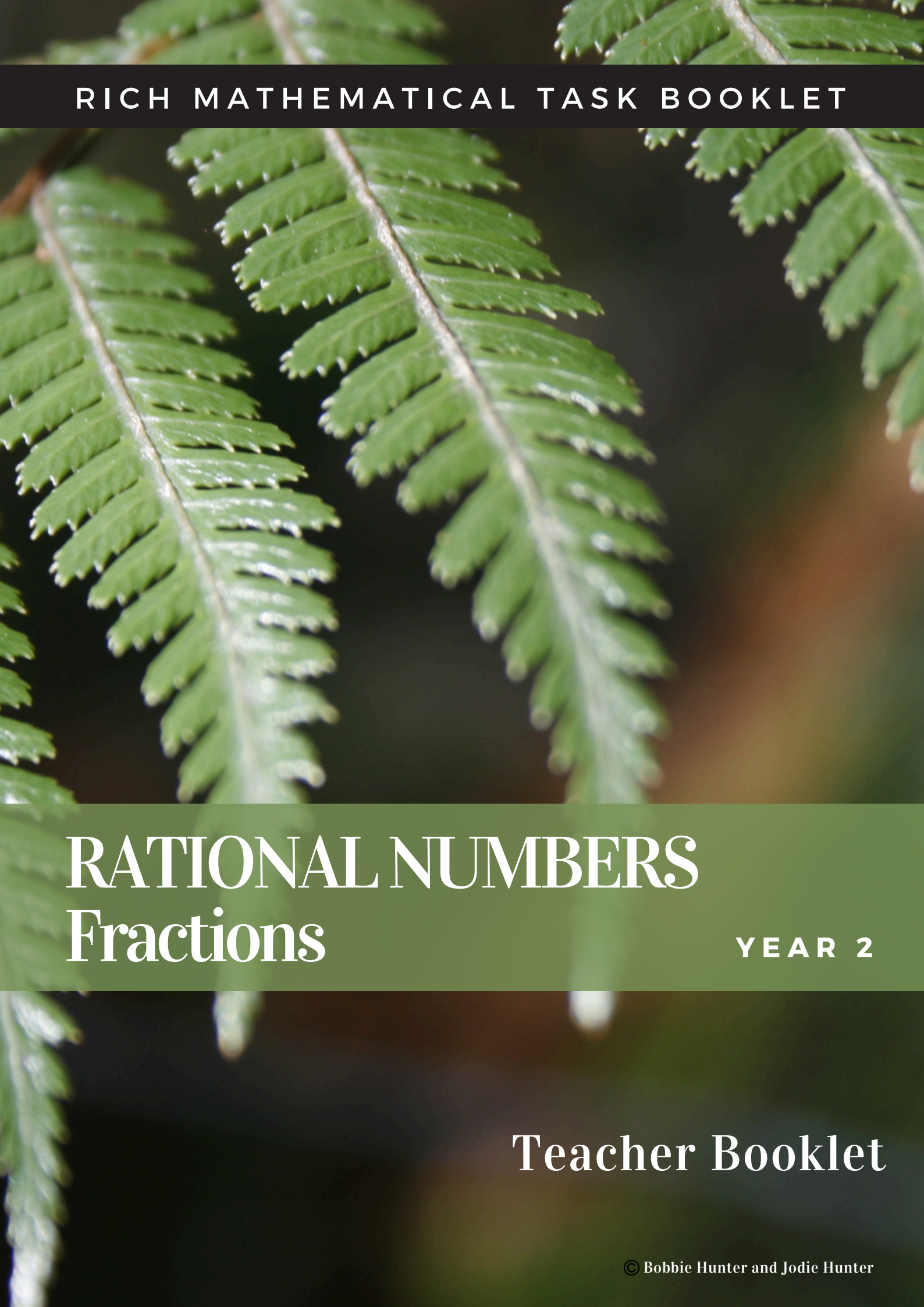


RICH MATHEMATICAL TASK BOOKLET

RATIONAL NUMBERS
Fractions

YEAR 2

Teacher Booklet

Task 1

What are all the different ways you and your buddy could halve your piece of paper?
Make sure you can explain how you know each pair of halves is equal.

Teacher Notes

Have A4 pieces of paper, pens, other different size pieces of paper including postage stamp size and larger than A4 paper.

Facilitate the students to notice that two halves of one whole have to be equal.

Monitor for students using two bits of pieces and revoice as two halves of one whole.

Notice students who use many different representations to explain all the different ways a whole can be shown as two halves equally.

