Released February 2018

Year 3

Small Steps Guidance and Examples

Block 5: Fractions

White Rose Maths

Year 3 – Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number – Place Value			Number – Addition and Subtraction					Number – Multiplication and Division			Consolidation
Spring	Number - Multiplication and Division			Measurement: Money	Statistics		Measurement: length and perimeter			Number - Fractions		Consolidation
Summer	Number – fractions			Measurement: Time			Geometry – Properties of Shapes		Measurement: Mass and Capacity			Consolidation

Week 10 to 11 – Number: Fractions

Overview

Small Steps

- Unit and non-unit fractions
- Making the whole
- Tenths
- Count in tenths
- Tenths as decimals
- Fractions of 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 on unit and non-unit fractions from Year 2. They explain the difference between a unit and non-unit fraction.

Children look at unit and non-unit fractions of shapes and amounts.

Mathematical Talk

What is a unit fraction?

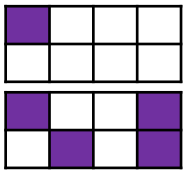
What is a non-unit fraction?

In the representation, what is the unit fraction shown?

What is the non-unit fraction shown?

Varied Fluency

1 Complete the sentences to describe the images.



☐ out of ☐ equal parts are shaded.

$\frac{☐}{☐}$ of the shape is shaded.

2 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 $\frac{3}{5}$?

3 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 this 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		

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

Are there any boxes in the table empty? Why?

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 we would just write this as 1

Making the Whole

Notes and Guidance

Children begin by counting up or down in fractions to make the link with the whole.

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

Mathematical Talk

What fraction is represented? What fraction is equivalent to the whole?

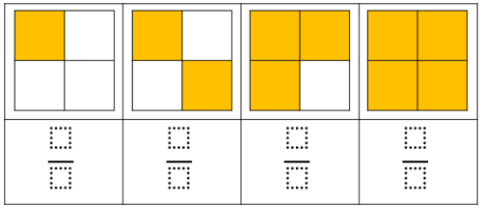
What fraction of the apples are green, what fraction are red?

What fractions make the whole?

Could we represent the fractions of apples in a part whole model?

Varied Fluency

1 Complete the missing information.



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

2 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.

3 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 of the counters?
Complete part whole models to show your findings.
What fraction will always stay the same in your part whole models?

Making the Whole

Reasoning and Problem Solving

Ted says,

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

Does Ted 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

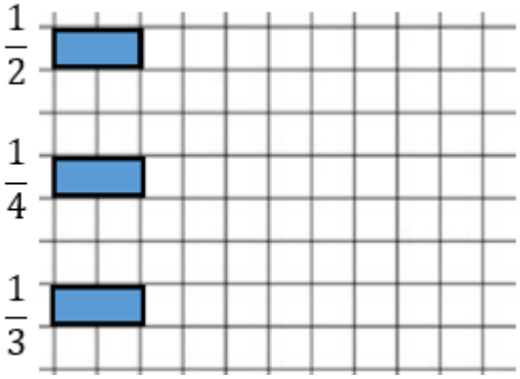
When a fraction is equal to a whole, the numerator and the denominator are _____

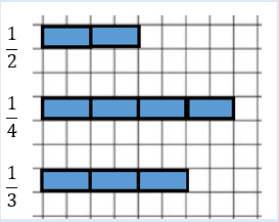
Use pictures to prove your answer.

The same/equal

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

Here are four fractions of four different bars.
Can you draw the whole bar for each?





Tenths

Notes and Guidance

Children explore what a tenth is. They recognise that tenths arise from dividing one object 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 are shaded?

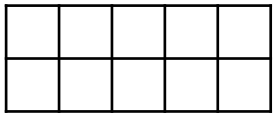
How many more tenths do I need to make a whole?

