

Mathematics

Year 3
Satisfactory

WORK SAMPLE PORTFOLIO

The 2012 portfolios are a resource to support teachers in planning and implementation of the Foundation to Year 10 Australian Curriculum in the learning area. Each portfolio comprises a collection of student work illustrating evidence of student learning in relation to the achievement standard. At every year level there are three portfolios illustrating satisfactory, above satisfactory and below satisfactory achievement in relation to the standard.

Each portfolio comprises a collection of different student work selected by state and territory nominees, and annotated and reviewed by classroom teachers and other curriculum experts. Each work sample in the portfolio varies in terms of how much time was available to complete the task and/or the degree of scaffolding provided by the teacher.

There is no pre-determined number of student work samples in a portfolio nor are they sequenced in any particular order. Together as a portfolio, the samples provide evidence of all aspects of the achievement standard unless otherwise specified.

As the Australian Curriculum is progressively implemented in schools, the portfolios will continue to be reviewed and enhanced in relation to their comprehensiveness in coverage of the achievement standard and their representation of the diversity of student work that can be used to highlight evidence of student learning.

THIS PORTFOLIO – Year 3 Mathematics

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

Sample 1	Number – Lunch order
Sample 2	Number – All about a fraction
Sample 3	Measurement – How much is there?
Sample 4	Geometry – What is on my island?
Sample 5	Number – Neighbourly numbers
Sample 6	Geometry – Symmetry
Sample 7	Geometry – Smaller than a square
Sample 8	Statistics – Ice-cream flavours
Sample 9	Number – Apple Orchard
Sample 10	Algebra – 20 Charlie
Sample 11	Measurement – Time
Sample 12	Number – Market stall

This portfolio of student work demonstrates addition and subtraction computation strategies (WS1, WS12) and the classification of odd and even numbers (WS5). The student identifies and creates number patterns (WS5, WS10) and models unit fractions (WS2). The student measures capacities (WS3), draws maps and locates features (WS4). The student identifies symmetry and angles in their environment (WS 6, WS7) and creates tables and graphs from given information (WS8). The student solves problems using multiplication and addition (WS9) and calculates the cost of items in a class shop including the giving change from different amounts tendered (WS12). The student creates a presentation to teach others how to tell the time to the minute (WS11).

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The annotated samples in this portfolio provide evidence of most (but not necessarily all) aspects of the achievement standard. The following aspects of the achievement standard are not evident in this portfolio:

- *count to and from 10,000*
- *use metric for length and mass*
- *conduct chance experiments and list possible outcomes.*

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Number – Lunch order

Relevant parts of the achievement standard

By the end of Year 3, students recognise the connection between addition and subtraction and solve problems using efficient strategies for multiplication. They model and represent unit fractions. They represent money values in various ways. Students identify symmetry in the environment. They match positions on maps with given information. Students recognise angles in real situations. They interpret and compare data displays.

Students count to and from 10 000. They classify numbers as either odd or even. They recall addition and multiplication facts for single digit numbers. Students correctly count out change from financial transactions. They continue number patterns involving addition and subtraction. Students use metric units for length, mass and capacity. They tell time to the nearest minute. Students make models of three-dimensional objects. Students conduct chance experiments and list possible outcomes. They carry out simple data investigations for categorical variables.

Summary of task

Students had completed a unit of work focusing on addition and subtraction computation strategies.

Students were asked to create a lunch order with a total cost of \$5.00 demonstrating addition and subtraction computation strategies. The lunch order had to include a food item from each section of the canteen menu (lunch, drink and snack).

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Number – Lunch order

SPECIAL LUNCH CHALLENGE



Lunch: <u>Margarita pizza</u>	Price: <u>\$1.95</u>
Drink: <u>Juice box</u>	<u>\$1.00</u>
Snack: <u>Yoghurt stick</u>	<u>15c</u>
Total: (remember to tape your expected change on the bag)	<u>3.10</u>

Special Lunch Challenge Name: _____

$\$1.00 + \$1.00 + \$1.00 + \$1.00 = \$4.00$

← $\$1.00 \quad \$2.00 \quad \$3.00 \quad \$4.00 \quad \$5.00$ →

$\$4.00 - \$1.95 = \$4.00 - \2.00 $\$4.00 - \$2.00 = 2.00 - 5$ $= 2.00 - 5$ $= 1.95$	$\$1.95 - 15c = \$1.95 - 10c$ $\$1.95 = 10 - 5$ $= 1.85 - 5$ $= 1.80$
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$\begin{array}{r} \$2.95 \\ + \quad 15 \\ \hline 3.10 \end{array}$

Annotations

Calculates change and selects coins to represent change.