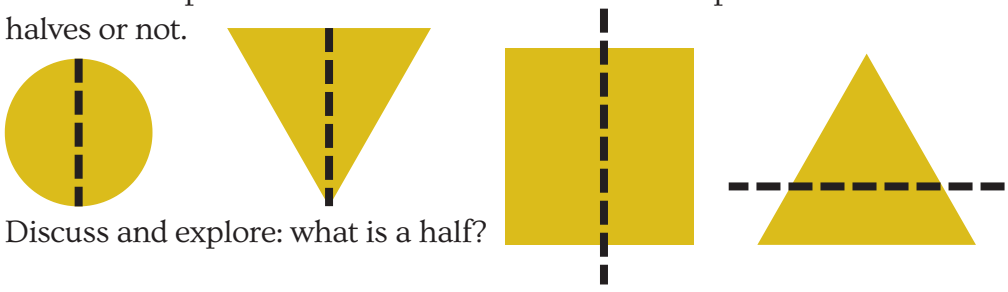
For the independent task, you will need different sized and shaped containers and water.

Shareback

Select students to share who have shown different ways of showing halves and can explain and show how each pair of halves is equal.

Connect

Show each representation and ask the students to explain whether it shows halves or not.



Discuss and explore: what is a half?

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit.

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Suggested Learning Outcomes

Share a whole into equal parts.

Put two equal parts (units) together to make one whole.

Count or add fractional parts to make one whole.

Independent Tasks

Choose a container and fill it with water. Pour out half of the water. How much water is left?

Do the same with a different sized container. What do you notice?

Draw a picture to record your actions. Show where half is on each container.

Mathematical Language

Whole, half, halves, fraction, share, fair, divide, same as, equal, more than, less than, because, compare

Anticipations

Solutions, Misconceptions

Task 2

Fold your paper strip into two equal parts.
Draw a representation to show what you did.
Be ready to explain how many folds you needed to make and how you made sure it was equal.

Fold your paper strip into four equal parts.
Draw a representation to show what you did.
Be ready to explain how many folds you needed to make and how you made sure that each part was equal.

Fold your paper strip into eight equal parts.
Draw a representation to show what you did.
Be ready to explain how many folds you needed to make and how you made sure it was equal.

Teacher Notes

During the launch, ask students to discuss how you would share a chocolate bar fairly. Make links to the ways they used a number-line to show their mass/capacity scales and in number.

Have available strips of 2cm wide paper and concrete material to use to measure pieces (not rulers).

Facilitate the students to notice the way in which different students have used measures to ensure equal parts including using concrete materials and their fingers.

During the activity, support students to recognise that folding a strip of paper into equal parts is using partitioning as they did in number. Here, instead of dividing a group of objects into equal groups as they did in number activities using folding, they are illustrating dividing a length into equal parts. Link to the use of the number line as divided into equal parts (usually as whole parts but this lays foundations for them to see fractions between whole numbers).

Model notating for students in both words and numbers what they show with their representations. Emphasise the whole and that the bottom number represents how many parts the whole has been divided into and the top number represents how many parts of the whole they have.

Monitor and affirm students using vocabulary which emphasises fair and equal and halves, quarters and eighths and sharing or dividing into equal parts.

Notice students who use different ways to ensure equal parts including using concrete materials and their fingers and use the language of fractions.

Expect students to represent using the folds and strips of paper but re-represent as drawings and equal sections or parts.

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Shareback

Select students to share who have represented halves, quarters and eighths accurately and can explain and show how each section in the fold is equal to the others.

Connect

Ask students to draw three long thin rectangles to represent their paperstrips. Ask them to represent halves on the first strip, quarters on the second strip, and eighths on the third strip. Record the symbol for one half, one quarter, one eighth.

Ask them to re-represent the fractions as a number line.

Suggested Learning Outcomes

Share a whole into equal parts.

Put equal parts (units) together to make one whole.

Count or add fractional parts to make one whole.

Independent Tasks

Identify the fractions that are equally cut into halves, quarters, or eighths. Write the fraction name on the shape.

(see Copy Masters)

Mathematical Language

Whole, half, halves, thirds, fraction, share, fair, divide, same as, equal, more than, less than.

Anticipations

Solutions, Misconceptions

Task 3

Use the fraction tiles to find as many different ways as you can to make one whole.
Record what you show using words or numbers.

Use the fraction tiles to find as many different ways as you can to make more than one whole.
Record what you show using words or numbers.

Use the fraction tiles to find as many different ways as you can to make less than one whole.
Record what you show using words or numbers.

Teacher Notes

For the conceptual warm up before the launch lead a choral count - counting in quarters. $\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{4}$ 1 $1\frac{1}{4}$ $1\frac{2}{4}$ $1\frac{3}{4}$ 2 $2\frac{1}{4}$

Ask the students to predict further terms and to discuss the patterns that they notice.

