Released January 2018

Years 3/4

Small Steps Guidance and Examples

Block 3 – Number: Fractions

White Rose Maths

Year 3/4 – 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: Length, Perimeter and Area		Number: Fractions				Year 3: Fractions Year 4: Decimals			Consolidation
Summer	Measurement: Money		Statistics		Measurement: Time			Geometry – Properties of Shapes		Year 3: Mass and Capacity Year 4: Position and Direction		Consolidation

Overview

Small Steps

Year 3	Year 4
Unit and non-unit fractions	What is a fraction?
Making the whole	
Equivalent fractions (1)	Equivalent fractions (1)
Equivalent fractions (2)	Equivalent fractions (2)
Equivalent fractions (3)	Fractions greater than 1
Fractions on a number line	Count in fractions
Add fractions	Add 2 or more fractions
Subtract fractions	Subtract 2 fractions
	Subtract from whole amounts
Fractions of a set of objects (1)	Calculate fractions of a quantity
Fractions of a set of objects (2)	Problem solving – calculate quantities
Fractions of a set of objects (3)	

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?

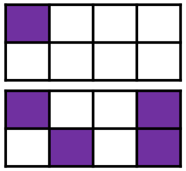
What is a non-unit fraction?

In the representation, what is the unit fraction shown?

What is the non-unit fraction shown?

Varied Fluency

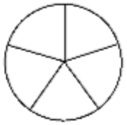
1. Complete the sentences to describe the images.



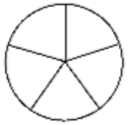
☐ out of ☐ equal parts are shaded.

$\frac{☐}{☐}$ of the shape is shaded.

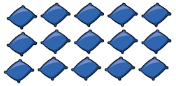
2. Shade $\frac{1}{5}$ of the circle.



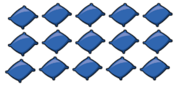
Shade $\frac{3}{5}$ of the circle



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

What is a Fraction?

Notes and Guidance

Children explore fractions in different representations, for example, fractions of shapes, quantities and fractions on a number line.

They explore and recap on the meaning of numerator and denominator, non unit and unit fractions.

Mathematical Talk

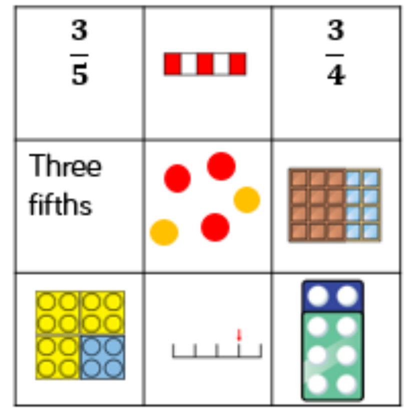
How can we sort the fraction cards? What does each one represent?

How can we represent $\frac{a}{b}$ in different ways?

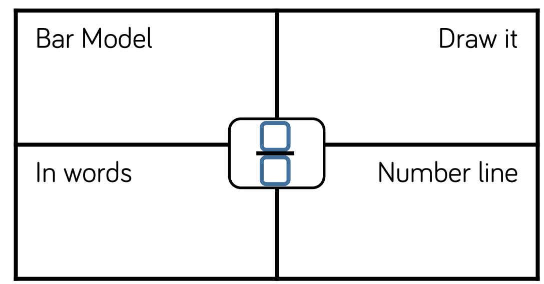
Is it a unit or non unit fraction?
Explain how you know.

Varied Fluency

1. Sort the cards into different groups.
Can you explain how you made your decision?
Can you sort the cards a different way?



2. Represent the fraction you have been given in as many different ways as possible.

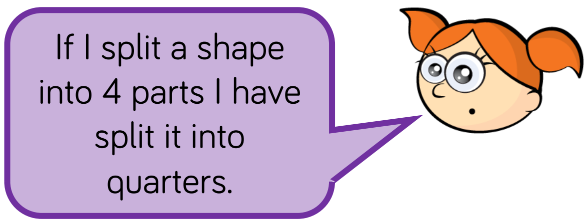


3. Using counters or cubes, explore finding $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ of different amounts. What do you notice? Can you use any amount? Why?
Repeat with other unit and non-unit fractions.

What is a Fraction?

Reasoning and Problem Solving

Always, Sometimes, Never

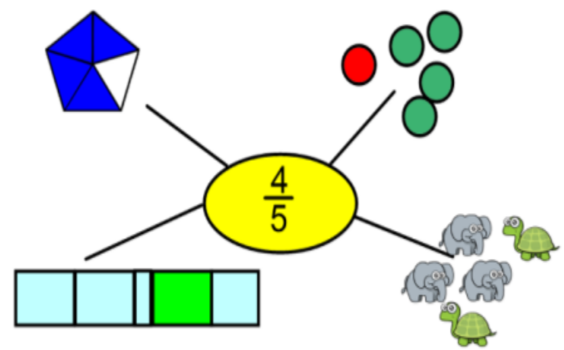


Explain your answer.

Sometimes

If the shape is not split equally it will not be in quarters.

Which representations of $\frac{4}{5}$ are incorrect?



Explain how you know.

Has not been split into equal parts.

Shows either $\frac{3}{5}$ or $\frac{2}{5}$

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?

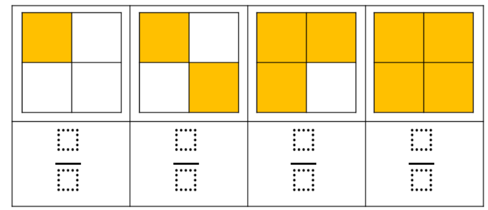
What fraction of the apples are green, what fraction are red?

What fractions make the whole?

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

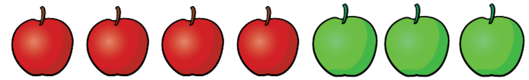
Varied Fluency

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.

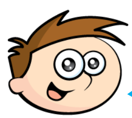
$\frac{\square}{\square}$ and $\frac{\square}{\square}$ make one whole.

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

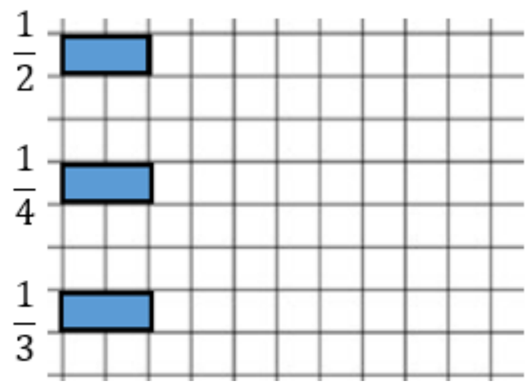
When a fraction is equal to a whole, the numerator and the denominator are
____

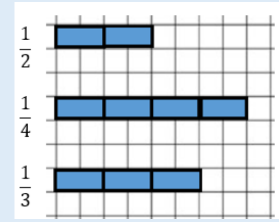
Use pictures to prove your answer.

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?





Equivalent Fractions (1)

Notes and Guidance

Children begin by using Cuisenaire or number rods to investigate and record equivalent fractions. Children then move on to exploring equivalent fractions through strip diagrams or bar models.

Children explore equivalent fractions in pairs and can start to spot patterns.