When I am writing tenths, the _____ is always 10

Varied Fluency

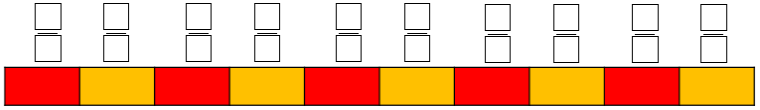
1 If the frame represents 1 whole, what does each box represent?

Use counters to represent:



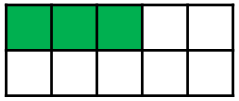
- One tenth
- Two tenths
- Three tenths
- One tenth less than eight tenths

2 The counting stick is worth 1 whole. Label each part of the counting stick.



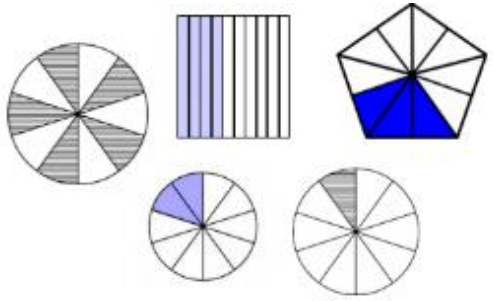
3 Identify what fraction of each shape is shaded. Give your answer in words and as a fraction.

E.g.



Three tenths

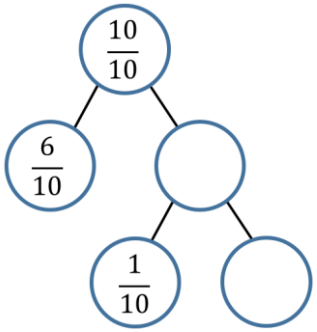
$\frac{3}{10}$

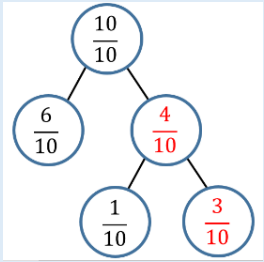


Tenths

Reasoning and Problem Solving

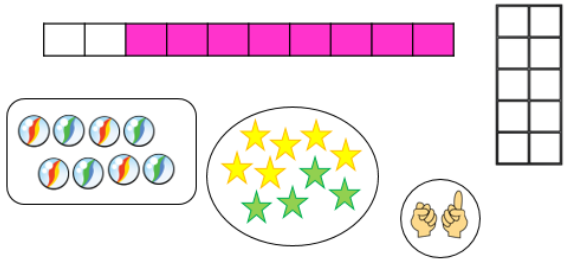
Fill in the missing values.
Explain how you got your answers.





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

Children also explore what happens when counting past $\frac{10}{10}$ and link this to their understanding of wholes.

Mathematical Talk

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

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

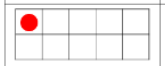
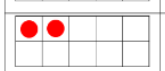
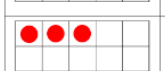
What tenth comes between ___ and ___?

When we get to 10/10 what else can we say? What happens next?

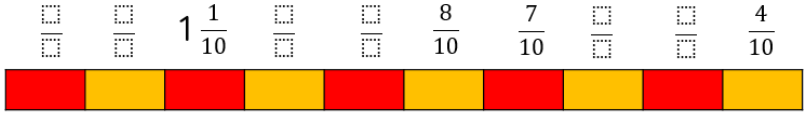
Varied Fluency

1 Continue the pattern in the table and answer the questions.

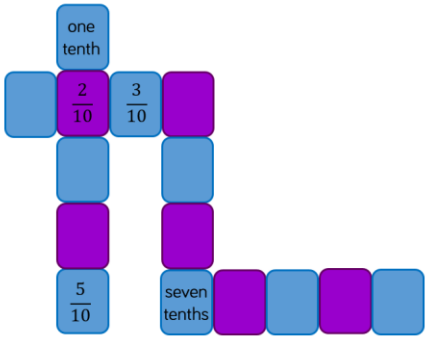
- What comes between $\frac{4}{10}$ and $\frac{6}{10}$?
- What is one more than $\frac{10}{10}$?
- If I start at $\frac{8}{10}$ and count back $\frac{4}{10}$, where will I stop?