During the launch, provide all students with a paper strip (the same length as they used in the previous lesson) and ask them to fold it into four equal parts. Link back and make comparisons to their paper strips from the previous lesson and the need for equal parts of the one whole. Name and record these as quarters.

Provide students with fraction tiles for one whole, halves, quarters, and eighths.

Teachers notate for students in both words and numbers what they show with their representations. Emphasise the whole and that the bottom number represents how many parts the whole has been divided into and the top number represents how many parts of the whole they have.

Facilitate the students to notice the connection between the concrete representation and their recording in words and numbers.

Notice students who notice equivalence in the fractional parts. Record these as number sentences using the equal sign.

For the independent task, have available fraction tiles for whole, halves, quarters, and eighths. Have the words: halves, half, quarters, fourths, eigths, whole and their equivalent in numbers available as cards for students to use as they record their combinations to make one whole.

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths.

Shareback

Select students to share who made combinations of the whole using the same size pieces (halves, quarters, eighths) and recorded the combinations as numbers or words.

Select students to share who made combinations of more than a whole using the same size pieces (halves, quarters, eighths) and recorded the combinations as numbers or words.

Select students to share who made combinations of less than a whole using the same size pieces (halves, quarters, eighths) and recorded the combinations as numbers or words.

Connect

Ask students to discuss why these make one whole and any patterns or relationships that they notice.

Suggested Learning Outcomes

Share a whole into different parts.

Combine and recombine different units of fractions to make one whole.

Identify and recognise equivalent fractions.

Independent Tasks

Use the fraction tiles to make different combinations of more than one whole.

Draw your representations as bars and record in words and fractions how you made one whole.

Use the fraction tiles to make different combinations of less than one whole.

Draw your representations as bars and record in words and fractions how you made one whole.

Mathematical Language

Whole, half, halves, thirds, quarters, fraction, share, fair, divide, same as, equal.

Anticipations

Solutions, Misconceptions

Task 4

What comes between 0 and 1?
Put your marker on the tape on the floor where you think half is. Be ready to explain and justify how you can prove the accuracy of where your marker is.

Now divide the tape into four equal parts and put the markers where you think they should be.
Be ready to explain and justify how you can prove the accuracy of where your marker is.

Look at our number line which goes from 0 to 10.
What numbers would go between 1 and 2?
What numbers would go between 2 and 3?

Can you put in any other numbers which would go halfway between the whole numbers?

Draw a picture of the number-line from 0 to 1.
Mark $\frac{1}{4}$ on the number-line.
Mark $\frac{2}{4}$ on the number-line.
Mark $\frac{3}{4}$ on the number-line.

Draw a number-line from 0 to 10.
Mark $2\frac{1}{2}$ on the number-line.
Mark $5\frac{1}{2}$ on the number-line.
Mark $3\frac{1}{4}$ on the number-line.

Teacher Notes

Have an unmarked number-line on the whiteboard to use during the lesson and two lengths of paper tape to lay on the floor and large marked fraction cards with words and notation and a number-line marked 0-10.

Facilitate the students to notice that previously the number lines they have used only contained whole numbers (numbers that resulted from counting). The fractions they are talking about now (numbers resulting from equal splitting or partitioning) can be represented on the number line. This shows that fractions may also be thought of as numbers. In the connection refer to the fractions (e.g., $3\frac{1}{2}$ as a mixed number).
Notice students who find the concept of fractions as numbers between numbers counter intuitive. Allow them to struggle and construct reasoning through mathematical talk and using agreeing mathematically and disagreeing mathematically (e.g., I agree because...).

IMost students will draw a number line from 0-10, mark all the whole numbers and then find the positions of the mixed numbers by partitioning. Some students may estimate the positions of the mixed numbers on the empty number line. Both strategies are acceptable as long as the students can justify what they have done.

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

A fraction describes division ($\frac{a}{b} = a \div b$, a & b are integers & b 0), and it can be interpreted on the number line in two ways. For example, $\frac{2}{3} = 2 \div 3$.

On the number line, $2 \div 3$ can be interpreted as 2 segments where each is $\frac{1}{3}$ of a unit ($2 \times \frac{1}{3}$) or $\frac{1}{3}$ of 2 whole units ($\frac{1}{3} \times 2$); each is associated with the same point on the number line.

Each fraction can be associated with a unique point on a numberline.

There is no least or greatest fraction on the number line.

Teacher Notes Continued

For the independent task, have on A3 a series of number-lines marked with whole numbers from 0 to 20. Have available fraction cards which students can use to select the fractional number

Shareback

Select students to share who can mark the fractions onto the number-lines with some accuracy and justification.

Connect

Put as many numbers that would come between other numbers onto the number-line.

