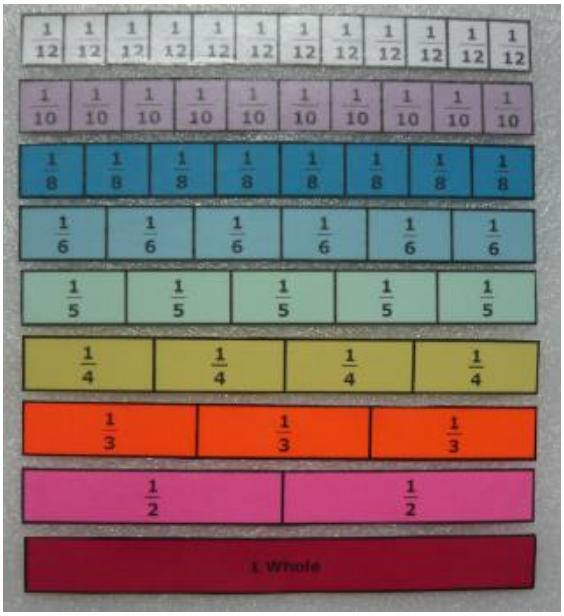
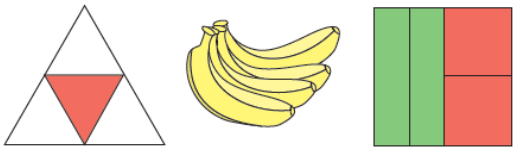
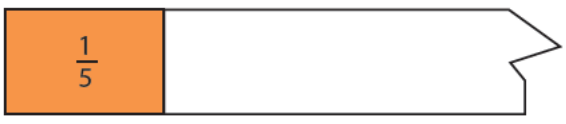
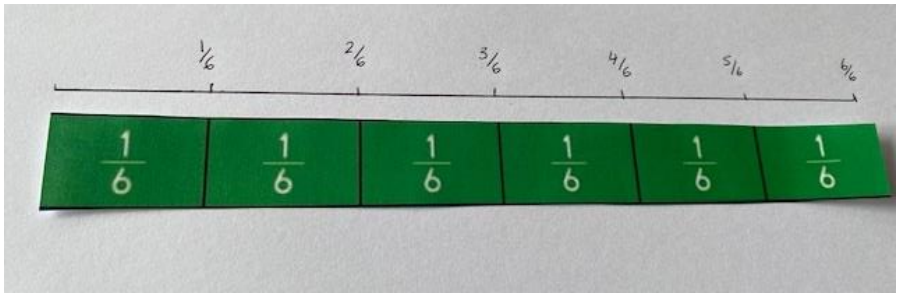
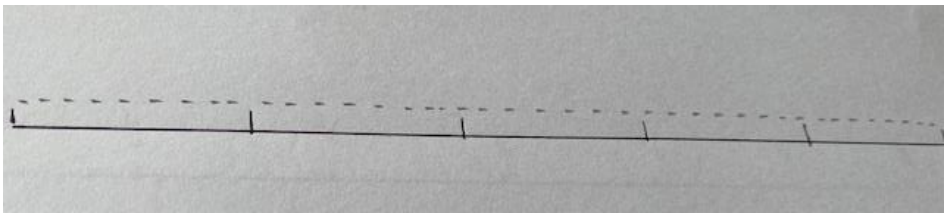
Planning Overview
Year 4 Fractions

