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 3 MATHEMATICS

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

Sample 1   Numbers – Apple combinations
Sample 2   Location – Positions on maps
Sample 3   Chance – Removing counters
Sample 4   Location – Home to the park
Sample 5   Fractions – Representing fractions
Sample 6   Money and financial transactions – Shopping purchases
Sample 7   Data representations – Interpreting and comparing data displays
Sample 8   Clock face
Sample 9   Finding the odd number

Mathematics

This portfolio of work samples demonstrates the student's ability to calculate combinations to 10 for both addition and subtraction (WS1, WS9) and represent fractions for collections and whole objects (WS5). The student locates co-ordinates on a map, creates a map of a local area from a top perspective and records directions from one place to another using a compass (WS2, WS4). The student makes predictions for the likelihood of a number being drawn when two dice are rolled and added (WS3). The student creates addition and subtraction problems for money values and correctly calculates purchase price and change given for a collection of items (WS6). The student investigates, creates and presents data in the form of a column graph, pie chart and bar graph (WS3, WS7), determines and justifies the most appropriate presentation of the data and tells time on both analogue and digital clocks to the minute (WS8).

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

- *identify symmetry in the environment*
- *count to and from 10 000*
- *use metric units for length, mass and capacity*
- *make models of three-dimensional objects.*

Mathematics

Work sample 1:
Numbers – Apple combinations

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

In this activity students recognised the connection between addition and subtraction.

Students were given ten counters and a work mat depicting two trees.

Students were presented with the following scenario:

'Mrs Day had two apple trees in her backyard. On Monday she picked three apples. How many apples did she pick from each tree?'
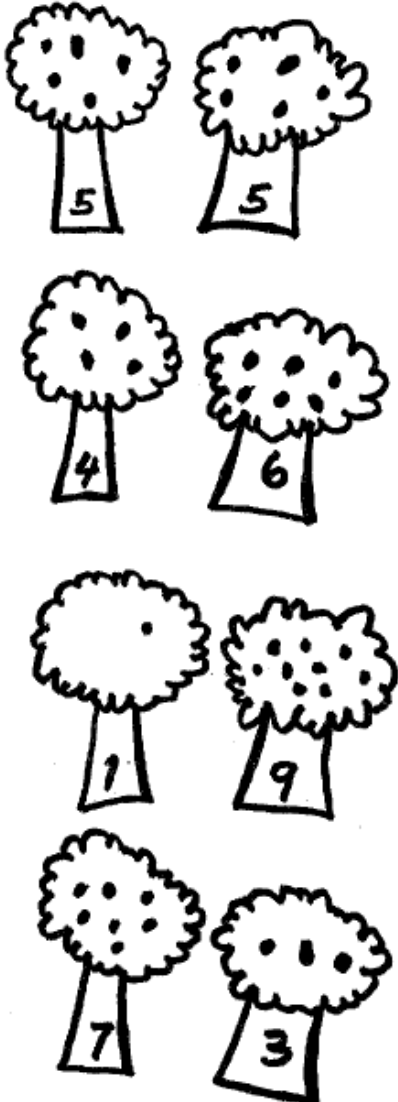
The teacher models the possible combinations for this problem:

- three apples from the left tree
- three apples from the right tree
- two apples from the left, one from the right, or
- two apples from the right, one from the left.

Students were asked to record the possible combinations if Mrs Day picked ten apples. Students were encouraged to use drawings, numerals and/or words in their recording.

Mathematics

Work sample 1:
Numbers – Apple combinations

$$5 + 5 = 10$$
$$5 - 5 = 0$$

$$4 + 6 = 10$$

$$1 + 9 = 10$$

$$7 + 3 = 10$$
$$7 - 4 = 3$$

Annotations

Identifies and describes patterns when counting.

Represents number patterns using diagrams.

Mathematics

Work sample 2:
Location – Positions on maps

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 were required to create a map. They were asked to draw items at the set coordinates on the map. They provided instructions to find a hidden treasure.

Mathematics

Work sample 2:
Location – Positions on maps

Annotations

Accurately records the location of objects on map using grid references.

Uses position language to describe direction.

