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
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.
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.

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 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.
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!!

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.

<table>
<thead>
<tr>
<th>Outcome spun on spinner</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tea</td>
<td>HH</td>
<td>13</td>
</tr>
<tr>
<td>Coke</td>
<td>HH</td>
<td>16</td>
</tr>
<tr>
<td>Salt Lemonade</td>
<td>HH</td>
<td>13</td>
</tr>
<tr>
<td>Water</td>
<td>H</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Frequency: 50

**Annotations**

- Designs a tool that when used has 4 equally likely outcome.
- Identifies the resulting sample space.
Work sample 1: 
Come in spinner

iv) What was the 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' being drawn. I 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 causing 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.

\[
\text{Prob (of outcome) = No. of outcomes where event occurs / total no of outcomes}
\]

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

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>1/5</td>
</tr>
<tr>
<td>Tea</td>
<td>1/4</td>
</tr>
<tr>
<td>Coffee</td>
<td>1/3</td>
</tr>
<tr>
<td>Soft Drinks</td>
<td>1/2</td>
</tr>
</tbody>
</table>

Uses their calculations to state probabilities.
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.

<table>
<thead>
<tr>
<th>Probability of outcome</th>
<th>Spinner adjusted with outcomes and explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certain</td>
<td><img src="image1" alt="Diagram" /> 4/4 are tea All outcomes are tea you are certain to flip tea</td>
</tr>
<tr>
<td>Equal</td>
<td><img src="image2" alt="Diagram" /> 2/4 are water There are 2 outcomes so you have equal probability</td>
</tr>
<tr>
<td>Impossible</td>
<td><img src="image3" alt="Diagram" /> 0/4 are juice There are no outcomes for juice so it is impossible</td>
</tr>
</tbody>
</table>

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

1) CERTAIN Tea  
2) EQUAL Water/Coffee  
3) IMPOSSIBLE Tea/Soft Drink/Coffee/Water  

Annotations

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

Uses fractions to demonstrate the probability.
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.
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.

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.


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.

<table>
<thead>
<tr>
<th>STEM</th>
<th>LEAF</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1,1,2,3,3,5,7,7,9</td>
</tr>
<tr>
<td>1</td>
<td>0, 0, 1, 1, 1, 2, 2, 3, 4, 5, 8, 8</td>
</tr>
<tr>
<td>2</td>
<td>0, 0, 1, 1, 2, 2, 2, 3, 3, 5, 6, 6, 7, 7, 7, 8, 8, 9, 9, 9, 9, 9</td>
</tr>
<tr>
<td>3</td>
<td>0, 0, 1, 1, 2, 2, 3, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 6, 6, 6, 7, 7, 7, 8, 8, 8, 8, 8, 8, 9, 9, 9, 9</td>
</tr>
<tr>
<td>4</td>
<td>0, 0, 1, 1, 1, 2, 3, 4, 4, 4, 4, 5, 5, 5, 5, 7, 7, 8, 8</td>
</tr>
<tr>
<td>5</td>
<td>0, 0, 1, 1, 1, 1, 2, 2, 2, 3, 4, 4, 4, 4, 6, 6, 6, 6, 6, 6</td>
</tr>
<tr>
<td>6</td>
<td>2, 2, 3, 3, 4, 4</td>
</tr>
<tr>
<td>7</td>
<td>1, 2, 3, 3, 6, 5, 8</td>
</tr>
<tr>
<td>8</td>
<td>1, 1, 2, 4, 7, 5, 9</td>
</tr>
<tr>
<td>9</td>
<td>0, 0, 0, 3, 9</td>
</tr>
</tbody>
</table>

Annotations

Correctly constructs an ordered stem-and-leaf plot including the stem.
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.
Arithmetic reasoning – Angles

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°.
Mathematics

Work sample 4: Solving equations

Relevant parts of the achievement standard

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Summary of task

Students were asked to solve a variety of linear equations in class time.
Work sample 4: Solving equations

Annotations

Accurately solves simple linear equations.
Relevant parts of the achievement standard

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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.
Work sample 5:
Financial transactions – Percentage changes in prices

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.

