

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 4 MATHEMATICS

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

Sample 1	Fractions – Fraction cards
Sample 2	Comparing and ordering fractions
Sample 3	Financial mathematics – Hermit crabs
Sample 4	Location – Using maps
Sample 5	Transformation – Area of 10 squares
Sample 6	Time and measurement – Planning with a calendar
Sample 7	Numbers – Multiplication and division strategies
Sample 8	Numbers – Chocolate boxes
Sample 9	Units of measurement – How many days?
Sample 10	Data representation and interpretation – Collecting, graphing and interpreting data - gold
Sample 11	Chance – Chance words
Sample 12	Geometric reasoning – Right angles

Mathematics

This portfolio of work shows the creation of pairs of equivalent fractions when working with halves, quarters, thirds and fifths, location of halves and quarters on a number line and identification of equivalent fractions in this context (WS1, WS2). The student understands the value of a fraction can also be represented as a decimal and identifies fractions equivalent to 0.5 (WS2). The student recalls multiplication and division facts to 10 X 10 and demonstrates an ability to solve simple purchasing problems (WS3) and simple time duration problems (WS3). The student interprets maps and compiles directions (WS4) using appropriate directional language and compares areas of regular and irregular shapes and understands line symmetry (WS5). The student converts between weeks and days and between hours, minutes and seconds (WS6, WS9), identifies and classifies angles which are smaller than, equal to or greater than a right angle (WS12) and identifies a straight line as a half turn. The student collects and displays data and lists the probabilities of everyday events (WS10, WS11).

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

- *describe number patterns resulting from multiplication*
- *identify dependent and independent events*
- *describe different methods of data collection and evaluate their effectiveness*
- *use properties of odd and even numbers*
- *continue number sequences involving multiples of single digit numbers*
- *students use scaled instruments to measure temperatures.*

Mathematics

Work sample 1: Fractions – Fraction cards

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

Students use the properties of odd and even numbers. They recall multiplication facts to 10×10 and related division facts. Students locate familiar fractions on a number line. They continue number sequences involving multiples of single digit numbers. Students use scaled instruments to measure temperatures, lengths, shapes and objects. They convert between units of time. Students create symmetrical shapes and patterns. They classify angles in relation to a right angle. Students list the probabilities of everyday events. They construct data displays from given or collected data.

Summary of task

Students have been using fraction kits to investigate equivalent fractions. As yet they have had no explicit teaching about equivalent fractions and decimals.

In groups, students were given a set of fraction cards where the fractions had denominators 2, 3, 4, 5, 6, 8 and 10. They were asked to record each fraction as a decimal and a percentage.

Students displayed their recordings and shared their findings with the class.

Variation: The fraction cards could contain multiple representations of the same fraction, for example 50%, 0.5. Students could use these cards to play Concentration, Snap, or Old Maid.

Mathematics

Work sample 1: Fractions – Fraction cards

$$\frac{1}{2} = \frac{5}{10} = 0.5$$

$$\frac{1}{4} = \frac{2}{8} = 0.2$$

$$\frac{1}{2} = \frac{2}{4} = 0.5$$

$$\frac{1}{3} = \frac{2}{6} = 0.2$$

$$\frac{1}{5} = \frac{2}{10} = 0.2$$

$$\frac{3}{4} = \frac{6}{8} = 0.6$$

$$\frac{2}{5} = \frac{4}{10} = 0.4$$

$$\frac{2}{3} = \frac{4}{6} = 0.4$$

$$\frac{4}{5} = \frac{8}{10} = 0.8$$

$$\frac{5}{6} = \frac{2}{3} = 0.25$$

$$\frac{3}{4} = \frac{1}{2} = 0.15$$

Annotations

Recognises simple equivalent fractions, but is unaware of the need for the numerator and denominator to be integers.

Identifies fractions which are equivalent to 0.5, but otherwise identifies the numerator as an amount of tenths, therefore occasionally recording the correct answer, but with incorrect reasoning.

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 2: Comparing and ordering fractions

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

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Summary of task

Students have been given opportunities to make halves, quarters, eighths, thirds and fifths. They have been investigating equivalent fractions using fraction walls.

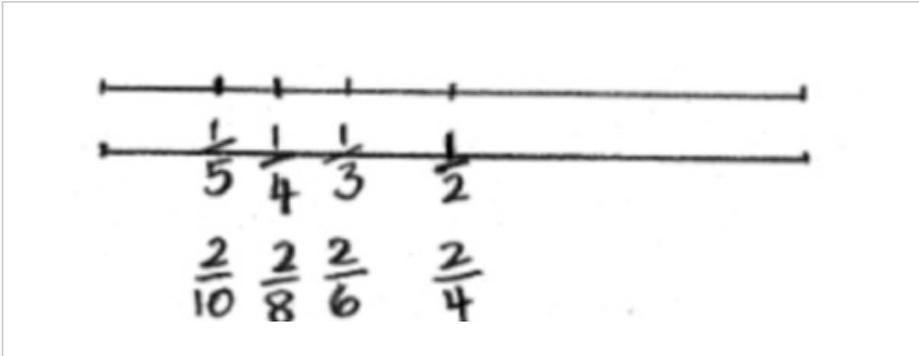
The teacher prepared a series of fraction cards as follows:

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$
$\frac{2}{4}$	$\frac{2}{6}$	$\frac{2}{8}$	$\frac{2}{10}$

Students were asked to place the cards on a number line. Students were encouraged to discuss the correct placement of the cards and why some cards need to be placed on top of other cards.

Mathematics

Work sample 2: Comparing and ordering fractions



Annotations

Locates and orders fractions on the number line.

Recognises common equivalent fractions.