Calculates the cost of lunch.

Uses an empty number line to calculate change.

Uses compensation strategy to calculate change with an error.

Uses the jump strategy to calculate change.

Use formal addition algorithm to calculate cost.

Acknowledgement

ACARA acknowledges the contribution of Australian teachers and education authorities in providing the tasks and work samples. The annotations are referenced to the Australian Curriculum achievement standards.

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Number – All about a fraction

Relevant parts of the achievement standard

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Summary of task

Students had completed a unit of work on fractions looking at fractions as part of a whole and fractions as part of a collection. They also investigated which fractions are bigger and smaller and where they fit on a number line.

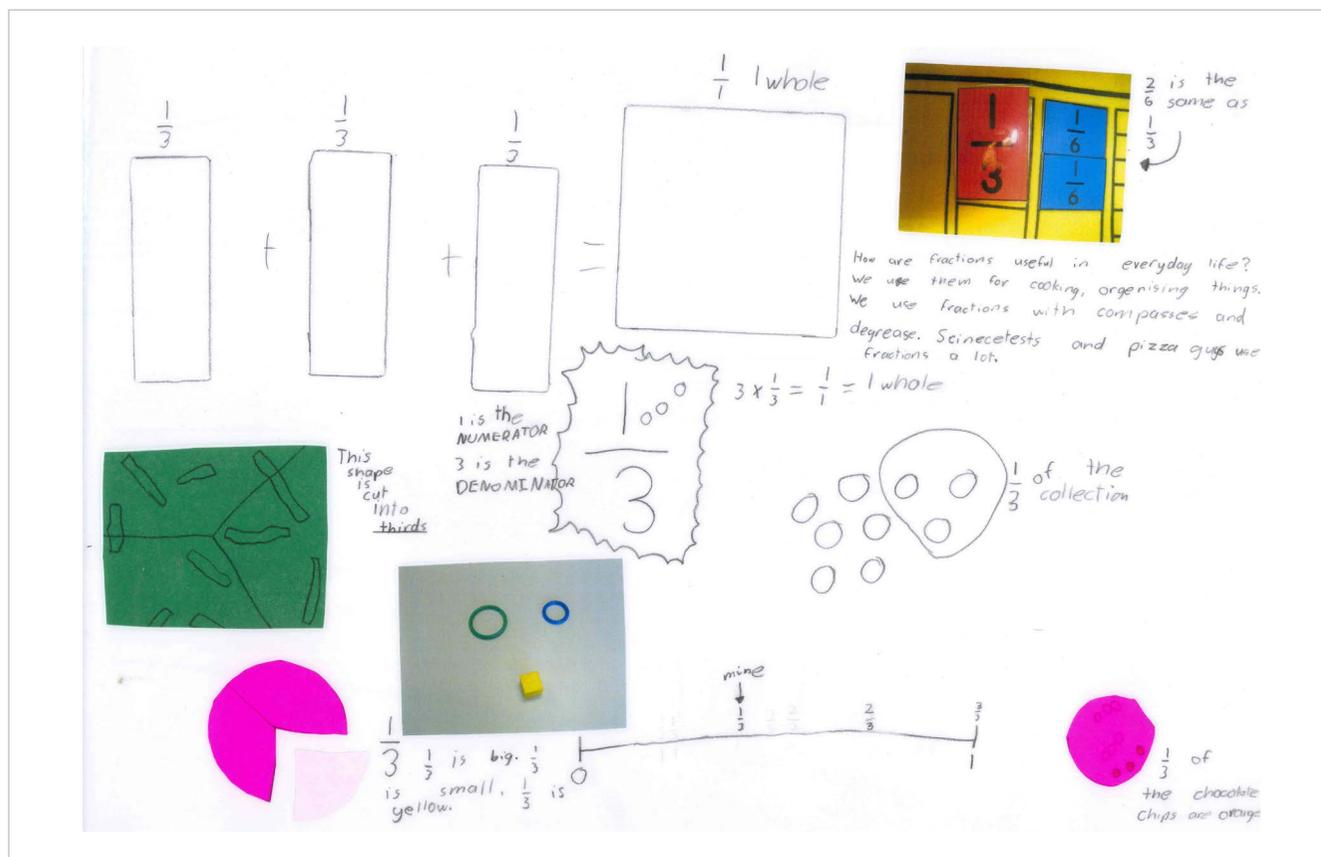
Students were asked to choose a fraction and record everything they knew about it. They were given access to all classroom resources to complete the task. They were also asked to answer the following question:

