

Mathematics

Year 4
Below satisfactory

WORK SAMPLE PORTFOLIO

Annotated work sample portfolios are provided to support implementation of the Foundation – Year 10 Australian Curriculum.

Each portfolio is an example of evidence of student learning in relation to the achievement standard. Three portfolios are available for each achievement standard, illustrating satisfactory, above satisfactory and below satisfactory student achievement. The set of portfolios assists teachers to make on-balance judgements about the quality of their students' achievement.

Each portfolio comprises a collection of students' work drawn from a range of assessment tasks. There is no pre-determined number of student work samples in a portfolio, nor are they sequenced in any particular order. Each work sample in the portfolio may vary in terms of how much student time was involved in undertaking the task or the degree of support provided by the teacher. The portfolios comprise authentic samples of student work and may contain errors such as spelling mistakes and other inaccuracies. Opinions expressed in student work are those of the student.

The portfolios have been selected, annotated and reviewed by classroom teachers and other curriculum experts. The portfolios will be reviewed over time.

ACARA acknowledges the contribution of Australian teachers in the development of these work sample portfolios.

THIS PORTFOLIO: YEAR 4 MATHEMATICS

This portfolio provides the following student work samples:

Sample 1	Number: Lucy's birthday
Sample 2	Number: Multiplication
Sample 3	Measurement: Quadrilaterals
Sample 4	Number: Odd and even
Sample 5	Number: Bingo
Sample 6	Geometry: Symmetry
Sample 7	Number: Sentences
Sample 8	Number: Fractions and decimals
Sample 9	Measurement: Time word problems
Sample 10	Number: Sausage sizzle
Sample 11	Statistics: Data
Sample 12	Statistics and probability: One minute challenge

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This portfolio of student work shows the drawing of different quadrilaterals with the same area (WS3). The student applies strategies to solve problems using knowledge of patterning, odd and even numbers and multiplication and division facts up to 10×10 (WS1, WS2, WS5). The student adds consecutive numbers to demonstrate understanding of odd and even numbers (WS4). The student creates four-sided shapes with and without symmetry (WS6) and uses strategies to solve time word problems (WS6). The student constructs addition and subtraction number sentences to solve written problems (WS7) and identifies equivalent fractions and decimals, locates them on a number line and represents them pictorially (WS8). The student uses knowledge of multiplication and decimals to solve and justify a financial problem (WS10) and uses reasoning to ask the best question to collect data in a table and create a data display (WS11). The student identifies the likelihood of events occurring and identifies whether or not events are affected by each other (WS12).

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Number: Lucy's birthday

Year 4 Mathematics achievement standard

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

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 x 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 had been working with patterns and number sequences. Students were given this task to complete in a half-hour time period in class:

Lucy was arranging some candles on her birthday cake.

When she placed them in 2 equal rows, there was 1 left over.

When she placed them in 3 equal rows, there were 2 left over.

How old could Lucy be turning?

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Number: Lucy's birthday

11 : 5 = 2 R 1

11 : 3 = 3 R 2

Happy Birthday Lucy

I picked 11 because I did 5 in a row 2 times and had 1 left over then did 3 row and had 2 left over.

Lucy could be turning 11

Annotations

Shows a calculation that has two equal rows and leaves a remainder of one.

Shows a calculation that has three equal rows and has a remainder of two.

Draws a conclusion based on their calculations in order to solve a number sentence problem.

Gives one solution to the problem posed.

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Number: Multiplication

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Summary of task

Students had been working with patterns formed when looking at number sequences involving multiplication. Students were given this task to complete in a half-hour time period in class.

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Number: Multiplication

Annotations

Can you create a multiplication number pattern that includes the number 60?

My Pattern is the 4 times table
 4, 8, 12, 16, 20, 24, 28, 32, 36,
 40, 44, 48, 52, 56, 60
 My 20 term is 78
 to work this out I added 5 more
 Fours. because I had 5 more
 terms already.
 the numbers that would be in my
 pattern is 4000 because 40 is the
 10th term and you times it by
 100. a number the wouldn't
 be in the 4 times is 2007
 because 7 doesn't go in to
 4 evenly. 4002 because
 42 is not in the 4 times table
 and 4000 in 100x40
 my times table is the 6 times

Creates a multiplication number pattern that includes the number 60.

Attempts to explain the pattern.

Attempts to justify terms in the sequence and terms not in the sequence.

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Measurement: Quadrilaterals

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Summary of task

Students had completed a unit of work on two dimensional shapes, their properties and their area.