Suggested Learning Outcomes

Show fractions on a number-line.

Independent Tasks

Mark on the numberline where you think the following mixed numbers would be.

$3\frac{1}{2}$
$19\frac{1}{2}$
$1\frac{1}{2}$
$10\frac{1}{2}$
$15\frac{1}{2}$
$5\frac{1}{2}$

Draw your own numberline from 0 to 10. Mark on it all the whole numbers from 0 to 10.

Now mark on it all the mixed numbers from $\frac{1}{2}$ to 9

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Mathematical Language

Whole, half, halves, thirds, fraction, divide, mixed numbers.

Anticipations

Solutions, Misconceptions

Task 5

Rebekah has helped her Mum make some panipopo for their family. Mum ate one and then she said that Rebekah could share the five left with her three sisters, but they all had to have the same amount. How many panipopo did they each get to eat?

What about if Rebekah had to share one panipopo with her sisters? How much panipopo would they get to eat?

What about if Rebekah had to share three panipopo with her sisters? How much panipopo would they get to eat?

Teacher Notes

Have concrete material available if needed for students to select (e.g., fraction tiles, playdough).

Facilitate the students to notice that fair sharing of a whole into quarters means four equal size pieces of the one whole.

Monitor for students using vocabulary of fractions (e.g., one whole panipopo and quarters of one panipopo).

Expect students to represent using drawings and as needed re-represent using materials. Notate for the students the solutions as addition using either numbers or words,

Notice students who draw on multiplicative thinking (i.e., means they immediately see $1 \div 4 = \frac{1}{4}$ so each person gets either 1 $\frac{1}{4}$ or five quarters).

Shareback

Select students to share who develop representations to justify their reasoning and either split all the panipopo in quarters or share as a whole and fractional amount.

If the second solution is not used, then model as another way the teacher has seen used previously.

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

The real-world actions for addition and subtraction of whole numbers are the same for operations with fractions and decimals.

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Connect

Record the matching equations and solutions for each problem.
$1 \div 4 = \frac{1}{4}$

$3 \div 4 = \frac{3}{4}$

$5 \div 4 = 1\frac{1}{4}$ or $\frac{5}{4}$

Ask students to discuss the pattern that they notice. Ask them to use the pattern to solve:
Rebekah had to share 7 panipopo with her four sisters.
Rebekah had to share 9 panipopo with her four sisters.

Suggested Learning Outcomes

Share whole parts equally.

Solve problems that involve dividing a whole number into a fraction.

Independent Tasks

Dad has made some banana muffins. How much would you get if you had to share:

Two banana muffins with four people.
Two banana muffins with eight people.
Four banana muffins with eight people.
Six banana muffins with four people.
Six banana muffins with eight people.

Draw and write how you solved the problems.

Mathematical Language

Whole, half, fourths, quarters, fraction, share, fair, divide.

Anticipations

Solutions, Misconceptions

Task 6

Bayley and Leoni have baked cookies to share with their friends.
If there were 6 cookies and four people, how much would they each get?
If there were 10 cookies to share equally and eight people, how much would they each get?
If there were 12 cookies to share equally and eight people, how much would they each get?

Teacher Notes

For the conceptual starter before you launch the task, have the students do a choral count counting in halves:

$\frac{1}{2}$ $\frac{2}{2}$ $\frac{3}{2}$ $\frac{4}{2}$
$\frac{5}{2}$ $\frac{6}{2}$ $\frac{7}{2}$ $\frac{8}{2}$

Ask the children to identify the patterns they notice and to represent the fractions and change these into whole numbers where possible.

Have concrete material available if needed for students to select (e.g., fraction tiles, playdough).

Monitor for students using vocabulary of fractions (e.g., one whole cookie and one half of a cookie).

Expect students to represent using drawings and as needed re-represent using materials.

Notate for the students the solutions as division using either numbers or words.

Notice students who draw on multiplicative thinking (i.e., means they immediately see 6 ÷ 4 = so each person gets 1and two quarters).

Shareback

Select students to share who develop representations to justify their reasoning and either split all the cookies in quarters or eighths or share as a whole and fractional amount. If the second solution is not used, then model as another way the teacher has seen used previously.

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

A fraction describes division ($\frac{a}{b} = a \div b$, a & b are integers & b 0), and it can be interpreted on the number line in two ways. For example, $\frac{2}{3} = 2 \div 3$.

On the number line, $2 \div 3$ can be interpreted as 2 segments where each is $\frac{1}{3}$ of a unit ($2 \times \frac{1}{3}$) or $\frac{1}{3}$ of 2 whole units ($\frac{1}{3} \times 2$); each is associated with the same point on the number line.