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

2 Continue counting in tenths.
Label each part of the counting stick.



3 Complete the sequence.



Count in Tenths

Reasoning and Problem Solving

Jason is counting in tenths.

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

Can you spot his mistake?

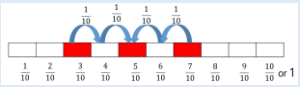
Jason thinks that after ten tenths you start counting in elevenths. He does not realise that ten tenths is the whole, and so the next number in the sequence after ten tenths is eleven tenths or one and one tenth.

Tania says five tenths is $\frac{2}{10}$ smaller than seven tenths, but $\frac{2}{10}$ 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?

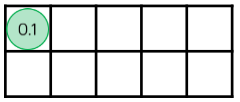
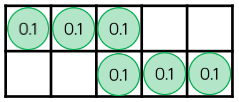
How many different ways can we write a tenth?

What does equivalent mean?

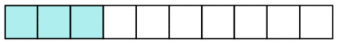
What is the same and what is different about decimals and fractions?

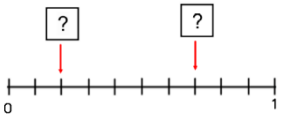
Varied Fluency

1 Complete the table.

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

2 Write the fractions and decimals shown.





3 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?

Tenths as Decimals

Reasoning and Problem Solving

True or False?

Tulisa

10 cm is one tenth of 1 metre

20 cm is two tenths of 2 metres

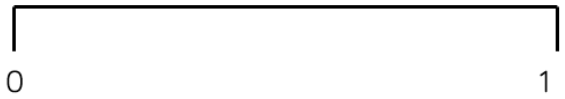
Owen

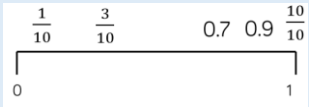
Explain your answer.

Tulisa is correct because 10 cm goes into 1 metre ten times.
Owen is incorrect because 20 cm goes into 2 metres ten times, so it is one tenth.

Place the decimals and fractions on the number line.

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





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 split into four sections.

Mathematical Talk

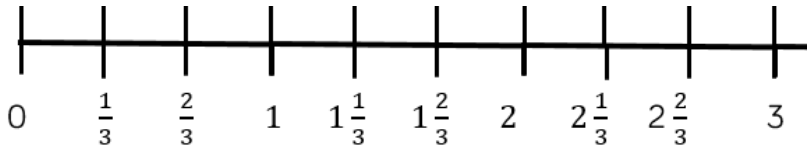
How can we count past 1?

How many lines do you need to draw to split a number line/shape into quarters?

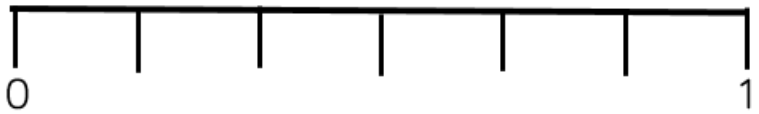
In a fraction, what does the denominator tell us?

Varied Fluency

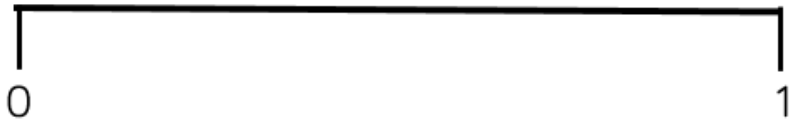
1 Complete the number line.



2 The number line has been split into equal parts.
Can you label each part correctly?



3 Split the number line into eighths.
Can you label each division of the number line?

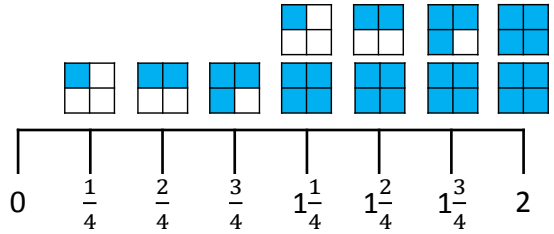


Can you continue the number line up to 2?
How would you label the fractions larger than one?

