Released March 2018

Year 3

Small Steps Guidance and Examples

Block 1: 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 1 to 3 – Number: Fractions

Overview

Small Steps

- Equivalent fractions (1)
- Equivalent fractions (2)
- Equivalent fractions (3)
- Compare fractions
- Order fractions
- Add fractions
- Subtract fractions

NC Objectives

Recognise and show, using diagrams, equivalent fractions with small denominators.
Compare and order unit fractions, and fractions with the same denominators.
Add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$]
Solve problems that involve all of the above.

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

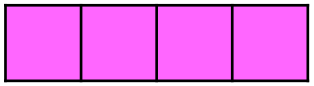
If the ___ rod is worth 1, can you show me $\frac{1}{2}$, $\frac{1}{4}$? Can you find other rods that are the same? What fraction would they represent?

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.

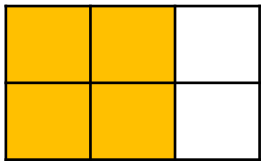
2 Use two strips of equal sized paper. Fold one strip into quarters and the other into eighths. Place the quarters on top of the eighths and lift up one quarter, how many eighths can you see? How many eighths are equivalent to one quarter? Which other equivalent fractions can you find?

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.

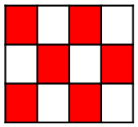
Equivalent Fractions (1)

Reasoning and Problem Solving

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



Which is the odd one out? Explain why.



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.

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 (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

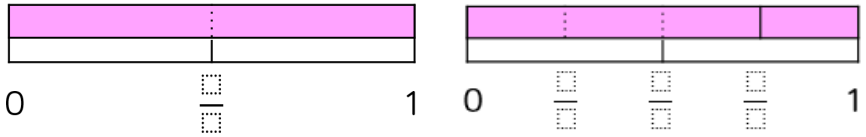
The number line represents 1 whole, where can we see the fraction $\frac{\square}{\square}$? Can we see any equivalent fractions?

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

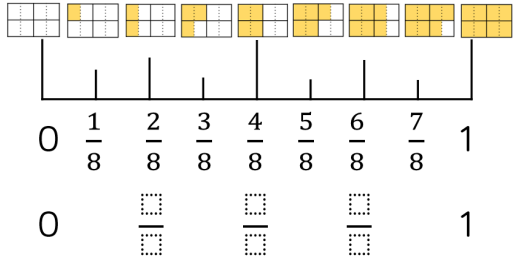
Where can we place $\frac{\square}{\square}$ on the number line? Can we identify an equivalent fraction? Is there a pattern between the denominators?

Varied Fluency

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

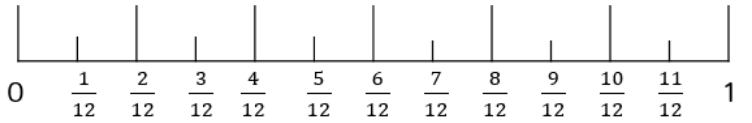


2 Complete the missing equivalent fractions.



3 Place these equivalent fractions on the number line.

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

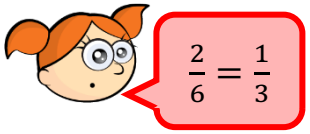


Are there any other equivalent fractions you can identify on the number line?

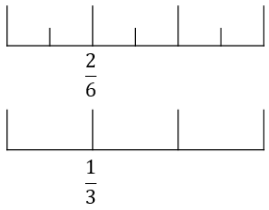
Equivalent Fractions (2)

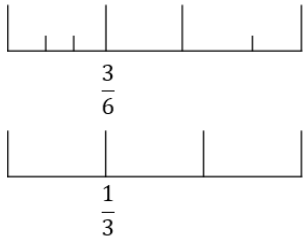
Reasoning and Problem Solving

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

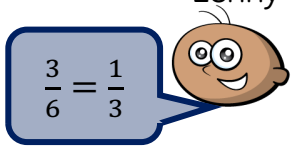


Tamzin



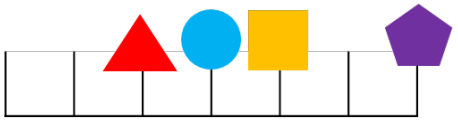


Lenny



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.

