Unit 9: Fractions (I)

Lesson 1: Unit and non-unit fractions

➜ pages 122–124

1. There are 5 birds altogether. The denominator is 5.
3 birds are flying to the right.
The numerator is 3.
$\frac{3}{5}$ of the birds are flying to the right.

2. Top: $\frac{2}{3}$
Middle: $\frac{1}{2}$
Bottom: $\frac{1}{4}$

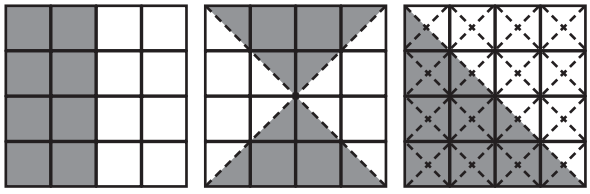
3. $\frac{1}{5}$ of the cards are light coloured.
$\frac{2}{5}$ have numbers on the roof.
$\frac{2}{5}$ are dark coloured.

4. a)

b)

c) $\frac{1}{2} > \frac{1}{3}$ $\frac{1}{3} < \frac{1}{2}$

5. a), b) and c) Half of each square shaded (in three different ways). For example:



Reflect

Three sections coloured yellow, 1 section coloured red

Explanations will vary; for example:

$\frac{1}{2}$ is shaded yellow because there are 6 sections and half of 6 is 3, so I coloured 3 sections yellow.

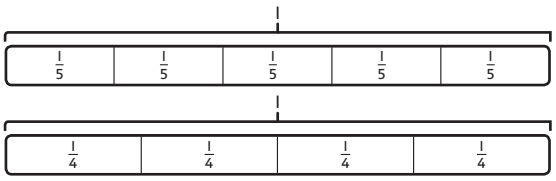
$\frac{1}{6}$ means 1 out of 6, so I coloured 1 out of the 6 sections red.

Lesson 2: Making the whole

➜ pages 125–127

1. a) 4 out of the 6 eggs are in the box. This is $\frac{4}{6}$ of the whole.
2 out of the 6 eggs have been used. This is $\frac{2}{6}$ of the whole.
$\frac{4}{6} + \frac{2}{6} = 1$
b) 1 out of the 4 parts is shaded.
This is $\frac{1}{4}$ of the whole.
3 out of the 4 parts are not shaded.
This is $\frac{3}{4}$ of the whole.
$\frac{1}{4} + \frac{3}{4} = 1$

2. a)



b)

3. a) $\frac{3}{8}$ d) $\frac{4}{7}$
b) $\frac{5}{5}$ e) $\frac{5}{6}$
c) $\frac{8}{9}$ f) $\frac{5}{9}$

4. $\frac{3}{7}$

5. When you add these fractions the denominator does not change but you add the numerators.
The answer is $\frac{3}{3} = 1$ whole.

6. Answers will vary; for example:
1 whole = $\frac{1}{6} + \frac{5}{6}$
1 whole = $\frac{4}{6} + \frac{2}{6}$
1 whole = $\frac{1}{2} + \frac{1}{2}$

Reflect

Children's responses will vary; for example:
Today I learnt that a whole can be split into different fractions.
Today I learnt that $\frac{2}{2}$ is the same as 1 whole.

Lesson 3: Tenths (I)

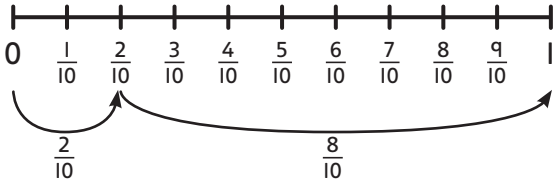
➜ pages 128–130

1. a) $\frac{4}{10}$ b) $\frac{8}{10}$ c) $\frac{3}{10}$

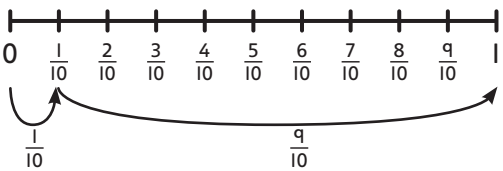
2. a) 4 triangles coloured
b) 7 small rectangles coloured
c) 8 circles coloured