Fractions on a Number Line

Reasoning and Problem Solving

Eva has drawn a number line.



Mike says it is incorrect.

Do you agree with Mike?

Explain why.

Use a drawing to explain your thoughts.

Mike is correct because Eva has missed 1 whole out.

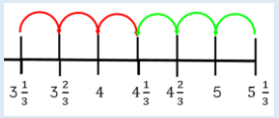
Alex and Joanne are counting up and down in thirds.

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

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

What fraction will they get to at the same time?

They will both land on $4\frac{1}{3}$



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 is finding a fraction of an amount similar to?

How many equal groups do we need? Which part of the fraction tells us this?

How does the bar model help us?

Varied Fluency

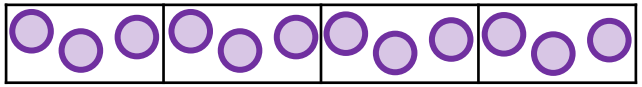
1 Find $\frac{1}{5}$ of Joe's marbles.

I have divided the marbles into ☐ equal groups.

There are ☐ marbles in each group.

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

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



Use Sam's method to calculate:

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

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

Use Faye'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

Kayleigh 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 Kayleigh have left?

Kayleigh has two chocolates left.

Fill in the Blanks

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

80

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

10

Fraction of an Amount (2)

Notes and Guidance

Children need to understand the denominator of the fraction tell us how many equal parts the whole has been divided into. Eg. $\frac{1}{3}$ 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. Eg. . $\frac{2}{3}$ means dividing the whole into 3 equal parts, then counting the amount in 2 of these parts.

Mathematical Talk

What 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

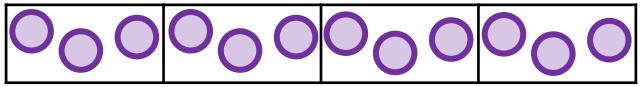
1 Find $\frac{2}{5}$ of Joe's marbles.

I have divided the marbles into ☐ equal groups.

There are ☐ marbles in each group.

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

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



Use Sam's method to calculate:

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

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

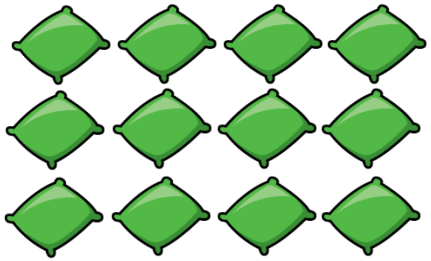
Use Faye's method to find:

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

Fraction of an Amount (2)

Reasoning and Problem Solving

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



How many were in the whole set?

16

Rajesh 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 $\frac{3}{5}$ of his remaining money.

How much money does Rajesh have left?

What fraction of his original amount is this?

Rajesh has £2 left.

This is $\frac{1}{14}$ of his original amount.

Fraction of an Amount (3)

Notes and Guidance

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

They build and recap their understanding of different measures.

Mathematical Talk

Can we represent the problem in a bar model?

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

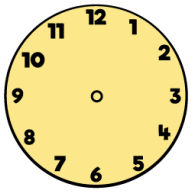
What is the whole? How can we represent this problem?

Varied Fluency

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

2 A bag of sweets weighed 2 kg and 400 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?

3 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 = ☐

Fraction of an Amount (3)

Reasoning and Problem Solving

Chris makes 3 rugby shirts.

Each rugby shirt uses 250 cm of material.

He has a 10 metre roll of material.

How much material is left after making the 3 shirts?

What fraction of the original roll is left over?

250 cm

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

Alison has a bottle of juice.

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

Sarah drinks 200 ml of the juice.

One fifth of the juice is left in the bottle.

How much did Alison drink?

What fraction of the bottle did Sarah drink?

What fraction of the drink is left?

Alison drank 600 ml of the juice.

Sarah drank one fifth of the juice.

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