Mathematical Talk

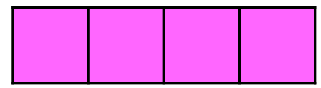
If the ___ rod is worth 1, can you show me $\frac{1}{2}$, $\frac{1}{4}$? Can you find other rods that are the same? What fraction would they represent?

How can you fold a strip of paper into equal parts?
What do you notice about the numerators and denominators? Do you see any patterns?

Can a fraction have more than one equivalent fraction?

Varied Fluency

1. The pink rod is worth 1



Which rod would be worth $\frac{1}{4}$? Which rods would be worth $\frac{2}{4}$?
Which rod would be worth $\frac{1}{2}$?
Use the Cuisenaire to find rods to investigate other equivalent fractions.

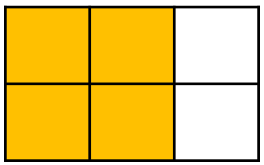
2. Use two strips of equal sized paper. Fold one strip into quarters and the other into eighths. Place the quarters on top of the eighths and lift up one quarter, how many eighths can you see? How many eighths are equivalent to one quarter? Which other equivalent fractions can you find?

3. Using squared paper, investigate equivalent fractions using equal parts. e.g. $\frac{\square}{4} = \frac{\square}{8}$. Start by drawing a bar 8 boxes along. Underneath compare the same length bar split into four equal parts.

Equivalent Fractions (1)

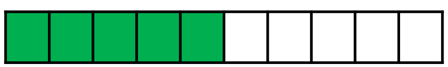
Reasoning and Problem Solving

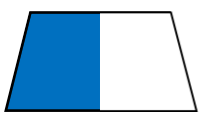
Explain how the diagram shows both $\frac{2}{3}$ and $\frac{4}{6}$

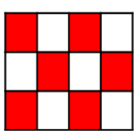


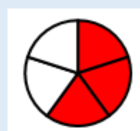
The diagram is split in to six equal parts and four out of the six are yellow. You can also see three columns and two columns are yellow.

Which is the odd one out? Explain why.

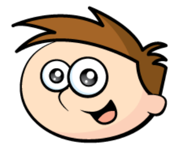






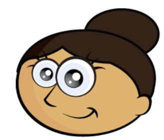


This is the odd one out because the others are all equivalent to $\frac{1}{2}$



Lucas makes this fraction:

Jermaine says he can make an equivalent fraction with a denominator of 9



Shania disagrees. She says it can’t have a denominator of 9 because the denominator would need to be double 3

Who do you agree with? Explain why.

Jermaine is correct. $\frac{1}{3} = \frac{3}{9}$ Children could show this with bar models or strip diagrams.

Equivalent Fractions (1)

Notes and Guidance

Children use strip diagrams to investigate and record equivalent fractions.

They start by comparing two fractions before moving on finding more than one equivalent fraction on a fraction wall.

Mathematical Talk

How can you fold a strip of paper into equal parts?

What do you notice about the numerators and denominators? Do you see any patterns?

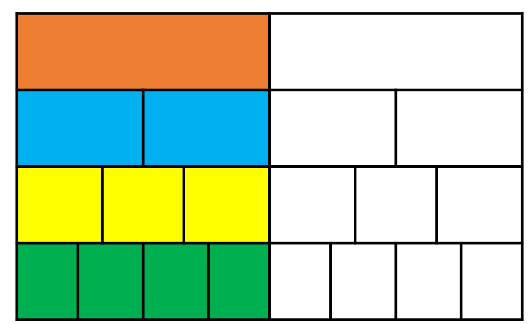
Can a fraction have more than one equivalent fraction?

Varied Fluency

1. Use two strips of equal sized paper. Fold one strip into quarters and the other into eighths. Place the quarters on top of the eighths and lift up one quarter, how many eighths can you see? How many eighths are equivalent to one quarter? Which other equivalent fractions can you find?

2. Using squared paper, investigate equivalent fractions using equal parts. e.g. $\frac{2}{4} = \frac{\square}{8}$. Start by drawing a bar 8 boxes along. Underneath compare the same length bar split into four equal parts.

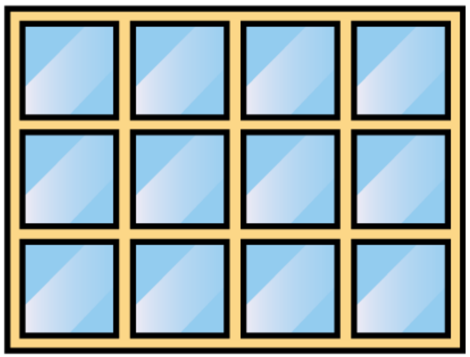
3. How many fractions that are equivalent to one half can you see on the fraction wall? Can you draw any extra rows to show other equivalent fractions?



Equivalent Fractions (1)

Reasoning and Problem Solving

How many equivalent fractions can you see in this picture?

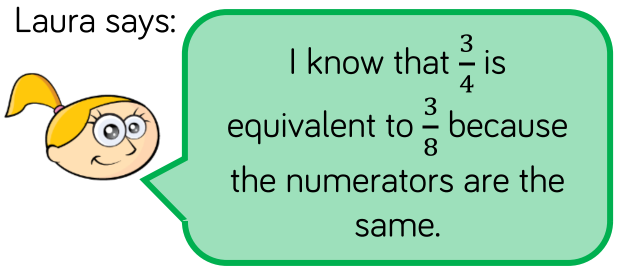


Children can give a variety of possibilities.
Examples:

$$\frac{1}{2} = \frac{6}{12} = \frac{3}{6}$$

$$\frac{1}{4} = \frac{3}{12}$$

Laura says:



Is Laura correct? Explain why.

Laura is not correct. They can use bar models/strip diagrams to explain.

Liam has two strips of the same sized paper.
He folds the strips into different sized fractions.
He shades in three equal parts on one strip and six equal parts on the other strip.

What fractions could he have folded his strips into?

Liam could have folded his strips into sixths and twelfths, quarters and eighths or any other fractions where one of the denominators is double the other.

Equivalent Fractions (2)

Notes and Guidance

Children can use practical equipment such as number rods or strips of paper over a number line to explore equivalent fractions. Children then use pictorial representations to identify equivalent fractions on a number line.
Once children see the link between the scales and the number of parts they can then move to finding equivalent fractions on a number line more abstractly.

Mathematical Talk

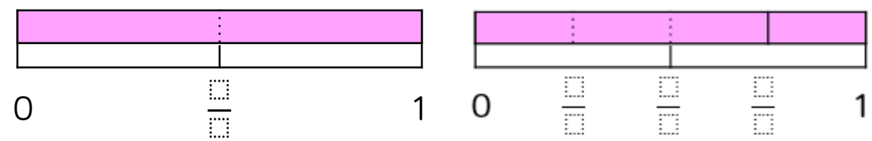
The number line represents 1 whole, where can we see the fraction $\frac{\square}{\square}$? Can we see any equivalent fractions?

Which fractions do not have an equivalent fraction when the denominator is X? Why?

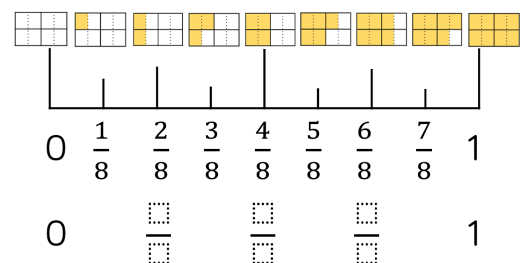
Where can we place $\frac{\square}{\square}$ on the number line? Can we identify an equivalent fraction? Is there a pattern between the denominators?