Acknowledgement

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 3: Financial mathematics – Hermit crabs

Relevant parts of the achievement standard

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Summary of task

Students have had prior exposure to simple financial problems. They have been taught familiar number facts and also some addition to check adding minutes.

Students were required to use mathematics to set up a hermit crab project. The investigation required students to:

- calculate the total cost of items on a shopping list
- organise a fundraising stall to cover the costs of items purchased
- organise helpers for a stall by creating a roster
- make decisions of how to spend excess funds, using all of the funds available
- explain their mathematical problem solving strategies.

Mathematics

Work sample 3: Financial mathematics – Hermit crabs

Getting started

Mathematics can be used to help set up a hermit crab project.

To set up a hermit crab project a class would have to buy items from a shopping list.

1. How would you use mathematics to help choose a shop that sells items for the best price?

a corner shop because its
cheap

To pay for a hermit crab project a class may have to plan a fundraising stall.

2. How would you use mathematics when serving customers at a fundraising stall?

- with using the price tags
- and how much change to give back and the right amount of money with a calculator.

3. Work out the total cost of all the items on the shopping list.

Giant strawberry hermit crab \$25.00 each

Salt

Hermit crab salt \$3.00

Plastic carry-cage \$18.00

Food

Hermit crab food per bag \$3.00

Pet book \$6.00

Show your working.

$$\$25 + \$25 + \$18 + \$3 + \$3 + \$6 = \$80$$

Annotations

Constructs number sentences and calculates correctly.

Correctly calculates the total cost.

Mathematics

Work sample 3: Financial mathematics – Hermit crabs

Organising a fundraising stall

Students are going to sell sausages in bread at a fundraising stall.

The sausages, bread and sauce have been given to the class by a parent for free.



Each sausage in bread will be sold for \$1.00.

4. How many sausages in bread must be sold to cover the cost of items on the shopping list?

.....\$80..... sausages in bread

5. How many packs of sausages will be needed?



Sausages come in packs of 8.

Show your working.

10

6. How many loaves of bread will be needed for all the sausages?



There are 22 slices (including the crusts) in each loaf of bread. The two crusts will not be used.

Show your working.

80/20

.....4..... loaves

7. If six sausages in bread are not sold, how much money is raised?

Show your working.

\$80
- 6

\$74

.....\$74.....

Annotations

Correctly calculates the number of sausages (however, use of \$ sign is inappropriate).

Correctly calculates the amount of money raised.

Mathematics

Work sample 3: Financial mathematics – Hermit crabs

Organising helpers

Every student in the class must have a turn helping at the sausage stall.

Four students will be at music lessons for some of the time of the stall.

8. Complete Table 1 to show when each student has their music lesson.

Table 1

Student	Start time	Duration	Finish time
Ned	10:15 am	25 minutes	10:40 am
Sid	10:40 am	30 minutes	11:10 am
Jake	11:10 am	25 minutes	11:35 am
Meg	11:25	20 minutes	11:45 am

The sausage stall will be held from 10:30 am until 11:30 am.

9. In Table 2, cross X the boxes to show when each student cannot help at the stall.

Ned has been done for you.

Table 2

Time	Ned	Sid	Jake	Meg
10:30 am - 10:45 am	X	X		
10:45 am - 11:00 am		X		
11:00 am - 11:15 am			X	
11:15 am - 11:30 am				X

Annotations

Calculates time duration correctly (three of the four time duration calculations are correct).

Makes errors in the placement of crosses.

Mathematics

Work sample 3: Financial mathematics – Hermit crabs

Spending the money
At the pet shop there is a sale.
The class has \$10.00 left over to spend. They decide to buy paint pens

10. The class must spend all of the \$10.00 to buy as many different-coloured pens as possible.

a) Circle the pens that they should buy.

Show your working.

$$2.50 + 1.50 + 2.00 + 2.50 + 1.50 =$$

b) Explain how you used mathematics to get your answer.

because if cheap prices you can buy more but if you buy expensive things you don't get lots

Annotations

Correctly calculates and recognises that all of the \$10.00 needs to be spent.

Demonstrates understanding of spending exactly \$10.00 but fails to use mathematical explanation. For example, there is no discussion of the need not to include one of the \$2.00 pens which would result in \$0.50 below \$10.00 and hence the inclusion of a \$2.50 pen.

Acknowledgment

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Mathematics

Work sample 4: Location – Using maps

Relevant parts of the achievement standard

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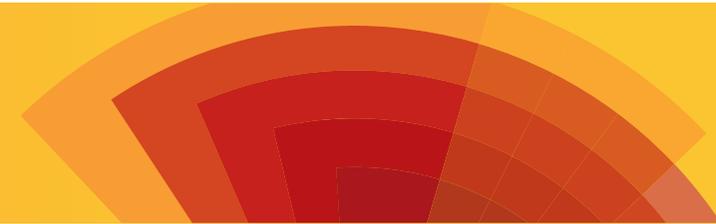
Summary of task

Prior to this students studied location and transformation and were asked to design an orienteering course for their friends to follow. Students were given the following instructions:

1. Map out your orienteering course on a school map (using mapping symbols).
2. Decide what letter will be at each marker (control) to spell a word.
3. Explore different materials from which to make your markers (controls).
4. Write mathematical directions to go with your map for others to follow.
5. Set up the course. Put up your markers (controls).
6. Give your map and mathematical directions to another group to follow.
7. Reflect on the orienteering challenge.