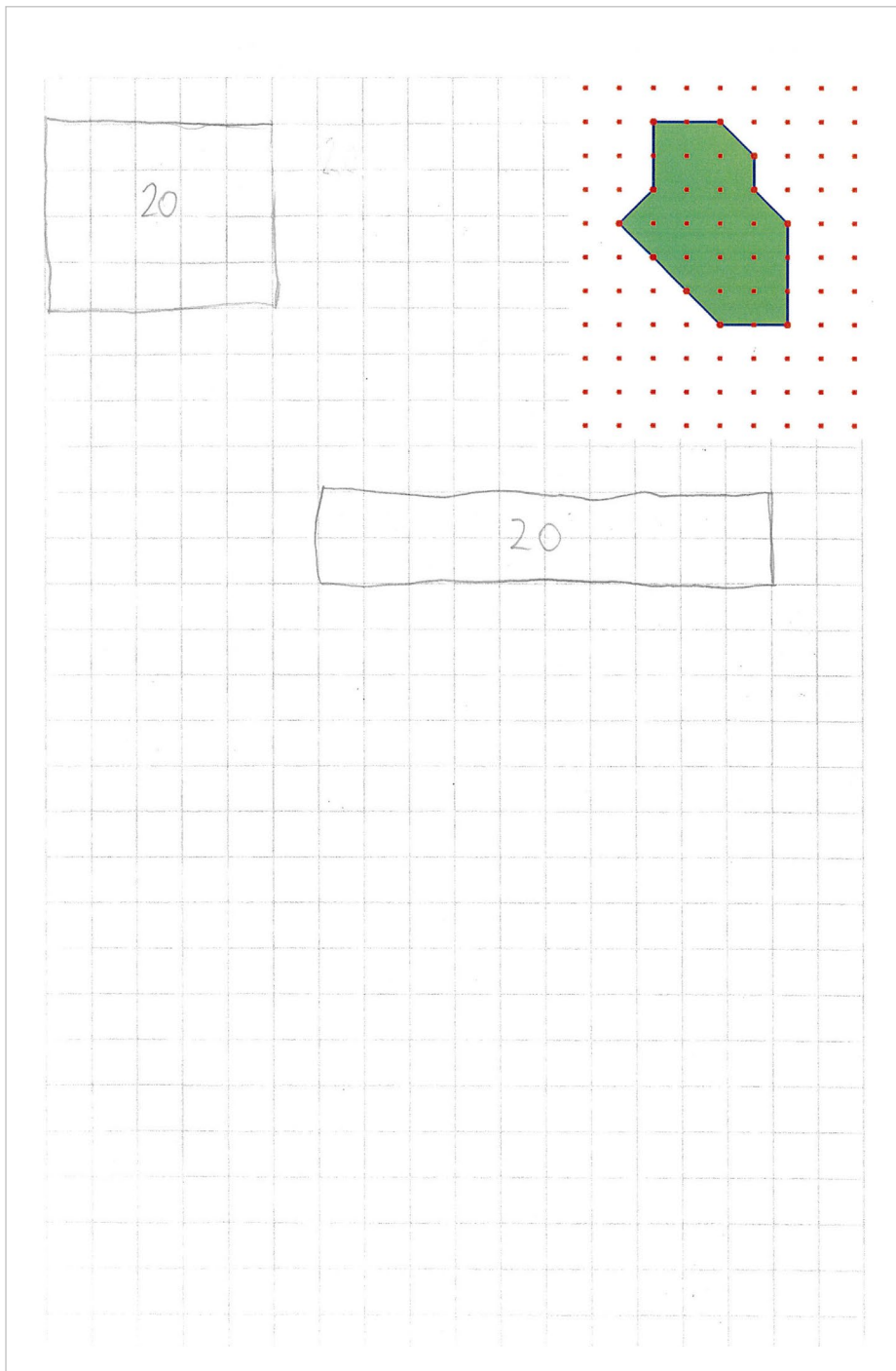
Students were asked to draw quadrilaterals with the same area as the given diagram.

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Measurement: Quadrilaterals



Annotations

Draws two rectangles with whole number side lengths which give the same area as the irregular shape.

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Number: Odd and even

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Summary of task

Students had completed a unit of work on addition and subtraction of numbers, investigating combinations of odd and even numbers.

Students were given one lesson to complete this task.

