

Booragul Public School NSW Syllabus for the Australian Curriculum- Number and Algebra

Fractions and Decimals 2

Outcome	Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Language / Date
<p>A student:</p> <ul style="list-style-type: none"> › describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols MA1-1WM › supports conclusions by explaining or demonstrating how answers were obtained MA1-3WM › represents and models halves, quarters and eighths MA1-7NA 			<p>whole, part, equal parts, half, quarter, eighth, one-half, one- quarter, one- eighth, halve (verb).</p>
<p><u>Activities</u></p>			
<p>Find Half of a Collection - Game</p> <p>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.</p>			
<p>Explicit Mathematical Teaching</p> <p>At this Stage, fractions are used in two different ways:</p> <ul style="list-style-type: none"> – to describe equal parts of a whole, and – to describe equal parts of a collection of objects. 			

<p>Fractions refer to the relationship of the equal parts to the whole unit. When using collections to model fractions it is important that students appreciate the collection as being a 'whole' and the resulting groups as 'parts of that whole'. It should be noted that the size of the resulting fraction will depend on the size of the original whole or collection of objects. It is not necessary for students to distinguish between the roles of the numerator and denominator at this Stage. They may use the symbol '$\frac{1}{2}$' as an entity to mean 'one-half' or 'a half' and similarly for '$\frac{1}{4}$'</p> <p>Be careful of introducing traditional fraction symbols too early as many students have not developed a meaning for the symbols before they are asked to operate with them. Sharing diagrams provide a good method of representing and calculating with fractions. Not only are they more closely linked to the nature of fractions arising from division than the traditional symbolic notation, they frequently provide access to the images students hold of fractions. Sharing diagrams are offered to a student as representational tools. Representational tools are forms of symbolising that support thinking.</p>		
<p>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.</p> <p>Part B The teacher demonstrates cutting a piece of fruit into two or four pieces. Students:</p> <ul style="list-style-type: none"> ■ count the pieces ■ describe how the pieces are alike ■ describe the pieces as 'halves' or 'quarters'. <p>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.</p> <p>Halve/Quarter the Paper Students discuss the two important things about creating halves/quarters</p> <ul style="list-style-type: none"> ■ creating two/four parts ■ checking whether they are the same size. <p>Using a paper square, students discuss:</p> <ul style="list-style-type: none"> ■ 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. 		<p>Mathematics K-6 Sample Units of Work pg 53 Bread</p> <p>Fractions: Pikelets and lamingtons p.11 – 31</p> <p>Mathematics K-6 Sample Units of Work pg 53 Paper</p>

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

Squares

Explicit Mathematical Teaching

At this Stage, fractions are used in two different ways:

- to describe equal parts of a whole, and
- to describe equal parts of a collection of objects.

Fractions refer to the relationship of the equal parts to the whole unit. When using collections to model fractions it is important that students appreciate the collection as being a

‘whole’ and the resulting groups as ‘parts of that whole’. It should be noted that the size of the resulting fraction will depend on the size of the original whole or collection of objects.

It is not necessary for students to distinguish between the roles of the numerator and denominator at this Stage. They may use the symbol ‘’ as an entity to mean ‘one-half’ or

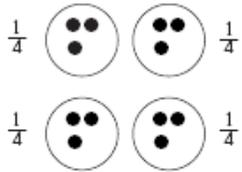
‘a half’ and similarly for ‘’.

Explain what is meant by quarters.

This is quarter of a circle. What do the other quarters look like? Here is a whole circle.

How can we cut this into quarters? Is there another way to do this?

Identifying quarters of the same unit as being the same
eg



Whole Class Teaching

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:

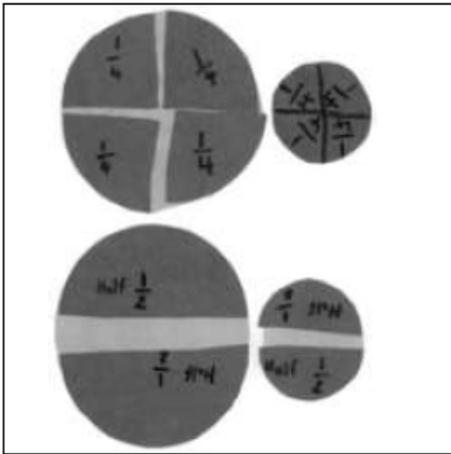
- which parts are the same? Why are they the same?
- which parts are different? How are they different?
- what is each piece called?

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:

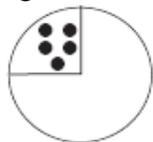
- do these circles show two equal parts?
- how do you know?

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 record their solutions.

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.

