectangular tables can seat a number of guests depending upon the table arrangement.



The 'L' shape arrangement will seat 9 guests.

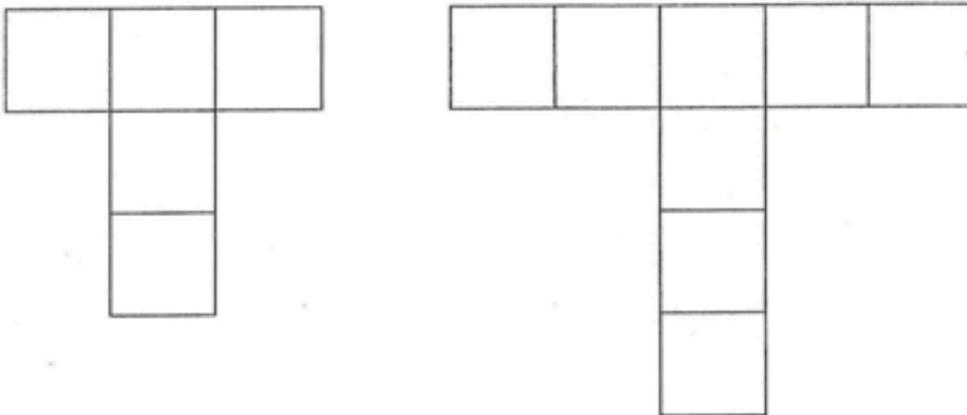
Task:

- Draw diagrams to show where each guest will sit on each of the arrangements for 2 tables.
- How many different arrangements are possible for groups of three and four tables?
- Record the largest and smallest number of seats for each arrangement of tables.
- Find a way to predict the largest and smallest number of seats for 10, 20, 50 and n tables.

Mathematics

Work sample 7: Exploring number patterns – A waiter’s nightmare

This is a T shape made from blocks which grows by adding extra blocks...



How many blocks would you need to make the T shape 15 high?

When writing about your work you could include some of the following:

- Diagrams
- Tables of results
- Use of graphs where appropriate
- Some Algebra
- A description of rules and patterns
- Predicting and checking
- Proofs of your rules
- A conclusion: have you enjoyed the work? What have you learned? What were your findings etc?

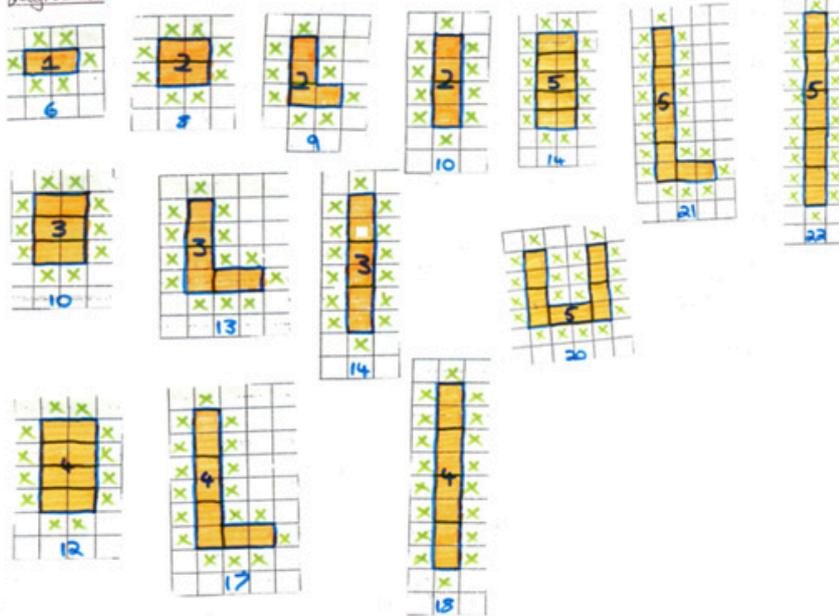
Mathematics

Work sample 7: Exploring number patterns – A waiter’s nightmare

Brief Description: I will use graph paper and highlighters to draw different numbers of tables arranged in different ways to find the most and least people that can be seated.

I will then use the diagrams to make a table of results. I will then create a rule to obtain the results. Then I will show an algebraic expression to explain the pattern. I will then create a graph to show the relationship in the table of results. I will then use the graph to predict a larger number.

Diagrams:



Annotations

Visually represents different ways of seating people at tables.

Mathematics

Work sample 7: Exploring number patterns – A waiter’s nightmare

Table:

Tables	1	2	3	4	5
Least Seats	6	8	10	12	14
Most seats	6	10	14	18	22

Rule: The number of tables (t) with the most seats (M) multiply t by 4 and add 2. The number of tables with the least seats (L) multiply t by 2 and add 4.

Expression: $L = 2t + 4$
 eg: 5 tables = $2 \times 5 + 4 = 14$
 $M = 4t + 2$
 eg: 5 tables = $4 \times 5 + 2 = 22$

Graph:

Annotations

Completes a table from the previous diagrams.

Determines a pattern between the number of seats and the number of tables.