Mathematics

Work sample 3:
Chance – Removing counters

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.
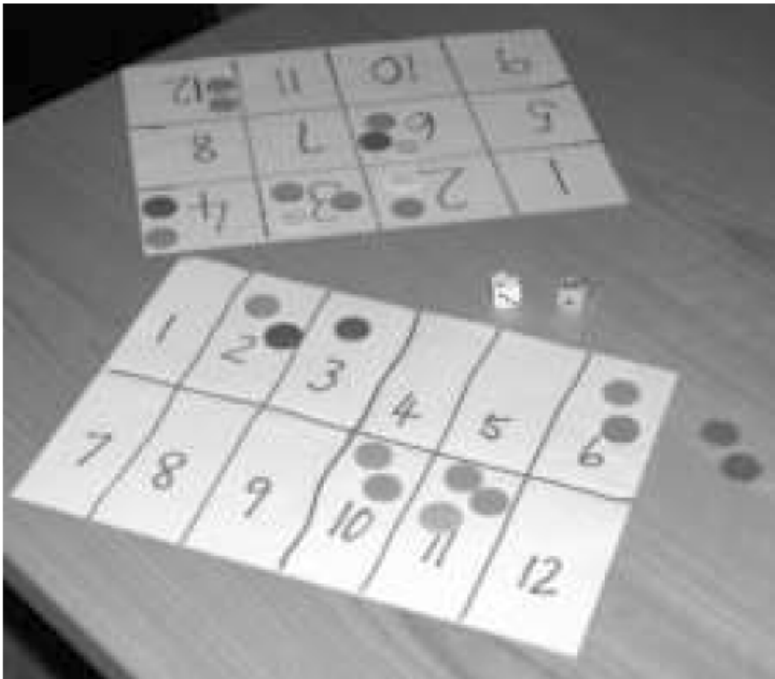
Summary of task

Students made a game board containing the numbers 1 to 12. In pairs, each student was given 12 counters to place on any of the numbers on their game board. Students could choose to place more than one counter on particular numbers and no counters on others.

Students took turns to roll and add two dice. If they have placed counters on the total obtained, they remove them. The first player to remove all their counters from their game board wins. Students predicted the likelihood of the most frequent combination of numbers being rolled.

Mathematics

Work sample 3:
Chance – Removing counters

Annotations

Applies an understanding of equally likely outcomes in situations involving a dice.

I predict that SIX will be the most likely total rolled. Six can be made up of 1+5, 3+3, 4+2 My prediction was right in one game and close in the other

Explains the difference between expected results and actual results.

Mathematics

Work sample 4:
Location – Home to the park

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.
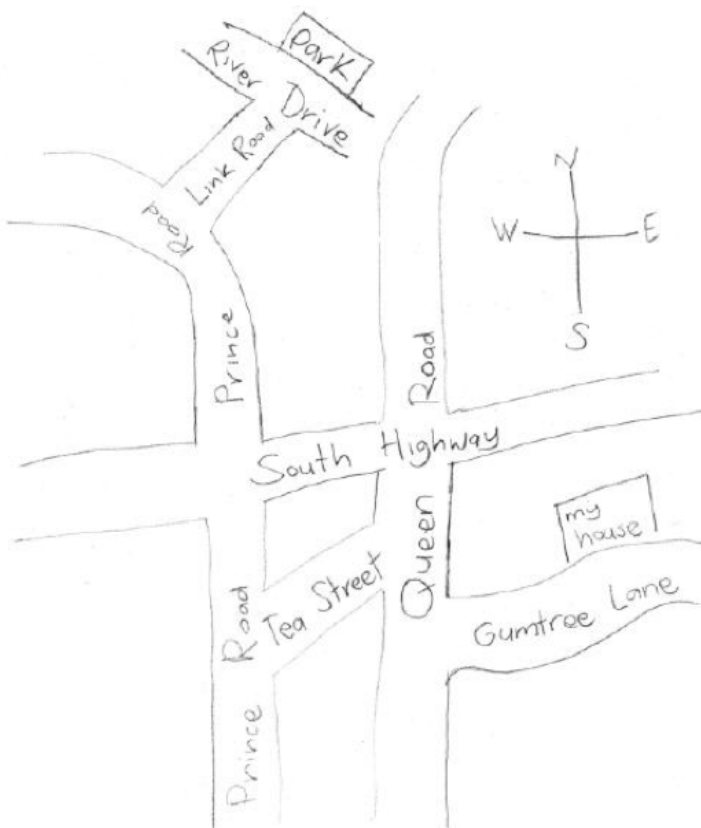
Summary of task

Students have had experience with using a compass and creating simple maps of familiar locations.

Students were asked to draw a map showing their route from home to their local park in response to the task of describing to a friend how they travel to the park. They provided instructions on the route they travelled from home to the park.

Mathematics

Work sample 4:
Location – Home to the park

Annotations

Compass points are referred to correctly in written descriptions.

Draws and labels their home, the park and surrounding roads using a 'birds eye' view.