Varied Fluency

1. Use the models on the number line to identify the missing fractions. Which fractions are equivalent?

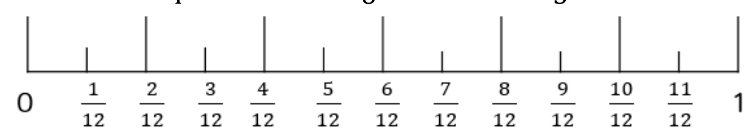


2. Complete the missing equivalent fractions.



3. Place these equivalent fractions on the number line.

$\frac{1}{4}$ $\frac{3}{4}$ $\frac{1}{6}$ $\frac{1}{3}$ $\frac{2}{3}$

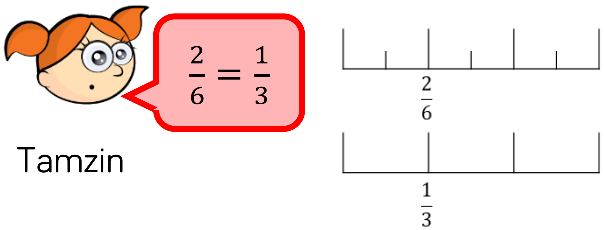


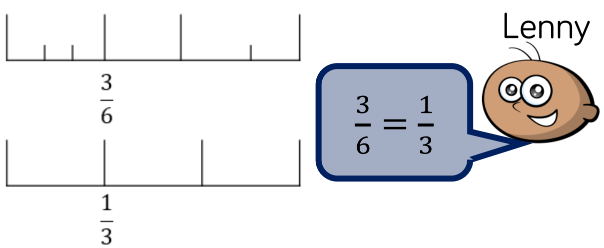
Are there any other equivalent fractions you can identify on the number line?

Equivalent Fractions (2)

Reasoning and Problem Solving

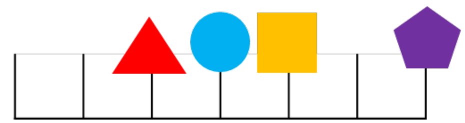
Tamzin and Lenny are using number lines to explore equivalent fractions.





Who do you agree with? Explain why.

Tamzin is correct. Lenny's top number line isn't split into equal parts which means he can not find the correct equivalent fraction.

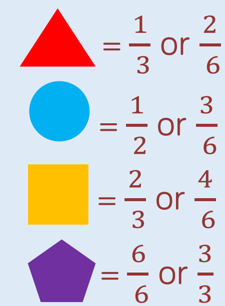


Use the clues to work out which fraction is being described for each shape.

- My denominator is 6 and my numerator is half of my denominator.
- I come before the shape equivalent to $\frac{1}{2}$ and I am equivalent to $\frac{2}{6}$
- I am equivalent to 1
- I am the same as $\frac{2}{3}$

Can you write what fraction each shape is worth? Can you record an equivalent fraction for each one?

- Circle
- Triangle
- Square
- Pentagon



Accept other correct equivalences.

Equivalent Fractions (2)

Notes and Guidance

Children continue to understand equivalences through diagrams. They move onto using proportional reasoning to find equivalent fractions.

Attention should be drawn to the method of multiplying the numerators and denominators by the same number to ensure that fractions are equivalent.

Mathematical Talk

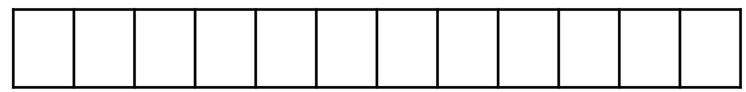
Do you notice anything about the denominators? Does this apply to the numerators? Would this pattern continue?

If I multiply the numerator by a number, what do I have to do to the denominator to keep it equivalent? Is this always true?

What relationships can you see between the numerator and denominator?

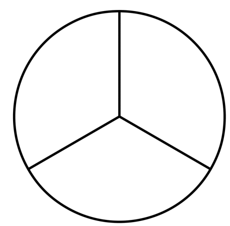
Varied Fluency

1 Using the diagram, complete the fractions.



$\frac{1}{4} = \frac{\square}{12}$ $\frac{1}{\square} = \frac{3}{6}$ $\frac{3}{4} = \frac{\square}{8}$ $\frac{5}{12} = \frac{\square}{24}$

2 Using the pie chart, complete the equivalent fractions.



$$\frac{1}{3} = \frac{\square}{6} = \frac{\square}{12} = \frac{\square}{24}$$

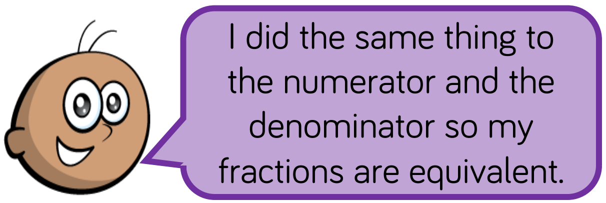
3 Complete:

$$\frac{1}{4} = \frac{2}{\square} = \frac{\square}{12} = \frac{4}{\square} = \frac{\square}{100} = \frac{\square}{500}$$

Equivalent Fractions (2)

Reasoning and Problem Solving

$$\frac{3}{4} = \frac{5}{6} = \frac{7}{9} = \frac{9}{11}$$



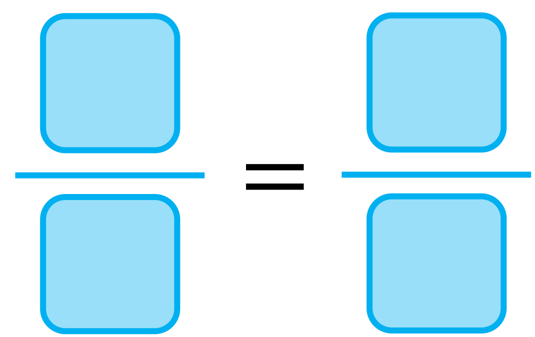
Shabaz

Do you agree with Shabaz? Explain your answer.

Shabaz is wrong. He has added two to the numerator and denominator. When you find equivalent fractions you either need to multiply or divide.

Use the digits cards below to fill in the boxes.

1 2 3
4 6 8



How many different ways can you find?

$\frac{1}{2} = \frac{3}{6}$, $\frac{1}{2} = \frac{4}{8}$,

$\frac{1}{3} = \frac{2}{6}$, $\frac{1}{4} = \frac{2}{8}$,

$\frac{3}{4} = \frac{6}{8}$, $\frac{2}{3} = \frac{4}{6}$

Equivalent Fractions (3)

Notes and Guidance

Children find equivalent fractions using proportional reasoning introduced initially through visual diagrams.

Children look for patterns between the numerators and denominators which will prepare them for the abstract method.

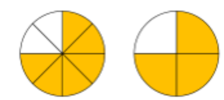
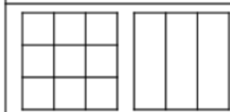
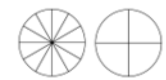
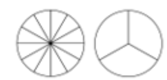
Mathematical Talk

What equivalent fractions can we see represented? Can we a pattern between the fractions?

Can you use the pattern to create a rule? Will it always work?