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Number: Odd and even

Annotations

Anna added three consecutive numbers together and the answer was an odd number. What numbers might they have been?

$$\begin{array}{r} 36 \\ + 37 \\ + 38 \\ \hline 111 \end{array}$$

odd numbers don't have a partner & even numbers do have partners

add the two then the answer is 111

$6 + 7 + 8 = 21$
 $3 + 3 + 3 = 9$

you can't do all 3 consecutive numbers because even odd even makes it odd

If you times an even by an even you get an even if you times an odd and an odd you get odd when you times an odd and even you get an even.

Demonstrates an understanding of the meaning of consecutive numbers.

Calculates addition algorithm using partitioning.

Calculates one example of the addition of three consecutive numbers to give an odd number as an answer.

Attempts to generalise the result.

Demonstrates simple understanding of odd and even numbers.

Demonstrates wider thinking of the concept.

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Number: Bingo

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Summary of task

Students had been practising their multiplication facts. Students were given this task to complete in a half-hour time period in class.

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Number: Bingo

Bingo Assessment Task

Design your own 4x4 grid in order to maximise your chances of achieving a bingo – 4 numbers in a row – diagonally, horizontally, vertically or the four corners. The aim of the game is to achieve a bingo in as few moves (multiplication facts) as possible.

72	24	16	36
4	9	28	42
10	60	30	54
8	6	12	32

Select 4 numbers from your grid and explain why you included them.

I have chosen 36, 16, 12, 72 because they appear a few times.

Choose 2 numbers you didn't include on your grid and write why you didn't choose them.

I've chosen 79 and 0 because they don't appear once.

Annotations

Selects some products that occur relatively frequently in the multiplication facts up to 10×10 .

Explains that some products occur more frequently in the multiplication facts up to 10×10 .

Excludes particular numbers with justification that they are not the result of a multiplication fact up to 10×10 .

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Geometry: Symmetry

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Summary of task

Students had completed a unit of work on two-dimensional shapes and their properties including symmetry.

Students were asked to draw shapes with more than four sides that had at least one line of symmetry and to create quadrilaterals that didn't have any lines of symmetry.

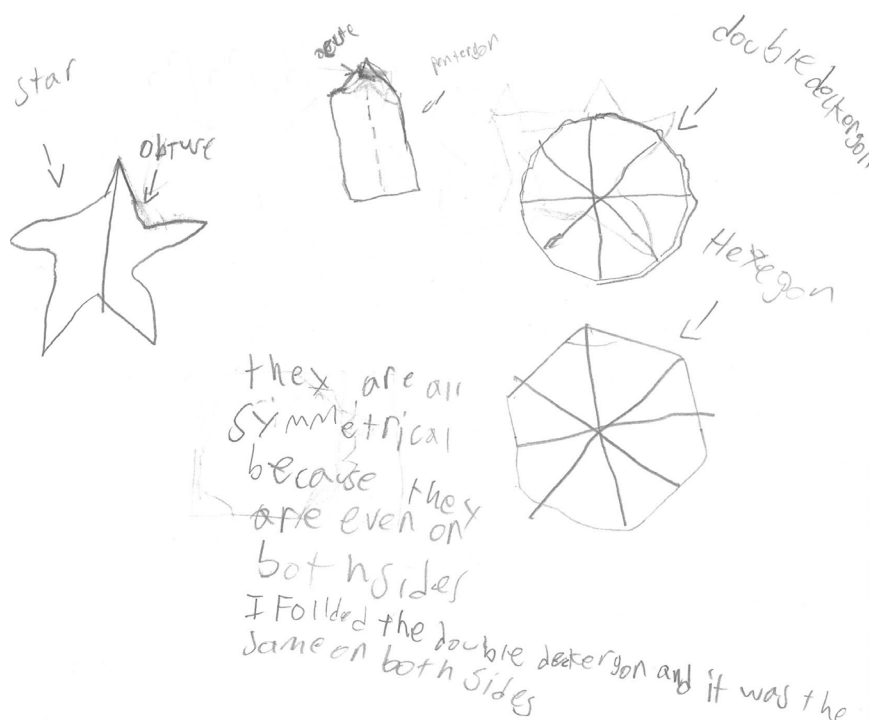
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Geometry: Symmetry

What different shapes with more than 4 sides can you create that have at least one line of symmetry?



Annotations

Identifies types of angles.

Draws shapes that are symmetrical.

Identifies lines of symmetry of shapes.

Describes why shapes are symmetrical.

