### Fractions and Decimals 2

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Teaching and Learning Activities</th>
<th>Notes/ Future Directions/Evaluation</th>
<th>Language / Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A student:</strong></td>
<td>› describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols MA1-1WM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>› supports conclusions by explaining or demonstrating how answers were obtained MA1-3WM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>› represents and models halves, quarters and eighths MA1-7NA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Activities

**Explicit Mathematical Teaching**

Recognise and interpret common uses of halves, quarters and eighths of shapes and collections (ACMNA033)

- use concrete materials to model a half, a quarter or an eighth of a whole object, eg divide a piece of ribbon into quarters
- Create quarters by halving one-half, eg 'I halved my paper then halved it again and now I have quarters' (Communicating, Problem Solving)
- Describe the equal parts of a whole object, eg 'I folded my paper into eight
equal parts and now I have eighths' (Communicating)

- discuss why is less than , eg if a cake is shared among eight people, the slices are smaller than if the cake is shared among four people (Communicating, Reasoning)

recognise that fractions refer to equal parts of a whole, eg all four quarters of an object are the same size
- visualise fractions that are equal parts of a whole, eg 'imagine where you would cut the rectangle before cutting it' (Problem Solving)

recognise when objects and shapes have been shared into halves, quarters or eighths

record equal parts of whole objects and shapes, and the relationship of the parts to the whole, using pictures and the fraction notation for half 1/2, quarter 1/4 and eighth 1/8, eg

| 1/8 | 1/8 | 1/8 | 1/8 |

use concrete materials to model a half, a quarter or an eighth of a collection, eg

- describe equal parts of a collection of objects, eg 'I have quarters because the four parts have the same number of counters' (Communicating)

recognise when a collection has been shared into halves, quarters or eighths

record equal parts of a collection, and the relationship of the parts to the whole, using pictures and the fraction notation for half, quarter and eighth

use fraction language in a variety of everyday contexts, eg the half-hour, one-quarter of the class

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### Ignition Activities

**Find Half of a Collection - Game**
Students are given a die with faces numbered 2, 4, 6, 8, 10, 12. In small groups or pairs, students take turns to roll the die. They collect counters to match half the amount rolled and record their roll and the counters taken eg 10 is rolled and the student collects 5 counters. Students have a predetermined number of rolls eg 20. The winner is the student who has the most counters.

**Variation:** The numbers on the die could be any even number.

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**Sharing the Whole**

**Part A**
In pairs students share a slice of bread so that each person gets the same amount of bread with none left over. Students discuss and record their strategies.

**Part B**
The teacher demonstrates cutting a piece of fruit into two or four pieces. Students:
- count the pieces
- describe how the pieces are alike
- describe the pieces as ‘halves’ or ‘quarters’.

In small groups, students attempt to cut paper shapes into two or four equal parts. They discuss whether the parts are equal and share the pieces.

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**Halve/Quarter the Paper**
Students discuss the two important things about creating halves/quarters
- creating two/four parts
- checking whether they are the same size.

**Using a paper square, students discuss:**
- how they would cut it into halves/quarters
- how they would check if the two/four parts are equal
- whether there is more than one way they could do it.

Students cut a variety of paper shapes into halves/quarters, describe the parts and compare their responses with others.

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**Whole Class Teaching**

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Halve/Quarter the Paper

Students discuss the two important things about creating halves/quarters:
- creating two/four parts
- checking whether they are the same size.

Using a paper square, students discuss:
- how they would cut it into halves/quarters
- how they would check if the two/four parts are equal
- whether there is more than one way they could do it.

Students cut a variety of paper shapes into halves/quarters, describe the parts and compare their responses with others.

Halve/Quarter Different Objects

Students investigate a variety of objects eg length of string, ball of plasticine, fruit, cup of water, muesli bar and symmetrical pictures. They discuss:
- how they would divide each object into halves/quarters
- how they would check if the two/four parts are equal.

Students manipulate each object, attempt to divide them into two/four equal parts, check the size of the halves/quarters and describe the parts.