3. a) $\frac{8}{10}$

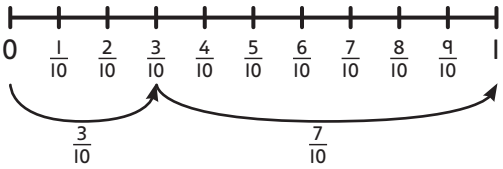
b)



4. a) $\frac{9}{10}$



b) $\frac{7}{10}$



5. They say $\frac{5}{10}$ at the same time. Children may show this using jumps on a number line.

6. Answers will vary. For example, the strip could have been long and thin (10 times as long and the same width) or a tall rectangle (same length and 10 times the width, which would now be the longer dimension).

7. Answers will vary; for example:
$\frac{1}{10} + \frac{9}{10} = 1$ whole
$\frac{2}{10} + \frac{8}{10} = 1$ whole

Reflect

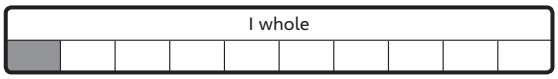
I know the next two numbers in the sequence will be $\frac{10}{10}$ (or 1) and $1\frac{1}{10}$.

Explanations will vary; for example: because $\frac{9}{10} + \frac{1}{10} = \frac{10}{10}$, which is 1 whole. 1 whole and 1 more tenth is written as $1\frac{1}{10}$.

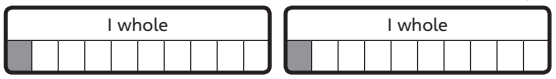
Lesson 4: Tenths (2)

→ pages 131–133

1. a) 1 part of the bar model should be shaded:
$1 \div 10 = \frac{1}{10}$



b) 1 part of each bar model should be shaded:
Altogether 2 tenths have been shaded. $2 \div 10 = \frac{2}{10}$



c) $3 \div 10 = \frac{3}{10}$
1 part of each bar model should be shaded:

d) $5 \div 10 = \frac{5}{10}$
1 part of each bar model should be shaded:

2. 3

3. a) 4
b) 5
c) $\frac{6}{10}$
d) $\frac{7}{10}$
e) $\frac{10}{10}$
f) $\frac{0}{10}$

4. a) 2
b) 10
c) $\frac{3}{10}$
d) Answers will vary: numerator should match first number; denominator is 10.

5. Each child eats $\frac{1}{2}$ of a pizza.
The pizzas could be cut in half.
The pizzas could be cut into tenths; each child eats $\frac{1}{10}$ from each pizza which makes $\frac{5}{10}$ of a pizza.

Reflect

Answers will vary; for example: because you can draw 2 bar models to show that 2 wholes are the same as 20 tenths. When you divide this by 10 you get 2 tenths. So, $2 \div 10 = \frac{2}{10}$.

Lesson 5: Fractions as numbers (I)

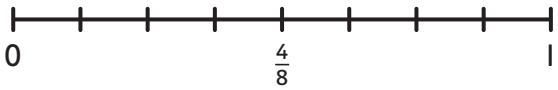
→ pages 134–136

1. a) 8
$\frac{1}{8}$ $\frac{3}{8}$
b) 5
$\frac{1}{5}$ $\frac{4}{5}$
c) 9
$\frac{1}{9}$ $\frac{5}{9}$

2. A = $\frac{2}{7}$
B = $\frac{2}{3}$ (or $\frac{6}{9}$)
C = $\frac{8}{9}$

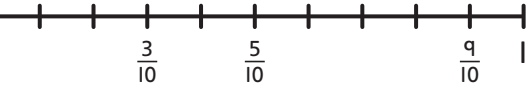
3. a)

b)



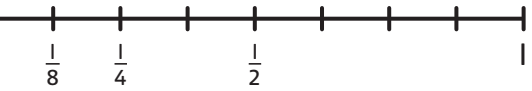
Some children may recognise that $\frac{4}{8}$ is equivalent to $\frac{1}{2}$ and position it at the midpoint of the line.

