![White Rose Maths logo]

Fractions

Overview

Small Steps

- Unit and non-unit fractions
- Making the whole
- Tenths
- Count in tenths
- Tenths as decimals
- Fractions on a number line
- Fractions of a set of objects (1)
- Fractions of a set of objects (2)
- Fractions of a set of objects (3)

NC Objectives

Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10

Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.

Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.

Solve problems that involve all of the above.

Unit and Non-unit Fractions

Notes and Guidance

Children recap their understanding of unit and non-unit fractions from Year 2. They explain the similarities and differences between unit and non-unit fractions.

Children are introduced to fractions with denominators other than 2, 3 and 4, which they used in Year 2. Ensure children understand what the numerator and denominator represent.

Mathematical Talk
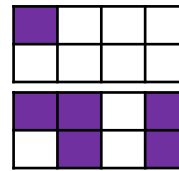
What is a unit fraction?

What is a non-unit fraction?

Show me $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ What's the same? What's different?

What fraction is shaded?   What fraction is not shaded?

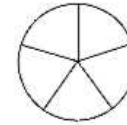What is the same about the fractions?   What is different?

Varied Fluency

■ Complete the sentences to describe the images.

___ out of ___ equal parts are shaded.

$\frac{\square}{\square}$ of the shape is shaded.

■ Shade $\frac{1}{5}$ of the circle.   Shade $\frac{3}{5}$ of the circle

Circle $\frac{1}{5}$ of the beanbags.   Circle $\frac{3}{5}$ of the beanbags.

What's the same and what's different about $\frac{1}{5}$ and $\frac{3}{5}$?

■ Complete the sentences.

> A unit fraction always has a numerator of _____
> A non-unit fraction has a numerator that is _____ than _____
> An example of a unit fraction is _____
> An example of a non-unit fraction is ____

Can you draw a unit fraction and a non-unit fraction with the same denominator?

Unit and Non-unit Fractions

Reasoning and Problem Solving

True or False?

$\frac{1}{3}$ of the shape is shaded.

False, one quarter is shaded. Ensure when counting the parts of the whole that children also count the shaded part.

Sort the fractions into the table.

	Fractions equal to one whole	Fractions less than one whole
Unit fractions		
Non-unit fractions		

Are there any boxes in the table empty? Why?

$\frac{3}{4}$	$\frac{3}{5}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{2}{2}$	$\frac{4}{4}$	$\frac{2}{5}$	$\frac{1}{2}$

Top left: Empty

Top right: $\frac{1}{3}, \frac{1}{4}$ and $\frac{1}{2}$

Bottom left: $\frac{2}{2}$ and $\frac{4}{4}$

Bottom right: $\frac{3}{4}, \frac{3}{5}$ and $\frac{2}{5}$

There are no unit fractions that are equal to one whole other than $\frac{1}{1}$ but this isn't in our list.

5

Making the Whole

Notes and Guidance

Children look at whole shapes and quantities and see that when a fraction is equivalent to a whole, the numerator and denominator are the same.

Building on using part-whole model with whole numbers, children use the models to partition the whole into fractional parts.
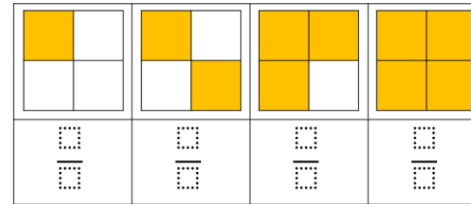
Mathematical Talk

Is a fraction always less than one?

When the fraction is equivalent to one, what do you notice about the numerator and denominator?

In the counter activity, what's the same about the part-whole models? What's different?
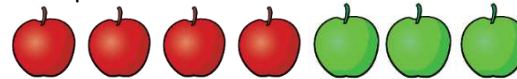
Varied Fluency

Complete the missing information.

1 whole is the same as $\frac{\square}{\square}$

Complete the sentences to describe the apples.