Varied Fluency

1. Complete the table. Can you spot any patterns?

Pictorial representation	Fraction	Words
	$\frac{6}{8}=\frac{3}{4}$	Six eighths is equivalent to three quarters
	$\frac{1}{3}=\frac{\square}{9}$	______is equivalent to ______
	$\frac{\square}{4}=\frac{\square}{12}$	Three twelfths is equivalent to ______ quarters
	$\frac{4}{12}=\frac{\square}{\square}$	______is equivalent to ______

2. Complete the statements.
Use practical equipment or strips to help you.

$\frac{1}{2}=\frac{\square}{6}=\frac{\square}{12}$ $\frac{\square}{2}=\frac{2}{4}=\frac{\square}{8}$ $\frac{1}{4}=\frac{\square}{8}=\frac{\square}{16}$

Equivalent Fractions (3)

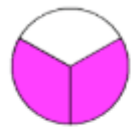
Reasoning and Problem Solving

Always, sometimes, never.

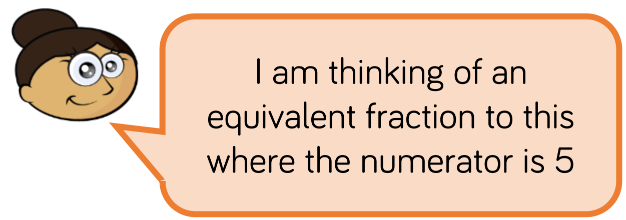
To find an equivalent fraction you can just double the numerator and the denominator.

Prove it.

Children could use practical equipment to prove this.
It is always true, if you double both the numerator and the denominator you will find an equivalent fraction. However, it is important that children understand this isn't the only way to find equivalent fractions.



Here is a diagram that has some equal parts shaded.
Alisha says,



Is this possible? Explain why.

It depends on whether Alisha is looking at the shaded parts. It will be $\frac{5}{15}$ if she is looking at the white part. But it is not possible for the pink parts.

Fractions Greater than 1

Notes and Guidance

Children use manipulatives and diagrams to show that a fraction can be split into wholes and parts.

Children focus on how many equal parts make a whole dependent on the number of equal parts altogether. This learning will lead on to Year 5 where children learn about improper fractions and mixed numbers.

Mathematical Talk

How many ____ make a whole?

If I have _____ eighths, how many more do I need to make a whole?

Can you draw it? Can you build it using cubes?

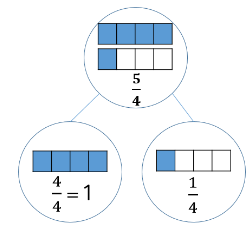
What do you notice about the numerator and denominator when a fraction is equivalent to a whole?

Varied Fluency

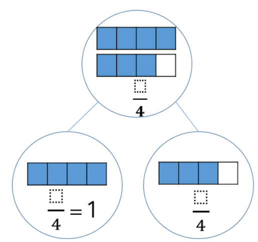
1. Complete the part whole models and sentences.

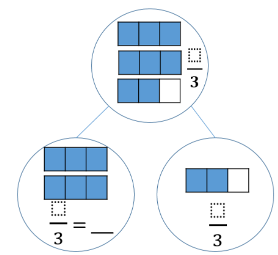
There are ☐ quarters altogether.

☐ quarters = ☐ whole and ☐ quarter.

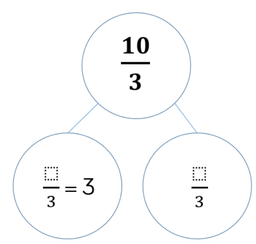


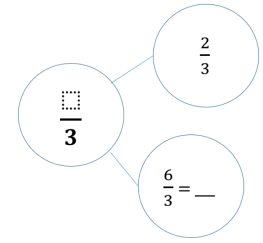
Write sentences to describe these part whole models.

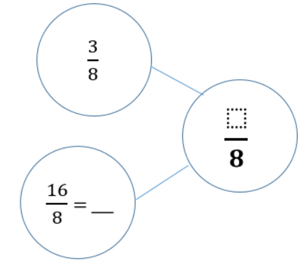




2. Complete the part whole models.







Fractions Greater than 1

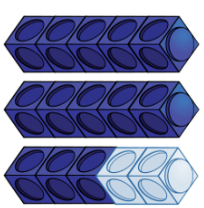
Reasoning and Problem Solving

3 friends share some pizzas.
Each pizza is cut into 8 equal slices.
Altogether they eat 25 slices.
How many whole pizzas do they eat?

They eat 3 whole pizzas.

There will be one slice left over.

Spot the mistake:



$\frac{13}{5}$ = 10 wholes and 3 fifths.

There are 2 wholes not 10.
$\frac{10}{5} = 2$ wholes

Do you agree?

$\frac{16}{4}$ is bigger than $\frac{8}{2}$ because 16 is bigger than 8

Explain why.

Disagree because they are both the same as 4.

Children may choose to build both fractions using cubes, or draw strip diagrams.

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

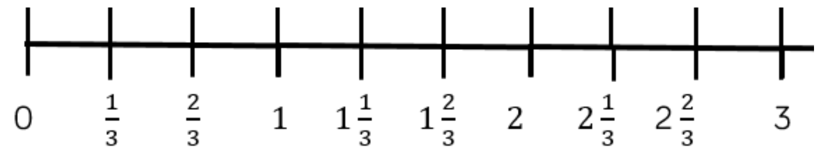
How can we count past 1?

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

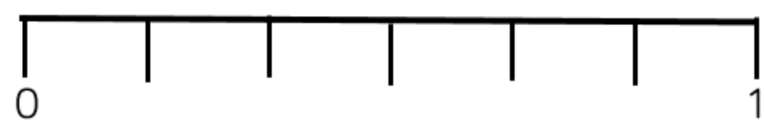
In a fraction, what does the denominator tell us?

Varied Fluency

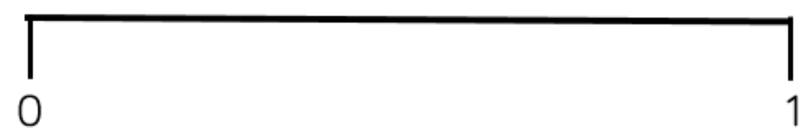
1. Complete the number line.



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?

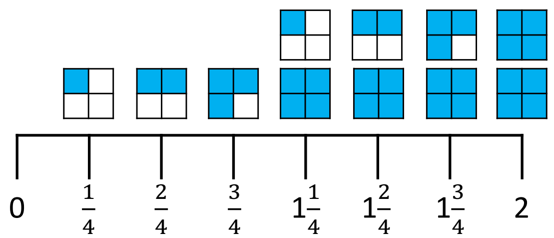


Can you continue the number line up to 2?
How would you label the fractions larger than one?

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.

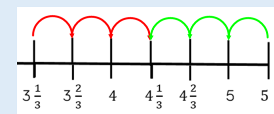
Alex and Joanne are counting up and down in thirds.

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 $4\frac{1}{3}$



Count in Fractions

Notes and Guidance

Children explore fractions greater than one on a number line and start to make connections between improper and mixed numbers.

They use cubes and bar models to represent fractions greater than a whole. This will support children when adding and subtracting fractions greater than a whole.