4.



5. $\frac{3}{9}$ and $\frac{4}{10}$ are not correct: they are at the positions for $\frac{3}{8}$ and $\frac{4}{8}$, as each fraction tile represents $\frac{1}{8}$.

6.



a) $\frac{1}{8}$
b) $\frac{3}{8}$

Reflect

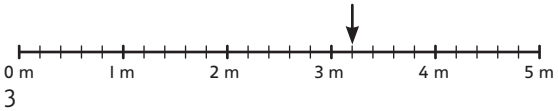
Divide the line into 5 equal parts and write $\frac{1}{5}$ at the first mark.

Divide the line into the number indicated by the denominator and then place the fraction at the mark shown by the numerator.

Lesson 6: Fractions as numbers (2)

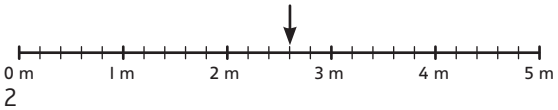
→ pages 137–139

1. a)

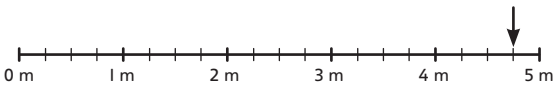


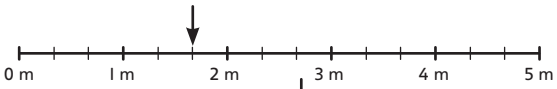
3
1

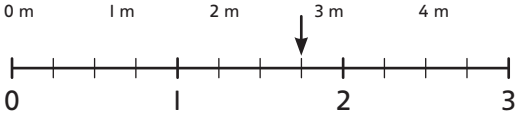
b)



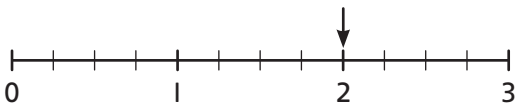
2
3

c)


d)


2. a)


b)

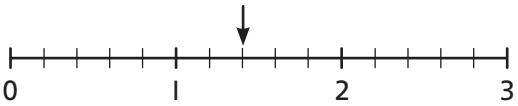

c)


3. A = $1\frac{6}{8}$ (or $1\frac{3}{4}$) B = $2\frac{4}{8}$ (or $2\frac{1}{2}$) C = $3\frac{7}{8}$

4. $3\frac{9}{10}$ could be represented by X.
Explanations will vary; for example:
X is almost 4.
$3\frac{1}{4}$ and $2\frac{3}{6}$ are too small. $4\frac{7}{8}$ is too big.

5. Danny and Aki will never say the same number at the same time.
Explanations will vary; for example: children might draw jumps along the number line to show the next number Danny and Aki say in the count.

Reflect



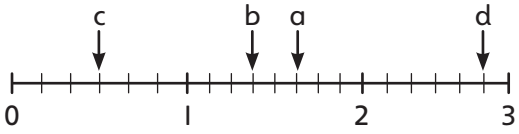
Answers will vary; for example:

I must first count how many sections between whole numbers and then find 1 whole and count on 2 small sections to mark $1\frac{2}{5}$.

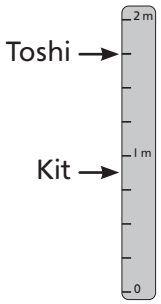
Lesson 7: Fractions as numbers (3)

→ pages 140–142

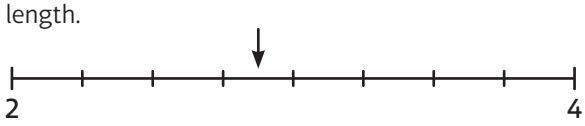
1. a) $1\frac{5}{8}$
b) $1\frac{3}{8}$
c) $\frac{3}{6}$ (or $\frac{1}{2}$)
d) $2\frac{5}{6}$

e)


2. A = $2\frac{1}{2}$ because it is half-way between 2 and 3
B = $3\frac{1}{9}$ because the line from 3 to 4 is divided into 9 equal parts so B is $\frac{1}{9}$ more than 3
C = $4\frac{9}{10}$ because the line from 4 to 5 is divided into 10 equal parts and so C is $\frac{9}{10}$ more than 4.