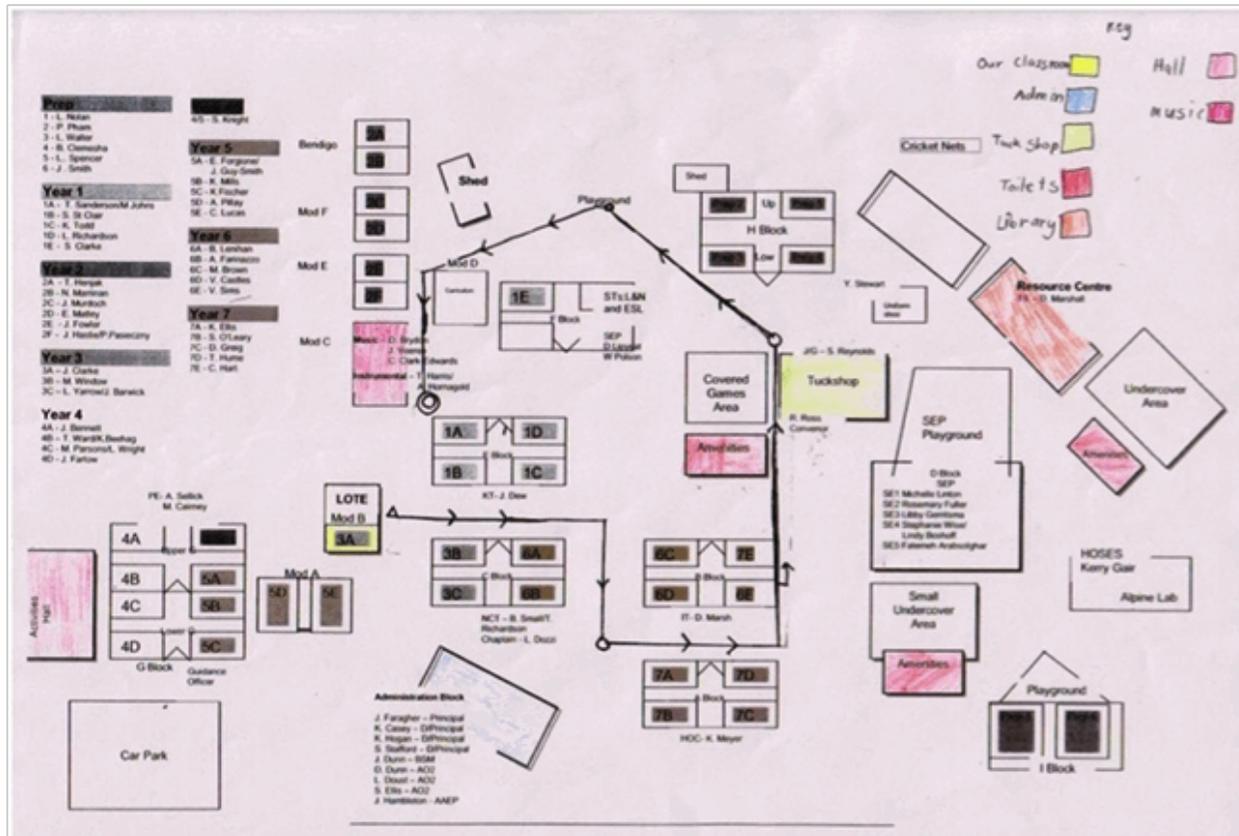
Mathematics

Work sample 4: Location – Using maps



Annotations

Identifies the pathway taken.



Mathematics

Work sample 4: Location – Using maps

Step Four WRITING DIRECTIONS FOR YOUR COURSE

Make sure your directions include:

- The start and finish points
- Where each control is located
- The length of all 4 stages (either in steps or metres)
- Directions for the course (eg. right/left, quarter turn, clockwise/anti-clockwise, near to, next to, between, beside, forwards, straight ahead, diagonal etc)
- Total distance of the course (either in steps or metres)



Stage One: Start outside Mod-B. Walk straight ahead 51 steps between C-Block and E-Block. Turn a quarter turn walk ahead 29 steps. You have now reached your first marker.

Stage Two: Turn a quarter turn left. Walk forward 46 steps between A-Block and B-Block. Turn a quarter turn left. Walk ahead 80 steps until you are beside the tuckshop.

Stage Three: Turn left and walk in a diagonal direction for 75 steps. Walk between H-Block and F-Block. You are now next to the adventure play ground. You have now reached the third marker.

Stage Four: Turn to the left and walk in a diagonal direction for 26 steps. Turn a quarter turn left. Walk ahead 16 steps until you are beside the music room. You have now reached the finish.

Total distance of the course (Show your working out):

$$51 + 29 + 46 + 80 + 75 + 26 + 16 = 323 \text{ Steps}$$

Annotations

Gives correct directions for movement from one position to another.

Uses key words to describe directions (except for clockwise/anti clockwise).

Correctly calculates the number of steps to move from original position to a destination.

Mathematics

Work sample 4: Location – Using maps



Step Five

PEER ASSESSMENT



To be completed by another group after they have walked your course.

Was the map clear and easy to read?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Was the start and finish clearly marked on the map?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Was the direction clearly marked on the map with arrows?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Were the written directions clear and easy to follow?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Was every marker found in order?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Were the markers colourful and easy to find?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Were the markers put in the right spot?	<input checked="" type="radio"/> Yes <input type="radio"/> No

Explain

Directions were good because they used words like left/right between beside, next to, forward and diagonal. The start and finish were marked on the map with symbols. We found every letter in order (H-O-P-E-I)



Step Six

SELF ASSESSMENT

What could be changed to make your orienteering course and directions better?

We should have measured the course in metres instead of steps because some children's steps are bigger than others. The pathways weren't marked on the map so we couldn't walk in a diagonal line because the path wasn't diagonal. Next time we could include more markers to make the course more challenging. We could put a word at each marker to make a sentence instead.