Mathematical Talk

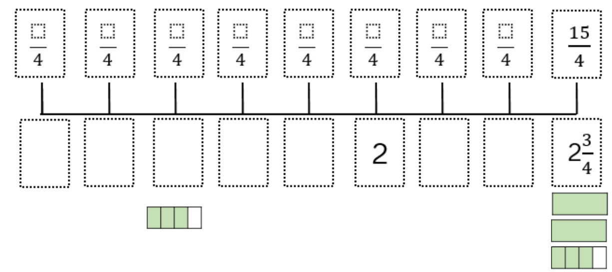
How many ____ make a whole?

If I have _____ eighths, how many more do I need to make a whole?

Can you write the missing fractions in more than one way?

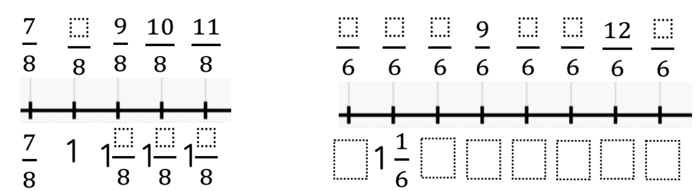
Varied Fluency

1. Complete the number line.



Can you complete bar models to represent each fraction?

2. Fill in the blanks using cubes or strip diagrams to help you.



3. Write the next two fractions in each sequence.

a) $\frac{12}{7}, \frac{11}{7}, \frac{10}{7}$, ____ , ____

b) $3\frac{1}{3}, 3, 2\frac{2}{3}$, ____ , ____

c) $\frac{4}{11}, \frac{6}{11}, \frac{8}{11}$, ____ , ____

d) $12\frac{3}{5}, 13\frac{1}{5}, 13\frac{4}{5}$, ____ , ____

Count in Fractions

Reasoning and Problem Solving

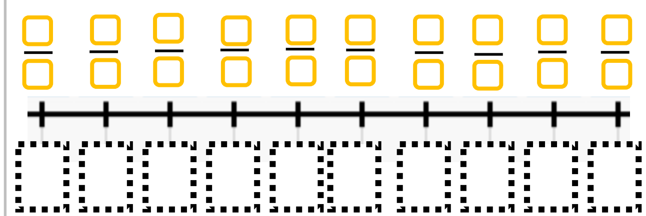
Here is a number sequence.

$\frac{5}{12}, \frac{7}{12}, \frac{10}{12}, \frac{14}{12}, \frac{19}{12},$ ____

Which fraction would come next?

The fractions are increasing by one more twelfth each time. The next fraction would be $\frac{19}{12}$

Create an improper fraction and mixed number number line for your partner to complete.



Multiple possible answers.

Add Fractions

Notes and Guidance

Children use practical equipment and pictorial representations to add two or more fractions with the same denominator where the answer is less than 1

They understand that we only add the numerators and the denominators stay the same.

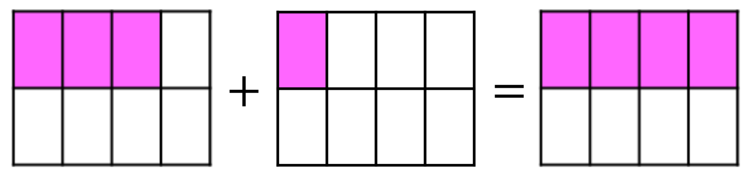
Mathematical Talk

Using your paper circles, show me what $\frac{\square}{4} + \frac{\square}{4}$ is equal to.
How many quarters in total do I have?

How many parts is the whole split into? How many parts am I adding?
What do you notice about the numerators?
What do you notice about the denominators?

Varied Fluency

1. Take a paper circle. Fold your circle to split it into 4 equal parts. Colour one part red and two parts blue. Use your model to complete the sentences.
   ______ quarter is red.
   ______ quarters are blue.
   ______ quarters are coloured in.
   Show this as a number sentence. $\frac{\square}{4} + \frac{\square}{4} = \frac{\square}{4}$

2. 

   We can use this model to calculate $\frac{3}{8} + \frac{1}{8} = \frac{4}{8}$
   Draw your own models to calculate

   $\frac{1}{5} + \frac{2}{5} = \frac{\square}{5}$ $\frac{2}{7} + \frac{3}{7} + \frac{1}{7} = \frac{\square}{\square}$ $\frac{7}{10} + \frac{\square}{\square} = \frac{9}{10}$

3. Isla eats $\frac{5}{12}$ of the pizza and Lily eats $\frac{1}{12}$ of the pizza.
   What fraction of the pizza do they eat altogether?

Add Fractions

Reasoning and Problem Solving

Nicola and Nisha are solving:

$$\frac{4}{7} + \frac{2}{7}$$

Nicola says,

The answer is $\frac{6}{7}$

Nisha says,

The answer is $\frac{6}{14}$

Who do you agree with?
Explain why.

Nicola is correct. Nisha has made the mistake of also adding the denominators. Children could prove why Nisha is wrong using a bar model or strip diagram.

Bix and Josh share these chocolates.

They both eat an odd number of chocolates.
Complete this number sentence to show what fraction of the chocolates they each could have eaten.

$$\frac{\square}{\square} + \frac{\square}{\square} = \frac{12}{12}$$

Possible answers:

$\frac{1}{12} + \frac{11}{12}$

$\frac{3}{12} + \frac{9}{12}$

$\frac{5}{12} + \frac{7}{12}$

(In either order)

Add 2 or More Fractions

Notes and Guidance

Children use practical equipment and pictorial representations to add two or more fractions. Children record their answers as an improper fraction when the total is more than 1

Children also explore using a number line to add fractions where they can add on from a given fraction. They could also explore adding fractions more efficiently by using known facts or number bonds to help them e.g. $\frac{5}{9}+\frac{7}{9}+\frac{5}{9}=\frac{10}{9}+\frac{7}{9}=\frac{17}{9}$

Mathematical Talk

If I have two strips folded into quarters, show me what $\frac{\square}{4}+\frac{\square}{4}=$

How many quarters do I have in total?

How many equal parts is the whole split into? How many equal parts am I adding?

Where is $\frac{\square}{\square}$ on the number line? How can I use the number line to add $\frac{\square}{\square}$ to my first fraction?

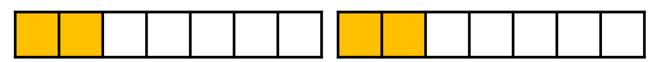
Varied Fluency

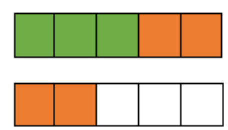
1. Take two identical strips of paper. Fold your paper into quarters. Can you use the strips to solve:

   $\frac{1}{4}+\frac{1}{4}$ $\quad$ $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$ $\quad$ $\frac{3}{4}+\frac{3}{4}$ $\quad$ $\frac{\square}{4}+\frac{\square}{4}=\frac{7}{4}$

   what other fractions can you make and add?