3.


4. Look for marks in sevenths from 0 to 1, from 1 to $1\frac{3}{7}$ and from $1\frac{6}{7}$ to 2, which may not be evenly spaced owing to length of line provided. Children may attempt to complete their marks up to 3 and may comment that the line is not long enough to do this properly. If markings are muddled, suggest that children redraw the line in their books at a suitable length.

5.


Reflect

Answers will vary; for example: mark half-way between 1 and 2; label this $1\frac{4}{8}$.

Mark half-way between $1\frac{4}{8}$ and 2; label this $1\frac{6}{8}$.

Half-way between $1\frac{4}{8}$ and $1\frac{6}{8}$, make a mark. This is $1\frac{5}{8}$.

Lesson 8: Fractions of a set of objects (I)

→ pages 143–145

1. a) $36 \div 6 = 6$
$\frac{1}{6}$ of 36 books = 6 books.
Each class gets 6 books.
b) $36 \div 9 = 4$
$\frac{1}{9}$ of 36 books = 4 books
Each class gets 4 books.

2. $\frac{1}{3}$ of 21 = 7
7 in each part of the part-whole diagram.

3. Amelia should put 3 cherries on each slice of cake.

4. $\frac{1}{2}$ of 24 = 12
There are 24 sweets in a whole bag.

5. a) Luis had 24 balloons to start with.
b) Lee burst 4 balloons.

Reflect

Aki is not correct. He has divided them into 6 equal groups, so each group is $\frac{1}{6}$ and $\frac{1}{6}$ of 30 is 5.

Lesson 9: Fractions of a set of objects (2)

→ pages 146–148

1. a) 16 ÷ 4 = 4 $\frac{1}{4}$ of 16 flowers = 4 flowers
b) 16 ÷ 4 = 4
4 × 3 = 12 $\frac{3}{4}$ of 16 flowers = 12 flowers
c) 18 ÷ 6 = 3 $\frac{1}{6}$ × 18 glasses = 3 glasses
d) 18 ÷ 6 = 3
5 × 3 = 15
$\frac{5}{6}$ × 18 glasses = 15 glasses

2. 18 ÷ 3 = 6
Children draw 6 in each part of the part-whole diagram.
18 ÷ 3 = 6
6 × 2 = 12

3. The cake has 32 candles altogether.

4. $\frac{2}{3}$ of 12; 8 $\frac{3}{4}$ of 20; 15 $\frac{2}{5}$ of 25; 10 $\frac{7}{8}$ of 16; 14

5. Disagree. Explanations will vary; for example:
I disagree because he has divided the 24 counters into 4 equal groups and there are 6 counters in each group. This means that $\frac{1}{4}$ of 24 is 6. He needs to multiply this by 3 to find $\frac{3}{4}$, so $\frac{3}{4}$ of 24 is 18.

6. $\frac{3}{4}$ of 16 = 12 $\frac{3}{5}$ of 20 =12
They are the same.

Reflect

Explanations will vary; for example: I can find a fraction of an amount by dividing it by the denominator and multiplying my answer by the numerator.

Lesson 10: Fractions of a set of objects (3)

→ pages 149–151

1. a) 100 ÷ 4 = 25
25 × 3 = 75
$\frac{3}{4}$ of 100 pencils is 75 pencils.
b) 180 ÷ 3 = 60
60 × 2 = 120
$\frac{2}{3}$ of 180 g of flour is 120 g.
c) 95 ÷ 5 = 19
19 × 2 = 38
$\frac{2}{5}$ of 95 dog biscuits is 38.
d) 32 ÷ 8 = 4
4 × 3 = 12
$\frac{3}{8}$ of 32 km is 12 km.