Annotations

Discovers that using a standard metric measure would improve the quality of the directions. Identifies the limitations of 'diagonal' as simple directional language, but has not yet considered an alternative.

Provides critical reflection on the route that was taken.

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 5: Transformation – Area of 10 squares

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

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Summary of task

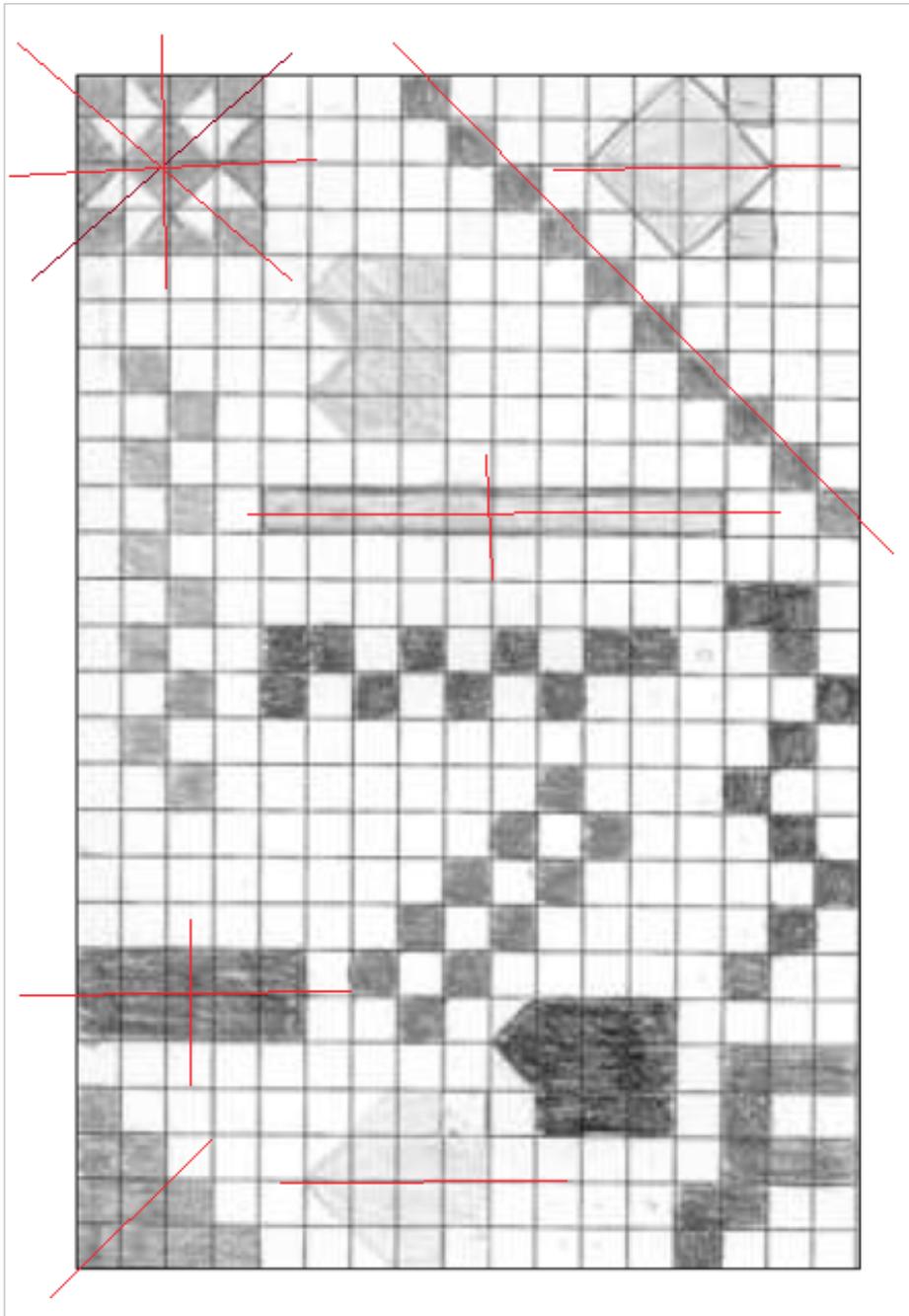
After using informal units to compare areas of shapes, students had begun to use square units. Students have been discussing line symmetry in their work on shape.

Students used grip paper to construct shapes with an area of 10 square units and patterns or pictures with 10 square units shaded.

Students were asked to identify lines of symmetry on their patterns and shapes.

Mathematics

Work sample 5: Transformation – Area of 10 squares



Annotations

Draws different shapes and patterns to show their understanding of the fact that shapes with 10 square units can look different to each other.

Identifies line symmetry in their shapes and patterns.

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 6: Time and measurement – Planning with a calendar

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

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Summary of task

The students have been choosing and using appropriate scaled instruments to measure length to the nearest millimetre. They have also been exploring the use of simple legends to interpret information contained in maps.

In this task students were required to plan a community fair. They planned their event using calendars and used scaled instruments to measure objects, such as the length of the stall, and a compass to determine direction. They calculated how much popcorn was sold at the fair.

Mathematics

Work sample 6: Time and measurement – Planning with a calendar

Planning with a calendar

Use this calendar to help answer questions on the next page.

September 2011						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			1	2	3	4
5	6 Choose stall food theme	7	8 Choose charity	9 Find out cost of ingredients	10	11
12 Job roster	13	14	15	16 Make poster	17	18
19 School holidays start	20	21	22	23	24	25
26	27	28	29	30 School holidays end		

October 2011						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					1	2
3 buy ingredients	4	5 Make labels	6 Get equipment	7 • Set up stall • Cook popcorn	8 Community fair	9
10	11	12	13	14	15 Market day	16
17 Student-free day	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

School days
 Weekends
 School holidays

Annotations

Locates and records specific information on a calendar.