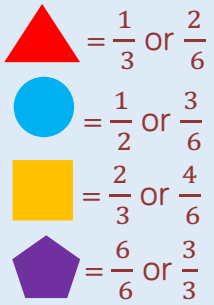


Use the clues to work out which fraction is being described for each shape.

- 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 (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.

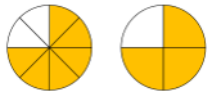
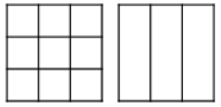
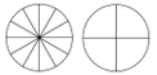
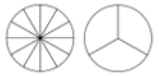
Mathematical Talk

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,

I am thinking of an equivalent fraction to this where the numerator is 5

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.

Compare Fractions

Notes and Guidance

Children start to compare unit fractions or fractions with the same denominator.

For unit fractions, children's natural tendency might be to say that $\frac{1}{2}$ is smaller than $\frac{1}{4}$, as 2 is smaller than 4. Discuss how breaking something into more equal parts makes each part smaller.

Mathematical Talk

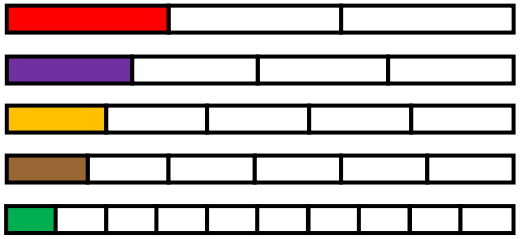
What fraction is represented by this strip? How do you know? How could you convince someone else?

When the numerators are the same, is it easy to compare them? What about the denominators?

Do you need to draw a fraction strip to compare? Which fractions are easy to compare, which are difficult? Why?

Varied Fluency

1 Using the fraction strips below, use the >, < or = symbol to compare the fractions.



$\frac{1}{10} \bigcirc \frac{1}{4}$ $\frac{1}{3} \bigcirc \frac{1}{6}$ $\frac{1}{5} \bigcirc \frac{1}{4}$

When the numerators are the same, the _____ the denominator, the _____ the fraction.

2 Using strips of paper, compare these fractions using the >, < or = symbols.

$\frac{3}{4} \bigcirc \frac{1}{4}$ $\frac{1}{6} \bigcirc \frac{5}{6}$ $\frac{3}{8} \bigcirc \frac{5}{8}$

When the denominators are the same, the _____ the numerator, the _____ the fraction.

Compare Fractions

Reasoning and Problem Solving

I know that $\frac{1}{3}$ is larger than $\frac{1}{2}$ because 3 is bigger than 2

Do you agree with Sally? Explain how you know.

$\frac{1}{3}$ is smaller because it is split into 3 equal parts, rather than 2 equal parts. Children could draw a bar model to show this.

What fraction could go in the missing box? How many can you find?

$$\frac{1}{2} > \frac{\square}{\square} > \frac{1}{10}$$

Examples could include $\frac{1}{3}$, $\frac{1}{4}$ etc.

Order Fractions

Notes and Guidance

Children order unit fractions and fractions with the same denominator.

They use bar models and number lines to order the fractions and write them in ascending and descending order.

Mathematical Talk

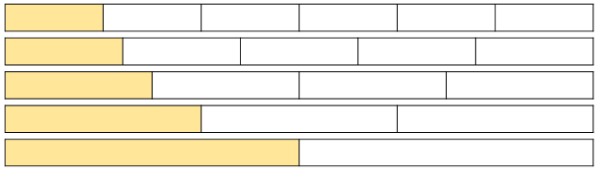
How many equal parts has the whole been split in to?

How many equal parts need shading?

Which is the largest fraction? Which is the smallest fraction?

Varied Fluency

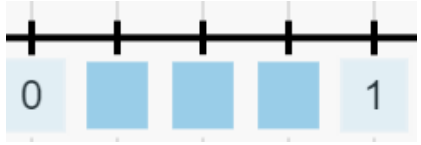
1 Split strips of paper into halves, thirds, quarters, fifths and sixths and colour in one part of each strip.
Now order the strips from smallest to largest.



When the numerators are the same, the _____ the denominator, the _____ the fraction.