$\frac{\square}{\square}$ of the apples are red. $\frac{\square}{\square}$ of the apples are green.

$\frac{\square}{\square}$ and $\frac{\square}{\square}$ make one whole

Use 8 double sided counters.
Drop the counters on to the table, what fraction of the counters are red? What fraction of the counters are yellow? What fraction represents the whole group of counters?
Complete part-whole models to show your findings.

Making the Whole

Reasoning and Problem Solving

Teddy says,

I have one pizza cut into 6 equal pieces. I have eaten $\frac{6}{6}$ of the pizza.

Does Teddy have any pizza left?
Explain your answer.

No because $\frac{6}{6}$ is equal to one whole, so Ted has eaten all of his pizza.

Complete the sentence.

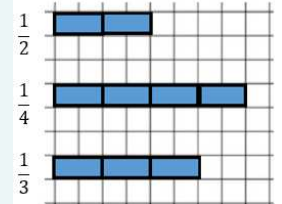When a fraction is equal to a whole, the numerator and the denominator are _____

Use pictures to prove your answer.

The same/equal

Children may draw a range of pictures to prove this statement.

Rosie is drawing bar models to represent a whole.
She has drawn a fraction of each of her bars.

$\frac{1}{2}$

$\frac{1}{4}$

$\frac{1}{3}$
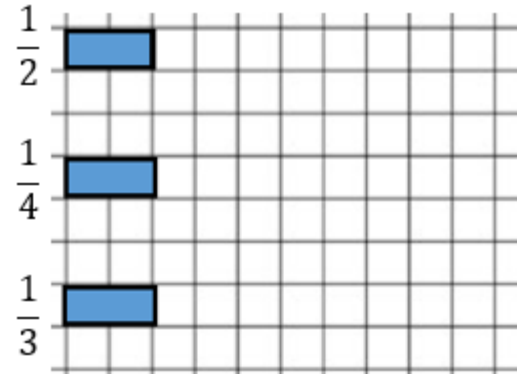
Can you complete Rosie's bar models?

$\frac{1}{2}$

$\frac{1}{4}$

$\frac{1}{3}$

Tenths

Notes and Guidance

Children explore what a tenth is. They recognise that tenths arise from dividing one whole into 10 equal parts.

Children represent tenths in different ways and use words and fractions to describe them. For example, one tenth and $\frac{1}{10}$

Mathematical Talk

How many tenths make the whole?

How many tenths are shaded?
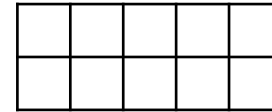
How many more tenths do I need to make a whole?

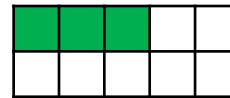When I am writing tenths, the _____ is always 10

How are fractions linked to division?

Varied Fluency

If the frame represents 1 whole, what does each box represent? Use counters to represent:
- One tenth
- Two tenths
- Three tenths
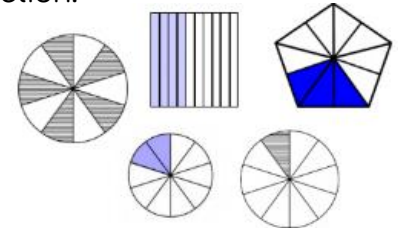- One tenth less than eight tenths

Identify what fraction of each shape is shaded. Give your answer in words and as a fraction.

e.g.

Three tenths $\frac{3}{10}$

Annie has 2 cakes. She wants to share them equally between 10 people. What fraction of the cakes will each person get?

There are ____ cakes.

They are shared equally between ___ people.