Mathematics

Work sample 6: Time and measurement – Planning with a calendar

Use the calendar on page 4 to answer Questions 1 to 4.

1. Complete the table below. The first row is done for you.

Activity	Day	Date	Month
Choose charity	Thursday	8	September
make labels	Wednesday	5	October
Student-free day	Monday	17	October

2. Add these activities to the calendar on page 4.

Activity	Date
Job roster	12 September
Make posters	16 September
Buy ingredients	3 October

The fair organisers are worried about rain.

They have set a backup date for the fair seven (7) days after 8 October.

3. What is the backup date of the fair? 15th October

Explain how you worked this out. I looked for 8 October and counted seven more days

4. There will be a school assembly on 7 November.

What day of the week is this? Friday

Annotations

Accurately records data in a table.

Solves problems involving time duration.

Mathematics

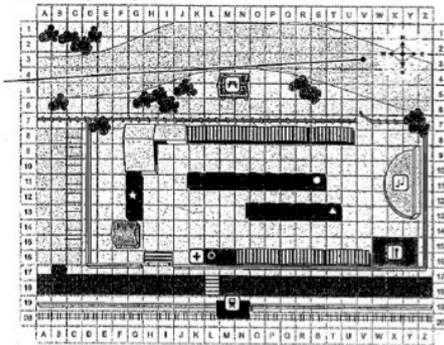
Work sample 6: Time and measurement – Planning with a calendar

Use the map below to answer Questions 5 to 7.

Mapping and locations

This map shows the landmarks, features and locations of the fair.
Alphanumeric grid maps use letter and number reference points.
These points show a location or landmark.

Community fair layout



Legend		

5. Complete the table below. The first row is completed for you.

Landmark	Location
stall	G 12
First aid	K 16
Picnic shed	M 5

6. Use the compass rose to identify the direction when walking from the:

- Entrance to the Friendship farm West
- Main stage to stall South west

There are two possible locations for your class stall, either or .

7. Identify the advantages and disadvantages for each location, using features on the map.

Stall	Advantages (+)	Disadvantages (-)
	near first aid near games near entrance near jumping castle near to stage	far away from food far away from stage
	near to food near picnic	far away from entrance

Annotations

Interprets information contained in map.

Provides accurate grid references of landmarks.

Correctly uses compass bearings to demonstrate location.

Mathematics

Work sample 6: Time and measurement – Planning with a calendar

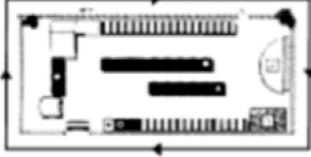
Measuring using standard units

A variety of instruments can be used to measure different objects in standard units (mm, cm, m, km).

8. Draw a line from each object to the best possible measuring instrument.

Object to measure		Instrument
length of stall 		5 metre tape measure 
height of popcorn box 		30 metre tape measure 
width of fairground 		30 cm ruler 

9. Below are two instruments. Which instrument is better to measure the distance around the fairground? Tick one.

trundle wheel 	<input checked="" type="checkbox"/>	metre ruler 	<input type="checkbox"/>	
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This instrument is better because:

because the trundle wheel is much longer than the 1 metre ruler

Annotations

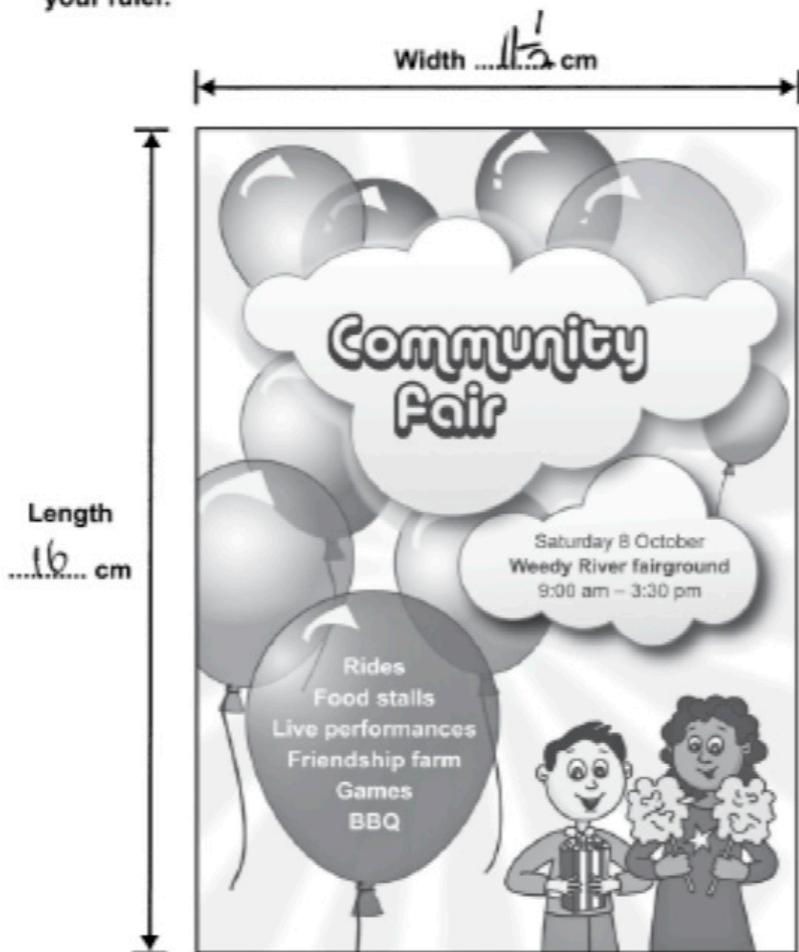
Selects the appropriate instrument to measure length.