Mathematics

Work sample 5:
Fractions – Representing fractions

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.
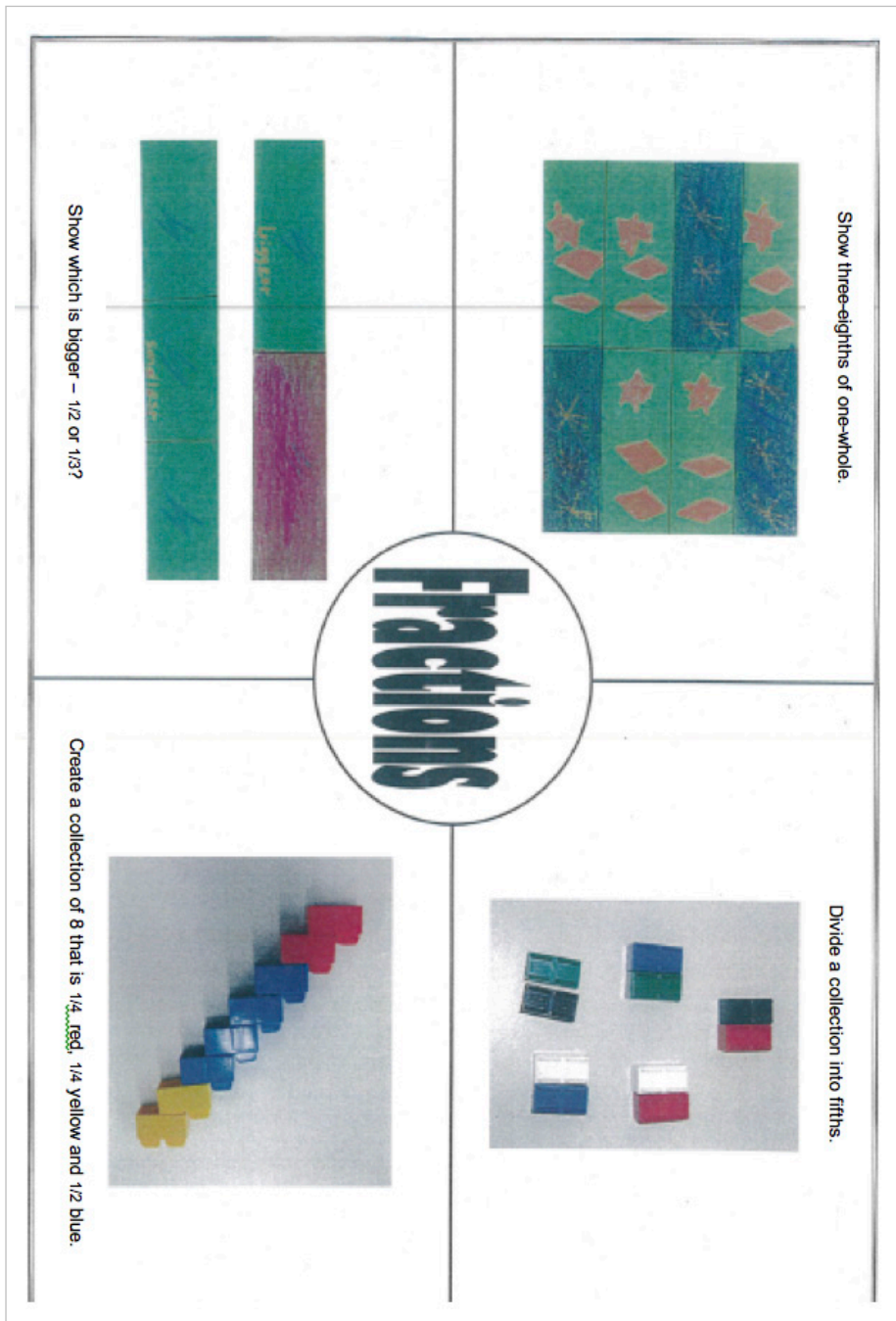
Summary of task

Students have been working on fractions of collections as well as fractions of a whole, possibly completed at the end of a unit on fractions.

Students were provided with cardboard and blocks and were asked to compare the size of unit fractions.

Mathematics

Work sample 5:
Fractions – Representing fractions

Annotations

Models and describes one fifth and three eighths.

Describes equal parts of a whole object or collection of objects.

Mathematics

Work sample 6:
Money and financial transactions – Shopping purchases

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 were required to cut out six pictures of products with prices from a catalogue and glue one in each box. They were asked to write an addition or subtraction problem that could be solved using each pair of products. Students were then asked to write and solve the algorithm.