Explain how fractions are useful in everyday life?

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Number – All about a fraction



Annotations

Models and represents the unit fraction 1/3.

Explains the use of fractions in everyday life.

Identifies 1/3 of a collection.

Identifies 1/3 of a shape.

Locates 1/3 on a number line.

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Measurement – How much is there?

Relevant parts of the achievement standard

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Summary of task

Students had completed a unit of work on metric units for capacity, including hefting buckets of water, predicting, measuring using scales, reading and working with millilitres and litres.

Students were asked to complete a series of questions based on the previous classwork on estimating and reading capacity levels.

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Measurement – How much is there?

Millilitres and litres

- How many millilitres are in 1 litre? 1000
- How much liquid is in each of the 3 jugs below? Write your answer below each jug.



<u>1200</u> ml <u>1.2</u> L	<u>1450</u> ml <u>1.450</u> L	<u>650</u> ml <u>0.650</u> L
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- How much liquid would each container roughly hold below. Write down your estimate (eg: 200ml - 250ml).

A cup of coffee A water bottle A bottle of milk A can of fizzy cordial



375ml 600ml 2L 375ml

Annotations

Demonstrates an awareness of the relationship between metric units.

Reads and records simple capacity measurements.

Estimates capacity of familiar items with some accuracy.

Acknowledgement

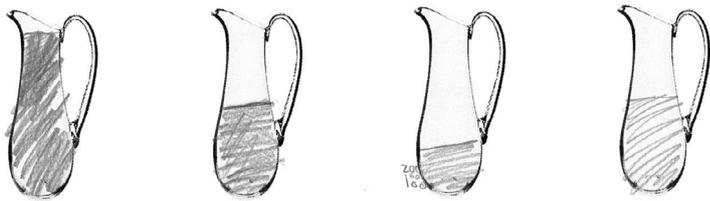
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Measurement – How much is there?

different measurement below:



1 L 500ml 250 ml 750 ml

Annotations

Estimates relative capacity with some accuracy.

Acknowledgement

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Geometry – What is on my island?

Relevant parts of the achievement standard

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Summary of task

Students had completed a unit of work on mapping that involved exploration of a range of maps with interactive white board activities, atlases and games such as Battleships.

Students were given grid references linked to entry and exit points of locations on a map. From the information given, they had to draw a map and write directions for locations on the map.

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Geometry – What is on my island?



Directions

West Point Park: F4. motels: E3.
 Glow worm cave: D4. Coral reef: G4.
 Surf board rentals: E2. Boat ramp: G2.
 forest: E2, D2, D3. Surfing waves: D1, D2, E1, F1, G1.
 ripstick park: F3.
 Pub: F6,
 Mountains: E5.
 animal centre: D5.

Annotations

Creates a legend to convey information on a map.

Uses coordinates to indicate location of features on a map.

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Number – Neighbourly numbers

Relevant parts of the achievement standard

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Summary of task

Students had investigated odd and even numbers and whether they could be grouped into twos. They had also investigated the results of adding two even and two odd numbers.

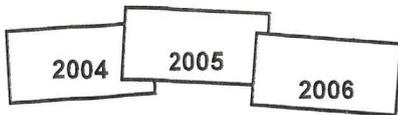
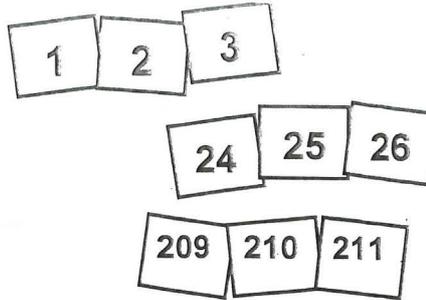
Students brainstormed all they knew about odd and even numbers. They then completed the task. They were encouraged to try adding mentally first and to check their total using a calculator for larger calculations. Students used colour to highlight patterns that they identified. Neighbourly numbers had been discussed and investigated.