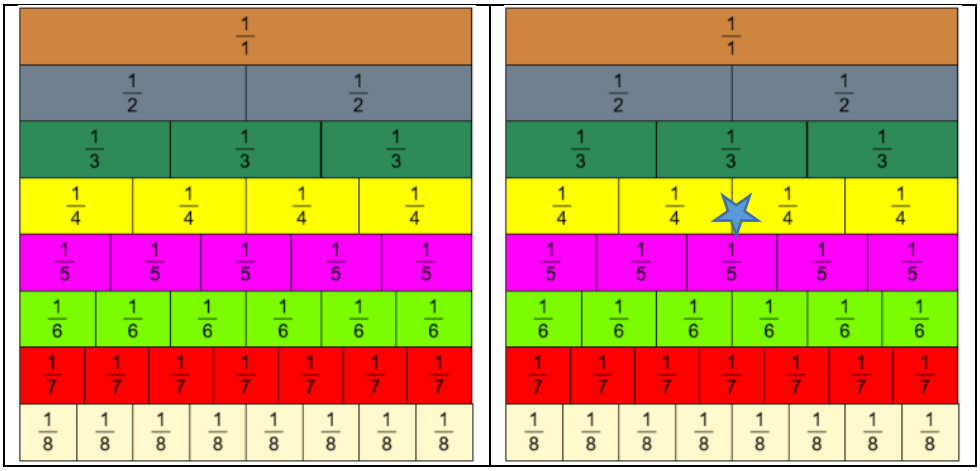
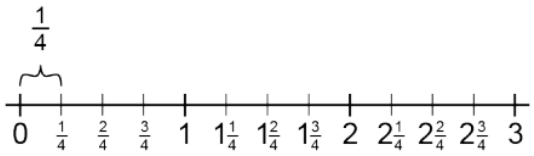
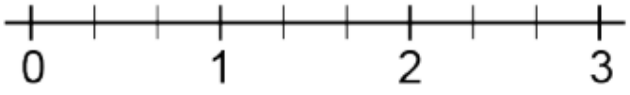
Recognise and show, using diagrams, families of common equivalent fractions.
Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.
Add and subtract fractions with the same denominator.

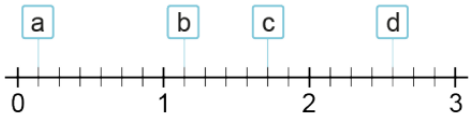
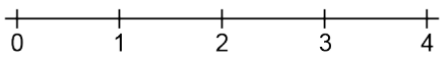
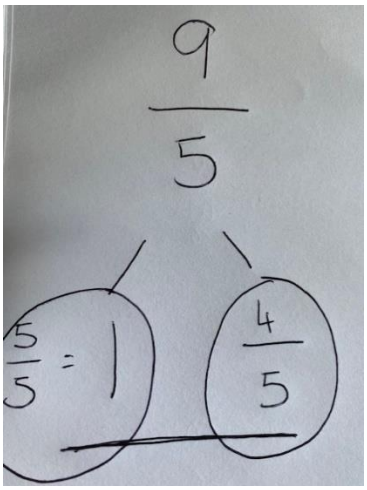
4F–1 Reason about the location of mixed numbers in the linear number system.
4F–2 Convert mixed numbers to improper fractions and vice versa.
4F–3 Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers.

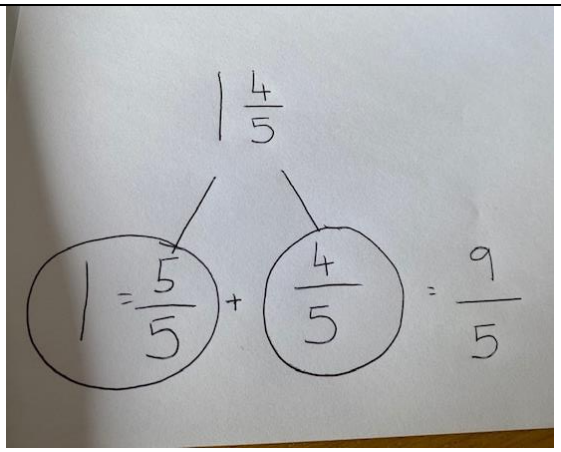
	Teaching and Learning
Introduction	Give children a fraction wall cut into strips.  Can you use the fraction strips to explain to your partner what you know about fractions? Discuss the number of pieces each strip is split into. Can you show me where ¼, ¾, is on your fraction wall? What is the same and what is different about ¼ and ¾? Can you tell me some fractions that are the same/equivalent? Can you show me which strips you can put together to show me the most equivalent fractions? Which strips do not have equivalent fractions when you put them together?