Mathematics

Work sample 6:
Money and financial transactions – Shopping purchases

Annotations

Poses purchasing questions that can be solved using addition and subtraction strategies.

Shows calculation to demonstrate how an answer was obtained.

Mathematics

Work sample 7:
Data representations – Interpreting and comparing data displays

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.
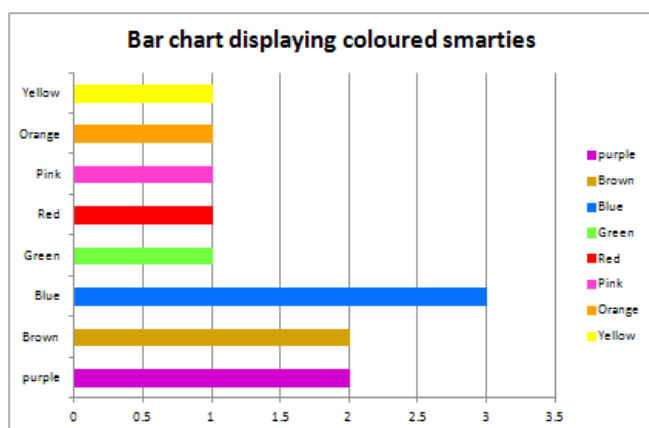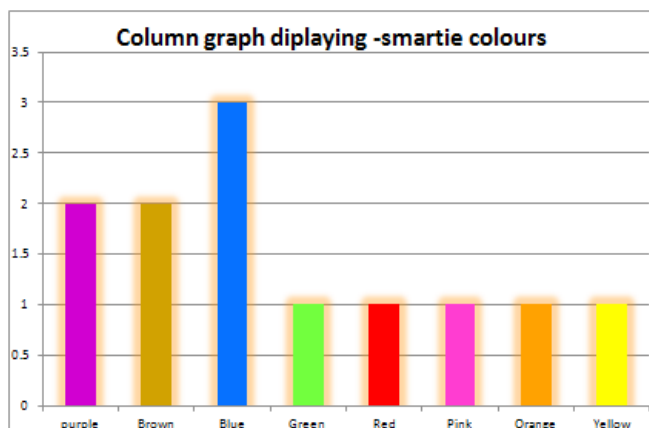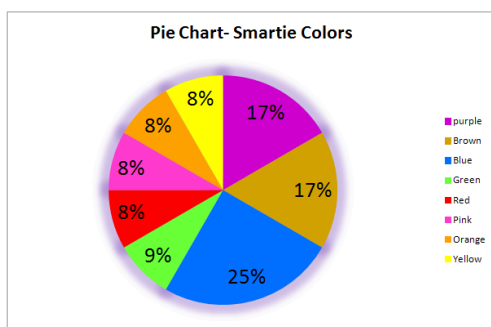
Summary of task

This investigation enabled students to interpret and compare data displays using a computer.

Students were given a medium box of smarties each and were asked to count the number of each coloured smartie to determine the most popular colour. They presented their results. Students discussed in class which chart best represented results using three different data displays - pie, column and bar chart and recorded their answers.

Mathematics

Work sample 7:
Data representations – Interpreting and comparing data displays

Color	Number
purple	2
Brown	2
Blue	3
Green	1
Red	1
Pink	1
Orange	1
Yellow	1
Total	12

Pie Chart- Smartie Colors

Legend: purple, Brown, Blue, Green, Red, Pink, Orange, Yellow

17%, 17%, 25%, 9%, 8%, 8%, 8%, 8%

Column graph diplaying -smartie colours

Bar chart displaying coloured smarties

The column chart and bar chart are best for comparing data. I can easily see that the blue was the most popular colour.

Annotations

Displays data in a table.

Creates a pie chart based on data collected using ICT.

Creates a column graph that displays data accurately using ICT.

Creates a bar chart that displays data accurately using ICT.