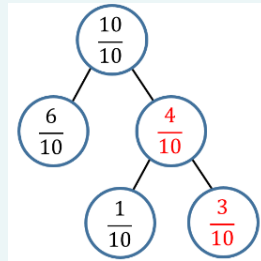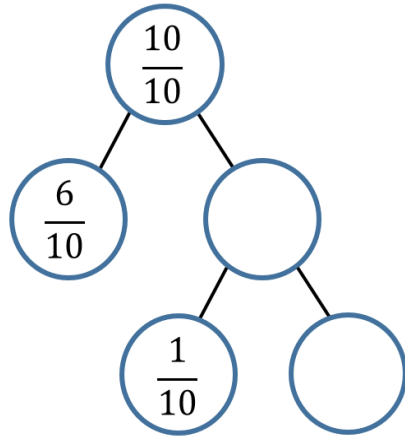Each person has $\frac{\square}{\square}$ of the cake.

___ ÷ ___ = ____

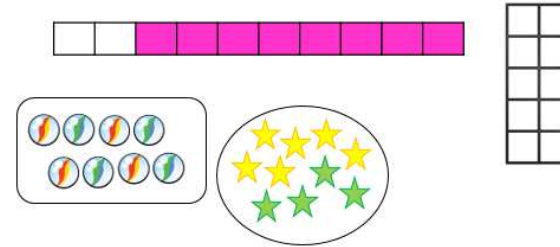What fraction would they get if Annie had 4 cakes?

Tenths

Reasoning and Problem Solving

Fill in the missing values.
Explain how you got your answers.

Children could use practical equipment to explain why and how, and relate back to the counting stick.

Odd One Out

Which is the odd one out?
Explain your answer.

The marbles are the odd one out because they represent 8 or eighths. All of the other images have a whole which has been split into ten equal parts.

Count in Tenths

Notes and Guidance

Children count up and down in tenths using different representations.

Children also explore what happens when counting past $\frac{10}{10}$ They are not required to write mixed numbers, however children may see the $\frac{11}{10}$ as $1\frac{1}{10}$ due to their understanding of 1 whole.
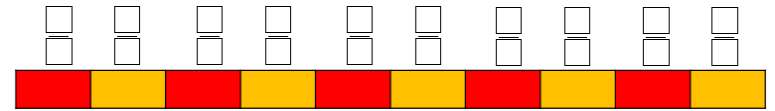
Mathematical Talk

Let's count in tenths. What comes next? Explain how you know.

If I start at ___ tenths, what will be next?

When we get to $\frac{10}{10}$ what else can we say? What happens next?

Varied Fluency

The counting stick is worth 1 whole. Label each part of the counting stick. Can you count forwards and backwards along the counting stick?
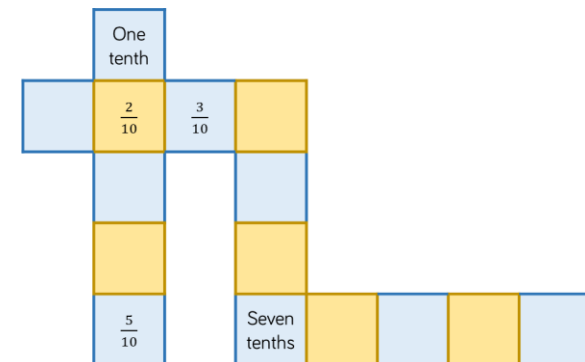

Continue the pattern in the table.
- What comes between $\frac{4}{10}$ and $\frac{6}{10}$?
- What is one more than $\frac{10}{10}$?
- If I start at $\frac{8}{10}$ and count back $\frac{4}{10}$, where will I stop?

Representation	Words	Fraction
	One tenth	$\frac{1}{10}$

Complete the sequences.

Count in Tenths

Reasoning and Problem Solving

Teddy is counting in tenths.

Seven tenths, eight tenths, nine tenths, ten tenths, one eleventh, two elevenths, three elevenths…

Can you spot his mistake?

Teddy thinks that after ten tenths you start counting in elevenths. He does not realise that ten tenths is the whole, and so the next number in the sequence after ten tenths is eleven tenths or one and one tenth.
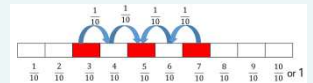
True or False?