	Recap on the language of unit and non-unit fractions from Year 3. **Mastery** What's the same? What's different?  *Children should be able to express the ideas that:* ■ *They are all divided into 4 equal parts.* ■ *Each part represents a quarter of the whole.* ■ *Each of the parts in the triangle are the same shape and area (congruent).* ■ *The shapes in the square are different but each has the same area (not congruent).* ■ *The bananas represent fractions of quantities.* Can you remember how to find a ½ and ¼ of an amount?
Making a whole	Using the strips from the previous session ask the children to explore ways of making a whole. How many fifths would you need to make 1 whole? How many tenths would make a whole? Can children spot the pattern with the numerator and denominator when they are making a whole? Can they come up with a rule about this? Complete _ = 1 _ < 1 Give your partner a section of a strip of a fraction wall – can they make a whole by drawing the rest of the strip? Mastery with Greater Depth Assessment **Mastery with Greater Depth** Two paper strips are ripped. Identify which original paper strip is longer. Explain your answer.  

Placing fractions on a 0-1 number line – introducing equivalents -comparing fractions	Take a range of fraction strips and create a number line for each strip.  Children to complete number line activities such as spot the mistake, can you complete this number line, can you position these fractions on a number line? If children are struggling to decide what the increments are on a 0-1 number line split into fractions, ask the children to put a 'lid' on the number line to turn it back into a fraction strip. E.g. on number line below they may think they are counting in sixths as there are 6 dashes but they can see the 5 parts (so fifths) when they add the 'lid'.  If we placed two strips on the number line which strips would give the most equivalent fractions? Which have the least? Why? Draw out the links to multiplication and factors. Using the fractions strips and number lines ask children to compare fractions. What do they notice about the unit fractions with the biggest denominators? Can you find me 4 fractions that are more than a ½ but less than a whole? What do you notice about all of the numerators in relation to the denominators? **Mastery** Put these fractions on the number line: $\frac{2}{3}, \frac{1}{2}, \frac{3}{6}, \frac{4}{9}$ 0 1 Put these fractions on the number line: $\frac{4}{5}, \frac{7}{10}, \frac{5}{10}, \frac{2}{5}$ 0 1

Placing mixed numbers and improper fractions on number lines beyond 1	Encourage children to count in multiples of fractions e.g. quarters beyond 1. Do this by placing 2 fraction walls next to each other. Continue the count beyond 1 to the star in fractions 'one quarter, 2 quarters, 3 quarters, 4 quarters, 5 quarters, 6 quarters'. Then repeat the count to the same point on the fraction wall but acknowledge the whole within the count 'one quarter, two quarters, 3 quarters, one whole, one whole and one quarter, one whole and 2 quarters.  Children to realise that $\frac{6}{4}$ and $1\frac{2}{4}$ relate to the same point on the fraction wall A fraction where the top number is larger is called an improper fraction and a number that has a whole number and a fraction is called a mixed number. Children repeat this on a number line. Count to a given point and record as an improper fraction and a mixed number.  **Figure 28: labelling a number line marked in quarters** Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England Add labels to each mark on the number line as mixed numbers and improper fractions. 

	Identify the values of a, b, c and d  Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England Can they reason about which two whole numbers a mixed number will lie between? When they are confident with this, challenge children to estimate the position of fractions on an unmarked number line with just whole numbers marked. $2\frac{2}{9}$ $\frac{2}{3}$ $3\frac{3}{7}$ $1\frac{1}{5}$  Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England
Convert mixed numbers to improper fractions	Recap counting using a fraction wall or a number line to record a given point as an improper fraction and a mixed number. Ask children to show you what point on the number line or the fraction wall $1\frac{4}{5}$ is. Show children how we can convert without using a fraction wall. Use a part whole model to demonstrate  Start with $\frac{9}{5}$ If we take 5 of those fifths we will make one whole. That leaves us with another $\frac{4}{5}$ This will become the mixed number $1\frac{4}{5}$