Each fraction can be associated with a unique point on a numberline.

There is no least or greatest fraction on the number line.

Connect

Use the fraction tiles and ask students to make drawings to explore equivalent fractions from the task.
What is the same as $\frac{2}{4}$?
What is the same as $\frac{2}{8}$?
What is the same as $\frac{4}{8}$?

Suggested Learning Outcomes

Share whole parts equally.

Solve problems that involve dividing a whole number into a fraction.

Independent Tasks

Hemi and Carter have baked cookies to share with their friends.
If there were 3 cookies and two people, how much would they each get?

If there were 6 cookies to share equally and four people, how much would they each get?

If there were 17 cookies to share equally and eight people, how much would they each get?

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Mathematical Language

Whole, half, halves, thirds, fourths, quarters, mixed numbers.

Anticipations

Solutions, Misconceptions

Task 7

Hone and Rangi both have a chocolate bar.
Hone has eaten $\frac{3}{4}$ of his bar and Rangi has eaten $\frac{1}{2}$ of her bar.
Who has eaten the most?

Hone and Rangi both have a chocolate bar.
Hone has eaten $\frac{2}{4}$ of his bar and Rangi has eaten $\frac{3}{8}$ of her bar.
Who has eaten the most?

Hone and Rangi both have a chocolate bar.
Hone has eaten $\frac{3}{4}$ of his bar and Rangi has eaten $\frac{7}{8}$ of her bar.
Who has eaten the most?

Teacher Notes

Facilitate the students to notice that the denominator represents the number of pieces the whole has been divided into and the smaller the denominator the greater the piece.

Reinforce that the chocolate bars should be the same size and need to be identical lengths if they draw it.

Shareback

Select students to share who are able to develop representations (drawings of two identical length chocolate bars marked as fractions, or two identical number lines with the fractional markings) to explain how and why each fractional number is bigger or smaller than another fractional number.

Connect

Bigger, smaller or the same?

$\frac{3}{4}$ or $\frac{2}{2}$

$\frac{8}{8}$ or $\frac{2}{2}$

$\frac{4}{4}$ or $\frac{5}{4}$

$\frac{1}{8}$ or $\frac{1}{2}$

$1\frac{1}{2}$ or $1\frac{3}{4}$

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

A fraction describes division ($\frac{a}{b} = a \div b$, a & b are integers & b 0), and it can be interpreted on the number line in two ways. For example, $\frac{2}{3} = 2 \div 3$.

On the number line, $2 \div 3$ can be interpreted as 2 segments where each is $\frac{1}{3}$ of a unit ($2 \times \frac{1}{3}$) or $\frac{1}{3}$ of 2 whole units ($\frac{1}{3} \times 2$); each is associated with the same point on the number line.

Each fraction can be associated with a unique point on a numberline.

There is no least or greatest fraction on the number line.

Suggested Learning Outcomes

Identify and compare different unit fractions.

Recognise equivalent fractions.

Independent Tasks

Look at the fractions below and draw a representation for each one.
Now use the symbols > (greater than), < (less than), = (equal) to make the number sentences true.

$\frac{1}{2} \square \frac{2}{3}$ $\quad$ $\frac{3}{2} \square \frac{8}{8}$

$\frac{5}{4} \square \frac{2}{2}$ $\quad$ $\frac{3}{2} \square \frac{3}{4}$

$\frac{4}{4} \square \frac{8}{8}$ $\quad$ $\frac{3}{2} \square \frac{2}{4}$

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Mathematical Language

Whole, half, halves, thirds, fourths, quarters, fraction, same as, equal, more than, less than.

Anticipations

Solutions, Misconceptions

Task 8

For your birthday, you have a cake to decorate with 16 M & Ms. You cut the cake in two and shared the M & Ms equally.
What fraction of the M & Ms would there be on each side?
How many M & Ms would be on each side?

For your birthday, you have a cake to decorate with 16 M & Ms. You cut the cake in four and shared the M & Ms equally.
What fraction of the M & Ms would there be on each side?
How many M & Ms would be on each side?

For your birthday, you have cake to decorate with 16 M & Ms. You cut the cake in eight and shared the M & Ms equally.
What fraction of the M & Ms would there be on each side?
How many M & Ms would be on each side?

Teacher Notes

During the launch, ensure that you reinforce that the set of M and Ms are one whole as part of developing the context. Model the representation of the cake as a rectangle.

Have counters available to represent the M & Ms or facilitate the students to draw these.

Facilitate the students to notice that they are finding a fraction of a whole even when there are a number of items in that set. Also, draw attention to the denominator as naming what the whole is divided into.

Shareback

Select students to share who have used two different representations to justify their reasoning.