Five tenths is $\frac{2}{10}$ smaller than 7 tenths.

Five tenths is $\frac{2}{10}$ larger than three tenths.

Do you agree?

Explain why.

This is correct. Children could show it using pictures, ten frames, number lines etc.
For example:

Tenths as Decimals

Notes and Guidance

Children are introduced to tenths as decimals for the first time. They compare fractions and decimals written as words, in fraction form and as decimals and link them to pictorial representations.

Children learn that the number system extends to the right of the decimal point into the tenths column.

Mathematical Talk

What is a tenth?

How many different ways can we write a tenth?
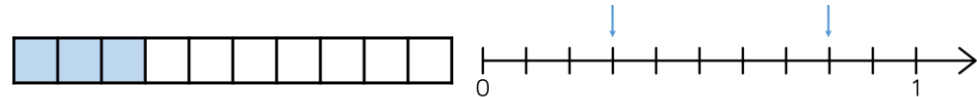
What does equivalent mean?

What is the same and what is different about decimals and fractions?

Varied Fluency

Complete the table.

Image	Words	Fraction	Decimal
	One tenth	$\frac{1}{10}$	0.1
	Nine tenths		

Write the fractions and decimals shown.

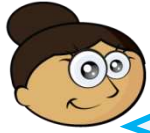Here is a decimal written in a place value grid.

Ones	Tenths
0	8

Can you represent this decimal pictorially?
Can you write the decimal as a fraction?

Reasoning and Problem Solving

True or False?

Dora: 10 cm is one tenth of 1 metre

Amir: 10 cm is 0.1 metres.

Explain your answer.

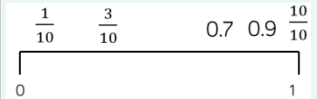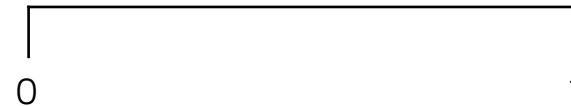
They are both correct.

$10 \text{ cm} = \frac{1}{10} \text{ m} = 0.1 \text{ m}$

Place the decimals and fractions on the number line.

$0.7 \quad \frac{3}{10} \quad \frac{1}{10} \quad 0.9 \quad \frac{10}{10}$

0 ———————————————— 1

$\frac{1}{10} \quad \frac{3}{10} \quad \quad 0.7 \quad 0.9 \quad \frac{10}{10}$

0 ———————————— 1

Fractions on a Number Line

Notes and Guidance

Children use a number line to represent fractions beyond one whole. They count forwards and backwards in fractions.

Children need to know how to divide a number line into specific fractions i.e. when dividing into quarters, we need to ensure our number line is divided into four equal parts.

Mathematical Talk

How many equal parts has the number line been divided into?
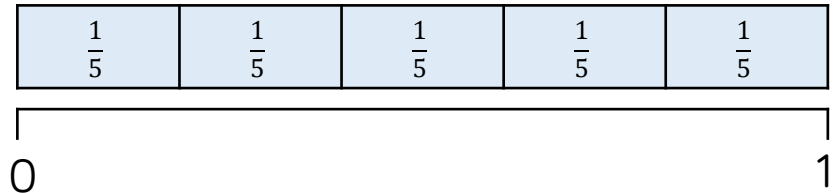
What does each interval represent?

How are the bar model and the number line the same? How are they different?

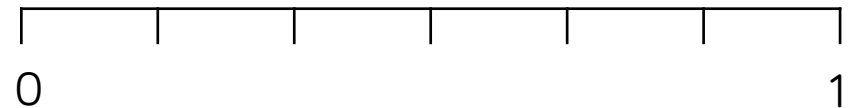How do we know where to place $\frac{1}{5}$ on the number line?