Writes the linear relationships for the most and least number of seats, but there is no conclusion drawn about the arrangement of tables.

Graphs the relationship correctly and shows that for one table there is only one possible arrangement.

Uses variables to represent numbers. Models a simple linear relationship from realistic situation.

Substitutes a value (5) for the independent variable link equation to evaluate it for the dependent variable.

Acknowledgment

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

Mathematics

Work sample 8: Units of Measurement – Perimeter, area and volume

Relevant parts of the achievement standard

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

Students use fractions, decimals and percentages, and their equivalences. They express one quantity as a fraction or percentage of another. Students solve simple linear equations and evaluate algebraic expressions after numerical substitution. They assign ordered pairs to given points on the Cartesian plane. Students use formulas for the area and perimeter of rectangles and calculate volumes of rectangular prisms. Students classify triangles and quadrilaterals. They name the types of angles formed by a transversal crossing parallel line. Students determine the sample space for simple experiments with equally likely outcomes and assign probabilities to those outcomes. They calculate mean, mode, median and range for data sets. They construct stem-and-leaf plots and dot-plots.

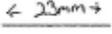
Summary of task

Students have been exploring the connections between perimeter, area and volume of two-dimensional and three-dimensional shapes, devising and then using formulae for the first time then formally practising using these formulae. Students were required to complete a test revising perimeter, area and volume.

Mathematics

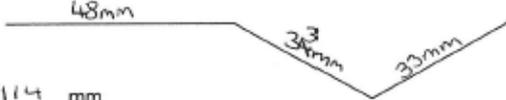
Work sample 8: Units of Measurement – Perimeter, area and volume

Annotations

1. Using your ruler, draw a line 23mm long in the space.


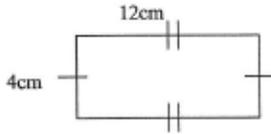
2. Measure the length of the following lines and write the length in the units indicated

A. 
 Answer: 10.5 cm

B. 
 Answer: 114 mm

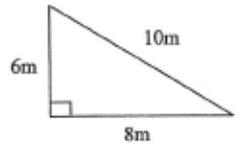
3. Place the following decimals in correct order from smallest to largest.
 2.12 2.21 2.2 2.012
2.012 2.12 2.2 2.21

4. Calculate the PERIMETER of the following shape.
 Show working out.



$12 \times 2 = 24$
 $4 \times 2 = 8$
 $24 + 8 = 32$
32cm

5. Calculate the AREA of the following shape.
 Show working out.



$A = \frac{B \times h}{2}$
 $A = \frac{8 \times 6}{2}$
 $A = \frac{48}{2}$
 $A = 24m^2$
24m²

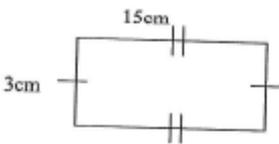
Chooses and applies formulae for the perimeter and area of rectangles and volume of right prisms.

Mathematics

Work sample 8: Units of Measurement – Perimeter, area and volume

6. Calculate the **AREA** of the following shape.

Show working out.



Handwritten work for Question 6:

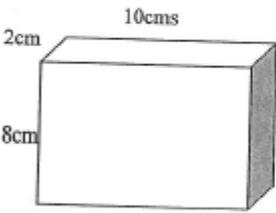
$$A = l \times h$$

$$A = 15 \times 3$$

$$A = 45 \text{ cm}^2$$

(45 cm²)

7. Calculate the **VOLUME** of the following shape.



Handwritten work for Question 7:

$$V = l \times b \times h$$

$$V = 10 \times 2 \times 8$$

$$V = 160 \text{ cm}^3$$

(160 cm³)

8. Complete the table of measurement conversions.

mm	cm	m	km
200mm	20cm	0.2m	0.0002km
66100mm	6610cm	66.1m	0.0661km

Annotations

Chooses and applies formulae for the perimeter and area of rectangles and volume of right prisms.

Acknowledgment

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

Mathematics

Work sample 9: Measurement and geometry – Classifying triangles and quadrilaterals

Relevant part of the achievement standard

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

*Students use fractions, decimals and percentages, and their equivalences. They express one quantity as a fraction or percentage of another. Students solve simple linear equations and evaluate algebraic expressions after numerical substitution. They assign ordered pairs to given points on the Cartesian plane. Students use formulas for the area and perimeter of rectangles and calculate volumes of rectangular prisms. Students **classify triangles and quadrilaterals**. They name the types of angles formed by a transversal crossing parallel line. Students determine the sample space for simple experiments with equally likely outcomes and assign probabilities to those outcomes. They calculate mean, mode, median and range for data sets. They construct stem-and-leaf plots and dot plots.*

Summary of task

Students were provided with a worksheet and were asked to classify triangles and quadrilaterals.

Mathematics

Work sample 9: Measurement and geometry – Classifying triangles and quadrilaterals

Classify the triangles according to their sides.

Classify each of these quadrilaterals. Give a reason for your answer.

Annotations:

Classifies the triangles as isosceles, equilateral, scalene or right angled.

Correctly classifies each quadrilateral with appropriate reason for classification.

Acknowledgement

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