Justifies the selection of instruments.

Mathematics

Work sample 6: Time and measurement – Planning with a calendar

10. Measure accurately the length and width of the fair flyer using your ruler.



Annotations

Uses scaled instrument to measure length.



Stop here: Wait for your teacher's directions.

Mathematics

Work sample 6: Time and measurement – Planning with a calendar

Investigating numbers

The class popcorn stall sold lots of popcorn at the fair.

Number of popcorn boxes sold at the fair

Time of day	Popcorn boxes sold
morning	42
lunch	83
afternoon	25

11. Calculate the total number of popcorn boxes sold.

$$\begin{array}{r}
 42 \\
 83 \\
 25 \\
 \hline
 150
 \end{array}$$



Show all working

Total number sold: 150

12. How many more popcorn boxes were sold at lunch than in the afternoon?

$$\begin{array}{r}
 83 \\
 - 25 \\
 \hline
 62
 \end{array}$$



Show all working

Total boxes: 62

Annotations

Uses appropriate strategies to calculate totals and to determine the number of items sold with some errors.

Mathematics

Work sample 6: Time and measurement – Planning with a calendar

Here are the costs for individual ingredients.



popcorn kernels



sugar



oil

13. Calculate the total cost of ingredients.

$$\begin{array}{r}
 \$25.50 \\
 10.70 \\
 6.00 \\
 \hline
 \$42.20
 \end{array}$$

 Show all working

Total cost of ingredients: \$42.20

Total money collected from the sale of popcorn



boxes of popcorn



collected



\$300

14. Calculate how much money your class raised after paying for the ingredients.

$$\begin{array}{r}
 \$300.00 \\
 42.20 \\
 \hline
 \$257.80
 \end{array}$$

 Show all working

Total raised:

Annotations

Uses data from the price labels to generate solutions using addition and subtraction with decimal numbers.

Draws on answers to solve purchasing problems.

Acknowledgment

ACARA acknowledges the contribution of the Queensland Studies Authority for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

Mathematics

Work sample 7: Numbers – Multiplication and division

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

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Summary of task

Students have been given opportunities to use their recall of multiplication and division facts.

Students have discussed the use of brackets but have not discussed order of operations.

Students were asked to select 15 numbers between 1 and 100. They were to express each of the selected numbers in two different ways using mixed operations. Each operation was required to include either a multiplication or a division.

Mathematics

Work sample 7: Numbers – Multiplication and division

1. $(25 - 5) + 10 = 15$	$(21 \div 7) \times 5 = 15$
2. $(60 \div 3) - 5 \times 2 = 30$	$(56 - 4) \div 2 + 9 = 35$
3. $5 \times 20 - 40 = 60$	$(7 + 3) \times 6 = 60$
4. $(31 \times 2) \div 16 = 4$	$(32 \div 2) + 4 - 16 = 4$
5. $(3 \times 7) \times 2 - 21 = 21$	$(13 - 10) \times 7 = 21$
6. $(7 \times 10) - 14 = 56$	$(3 \times 3) + 47 = 56$
7. $(3 \times 21) \div 7 + 9 = 18$	$(6 \times 2) + 0 \div 0 = 12$
8. $(22 \div 2) - 5 = 6$	$36 \div 6 + 5 - 5 = 6$
9. $(11 \times 2) + 11 = 33$	$(50 \div 2) + 13 - 0 = 38$
10. $(21 \times 3) - 8 = 55$	$(18 \times 2) + 29 = 65$
11. $(2 \times 10) + 5 - 5 = 20$	$(3 \times 10) - 6 + 1 = 25$
12. $(6 \times 1) - 3 + 4 = 7$	$(56 - 8) + 3 - 3 = 7$
13. $(4 \times 4) + 4 - 4 = 16$	$(6 \times 3) + 2 - 4 = 16$
14. $(21 \times 3) + 1 - 3 = 61$	$(3 \times 10) - 1 + 1 = 30$
15. $(33 \div 3) + 5 - 5 = 11$	$(11 \times 4) + 4 \div 2 - 13 = 11$

Annotations

Demonstrates good recall of multiplication and division facts.

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: Chocolate boxes

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

Students use the properties of odd and even numbers. They recall multiplication facts to 10×10 and related division facts. Students locate familiar fractions on a number line. They continue number sequences involving multiples of single digit numbers. Students use scaled instruments to measure temperatures, lengths, shapes and objects. They convert between units of time. Students create symmetrical shapes and patterns. They classify angles in relation to a right angle. Students list the probabilities of everyday events. They construct data displays from given or collected data.

Summary of task

Students have been learning to use their times tables and related division facts.

The teacher posed the problem: 'Imagine you had the job of designing a chocolate box. There are to be 48 chocolates in the box. The box can be one or two layers high. How many ways could you arrange the chocolates in the box?'

Students drew or made models of their solutions and discussed these in terms of multiplication and division facts.

Mathematics

Work sample 8: Chocolate boxes

I have 48 chocolates.



I can have 6 rows and 8 columns
That gives 48



I can have 4 rows and 12 columns

Perhaps I could have 2 layers.



This is 24.
I could add another lot the same on top.

I have 4 rows and 6 columns

I can also make 24 by having 3 rows and 8 columns



If I add another layer it would make 48 chocolates

I can have 1 column of 48 but that is a bit silly

Annotations

Demonstrates the use of an array as a strategy to solve this problem.

Uses times table knowledge to engage in this task.

Acknowledgment

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Mathematics

Work sample 9: How Many Days?