2 Place these fractions on the number line.

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

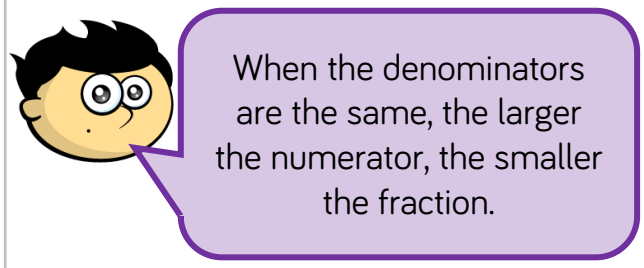


3 Order the fractions in descending order.

$\frac{3}{8}$ $\frac{5}{8}$ $\frac{1}{8}$ $\frac{8}{8}$ $\frac{7}{8}$

Order Fractions

Reasoning and Problem Solving

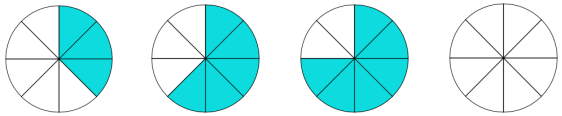


Is James correct?
Prove it.

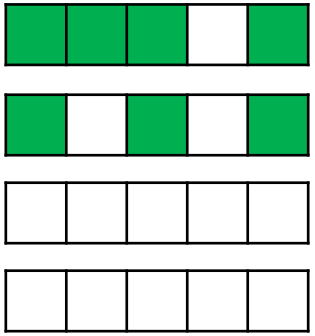
James is incorrect. When the denominators are the same, the larger the numerator the larger the fraction. Children could prove this using bar models or strip diagrams etc.

Complete the fractions so the fractions are ordered correctly.

Fractions in ascending order



Fractions in descending order



Either 7 or 8 parts shaded.

Either 2 or 1 parts shaded in the first, then 1 or 0 shaded in the second depending on how many they shaded in the other.

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?

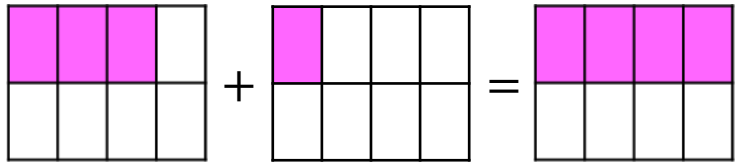
How many parts is the whole split into? How many parts am I adding?
What do you notice about the numerators?
What do you notice about the denominators?

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?

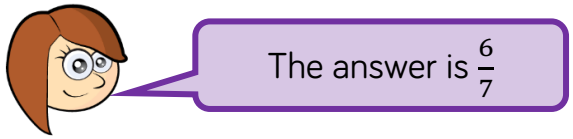
Add Fractions

Reasoning and Problem Solving

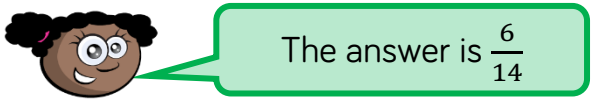
Nicola and Nisha are solving:

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

Nicola says,



Nisha says,



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)

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

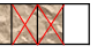
What fraction is shown first? Then what happens? Now what is left? Can we represent this in a number story?

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?

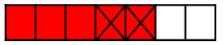
Varied Fluency

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

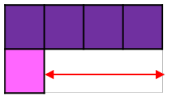
First	Then	Now
		

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

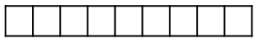
2 Use the models to help you subtract the fractions.



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

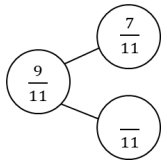


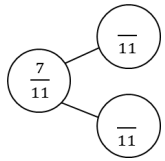
$\frac{4}{8} - \square = \square$

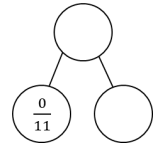


$\square - \square = \frac{4}{9}$

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







Subtract Fractions

Reasoning and Problem Solving

Find the missing fractions:

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

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

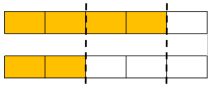
$\frac{7}{7} - \frac{3}{7} = \frac{2}{7} + \frac{2}{7}$

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

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

Jack's method:

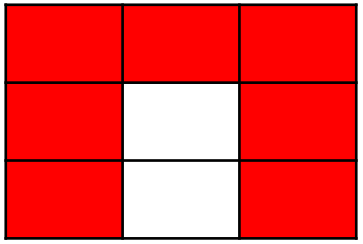
Kira's method:



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.