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

A fraction describes division ($\frac{a}{b} = a \div b$, a & b are integers & b 0), and it can be interpreted on the number line in two ways. For example, $\frac{2}{3} = 2 \div 3$.

On the number line, $2 \div 3$ can be interpreted as 2 segments where each is $\frac{1}{3}$ of a unit ($2 \times \frac{1}{3}$) or $\frac{1}{3}$ of 2 whole units ($\frac{1}{3} \times 2$); each is associated with the same point on the number line.

Each fraction can be associated with a unique point on a numberline.

There is no least or greatest fraction on the number line.

Connect

You have a bag of lollies, and you share them equally with your friend. If you have 8 lollies in the bag how many do you each get? Record as:

$\frac{1}{2}$ of 8 = 4 8 ÷ 2 = 4

You have a bag of lollies, and you share them equally with your friend. If you have 20 lollies in the bag how many do you each get? Record as:

$\frac{1}{2}$ of 20 = 10 20 ÷ 2 = 10

What do you notice?

Suggested Learning Outcomes

Find fractions of a set.

Independent Tasks

There are 10 marbles in a bag. One half of the marbles are blue. How many marbles are blue?

There are 24 marbles in a bag. One half of the marbles are blue. How many marbles are blue?

There are 30 marbles in a bag. One half of the marbles are blue. How many marbles are blue?

There are 12 marbles in a bag. One quarter of the marbles are red. How many marbles are red?

There are 20 marbles in a bag. One quarter of the marbles are red. How many marbles are red?

There are 28 marbles in a bag. One quarter of the marbles are red. How many marbles are red?

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Mathematical Language

Whole, half, halves, fourths, quarters, eighths, fraction, share, fair, divide.

Anticipations

Solutions, Misconceptions

Task 9

Mere and Harmony are playing with their toy cars, and they decide to use boxes for garages. They have 16 little cars.
They share them equally between 4 garages.
What fraction of the cars would be in each garage?
How many cars would be in each garage?

Mere and Harmony are playing with their toy cars, and they decide to use boxes for garages. They have 44 little cars.
They share them equally between 4 garages.
What fraction of the cars would be in each garage?
How many cars would be in each garage?

Mere and Harmony are playing with their toy cars, and they decide to use boxes for garages. They have 32 little cars.
They share them equally between 8 garages.
What fraction of the cars would be in each garage?
How many cars would be in each garage?

Teacher Notes

During the launch, ensure that you reinforce that the set of cars are one whole as part of developing the context.

Have counters available to represent the cars.

Facilitate the students to notice that they are finding a fraction of a whole even when there are a number of items in that set. Also, draw attention to the denominator as naming what the whole is divided into.

Shareback

Select students who develop a representation and:

Share the cars equally in chunks or by using division. If no students use division, then model as another way the teacher has seen used previously.

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

A fraction describes division ($\frac{a}{b} = a \div b$, a & b are integers & b 0), and it can be interpreted on the number line in two ways. For example, $\frac{2}{3} = 2 \div 3$.

On the number line, $2 \div 3$ can be interpreted as 2 segments where each is $\frac{1}{3}$ of a unit ($2 \times \frac{1}{3}$) or $\frac{1}{3}$ of 2 whole units ($\frac{1}{3} \times 2$); each is associated with the same point on the number line.

Each fraction can be associated with a unique point on a numberline.

There is no least or greatest fraction on the number line.

Connect

What is a quarter of 20?
Record as: $\frac{1}{4}$ of 20 = 5 20 ÷ 4 = 5

What is a quarter of 200?
Record as: $\frac{1}{4}$ of 200 = 50 200 ÷ 4 = 50

What is one eighth of 16?
Record as $\frac{1}{8}$ of 16 = 2 16 ÷ 8 = 2

What is one eighth of 160
Record as $\frac{1}{8}$ of 160 = 20 160 ÷ 8 = 20

What patterns and relationships do you notice?

Suggested Learning Outcomes

Find fractions of a set.

Make links between finding a fraction of a set and division.

Independent Tasks

Make three playdough loaves.
Share the loaves equally between 8 friends.
What do you notice?
Record your thinking and show how you worked out how much of each loaf each friend got.

Make four playdough loaves.
Share the loaves equally between 8 friends.
What do you notice?
Record your thinking and show how you worked out how much of each loaf each friend got.

Make six playdough loaves.
Share the loaves equally between 8 friends.
What do you notice?
Record your thinking and show how you worked out how much of each loaf each friend got.

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Mathematical Language

Whole, thirds, fourths, quarters, divide.

Anticipations

Solutions, Misconceptions

Task 10

Jason has read $\frac{1}{2}$ of his book and is at page 14. How many pages in the book?