Relevant parts of the achievement standard

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Summary of task

Students have been using calculators to solve problems involving the four operations.

The teacher posed the problem 'How many days have you attended school this term/year?' Students calculated a solution.

Students were asked 'How many other ways can you express this information?', for example in hours, in minutes. Students used a calculator to check their answers.

This activity could be extended by asking 'How many hours have you spent at recess and lunch this week?' Students could record information in days, hours or minutes on a spreadsheet and then draw a graph.

Mathematics

Work sample 9: How Many Days?

4 weeks and 3 days at school - 2 days. I was sick. This makes 21 days.

$$21 \times 6 = 126 \text{ hours}$$

126 \times 60 makes 7560 minutes.

To get seconds \times 60 = 453600 seconds.

Lunch is 60 minutes recess is 25 minutes

That makes 95 minutes each day $60 + 25 = 95$

$$95 \times 21 = 1995 \text{ minutes} \div 60 = 33.25$$

So 33 hours and 25 minutes of lunch and recess

Annotations

It is implied (but not demonstrated) that the student uses valid operations to convert weeks and days into days (likely calculation process $4 \times 5 = 20$, $20 + 3 = 23$, $23 - 2 = 21$).

Identifies the need to multiply by 6, as there are 6 hours in a school day.

Demonstrates an understanding of the need to multiply by 60 to convert hours to minutes and minutes to seconds.

Acknowledgment

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Mathematics

Work sample 10: Data representation and interpretation – Collecting, graphing and interpreting data - Gold

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

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Summary of task

In this task students compared and observed expected frequencies and communicated probabilities. The students were given 30 minutes to complete this task.

Students completed a data collection task using gold panning. The activity involved students taking a small handful of counters from a bag 7 times, which represents 7 days' findings on the goldfields. Yellow counters represent a set amount of gold (in grams). Students completed a graph or table to show their knowledge of collecting data and creating a graph. Students then explained their findings.

Mathematics

Work sample 10: Data representation and interpretation – Collecting, graphing and interpreting data - Gold

What do I already know about Graphs? Name... Rebecca.....

Focus: To find out where students in Year 6 are at:

- collecting data
- using the data to make a graph
- Interpreting the information they have found

Tasks:

- Collect data
- Use the data to create a graph below- what graph would be best for your data
- Answer the set questions below

How many pieces of Gold I collected in a week

Day	Pieces of Gold
Day 1	3
Day 2	3
Day 3	1
Day 4	1
Day 5	1
Day 6	3
Day 7	3

- What is the purpose of your graph? To show how many pieces of gold I collected in 1 week
- What are the highest and lowest scores? Is there a reason for this? 1 was lowest and 3 was the highest. Because there is only 5 pieces of gold and you could only grab a small handful.
- Do you know the mean, mode, range or median? no
- Rate yourself out of 10 on where you think you are with 'Graphs' and write a comment
8/10 I think I am getting the hang of graphs but I am not very good at writing the things on the side of my graph.

Annotations

Selects a suitable display for data collected. Explains what the group shows.

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 11: Chance – Chance words

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

Students use the properties of odd and even numbers. They recall multiplication facts to 10×10 and related division facts. Students locate familiar fractions on a number line. They continue number sequences involving multiples of single digit numbers. Students use scaled instruments to measure temperatures, lengths, shapes and objects. They convert between units of time. Students create symmetrical shapes and patterns. They classify angles in relation to a right angle. Students list the probabilities of everyday events. They construct data displays from given or collected data.

Summary of task

Students have discussed language that can be used to explain events of chance.

Students were given the following chance words on cards: always, never, sometimes, often, might, equal chance, probably, certain, possible, and mostly.

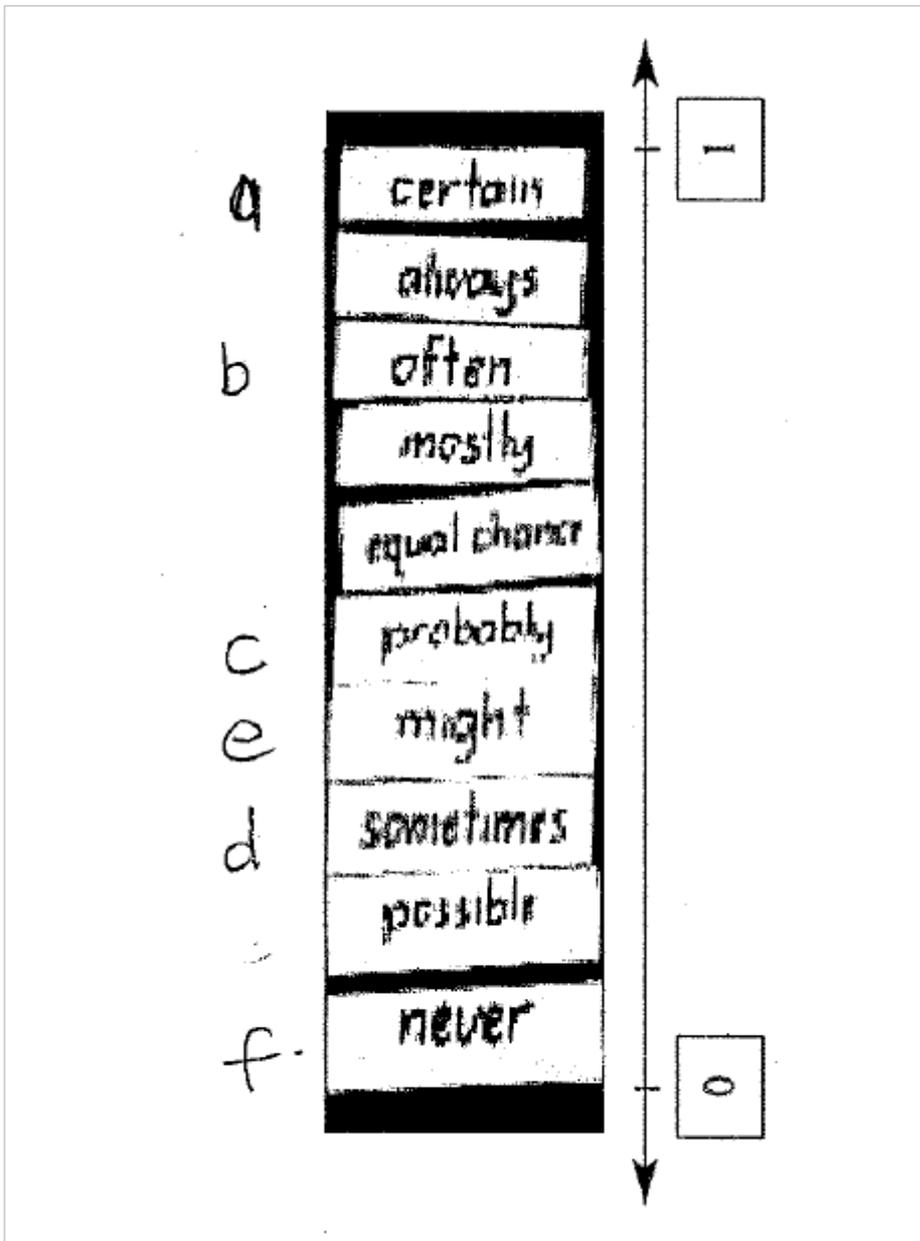
In groups, students were asked to order them on a number line from 0 (impossible) to 1 (certain). Students compared their order with other groups and discussed. They then matched each word with an everyday event, for example 'We sometimes play tips at lunchtime.' There is an equal chance it will rain tonight.'