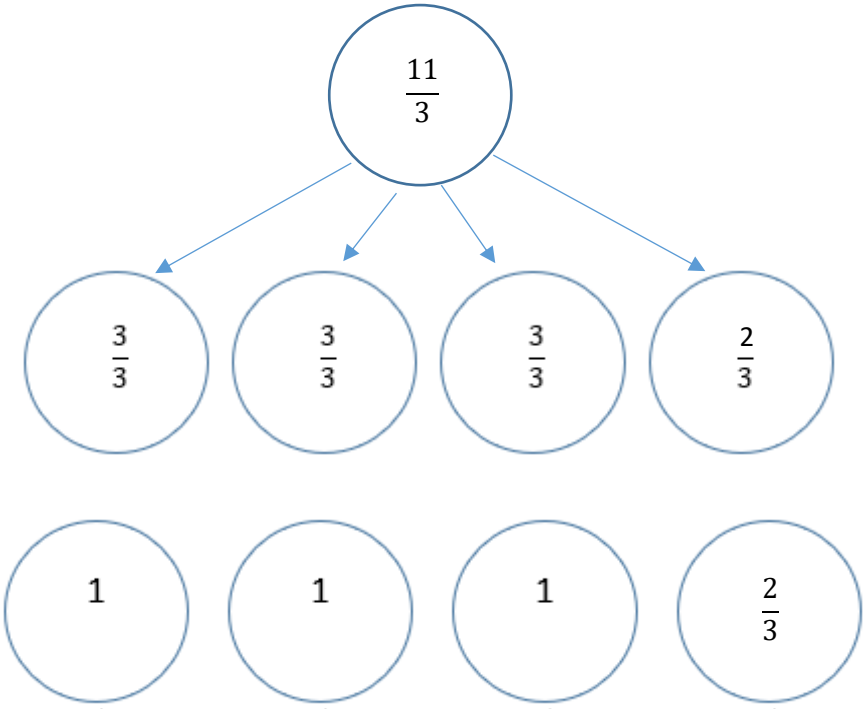
If we start off with $1\frac{4}{5}$

If we make the 1 whole into a fraction, then we get $\frac{5}{5}$

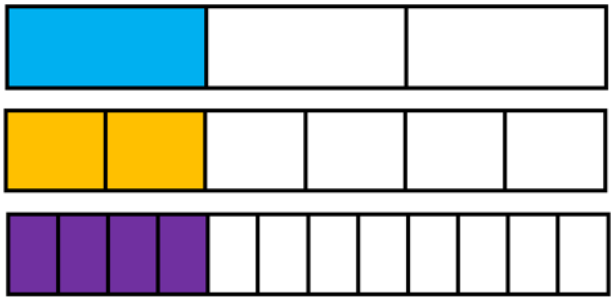
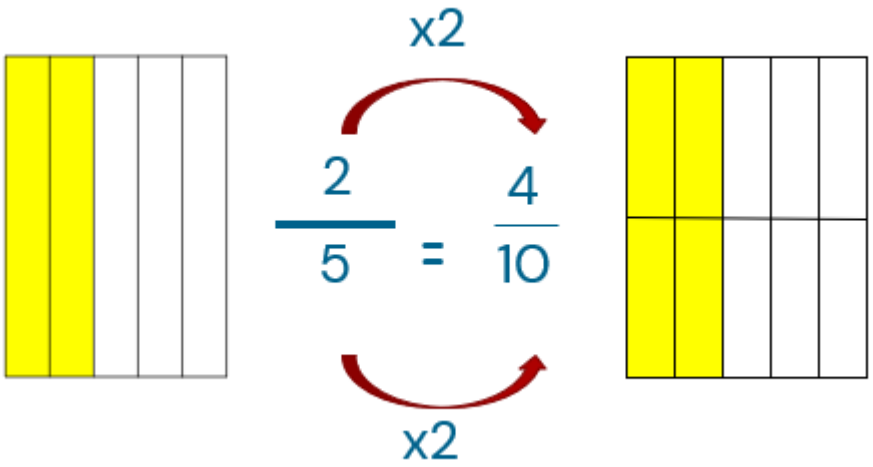
We have another $\frac{4}{5}$