Chaewon has $\frac{1}{4}$ of a bag of lollies left and now has 6 lollies. How many lollies did she have to start with?

Kesi has given away $\frac{1}{4}$ of his sticker collection which is 15 stickers. How many stickers did he start with?

Teacher Notes

During the launch, ensure that you reinforce that each fraction is part of one whole as part of developing the context of the task and that the problem is focused on finding the whole.

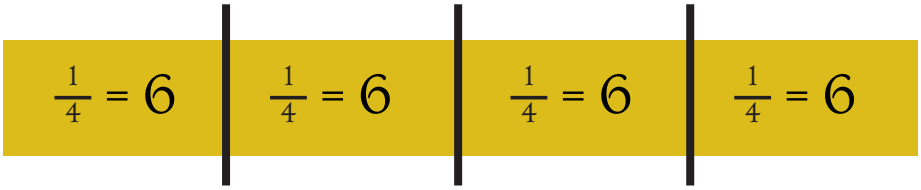
Have counters or beans available for the students to use to represent the task context or facilitate the students to draw these.

Facilitate the students to notice that they are finding the whole from the fraction given and the number in the set. Draw attention to the denominator as naming what the whole has been divided into (e.g., two groups, four groups).

Support the students to represent using a box model to show the problem context.

Shareback

Select students to share who develop representations to justify their reasoning and use this to show the whole.



Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

A fraction describes division ($\frac{a}{b} = a \div b$, a & b are integers & b 0), and it can be interpreted on the number line in two ways. For example, $\frac{2}{3} = 2 \div 3$.

On the number line, $2 \div 3$ can be interpreted as 2 segments where each is $\frac{1}{3}$ of a unit ($2 \times \frac{1}{3}$) or $\frac{1}{3}$ of 2 whole units ($\frac{1}{3} \times 2$); each is associated with the same point on the number line.

Each fraction can be associated with a unique point on a numberline.

There is no least or greatest fraction on the number line.

Connect

If 4 is $\frac{1}{2}$ of the set, what is the whole?

If 4 is $\frac{1}{4}$ of the set, what is the whole?

If 10 is $\frac{1}{2}$ of the set, what is the whole?

If 10 is $\frac{1}{4}$ of the set, what is the whole?

What patterns do you notice?

Suggested Learning Outcomes

Identify the whole set when given a half.

Identify the whole set when given a quarter.

Independent Tasks

Lily has spent $\frac{1}{2}$ her pocket money and has $5 left. How much money did she start with?

Jason has read $\frac{1}{2}$ of his book and is at page 12. How many pages in the book?

Chaewon has $\frac{1}{4}$ of a bag of lollies left and now has 11 lollies. How many lollies did she have to start with?

Kesi has given away $\frac{1}{4}$ of his sticker collection which is 21 stickers. How many stickers did he start with?

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Mathematical Language

Whole, thirds, fourths, quarters, divide.

Anticipations

Solutions, Misconceptions

Task 11

Look at the pairs of fractions and identify which is the biggest number and which is the smallest number. Make sure you justify your thinking in at least two different ways (e.g., drawing, number-line)

$\frac{1}{2}$ or $\frac{1}{4}$ $\quad$ $\frac{1}{8}$ or $\frac{1}{4}$

$\frac{3}{8}$ or $\frac{1}{2}$ $\quad$ $\frac{1}{2}$ or $\frac{3}{4}$

$\frac{3}{4}$ or $\frac{2}{2}$ $\quad$ $\frac{4}{4}$ or $\frac{9}{8}$

$\frac{2}{4}$ or $\frac{8}{8}$ $\quad$ $\frac{3}{2}$ or $\frac{3}{4}$

$1\frac{1}{2}$ or $1\frac{1}{4}$ $\quad$ $2\frac{3}{4}$ or $2\frac{7}{8}$

Teacher Notes

Facilitate the students to notice the relationship between the numerator and denominator.

Notice students who use the language of justification and draw on equal lengths as representations of the whole as justification.

Expect students to represent using concrete means including both drawings and a number-line.

Shareback

Select students to share who have used two different representations to justify their reasoning.

Connect

Put these numbers in order from smallest to biggest:

$\frac{1}{2}$ $\quad$ $\frac{8}{8}$ $\quad$ $\frac{1}{8}$ $\quad$ $\frac{1}{4}$ $\quad$ $\frac{2}{8}$ $\quad$ $\frac{3}{4}$

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

A fraction describes division ($\frac{a}{b} = a \div b$, a & b are integers & b 0), and it can be interpreted on the number line in two ways. For example, $\frac{2}{3} = 2 \div 3$.