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?

\[
\begin{align*}
\text{2006 price} & = 40 \\
\text{2007 price} & = 40 \times 1.1 \\
\text{2008 price} & = 44 \times 1.1 \\
\text{2009 price} & = 48.4 \times 0.9 \\
\text{2010 price} & = 43.56 \\
\end{align*}
\]

\[
\text{Price per gram in 2010: } 43.56
\]
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.
Work sample 6: Real Numbers – Fractions and decimals

1. Complete the table by using fractions and diagrams. The first one has been done for you.

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{2}$</td>
<td>[Diagram]</td>
</tr>
<tr>
<td>$\frac{5}{8}$</td>
<td>[Diagram]</td>
</tr>
<tr>
<td>$\frac{8}{10}$</td>
<td>[Diagram]</td>
</tr>
<tr>
<td>$\frac{6}{14}$</td>
<td>[Diagram]</td>
</tr>
<tr>
<td>$\frac{1}{3}$</td>
<td>[Diagram]</td>
</tr>
</tbody>
</table>

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

(i) $a = \frac{1}{2}$, $b = \frac{1}{3}$, $c = \frac{1}{4}$

(ii) $a = \frac{3}{5}$, $b = \frac{4}{5}$

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

(a) This represents: $\frac{3}{5}$

(b) This represents: $\frac{2}{5}$

Annotations

Represents and recognises pictorial representations of common fractions.
Annotations

Represents equivalencies of fractions, for example \( \frac{1}{3} = \frac{4}{12} \) through pictorial representation.
Work sample 6: 
Real Numbers – Fractions and decimals

Annotations

Translates mixed numbers into improper fractions.

Applies their knowledge of fractions to solve problems.
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?

   $\frac{3}{8} - \frac{1}{4} = \frac{1}{8}$
   $\frac{3}{8} - \frac{1}{4} = \frac{3}{8}$ or $\frac{1}{4}$
   $\frac{3}{8}$ 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?

   $\frac{1}{2}$ of an hour = $\frac{30}{60}$
   $\frac{1}{3}$ of an hour = $\frac{20}{60}$
   Penny takes 50 mins of her normal pace.

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?
   $\frac{3}{4}$ of 1000 = 750
   750 - 200 = 550
   550 Clydesdale horses 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 1/4 of the total. The rest had to be bought at the local butcher. What fraction was bought?

   $\frac{1}{10}$ of 200 = 20
   $\frac{1}{4}$ 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.
Work sample 7:
Exploring number patterns – A waiter’s nightmare

Relevant parts of the achievement standard

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

Annotations

Visually represents different ways of seating people at tables.
Work sample 7:
Exploring number patterns – A waiter’s nightmare

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

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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.
Year 7 Mathematics - Work sample 8

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

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

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

   A. 
   Answer: 10.5 cm

   B. 
   Answer: 11.4 mm

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

4. Calculate the PERIMETER of the following shape.
   Show working out.
   ![Perimeter Shape]
   \(\text{Perimeter} = 2 \times 12 + 2 \times 4 = 32 \text{ cm}\)

5. Calculate the AREA of the following shape.
   Show working out.
   ![Area Shape]
   \(A = \frac{1}{2} \times 10 \times 6 = 30 \text{ cm}^2\)
   \(A = \frac{1}{2} \times 8 \times 6 = 24 \text{ cm}^2\)
   \(A = 4 \times 2 = 8 \text{ cm}^2\)
   \(A = 2 \times 3 = 6 \text{ cm}^2\)

Annotations

Chooses and applies formulae for the perimeter and area of rectangles and volume of right prisms.
Work sample 8: 
Units of Measurement – Perimeter, area and volume

6. Calculate the AREA of the following shape.
   Show working out.
   \[ A = 15 \times 3 \]
   \[ A = 45 \text{cm}^2 \]

7. Calculate the VOLUME of the following shape.
   \[ V = 16 \times 2.8 \]
   \[ V = 44.8 \text{cm}^3 \]

8. Complete the table of measurement conversions.

<table>
<thead>
<tr>
<th>mm</th>
<th>cm</th>
<th>m</th>
<th>km</th>
</tr>
</thead>
<tbody>
<tr>
<td>200mm</td>
<td>20</td>
<td>0.2</td>
<td>0.002</td>
</tr>
<tr>
<td>60100mm</td>
<td>6010</td>
<td>66.1</td>
<td>0.0061</td>
</tr>
</tbody>
</table>
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.
**Work sample 9:**
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Annotations:

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

Correctly classifies each quadrilateral with appropriate reason for classification.

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