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Number – Neighbourly numbers

My neighbourly numbers



What happens when you add three numbers in a row?
Use blocks or square paper or just add up in your head!
Choose your own numbers and write down the sums you make.

1	2	3	6
4	5	6	15
7	8	9	24
10	20	11	31
30	40	201	271
24	25	26	75
26	27	28	81
30	31	32	93
40	41	42	123

201	202	203	606
298	299	300	897
398	399	400	1197
198	199	200	597
498	499	500	1497
598	599	600	1797
2004	2005	2006	6015
2400	2401	2402	7203
1099	2000	2001	6000

Annotations

Classifies numbers as odd or even.

Acknowledgement

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Number – Neighbourly numbers

ODD and Even numbers

Even

0 2 4 6 8

Odd

1 3 5 7 9

Even

0000 → 😊

0000 → 😊

Odd

12 → 😊

3 → 😊

5 → 😊

7 → 😊

9 → 😊

Don't worry about the number(s) in front, worry about the number on the end.

Even

22 20 4

2x 6 38

40 8

10 18

14 12 2

2 6

26 28

30 32 34

36 44 50

2x

2x1=2

2x2=4

2x3=6

2x4=8

2x5=10

2x6=12

2x7=14

2x8=16

2x9=18

2x10=20

2x11=22

2x12=24

Even numbers can be shared equally in ones, but odd numbers have to be split to have equal numbers.

Even

00 → 😊

00 → 😊

Odd

00 → 😊

0 → 😊

Annotations

Identifies odd and even digits.

Identifies how to classify a number as odd or even.

Demonstrates understanding of the concept of odd and even.

Acknowledgement

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Geometry – Symmetry

Relevant parts of the achievement standard

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Summary of task

Students had completed a unit of work on identifying symmetry in shapes and objects in the environment.

Students were given two lines of symmetry and asked to find shapes and objects that had the lines of symmetry and to record their findings.

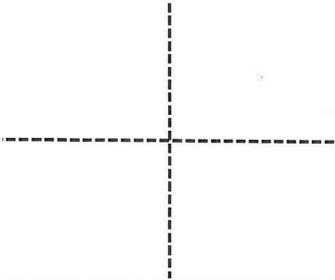
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Geometry – Symmetry

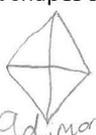
Annotations

Here are 2 lines of symmetry.

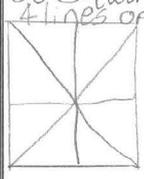


What shapes and objects can you find that they could belong to?

A diamond has 2 lines of symmetry



a Square has 4 lines of symmetry



The circle has 5 lines of symmetry but it could have more



this love heart



only has 1 line of symmetry



this shape has 2 lines of symmetry

Makes connections that a circle has infinite lines of symmetry.

Identifies the number of axes of symmetry.

Identifies shapes with symmetry.

Acknowledgement

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Geometry – Smaller than a square

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Summary of task

Students had completed a unit of work on identifying angles as measures of turn and the comparison of angle sizes.

Students were asked to identify angles that were smaller than, the same as and larger than a corner of a square.

Geometry – Smaller than a square

What angles can you find that are smaller than the corner of a square?

Annotations within the work sample:

- an obtuse angle is bigger than a right angle.
- this is a square
- these corners are right angles
- the outside of angle this is an obtuse angle
- these angles are smaller than a square
- obtuse
- acute
- right angle
- acute
- acute
- an acute angle is smaller than a right angle.

Annotations

Describes an obtuse angle.

Uses the mathematical symbol to represent a right angle.

Identifies acute and obtuse angles involving everyday objects.

Describes an acute angle.

Acknowledgement

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Statistics – Ice-cream flavours

Relevant parts of the achievement standard

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Summary of task

Students had completed a unit of work that included collecting data, drawing tables and graphs and discussing their findings compared with other students.