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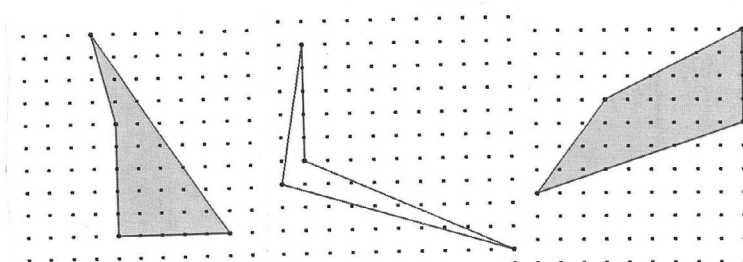
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Geometry: Symmetry

TASK 2

What different quadrilaterals can you create on a virtual geoboard that have NO lines of symmetry?



I don't think my shapes have names I know they are 4 sided shapes and no symmetry which are quadrilaterals.
I know they aren't symmetrical because there not even on both sides.

Annotations

Creates asymmetrical shapes.

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Number: Sentences

Year 4 Mathematics achievement standard

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Summary of task

Students had completed a unit of work on addition, subtraction and identification of unknown quantities in number sentences.

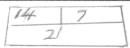

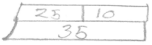
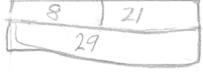
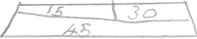
Students were asked to complete a series of problems showing their visual representations to solve the problem and a number sentence with an answer.

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Number: Sentences

Complete the grid below to solve the problems. You are able to choose how you represent the problem. You may wish to use diagrams or number sentences.

The problem	Representations	Calculator number sentence. Include your answer.
Peter has 14 cats eye marbles and 7 pearly marbles. How many marbles does he have altogether?	$14 + 7 = 21$ 	$14 + 7 = 21$
Sarah sorted out her pencils and threw out 12 old pencils. She ended up with 17 pencils. How many did she have to start with?		$17 - 12 = 5$
The teddy bear weighs 25 grams. The toy car weighs 10 grams more than the teddy. How heavy is the car?		$25 + 10 = 35$
The farmer had some cattle. She sold 8 of her cattle and she had 21 cattle left on the farm. How many cattle did she have to start with?		$8 + 21 = 29$
Harry had some money saved for a new bike. He was given \$15 for his birthday and then had \$30. How much money did he have to start with?		$15 + 30 = 45$

Annotations

Creates number sentences using addition and subtraction to solve a written problem.

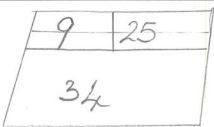
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Number: Sentences

The problem	Representations	Calculator number sentence. Include your answer.				
There were 9 books on the shelf. At the end of silent reading the children packed away and now there are 25. How many books did they put on the shelf?						
Lexi had \$14 and 20¢. Her friends Jenny and Sue gave her some more money. How many money does she have altogether?	<table border="1" data-bbox="739 826 922 906"> <tr> <td>14</td> <td>?</td> </tr> <tr> <td colspan="2">30</td> </tr> </table>	14	?	30		
14	?					
30						

Can you write an addition and subtraction number sentence for each part/part/whole diagram?

12	13
?	

18	?
38	

Annotations

Writes a problem to match given information.

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Number: Fractions and decimals

Year 4 Mathematics achievement standard

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Summary of task

Students had completed a unit of work on fractions, looking at halves, quarters, thirds, fifths, sixths, eighths and tenths of collections and a whole.



Students were asked to choose two fractions that are equivalent and fill in the appropriate information on a think board. They also had to cut a length of string and create a blank number line, marking their fractions and decimals on it.

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Number: Fractions and decimals

Symbolic representation Write your equivalent fractions $\frac{1}{4} = \frac{2}{8}$		Write your equivalent fractions in words one quarter one quarter	
Pictorial Representation Whole 		Write in decimal form 0.25 0.25	
Collection 		Give an example of where you might see this fraction in a real life situation When you're at a shop and the and a block of ham is 10 kg and I asked for a quarter of it.	

Annotations

Identifies equivalent fractions.

Draws one pictorial representation of the fraction.

States the decimal equivalent of the fraction.