2. Use the models to add the fractions:



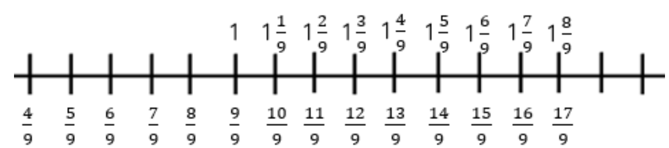


   $\frac{3}{5}+\frac{4}{5}$

   Choose your preferred model to add:

   $\frac{2}{5}+\frac{1}{5}$ $\quad$ $\frac{3}{7}+\frac{6}{7}$ $\quad$ $\frac{7}{9}+\frac{4}{9}$

3. Use the number line to add the fractions.

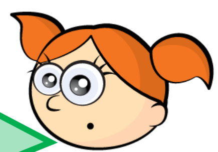


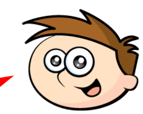
   $\frac{4}{9}+\frac{4}{9}+\frac{8}{9}$

   $\frac{3}{7}+\frac{5}{7}+\frac{2}{7}$ $\quad$ $\frac{5}{8}+\frac{7}{8}+\frac{1}{8}$ $\quad$ $\frac{\square}{9}+\frac{5}{9}+\frac{7}{9}=\frac{17}{9}$

Add 2 or More Fractions

Reasoning and Problem Solving

Zoe thinks she has got the correct answer for this calculation. $\frac{3}{9} + \frac{2}{9} = \frac{5}{18}$  Is she correct? Explain why.	Zoe is incorrect. Zoe has added the denominator as well as the numerator.
How many different ways can you find to solve the calculation? $\frac{\square}{\square} + \frac{\square}{\square} = \frac{11}{9}$	Any combination of ninths where the numerators total 11.

Lennox and Brandon are solving: $\frac{6}{13} + \frac{5}{13} + \frac{7}{13}$ Lennox  The answer is 1 and $\frac{5}{13}$ Brandon  The answer is $\frac{18}{13}$ Who do you agree with? Explain why.	They are both correct. Lennox has added $\frac{6}{13} + \frac{7}{13}$ to make a whole and then added $\frac{5}{13}$

Subtract Fractions

Notes and Guidance

Children use practical equipment and pictorial representations to subtract fractions. Children should identify the larger fraction first and then subtract the smaller fraction from this.

They will look at take away and find the difference as different forms of subtraction.

Mathematical Talk

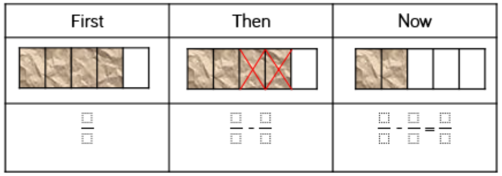
What fraction is shown first? Then what happens? Now what is left? Can we represent this in a number story?

Which models show take away? Which models shown find the difference? What's the same? What's different?
Can we represent these models in a number story?

How can we complete the part whole models?

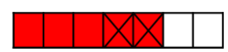
Varied Fluency

1. Emily is eating a chocolate bar. Fill in the missing information.

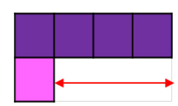


Can you write a number story using 'first', 'then' and 'now' to describe your calculation?

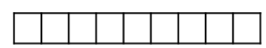
2. Use the models to help you subtract the fractions.



$\frac{5}{7} - \frac{\square}{7} = \frac{\square}{7}$

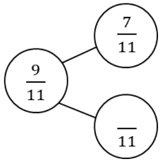


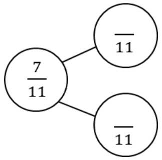
$\frac{4}{8} - \frac{\square}{8} = \frac{\square}{8}$

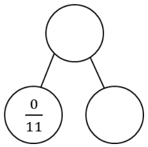


$\frac{\square}{9} - \frac{\square}{9} = \frac{4}{9}$

3. Complete the part whole models. Use equipment if needed.







Subtract Fractions

Reasoning and Problem Solving

Find the missing fractions:

$$\frac{7}{7} - \frac{3}{7} = \frac{2}{7} + \frac{\square}{7}$$

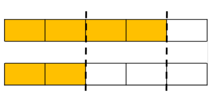
$$\frac{\square}{9} - \frac{5}{9} = \frac{4}{9} - \frac{2}{9}$$

$\frac{7}{7} - \frac{3}{7} = \frac{2}{7} + \frac{2}{7}$

$\frac{7}{9} - \frac{5}{9} = \frac{4}{9} - \frac{2}{9}$

Jack and Kira are solving $\frac{4}{5} - \frac{2}{5}$

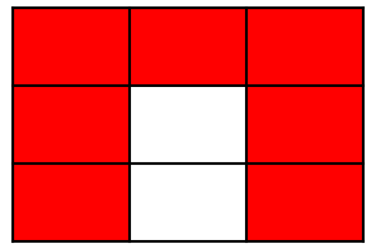
Jack's method: 

Kira's method: 

They both say the answer is two fifths. Can you explain how they have found their answers?

Jack has taken two fifths away. Kira has found the difference between four fifths and two fifths.

How many fraction addition and subtractions can you make from this model?



There are lots of calculations children could record. Children may even record calculations where there are more than 2 fractions e.g. $\frac{3}{9} + \frac{1}{9} + \frac{3}{9} = \frac{7}{9}$ Children may possibly see the red representing one fraction and the white another also.

Subtract 2 Fractions

Notes and Guidance

Children use practical equipment and pictorial representations to subtract fractions.

Children explore using a number line to subtract fractions. They could also explore partitioning fractions to help subtract more efficiently by using known facts or number bonds to help them e.g. $\frac{12}{9} - \frac{7}{9} = \frac{12}{9} - \frac{2}{9} - \frac{5}{9} = \frac{5}{9}$

Mathematical Talk

If I have two strips folded into eighths, show me what $\frac{\square}{8} - \frac{\square}{8} =$

Can you use a bar model to show the difference between two fractions?

Where is $\frac{\square}{\square}$ on the number line? How can I use the number line to subtract $\frac{\square}{\square}$? Can I partition my fraction to help subtract?

What is staying the same? What is changing?

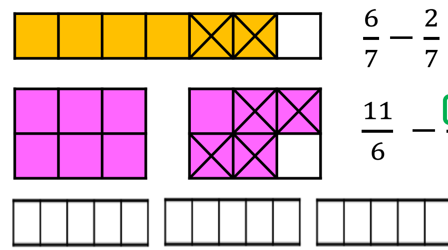
Varied Fluency

1. Use identical strips of paper and fold in to eighths. Use this to solve the calculations.

$\frac{8}{8} - \frac{3}{8}$ $\frac{7}{8} - \frac{3}{8}$ $\frac{16}{8} - \frac{9}{8}$ $\frac{13}{8} - \frac{\square}{8} = \frac{7}{8}$

Can you use the strips to show take away and then to show the difference? What's the same? What's different?

2. Use the bar models to subtract the fractions.

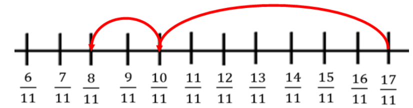


$\frac{6}{7} - \frac{2}{7}$

$\frac{11}{6} - \frac{\square}{6} = \frac{\square}{6}$

$\frac{13}{5} - \frac{\square}{5} = \frac{\square}{5}$

3. Rachel uses the number line to solve $\frac{17}{11} - \frac{9}{11}$



Use a number line to solve:

$\frac{16}{13} - \frac{9}{13}$ $\frac{16}{9} - \frac{9}{9}$ $\frac{16}{7} - \frac{9}{7}$ $\frac{16}{16} - \frac{9}{16}$

Subtract 2 Fractions

Reasoning and Problem Solving

Match the number stories to the correct calculations.