The student scribed these sentences to this scale:

- a) It is certain I am at school today
- b) I often watch t.v.
- c) I will probably eat my dinner before 6pm
- d) I sometimes don't eat breakfast
- e) I might be a Policeman when I get older
- f) I will never be 5 years old again.

Mathematics

Work sample 11: Chance – Chance words



Annotations

Identifies everyday events and classifies them according to the likelihood of their occurrence.

Acknowledgment

ACARA acknowledges the contribution of the NSW Department of Education and Communities for providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

Mathematics

Work sample 12: Geometric reasoning – Right angles

Relevant parts of the achievement standard

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

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Summary of task

Students made angle finders in previous lessons.

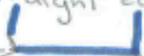
Students collected objects which were greater than a right angle, less than a right angle and equal to a right angle.

Mathematics

Work sample 12: Geometric reasoning – Right angles

RIGHT ANGLES

Use your angle finder to fill out the table below.

<p>Things in my classroom that are smaller than a right angle.</p> 	<p>At point of a star</p>  <p>Scissors</p>  <p>Tip of a pencil</p> 
<p>Things in my classroom that are about the same size as a right angle.</p> 	<p>white board</p>  <p>Folder</p>  <p>paper</p> 
<p>Things in my classroom that are larger than a right angle.</p> 	<p>inside a star</p>  <p>wand</p>  <p>straight edge of a window</p> 

Annotations

Identifies angles which are smaller than, equal to and larger than a right angle, including identifying that an angle on a straight line (or half turn) is longer than a right angle.

Mathematics

Work sample 12: Geometric reasoning – Right angles

RIGHT ANGLES

Use your angle finder to fill out the table below.

★

<p>Things in my classroom that are smaller than a right angle.</p> 	<p>A point of a star </p> <p>The tip of a pencil </p> <p>The end of scissors </p> <p>The bottom of a love heart </p>
<p>Things in my classroom that are about the same size as a right angle.</p> 	<p>A sheet of paper </p> <p>A book </p> <p>A white board</p> 
<p>Things in my classroom that are larger than a right angle.</p> 	<p>The straight edge of a window </p> <p>A not so magic wand </p>

Annotations

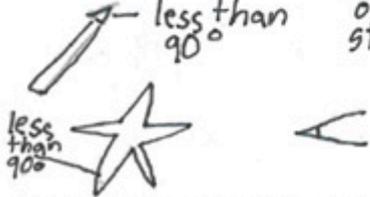
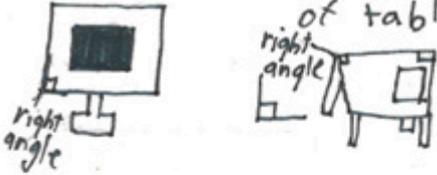
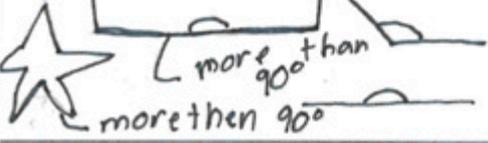
Identifies a straight edge as greater than a right angle.

Mathematics

Work sample 12: Geometric reasoning – Right angles

RIGHT ANGLES

Use your angle finder to fill out the table below.

<p>Things in my classroom that are smaller than a right angle.</p> 	<p>tip of a pencil point of a star</p> <p>less than 90° less than 90°</p> 
<p>Things in my classroom that are about the same size as a right angle.</p> 	<p>corner of computer screen corner of table</p> <p>right angle right angle</p> 
<p>Things in my classroom that are larger than a right angle.</p> 	<p>bottom of a pencilcase inside of star</p> <p>more than 90° more than 90°</p> 

Annotations

Uses correct symbol to label the angle which is being referred to.

Uses correct symbol to identify a right angle.

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.