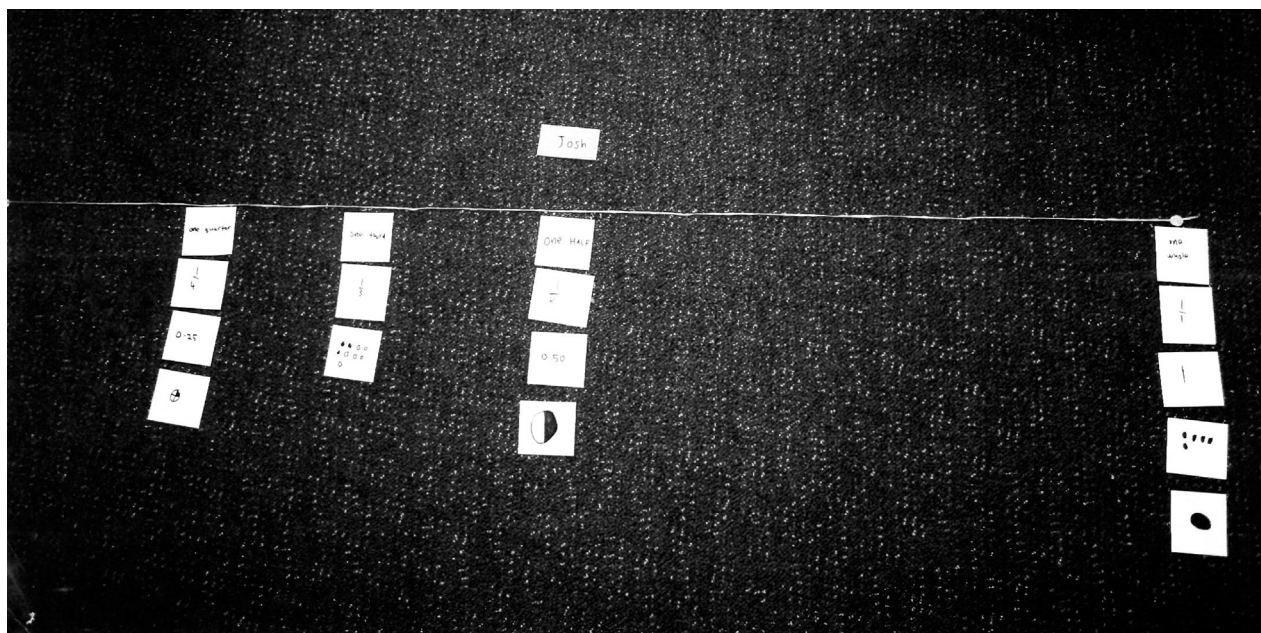
Draws 1/4 of a collection.

Gives a real-life example where the fraction could be used.

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Number: Fractions and decimals



Annotations

Locates some equivalent fractions on a number line.

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Measurement: Time word problems

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Summary of task

The students had completed two units of work on time during the year, including calculating the duration of events using start and finish times and converting between units of time, such as from hours to minutes. There had also been a focus on problem-solving using different techniques, including explicit teaching of the empty number line.

The students were given the problem-solving tasks as a class and the teacher read through the problems, clarifying any questions related to meaning. The students then completed the work individually as a formal assessment task.

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Measurement: Time word problems

Time Word Problems

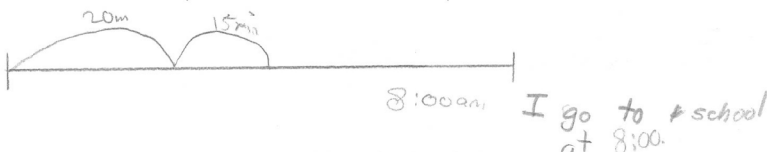
Would rather have your Sports lesson for 1 hour 10 minutes or 80 minutes? Explain why.

80 minutes because you have more time to do more sport.

It is 9 weeks and 2 days till your classmate's birthday party. How many days do you have to wait for their birthday party?

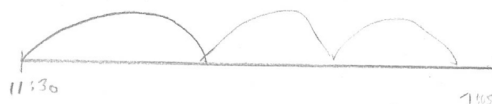
$9 \times 7 = 63$ 63 + 2 = 65 65 days until the birthday party comes.

You are going on an excursion to Elizabeth Farm and need to arrive 20 minutes before the bus leaves. It takes you 15 minutes to walk to school. The bus is leaving at 8:30am. What time do you need to leave home so that you don't miss the bus?



You are having a race on your bike with a friend. The race starts at 11:30am, your friend finishes at 1:05 pm and you finish 6 minutes earlier. Calculate the time you and your friend were cycling.

I was cycling for 3 hours and 54 mins



It took you 5 minutes and 12 seconds to swim 10 laps of an Olympic swimming pool. How many seconds were you in the water for?

Approximately how long did it take you to swim each lap?

$\frac{60 \times 5}{10} = 300$ 312 seconds in the pool
12 seconds in a pool lap

Annotations

Compares time durations.

Uses a multiplicative strategy to convert efficiently between units of time.