Rachel eats $\frac{7}{8}$ of a pizza. Jenny eats $\frac{4}{8}$ How much do they eat altogether?	$\frac{7}{8}+\frac{3}{8}=\frac{}{}$
Rachel eats $\frac{7}{8}$ of a pizza. Jenny eats $\frac{4}{8}$ less. How much do they eat altogether?	$\frac{7}{8}+\frac{4}{8}=\frac{}{}$
Rachel eats $\frac{7}{8}$ of a pizza. Jenny eats $\frac{3}{8}$ less. How much does Jenny eat?	$\frac{7}{8}-\frac{3}{8}=\frac{}{}$

Rachel eats $\frac{7}{8}$ of a pizza. Jenny eats $\frac{4}{8}$ How much do they eat altogether?	$\frac{7}{8}+\frac{4}{8}=\frac{\square}{\square}$
Rachel eats $\frac{7}{8}$ of a pizza. Jenny eats $\frac{4}{8}$ less. How much do they eat altogether?	$\frac{7}{8}+\frac{3}{8}=\frac{\square}{\square}$
Rachel eats $\frac{7}{8}$ of a pizza. Jenny eats $\frac{3}{8}$ less. How much does Jenny eat?	$\frac{7}{8}-\frac{3}{8}=\frac{\square}{\square}$

How many different ways can you complete the calculations?

$$\frac{\square}{7}-\frac{3}{7}=\frac{\square}{7}+\frac{\square}{7}$$

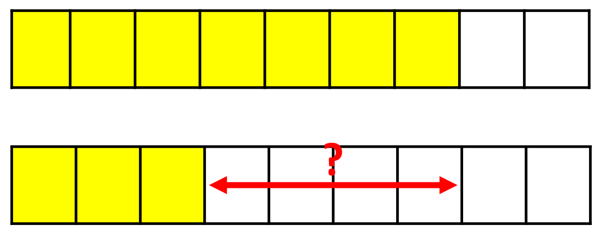
$$\frac{\square}{7}-\frac{3}{7}=\frac{\square}{7}-\frac{\square}{7}$$

Children may give a range of answers as long as the calculation for the numerators is correct.

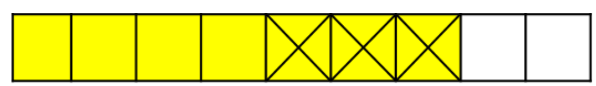
Sally and Jade are working out the answer to this problem.

$$\frac{7}{9}-\frac{3}{9}$$

Sally uses this model.



Jade uses this model.



Which model is correct? Explain why.

Can you write a number story for each model?

They are both correct. The first model shows finding the difference and the second model shows take away.

Ensure number stories show take away (where something is removed) or the difference (comparing two quantities)

Subtract from Whole Amounts

Notes and Guidance

Children continue to use practical equipment and pictorial representations to subtract fractions.

Children subtract fractions from a whole amount. Children need to understand the relationship between the whole number and the denominator. For example, $\frac{9}{9} = 1$, $\frac{18}{9} = 2$ etc.

Mathematical Talk

How can we represent our calculation? What is $\frac{9}{9}$ the same as?

Can we record our fraction as a whole number? Why? Why not?

Where can we see the whole number?

How can we use a number line to find the difference between a fraction and a whole number?

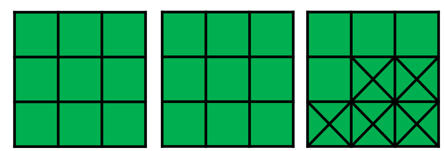
Varied Fluency

1. Use cubes, strips of paper or a bar model to solve:

   $\frac{9}{9} - \frac{4}{9} = \frac{\square}{9}$ $\frac{9}{9} - \frac{\square}{9} = \frac{2}{9}$ $\frac{13}{9} - \frac{9}{9} = \frac{\square}{9}$

   What's the same? What's different?

   Use cubes to build a model to show $3 - \frac{5}{9} = 2\frac{4}{9}$

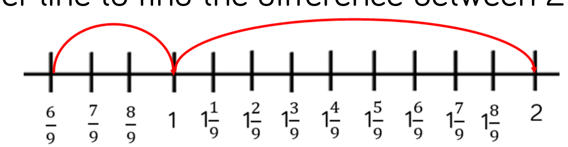
   

   Could you build the cubes in a tower to subtract?

2. Use cubes to calculate:

   $2 - \frac{3}{4}$ $3 - \frac{3}{7}$ $3 - \frac{\square}{8} = 1\frac{3}{8}$ $\frac{\square}{\square} - \frac{4}{5} = 1\frac{3}{5}$

3. Charlie uses a number line to find the difference between 2 and $\frac{6}{9}$

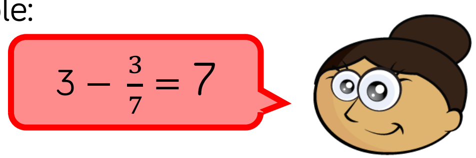
   Use a number line to find the difference between:

   2 and $\frac{2}{3}$ 2 and $\frac{2}{11}$ 2 and $\frac{2}{7}$

Subtract from Whole Amounts

Reasoning and Problem Solving

Callie is subtracting a fraction from a whole:



Can you spot her mistake?

What should the answer be?

Callie has not recognised the whole number as an improper fraction. The answer is $2\frac{4}{7}$

How many ways can you make the statement correct?

$$4 - \frac{\square}{9} > 2\frac{1}{9} + \frac{\square}{9}$$

Lots of possible Reponses. Check numerators make the statement correct.

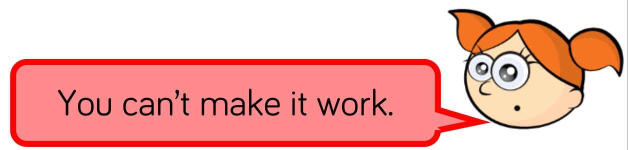
Zoe and Billy have these digits:

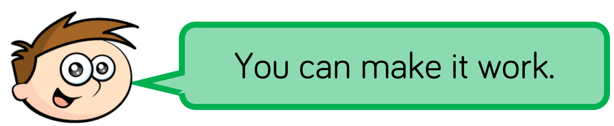
1 2 3 4 5

They are trying to use them to solve:

$$\square - \frac{\square}{\square} = \frac{\square}{\square}$$

Zoe





Billy

Who do you agree with? Explain why

Zoe is correct. You can not place the digits to make the calculation correct. Children could explore which digit they could change to make it correct.

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

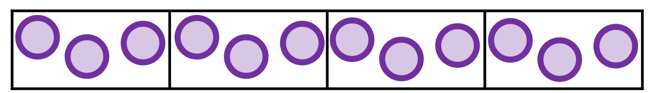
1. Find $\frac{1}{5}$ of Joe's marbles.

I have divided the marbles into ☐ equal groups.

There are ☐ marbles in each group.

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

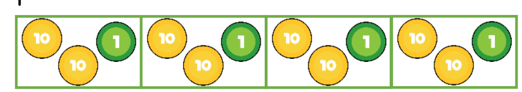
2. Sam has used a bar model and counters to find $\frac{1}{4}$ of 12



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 $\square$ $\frac{1}{\square}$ of 50 = $\frac{1}{5}$ of 25	80 10

Fractions of a Quantity

Notes and Guidance

Children build on their understanding from Year 3 that the denominator tells us how many equal parts a whole has been split into and the numerator tells us how many equal parts of the whole there are.