On the number line, $2 \div 3$ can be interpreted as 2 segments where each is $\frac{1}{3}$ of a unit ($2 \times \frac{1}{3}$) or $\frac{1}{3}$ of 2 whole units ($\frac{1}{3} \times 2$); each is associated with the same point on the number line.

Each fraction can be associated with a unique point on a numberline.

There is no least or greatest fraction on the number line.

Suggested Learning Outcomes

Find fractions of a set.

Make links between finding a fraction of a set and division.

Independent Tasks

Sepi ate one quarter of a liquorice strap; Mara ate two eighths of a liquorice strap.
Who ate the most? Why?

Josie ate one half of a liquorice strap; Lee ate three eighths of a liquorice strap.
Who ate the most? Why?

Moana ate one half of a liquorice strap; Eli ate four eighths of a liquorice strap.
Who ate the most? Why?

Now write your own fraction problems and ask a classmate to solve them.

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Mathematical Language

Whole, half, halves, thirds, fourths, quarters, eighths, fraction, same as, equal, more than, less than, numerator, denominator.

Anticipations

Solutions, Misconceptions

Task 12

There are two children in Teremoana's family. Their mother gives them half a banana each.
How many bananas does she use?

There are four children in Teremoana's family. Their mother gives them half a banana each.
How many bananas does she use?

There are six children in Teremoana's family. Their mother gives them half a banana each.
How many bananas does she use?

There are seven children in Teremoana's family. Their mother gives them half a banana each.
How many bananas does she use?

Teacher Notes

Facilitate the students to notice that there are multiples of the fractional number which they can add or multiply.

Expect students to represent using drawings or fraction pieces to represent parts of the whole.

For the independent task, you will need to complete the assessment tasks. For Task 1 encourage students to draw, write or describe everything they know about halves and quarters. For Task 2 have counting beans available for students to manipulate. Encourage students to make representations of drawings, numbers and equations to show their thinking. Transcribe where necessary.

Shareback

Select students to share who either add all the halves and get four halves and change this to two whole bananas: $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{4}{2} = 2$

or add the halves to one whole : $\frac{1}{2} + \frac{1}{2} = 1, \frac{1}{2} + \frac{1}{2} = 1, 1 + 1 = 2$

or multiply: $4 \times \frac{1}{2} = 2$

If either of the addition solutions is not used, then model as another way the teacher has seen used previously.

Big Ideas

Numbers can be described in many different ways including as fractions.

The whole is important in naming fractions. A fraction is relative to the size of the whole or unit

A comparison of a part to the whole can be represented using a fraction.

A fraction describes the division of a whole (region, set, segment) into equal parts.

The bottom number in a fraction tells how many equal parts the whole or unit is divided into. The top number tells how many equal parts are indicated.

A fraction describes division ($\frac{a}{b} = a \div b$, a & b are integers & b 0), and it can be interpreted on the number line in two ways. For example, $\frac{2}{3} = 2 \div 3$.

On the number line, $2 \div 3$ can be interpreted as 2 segments where each is $\frac{1}{3}$ of a unit ($2 \times \frac{1}{3}$) or $\frac{1}{3}$ of 2 whole units ($\frac{1}{3} \times 2$); each is associated with the same point on the number line.

Each fraction can be associated with a unique point on a numberline.

There is no least or greatest fraction on the number line.

Connect

What if Monica's mother had given the two children $1\frac{1}{2}$ bananas each?

What if Monica's mother had given the two children $\frac{2}{4}$ bananas each?

Suggested Learning Outcomes

Identify how many halves make one whole.

Add or count fractional parts.

Multiply a fraction by a whole number.

Independent Tasks

Assessment Tasks

Task One: Fractions (region)
Task Two: Fractions (set)

Curriculum Links

During the second year

Identify, read, write (using symbols and words), and represent halves, quarters, and eighths as fractions of sets and regions, using equal parts of the whole.

Directly compare two fractions involving halves, quarters, and eighths

Find a half and quarter of a set by identifying groups and patterns (rather than sharing by ones), and identify the whole set or shape when given a half or quarter

Mathematical Language

Whole, half, halves, thirds, fourths, quarters, eighths, fraction, same as, equal, more than, less than, numerator, denominator.

Anticipations

Solutions, Misconceptions

Assessment Task 1 - Fractions - Year 2

Write and draw everything you know about halves, quarters and eighths.

Are there any other fractions you know that you can write and draw about?

Assessment Task 2 - Fractions - Year 2

At school the classes are planting seeds. They have:

One half ($\frac{1}{2}$) of a bag of 12 seeds
One quarter ($\frac{1}{4}$) of a bag of 24 seeds
One eighth ($\frac{1}{8}$) of a bag of 16 seeds

How many seeds are in each bag?

Which bag has the most seeds?

Show your thinking.