Labels appropriate time durations on an empty number line.

Converts from minutes to seconds.

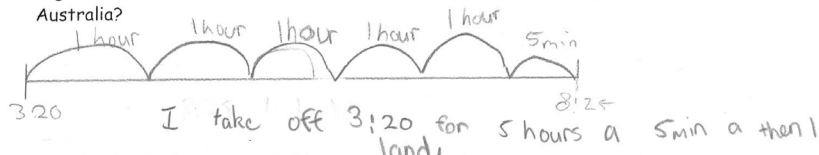
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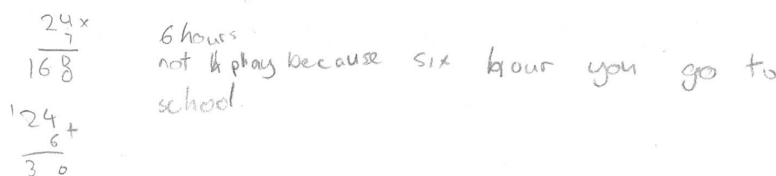
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Measurement: Time word problems

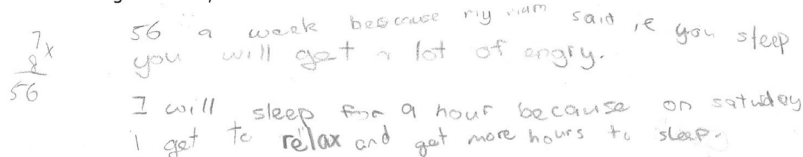
You are going on a holiday to Fiji. You arrive in Fiji at 3:20pm (Australian Time). If the flight from Australia takes 5 hours and 5 minutes, what time did you take off from Australia?



You play for 30 hours a week. List some possible times for your play routine. How many minutes in a week do you spend 'not playing'?



Add up the total amount of sleep you get each week. Predict how much sleep you will get tomorrow night and why?



Write a time problem that involves the following times 8:00 am, 1 hour 20 min

I was going to the shop to buy carrots and I were for 1hr and I went to buy clothes for 120min.
How long do I go for??

Annotations

Calculates the number of hours in a week.

Makes a prediction and provides a reason.

Writes a simple time problem.

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Number: Sausage sizzle

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Summary of task

A unit on money and financial mathematics linking with number, fractions and decimals was taught for two weeks. The Australian Securities and Investments Commission (ASIC) Helping Out Teaching Resource (<http://teaching.moneysmart.gov.au/mst-digital-resources/helping-out/index.html#start>) was used as a teaching tool. The assessment task was adapted from the ASIC Helping Out game. The students played the game a number of times during the teaching of the unit.

Students were given one hour to complete the assessment task individually, under examination conditions at the end of the unit.

Mathematics

Year 4

Below satisfactory

Number: Sausage sizzle

Sausage Sizzle Fundraiser

Part A:

Your Principal has asked for your help to organise the end of term BBQ fundraiser. You can borrow up to \$400 from the school to start up the fundraiser, however, it needs to be paid back.

Some information you will need:

- 400 students in the school
- Sausages will cost \$5 per kilo (10 sausages)
- Rolls will cost 25c each
- Tomato sauce will cost \$4.55 per bottle (40 serves)

Budget: How much will it cost?

Sausages	Rolls	Sauce
$\begin{array}{l} \text{Sausages} = \$5 \text{ per kilo} \\ 400 \div 10 = 40 \text{ kilo} \\ \begin{array}{r} 40 \\ \times 5 \\ \hline \$200 \end{array} \end{array}$	$\begin{array}{l} \text{Rolls} = \$0.25 \\ 0.25 = \frac{1}{4} \\ \frac{1}{4} \text{ of } 400 = 100 \\ 100 \times \$1.50 = \$150.00 \end{array}$	$\begin{array}{l} \text{Sauce} = \$4.55 \\ 40 \times \$4.55 = \$182.00 \end{array}$

Total Cost:

$$\begin{array}{r} 200.00 \\ 150.00 \\ 182.05 \\ \hline 532.05 \end{array}$$

Price of Sausages: Explain Why?

Because the last time we had a sausage sizzle it was \$5.00 for sausage, chips and drink so I halve the price and for paying back.

Income: What is the total amount of money you will collect after selling all the sausages?

$$\begin{array}{r} 400 \\ \times 3.00 \\ \hline 1200.00 \end{array}$$

Profit: How much money can you make?