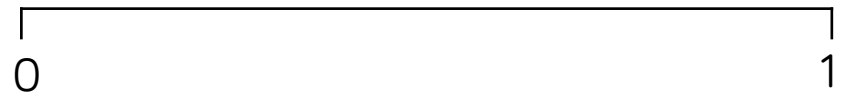How do we label fractions larger than one.

Varied Fluency

▪ Show $\frac{1}{5}$ on the number line. Use the bar model to help you.

$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$

0   1

▪ The number line has been divided into equal parts. Label each part correctly.

0   1
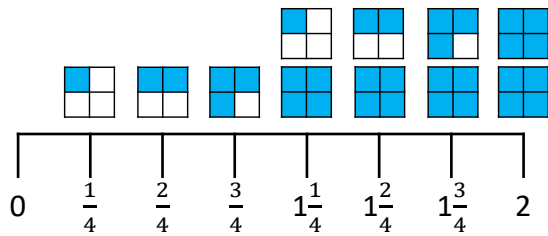
▪ Divide the number line into eighths. Can you continue the number line up to 2?

0   1

Reasoning and Problem Solving

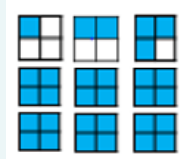Eva has drawn a number line.

Tommy says it is incorrect.

Do you agree with Tommy?

Explain why.

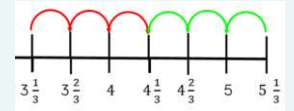Can you draw the next three fractions?

Alex and Jack are counting up and down in thirds.

Alex starts at $5\frac{1}{3}$ and counts backwards.

Jack starts at $3\frac{1}{3}$ and counts forwards.

What fraction will they get to at the same time?

They will reach $4\frac{1}{3}$

15

Fraction of an Amount (1)

Notes and Guidance

Children find a unit fraction of an amount by dividing an amount into equal groups.

They build on their understanding of division by using place value counters to find fractions of larger quantities including where they need to exchange tens for ones.

Mathematical Talk

Which operation do we use to find a fraction of an amount?

How many equal groups do we need?

Which part of the fraction tells us this?

How does the bar model help us?

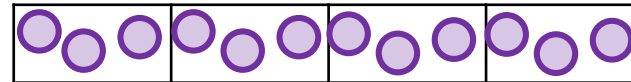## Varied Fluency

Find $\frac{1}{5}$ of Eva's marbles.

I have divided the marbles into ☐ equal groups.

There are ☐ marbles in each group.

$\frac{1}{5}$ of Eva's marbles is ☐ marbles.

Dexter has used a bar model and counters to find $\frac{1}{4}$ of 12

Use Dexter's method to calculate:

$\frac{1}{6}$ of 12 $\frac{1}{3}$ of 12 $\frac{1}{3}$ of 18 $\frac{1}{9}$ of 18

Amir uses a bar model and place value counters to find one quarter of 84

Use Amir's method to find:

$\frac{1}{3}$ of 36 $\frac{1}{3}$ of 45 $\frac{1}{5}$ of 65

Fraction of an Amount (1)

Reasoning and Problem Solving

Whitney has 12 chocolates.

On Friday, she ate $\frac{1}{4}$ of her chocolates and gave one to her mum.

On Saturday, she ate $\frac{1}{2}$ of her remaining chocolates, and gave one to her brother.

On Sunday, she ate $\frac{1}{3}$ of her remaining chocolates.

How many chocolates does Whitney have left?

Whitney has two chocolates left.

Fill in the Blanks

$\frac{1}{3}$ of 60 = $\frac{1}{4}$ of $\boxed{}$

80

$\frac{1}{\boxed{}}$ of 50 = $\frac{1}{5}$ of 25

10

Fraction of an Amount (2)

Notes and Guidance

Children need to understand that the denominator of the fraction tells us how many equal parts the whole will be divided into. E.g. $\frac{1}{3}$ means dividing the whole into 3 equal parts.