Children use concrete and pictorial representations to find fractions of a quantity. They link bar modelling to the abstract method in order to understand why the method works.

Mathematical Talk

What is the whole? What fraction of the whole are we finding? How many equal parts will I split the whole into?

If we change the numerator by 1, what do you notice? Can we spot a pattern?

How can we represent this fraction of an amount using a bar model? What does this part of the model represent?

Varied Fluency

1. Tim has 24 apples. Use counters to represent his apples and find:

$\frac{1}{2}$ of 24 $\quad$ $\frac{1}{4}$ of 24 $\quad$ $\frac{1}{3}$ of 24 $\quad$ $\frac{1}{6}$ of 24

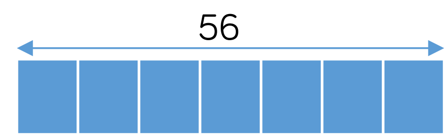
Now calculate:

$\frac{2}{2}$ of 24 $\quad$ $\frac{3}{4}$ of 24 $\quad$ $\frac{2}{3}$ of 24 $\quad$ $\frac{5}{6}$ of 24

What do you notice?

2. Use a bar model to help you represent and find:

$\frac{1}{7}$ of 56 = 56 ÷ $\square$



a. $\frac{2}{7}$ of 56 $\quad$ b. $\frac{3}{7}$ of 56 $\quad$ c. $\frac{4}{7}$ of 56 $\quad$ d. $\frac{4}{7}$ of 28

3. Jenny eats $\frac{3}{8}$ of 240 *g* bar of chocolate. How many grams does she have left?

Fractions of a Quantity

Reasoning and Problem Solving

True or False?

To find $\frac{3}{8}$ of a number, divide by 3 and multiply by 8

Convince me

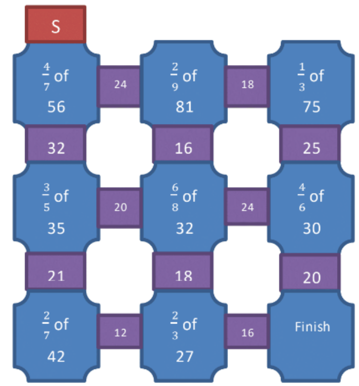
False. Divide the whole by 8 to find one part and then multiply your answer by three because we want to find three parts.

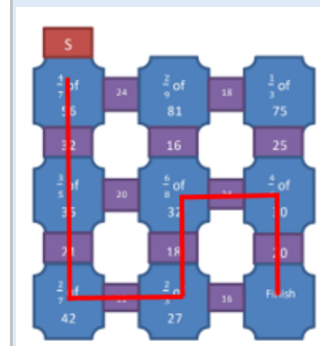
How many ways can you make the statement correct?

$\frac{2}{9}$ of 81 > $\frac{3}{4}$ of $\square$

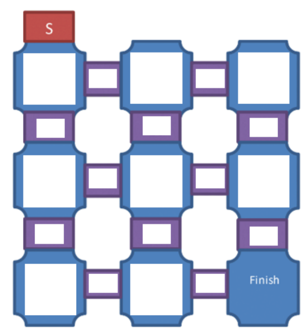
20
16
12
8
4

Work out the answer to each question to make it through the maze.





Can you create your own version?



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

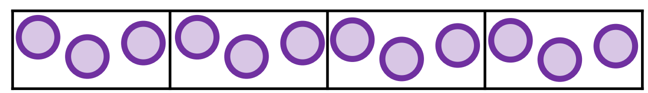
1. Find $\frac{2}{5}$ of Joe's marbles.

I have divided the marbles into ☐ equal groups.

There are ☐ marbles in each group.

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

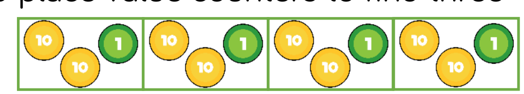
2. Sam has used a bar model and counters to find $\frac{3}{4}$ of 12



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



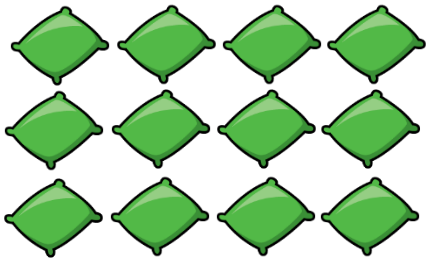
Use Faye's method to find:

$\frac{2}{3}$ 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.

Calculate Quantities

Notes and Guidance

Children solve more complex problems for fractions of an amount. They continue to use practical equipment and pictorial representations to help them work out what the whole is when a fraction is given.

Children continue to only use proper fractions within this step.

Mathematical Talk

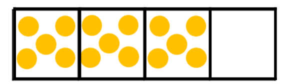
If I know one quarter of a number, how can I find three quarters of a number?

If I know one of the equal parts, how can I find the whole?

How can a bar model support my working?

Varied Fluency

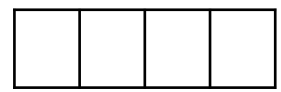
1. Use the counters and bar models to calculate the whole:



There are ____ counters in one part.

$\frac{1}{4}$ = ____ counters $\frac{2}{4}$ = ____ counters

$\frac{3}{4}$ = ____ counters $\frac{4}{4}$ or 1 whole = ____ counters



There are 7 counters in one part.

$\frac{1}{4}$ = ____ counters $\frac{2}{4}$ = ____ counters

$\frac{3}{4}$ = ____ counters $\frac{4}{4}$ or 1 whole = ____ counters

2.

Whole	Unit Fraction	Non-unit Fraction
The whole is 24	$\frac{1}{6}$ of 24 = ____	$\frac{5}{6}$ of 24 = ____
The whole is ____	$\frac{1}{3}$ of ____ = 30	$\frac{2}{3}$ of ____ = ____
The whole is ____	$\frac{1}{5}$ of ____ = 30	$\frac{3}{5}$ of ____ = ____
The whole is 4.5 *l*	$\frac{1}{10}$ of ____ = ____	$\frac{7}{10}$ of ____ = ____

3. Gino and Holly have ordered lemonade. Gino has a small lemonade which is 250 *ml*. Holly has a large lemonade which is $\frac{4}{10}$ more than a small. How many millilitres does Holly have?

Calculate Quantities

Reasoning and Problem Solving

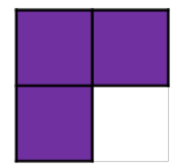
The school kitchen needs to buy carrots for lunch. A large bag has 200 carrots and a medium bag has $\frac{3}{5}$ of a large bag. The school cook says,

> I need 150 carrots so I will have to buy a large bag.

Is he correct? Explain your reasoning.

Yes. $\frac{3}{5}$ of 200 = 120 so he will need a large bag.

These three squares are $\frac{1}{4}$ of a whole shape.



How many different shapes can you draw or build that could be the complete shape?

Lots of different possibilities. The shape should have 12 square in total.

If $\frac{1}{8}$ of A = 12, find the value of A, B and C

$\frac{5}{8}$ of A = $\frac{3}{4}$ of B = $\frac{1}{6}$ of C

A = 96
B = 80
C = 360

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?

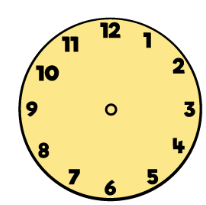
What is the whole? How can we represent this problem?

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.