Remember your need to pay back the start up cost.

$$\begin{array}{r} 1200.00 \\ - 532.05 \\ \hline 667.95 \end{array}$$

Adapted from ASIC's MoneySmart Teaching Digital Resource:
<http://teaching.moneysmart.gov.au/resource-centre/teaching-resources/asic-helping-out?page=2&yl=0&la=0&a=0&rt=146>

Annotations

Uses an algorithm to perform calculations involving the multiplication of whole numbers.

Uses prior experiences to justify the pricing of an item.

Calculates expected income from sales.

Calculates expected profit from sales.

Mathematics

Year 4

Below satisfactory

Number: Sausage sizzle

Annotations

Helping Out

Part B:

Some of your profit needs to be donated to Papua New Guinea to assist their schools.
1AUD= 2.5PGK

How much PGK are you going to donate? Show your working.

$\begin{array}{r} 809.95 \\ \times 2.05 \\ \hline 4049.75 \\ 0000.00 \\ 161940.00 \\ \hline 166039.75 \end{array}$

What will you buy with your PGK?

Desks = 30 PGK 200 Desk.

Chairs = 20 PGK 200

Exercise books = 2 PGK 200

PGK 16 6039.75

I am donating \$100,000.00

What will you buy with your PGK?

Desks= 30 PGK	200	Desks
Chairs= 20 PGK	200	
Exercise books= 2 PGK	200	

workbooks
10
8-9 600.00
400.60

9600.00

chairs

94,600.00
4000.00
<hr/>
90600.00

$$\begin{array}{r} 19 \\ 100,000 \\ \hline 91,900 \end{array}$$

Desks

0	9	6			
1	0	0	,	0	0
				6	,000,00
<hr/>					
				94	,000,00

Adapted from ASIC-Helping Out Teaching Resource

Adapted from ASIC's MoneySmart Teaching Digital Resource:
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Recognises that multiplication is involved when converting currencies.

Mathematics

Year 4

Below satisfactory

Statistics: Data

Year 4 Mathematics achievement standard

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

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 x 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 had completed a unit of work on collecting, representing and displaying data. This task was given to them as a task over several mathematics lessons as an end-of-unit assessment.

Students had to reflect on the best way to ask a question to collect and present data. They were asked to predict the responses, collect the data and construct a data display with the information collected.

Mathematics

Year 4

Below satisfactory

Statistics: Data

Data Assessment Task Part 1

Name:

Date:

4 Green are planning a special class lunch and their teacher needs to know the most popular fast food amongst the students. The teacher has decided to survey the students.

View the two survey questions below and circle the question that will best provide the teacher with the data he /she needs.

Explain why you believe that question to be best.

What is your favourite fast food?

My favourite fast food is:

- ☐ Mc Donald's
- ☐ KFC
- ☐ Fish And Chips
- ☒ Pizza Hut
- ☐ I Don't Like Fast Food

I chose this because Pizza Hut has toppings that are healthy and the don't deep fri pizza.

Annotations

Selects an effective question to collect data.

Mathematics

Year 4

Below satisfactory

Statistics: Data

Data Assessment Task Part 2

Predict the **total number** of given devices that Year 4 students have in their homes.

Devices	Number Of Devices
iPad	41
Mini iPad	3
Mobile Phone	40
Tablet	4
Laptop Computer	26
Desktop Computer	24
Gaming Device	40
TOTAL NUMBER OF DEVICES	158

Record in the table below the **actual** number of given devices that Year 4 students have in their homes

Devices	Number Of Devices
iPad	28
Mini iPad	7
Mobile Phone	69
Tablet	13
Laptop Computer	55
Desktop Computer	23
Gaming Device	68
TOTAL NUMBER OF DEVICES	

Annotations

Makes predictions in an investigation.