They need to understand that the numerator tells them how many parts of the whole there are. E.g. $\frac{2}{3}$ means dividing the whole into 3 equal parts, then counting the amount in 2 of these parts.

Mathematical Talk

What does the denominator tell us?

What does the numerator tell us?

What is the same and what is different about two thirds and two fifths?

How many parts is the whole divided into and why?

Varied Fluency
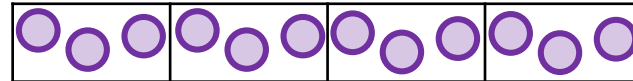
Find $\frac{2}{5}$ of Eva's marbles.

I have divided the marbles into ☐ equal groups.

There are ☐ marbles in each group.

$\frac{2}{5}$ of Eva's marbles is ☐ marbles.

Dexter has used a bar model and counters to find $\frac{3}{4}$ of 12

Use Dexter's method to calculate:

$\frac{5}{6}$ of 12 $\frac{2}{3}$ of 12 $\frac{2}{3}$ of 18 $\frac{7}{9}$ of 18

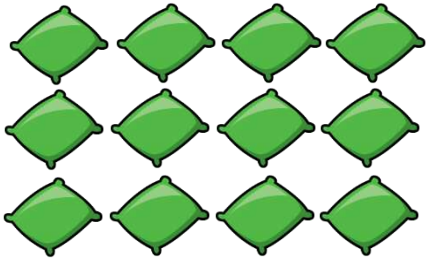Amir uses a bar model and place value counters to find three quarters of 84

Use Amir's method to find:

$\frac{2}{3}$ of 36 $\frac{2}{3}$ of 45 $\frac{3}{5}$ of 65

This is $\frac{3}{4}$ of a set of beanbags.

How many were in the whole set?

16

Ron has £28

On Friday, he spent $\frac{1}{4}$ of his money.

On Saturday, he spent $\frac{2}{3}$ of his remaining money and gave £2 to his sister.

On Sunday, he spent $\frac{1}{5}$ of his remaining money.

How much money does Ron have left?

What fraction of his original amount is this?

Ron has £4 left.
This is $\frac{1}{7}$ of his original amount.

Fraction of an Amount (3)

Notes and Guidance

Children will apply their knowledge and understanding of fractions to solve problems in various contexts.

They recap and build their understanding of different measures.

Mathematical Talk

Do we need to make an exchange?

Can we represent the problem in a bar model?

When finding $\frac{5}{6}$, what will we need to do and why?

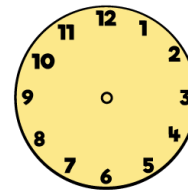What is the whole? How can we represent this problem?

Varied Fluency

Ron has £3 and 50p
He wants to give half of his money to his brother.
How much would his brother receive?

A bag of sweets weighs 240 g
There are 4 children going to the cinema, each receives $\frac{1}{4}$ of the bag.
What weight of sweets will each child receive?

Find $\frac{2}{3}$ of 1 hour.
Use the clock face to help you.

1 hour = ☐ minutes

$\frac{1}{3}$ of ☐ minutes = ☐

$\frac{2}{3}$ of ☐ minutes = ☐

Reasoning and Problem Solving

Mo makes 3 rugby shirts.

Each rugby shirt uses 150 cm of material.

He has a 600 cm roll of material.

How much material is left after making the 3 shirts?

What fraction of the original roll is left over?

150 cm

This is $\frac{1}{4}$ of his original roll of material.

Alex and Eva share a bottle of juice.

Alex drinks $\frac{3}{5}$ of the juice.

Eva drinks 200 ml of the juice.

One fifth of the juice is left in the bottle.

How much did Alex drink?

What fraction of the bottle did Eva drink?

What fraction of the drink is left?

Alex drank 600 ml of the juice.

Eva drank one fifth of the juice.

The fraction of juice left is $\frac{1}{5}$ of the bottle.