Students reflect on whether their method of checking that the halves/quarters were equal was different for each of the objects eg checking the two halves of a length of string compared to checking the two halves of a ball of plasticine.

Comparing Halves and Quarters

Part A

Students are given two identical paper circles.
They are asked to fold one of the circles in half, label each part and cut along the fold.
They are then asked to fold the other circle into quarters, label each part and cut along the folds.

Students compare the halves/quarters.
Possible questions include:
- which parts are the same?
- which parts are different? How are they different?

Part B

Students are given two different-sized paper circles. They are asked to fold both circles in half, label the parts and cut along the folds.

Students compare the halves.
Possible questions include:
- which parts are the same? Why are they the same?
which parts are different? How are they different?
what is each piece called?
Students discuss that halves of different wholes can be different sizes.

Labelling Equal Parts
Students are given a paper square and are asked to fold the square into four equal parts. They are asked to name the parts and encouraged to use fraction notation and/or words to label the equal parts.

Students cut along the folds and describe the parts in relation to the whole. Possible questions include:
• what is a half/quarter?
• what does a half/quarter look like?
• how could you check if the two/four parts are equal?

Students draw a circle on paper and imagine that it is the top view of a cake. They use pencils or popsticks to show where they would cut the cake to have two/four equal slices.

Introducing Sharing Diagrams
Students use paper circles to model the process of sharing pikelets and record their answer using a sharing diagram.

If we wanted to share 4 pikelets between 4 people, how could we do it?
What would we do if we had 3 pikelets to share among 4 people? Can you draw your answer?

Are They Halves/Quarters?
Students are shown a collection of shapes eg circles. The collection should include some that show two equal parts and some that show two unequal parts.

Possible questions include:
| do these circles show two equal parts? |
| how do you know? |
| The activity should be repeated for quarters. |

**Hidden Quarters**
The teacher displays a diagram of a cake on an overhead projector. A small number of 'choc buds' (counters) are placed in one of the quarters.

Eg

The students are presented with the following story:
‘Judy cut her cake into quarters to share. She made sure everyone got the same number of choc buds on their piece of cake. Three people have taken their piece and Judy’s piece is left on the plate.’
Possible questions include:
- how many pieces was the cake cut into?
- what is each piece called?
- how many choc buds (counters) can you see?
- how many choc buds were there altogether on the cake?
- how did you work it out?
- is there another way to cut the cake into halves/quarters?
Student share, discuss, and record their strategies.

**Fraction Problems**
Students are presented with problems that require a knowledge of fractions to solve.
Possible problems include:
- quarter of the children in the family are boys. Draw what the family could look like.
- if you cut a ball of plasticine in quarter, how could you check if the parts are equal?
Extension: ‘Emily bought six pizzas. Some were cut into halves and some were cut into quarters. There was the same number of halves as quarters. How many halves and how many quarters were there?’

Students are encouraged to use their own strategies to solve the problems, and...
Find Half of a Collection
Students are given a die with faces numbered 2, 4, 6, 8, 10, 12.
In small groups or pairs, students take turns to roll the die. They collect counters to match half the amount rolled and record their roll and the counters taken eg 10 is rolled and the student collects 5 counters. Students have a predetermined number of rolls eg 20. The winner is the student who has the most counters.
Variation: The numbers on the die could be any even number.

Find Quarter of a Collection
Students are given a die with faces numbered 4, 8, 12, 16, 20, 24.
In small groups or pairs, students take turns to roll the die.
They collect counters to match quarter the amount rolled and record their roll and the counters taken eg 10 is rolled and the student collects 5 counters. Students have a predetermined number of rolls eg 20. The winner is the student who has the most counters.
Variation: The numbers on the die could be any even number.

Students use a collection of objects eg counters, blocks, pegs. One student selects a number of objects and covers up quarter of the objects with their hand. Their partner is then asked:
How many counters are under my hand?
How many counters are there altogether?
The activity can be extended showing two, three quarters or a third.