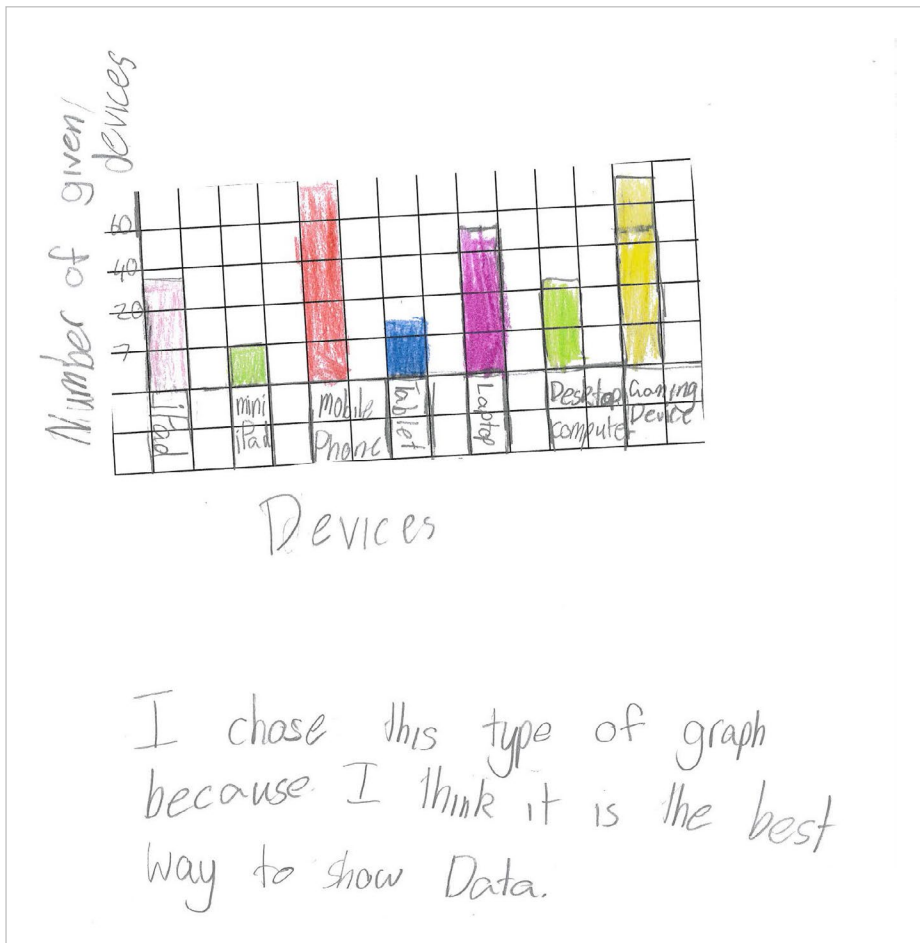
Records data from a survey.

Mathematics

Year 4

Below satisfactory

Statistics: Data



Annotations

Selects and constructs a column graph to represent the data collected.

Selects and uses appropriate labels for the axes.

Justifies the selection of a column graph using personal experience.

Mathematics

Year 4

Below satisfactory

Statistics and probability: One minute challenge

Year 4 Mathematics achievement standard

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

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 had completed work on the topic of chance twice during the year. They had participated in activities using dice, coins and spinners and had predicted the chance of events occurring and identified events that can't happen at the same time.

This assessment was given after the second series of lessons. Students were asked to independently complete a series of tasks related to chance.

Mathematics

Year 4
Below satisfactory

Statistics and probability: One minute challenge

One Minute Challenge

Using a coin, toss it as many times as you can in one minute. Record your results below.

Results:

Tails: HTT 7
Heads: 4

Which result occurred the most?
Tails

Can you explain why this happened?
because it flipped the most times.

Did the result of the previous coin toss influence the result of the next coin toss? Why or Why not?
If I got tails it would mean that I will get tails again.

A New Student

Imagine a new student is about to join the class. Order the following statements, from least likely to most likely to occur. Using the underlined key words, place them on the line. Create your own chance statement to place on the line.

The student is a girl.
 The student is the same age as a majority of the students in the class.
 The student is 21 years old.
 The student has a head.
 The student lives in the local area.
 The student likes sport.
 The student has a sibling also coming to the school.

Your own: The student is a boy.

Least Likely 21 years old sibling same age girl lives in the local area likes sport Head Most Likely

Annotations

Records the results of repeated trials in a chance experiment.

Identifies the outcome with the highest frequency in a chance experiment.

Recognises when the results of previous trials in a particular chance experiment do not affect the results of subsequent trials.

Creates a simple chance statement that has the same likelihood as one of the given statements.

Orders events from least likely to most likely to occur.

Mathematics

Year 4

Below satisfactory

Statistics and probability: One minute challenge

Why can't this happen?

Consider the following events, what event cannot happen if other does.

If the sun is rising it cannot go down at the same time.

If it is dry it cannot wet at the same time.

If I roll a 5 in a six sided die I cannot get a 1, 2, 3, 4, 5 at the same time.

Create 2 of your own events where one cannot happen if the other happens.

If it is Sunday it cannot be Monday at the same time.

If she is my friend it cannot be my enemy.

Annotations

Identifies some events that cannot happen at the same time as particular given events.

Describes pairs of everyday events that cannot happen at the same time as each other.