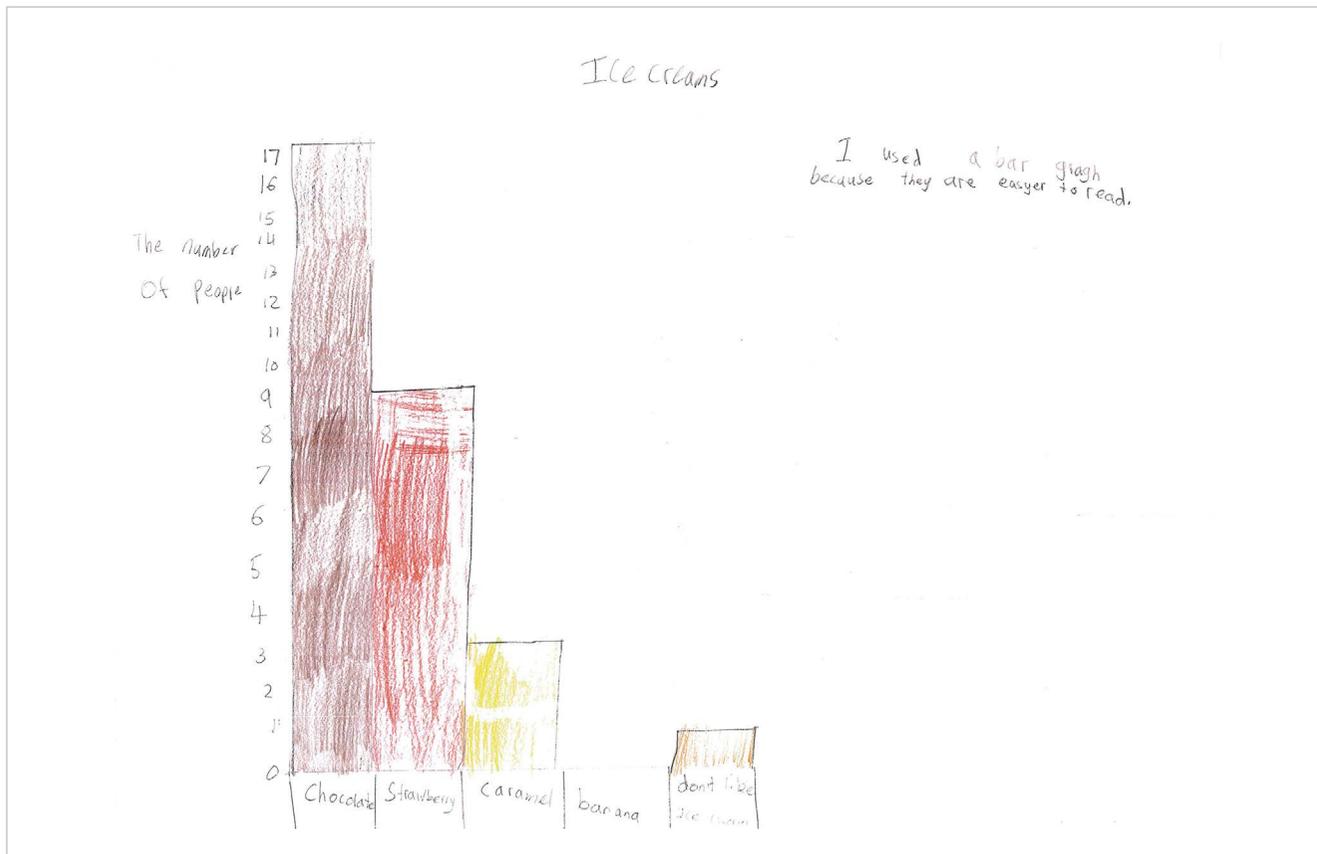
Students were given a task to survey the class about their favourite ice cream flavour. Using the data they had collected they were asked the following questions:

- Can you create a table and a graph to show what these findings could look like?
- What type of graph is most suitable and why?
- How will you record your work?
- How can you explain your graph?
- How do your results compare with others?

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Statistics – Ice-cream flavours



Annotations

Records why a column graph was used to represent data.

Uses data from a table to construct a simple column graph.

Acknowledgement

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Mathematics

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Statistics – Ice-cream flavours

Ice Cream

Chocolate	
Strawberry	
Caramel	
banana	
Dont like Ice cream	

Annotations

Interprets and organises data in a table using tally marks.