2. 32 ÷ 4 = 8
8 × 3 = 24
24 cm of ribbon was used.

3. 60 ÷ 6 = 10
10 × 5 = 50
$\frac{5}{6}$ of 60 m is 50 m.

4. a) 24 b) $\frac{4}{5}$ c) 60

5. a) $\frac{4}{6}$ b) 27

6. $\frac{3}{4}$ of a race will sometimes be a longer distance to run than $\frac{1}{2}$ of a race.
If the races are the same length, then it will be true. If the races are different lengths it may not be true; for example: $\frac{3}{4}$ of a 100-metre race is 75 metres but $\frac{1}{2}$ of a 1,000-metre race is 500 metres, which is longer.

Reflect

$\frac{3}{5}$ of 80 is 48. Explanations will vary; for example:
First find $\frac{1}{5}$ of 80 by working out 80 ÷ 5 = 16, then work out 16 × 3 = 48 to find $\frac{3}{5}$ of 80.

Lesson 11: Problem solving – fractions

→ pages 152–154

1. There are 8 kg of rice left in the sack.

2. a) $\frac{1}{2}$ of 20 is 10.
There are 10 apples in the fruit bowl.
b) $\frac{2}{5}$ of 20 is 8.
20 ÷ 5 = 4 4 × 2 = 8
c) 10 apples + 8 oranges = 18 pieces of fruit
20 – 18 = 2
There are 2 bananas. This is $\frac{1}{10}$ of the whole.

3. $\frac{1}{4}$ of 20 is 5. $\frac{1}{5}$ of 20 is 4. 5 + 4 = 9
The counter finishes on number 9.

4. $\frac{1}{3}$ of the group are girls so $\frac{1}{3}$ of the group is 18.
There are 54 children in the group.

6. Holly baked 24 muffins.

Reflect

Answers will vary; for example: $\frac{2}{12}$ of 60 is 10, $\frac{3}{12}$ of 60 is 15.

End of unit check

→ pages 155–157

My journal

1. Example questions that could have been asked will vary, but should be based on the fact family 3 × 6 = 18 and the bracketing of the two 6s, for example:
Miss Hall brings in 18 eggs for her class to make cookies. Eggs come in boxes of 6. There is 1 full box left after the baking has been done. How many eggs did the children use? (Answer: 12)

Worked calculations should include some or all of the following:
3 × 6 = 18 or 6 + 2 × 6 = 18
6 + 6 + 6 = 18 or 6 + 12 = 18
18 – (2 × 6) = 6 or 18 – 6 = 2 × 6 = 12
Allow any variant of each 'fact family'.

2. 500 + 500 = 1,000, so Toshi and Jen have 1,000 ml or 1 litre of orange juice. They also have: 3 apples, 8 slices of pizza, 4 baguettes and 9 strawberries. Ash's way of sharing the cartons is more sensible, though Astrid's might be useful if the juice cartons were different flavours.

It is not possible to share all the food equally without fractions or remainders, because 3 apples and 9 strawberries do not divide exactly by 2. All the other items can be shared between 2.

They will each get 1 juice carton (500 ml), $1\frac{1}{2}$ apples, 4 slices of pizza (or half a pizza), 2 baguettes and $4\frac{1}{2}$ strawberries.

If children give 1 r 1 for the apples and 4 r 1 for the large strawberries, this could lead to a 'Deepen' discussion about remainders. What if someone has to have the leftover apple and strawberry? The fairest answer would be: (child 1) 1 apple, 5 large strawberries and (child 2) 2 apples, 4 large strawberries; this now becomes a question about combinations, rather than division.

Number sentences should show:

$2 \div 2 = 1$ or $1{,}000 \div 2 = 500$

$3 \div 2 = \frac{3}{2}$ or $1\frac{1}{2}$ or 1 r 1

$8 \div 2 = 4$ or $\frac{8}{8} \div 2 = \frac{4}{8} = \frac{1}{2}$

$4 \div 2 = 2$

$9 \div 2 = \frac{9}{2} = 4\frac{1}{2}$ or 4 r 1