Mathematics

Work sample 8:
Clock face

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.
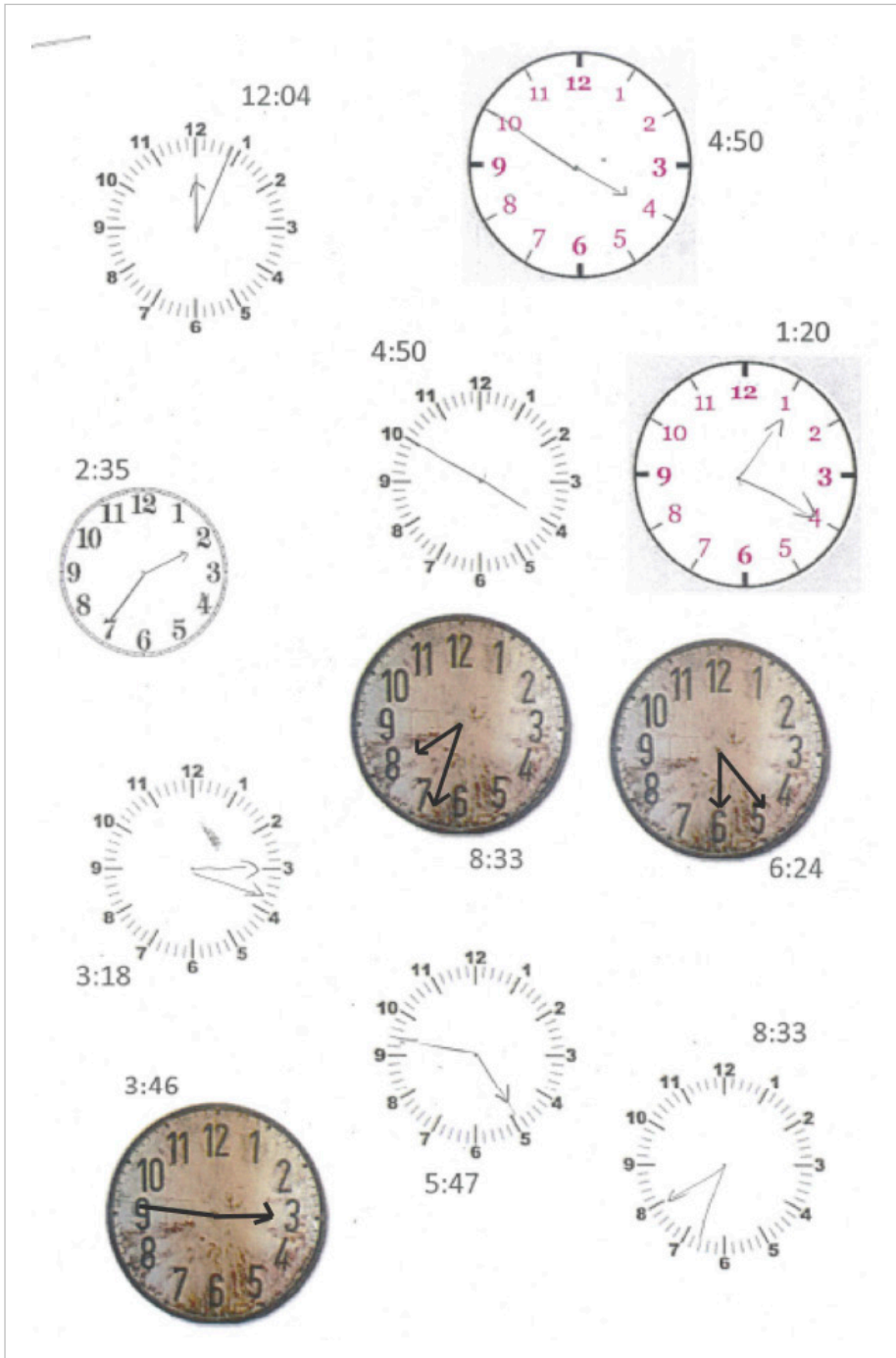
Students count to and from 10 000. They classify numbers as either odd or even. They recall addition and multiplication facts for single digit numbers. Students correctly count out change from financial transactions. They continue number patterns involving addition and subtraction. Students use metric 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 were presented with a series of clock faces and times. Students drew the correct time to the nearest minute on each clock face.

Mathematics

Work sample 8:
Clock face

Annotations

Draws and correctly identifies time to the nearest minute.

Mathematics

Work sample 9:
Finding the odd number

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 were presented with the number 18. Students had to write calculations using the four operations resulting in the answer 18. They were asked to circle the odd numbers on their sheet of paper.

Mathematics

Work sample 9:
Finding the odd number

Circle the odd number on your page.

$20 - 2 = 18$

$9 \times 2 = 18$

$\frac{54}{3} = 18$

$8 + 10 = 18$

$3 \times 4 + 6 = 18$

$11 + 7 = 18$

18

$2 \times 3 \times 3 = 18$

$3 \times 6 = 18$

$36 / 2 = 18$

$14 + 4 = 18$

$6 \times 2 + 6 = 18$

Annotations

Constructs a variety of mathematical problems using different operations

Demonstrates number relationships using the four operations and whole numbers.

Recognises the difference between odd and even numbers.