Acknowledgement

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Number – Apple Orchard

Relevant parts of the achievement standard

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Summary of task

Students had completed a unit of work on addition, multiplication and their connection and on using efficient mental and written strategies to solve problems.

Students were asked to answer the following question:

Sandie grew apple trees in orchards. One sunny Sunday she picked 24 apples from the trees in one of her orchards. Each tree had the same number of apples on it. How many trees could be in that orchard and how many apples on each tree?

Can you think of another number of apples that Sandie could pick from another one of her orchards? If so how many trees could be in the orchard and how many apples on the tree?

Mathematics

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Satisfactory

Number – Apple Orchard



Annotations

Draws pictures to demonstrate some of the possible answers to the problem.

Demonstrates an understanding that repeated addition and multiplication can be used to solve the problem.

Demonstrates a connection between a picture representation and a multiplication number sentence.

Uses multiplication to solve the problem.

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Algebra – 20 Charlie

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Summary of task

Students had completed a unit of work identifying the rules for number patterns and continuing or creating patterns.

Students were asked to solve the following problem:

Charlie created an addition number pattern which contained the number 20. What could the pattern be?

What other possibilities are there? Can you describe the rules for each of your patterns? How do you know if you have found all of the possibilities? What if your pattern also had to contain the number 36? If you had to create a subtraction pattern containing the number 20, explain why or why not the patterns could be the same as before.

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Algebra – 20 Charlie

Charlie created an addition number pattern which contained the number 20.

What could the pattern be?

2, 4, 6, 8, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36
I added 2 each time Rule = +2

4, 8, 12, 16, 20, 24, 28, 32, 36
I added 4 each time

2, 6, 8, 12, 14, 18, 20, 24, 26, 30, 32, 36
I added 2 then 4 each time

10, 20, 30, 40, 50, 60, 70, 80, 90, 100
I added 10 each time

3, 5, 8, 10, 13, 15, 18, 20, 23, 25, 28, 30
I added 3 then 2 each time

5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60.
I added 5 each time.

5, 10, 16, 20, 24, 30, 34, 40
I added 6 then 4 each time.

Annotations

Creates and continues a number pattern involving addition.

Identifies the rule in number patterns.

Creates and continues a number pattern with two addition values.

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Algebra – 20 Charlie

40, 38, 36, 34, 32, 30, 28, 26, 24, 22, 20, 18, 16
 I tacked away 2 each time.

100, 90, 80, 70, 60, 50, 40, 30, 20, 10
 I tacked away 10 each time

The difference to the other ones is
 you take away and the numbers
 get smaller

Annotations

Creates and continues a number pattern involving subtraction.

Identifies the difference in number patterns involving addition and subtraction.

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Measurement – Time

Relevant parts of the achievement standard

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Summary of task

Students completed a unit of work involving o'clock, half past, quarter to and quarter past as students didn't have this prior knowledge. Then the class progressed to telling the time to 5 minute intervals and to the minute.

Students were asked to use an interactive environment to teach someone how to tell the time to the minute.

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Measurement – Time



Annotations

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Number – Market stall

Relevant parts of the achievement standard

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Summary of task

Students had completed a unit of work on developing effective mental and written methods to solve addition and subtraction problems and exploring money.

Students investigated how many ways they could make \$1. They discussed the most appropriate choice of coins explaining their choices. They investigated and represented different ways to show money values up to \$20. They counted money collections and explored money problems involving addition and subtraction. They created and solved 'spending stories' choosing and using their own methods.

For this particular task students first took part in a class market stall afternoon where they ran their own shop along with two of their peers. They were given the opportunity to shop at other stalls as well as run their own stall. They were encouraged to buy multiple items to give the opportunity for the addition of money. There was also a bank where stall holders could change their money if they wished to have more coins.

Market Stall Role Play

Students were asked to individually run the class market stall. They were told they could use mental strategies or the whiteboard provided to assist them in their calculations. The customer (their teacher) would come to purchase some items.

Each student was asked to solve a transaction problem involving a single item (calculating change – subtraction) and then a transaction involving two items (adding together values and then calculating change or two subsequent subtractions). They were also asked to explain their thinking and asked how to give the change in a different way (representing money values in various ways).

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Satisfactory

Number – Market stall



Annotations

Acknowledgement

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