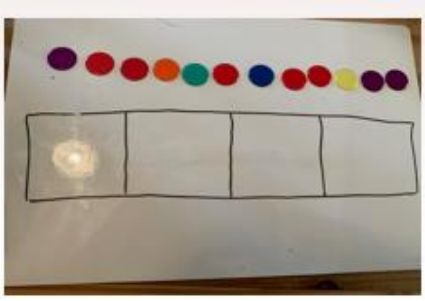
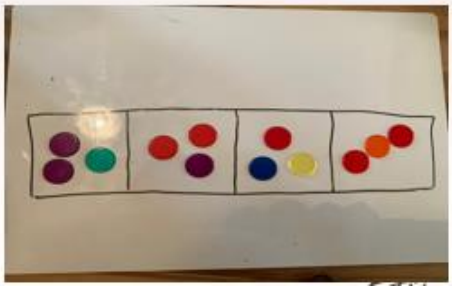
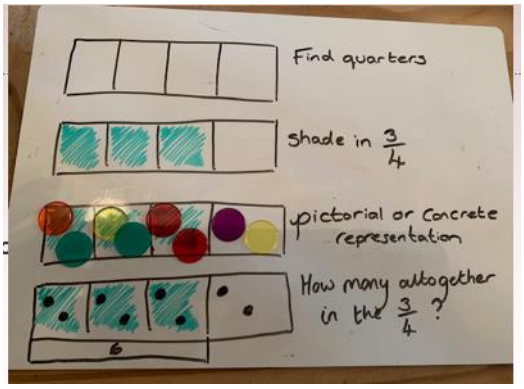
When we add those together, we have $\frac{9}{5}$

Children repeat and move onto increasingly difficult calculations when ready.



$\frac{11}{3}$ as a mixed number is $3\frac{2}{3}$

Equivalent fractions – linked to multiplication	Use the fraction wall to find equivalent fractions. Record these as an equivalent fractions family.  $\frac{1}{3} = \frac{2}{6} = \frac{4}{12}$ What do children notice about the numbers involved in these equivalent fractions families? Can children see how the numerators and the denominators have been multiplied by the same number?  Children to use multiplication to create equivalent fractions families. **Mastery** Draw diagrams to show two fractions that are equivalent to $\frac{2}{8}$. Can children work more systematically to show Greater Depth? **Mastery with Greater Depth** How many ways can you express $\frac{2}{8}$ as a fraction?

Fraction of an amount	Using a fraction wall and counters as the concrete representation and the bar model as the pictorial representation, show children how to find fractions of quantities, first with unit fractions and then with non-unit fractions.    Model to children how the bar model supports mental calculation of a fraction of a quantity. Using the bar model, we divided 12 by 4 to find $\frac{1}{4}$ To find a unit fraction of a quantity we divide by the denominator. To find $\frac{4}{5}$ of a number we divided the number between 5 sections and then we found 4 lots of that amount. We divided by the denominator, and we multiplied by the numerator. Children practice finding unit and non-unit fractions of quantities using concrete or abstract methods. **Mastery** Find: $\frac{1}{10}$ of 10 $\frac{1}{10}$ of 20 $\frac{1}{10}$ of 30 $\frac{1}{10}$ of 40 $\frac{1}{10}$ of 50 What do you notice?

Mastery with Greater Depth

Captain Conjecture says,

'To find a tenth of a number I divide by 10 and to find a fifth of a number I divide by 5.'

Do you agree?

Explain your reasoning.

If I eat ¼ of my bag of 24 sweets, how many are left?

Use the bar model to show what was eaten and what was left.

Would you rather have $\frac{1}{2}$ of 24 or $\frac{2}{4}$ of 24?

Would you rather have $\frac{2}{3}$ of 30 or $\frac{1}{2}$ of 24?

Mastery with Greater Depth

Insert the symbol >, < or = to make each statement correct.

$\frac{2}{5}$ of 5 ◯ $\frac{1}{4}$ of 4

$\frac{1}{7}$ of 7 ◯ $\frac{2}{7}$ of 14

$\frac{2}{3}$ of 9 ◯ $\frac{1}{3}$ of 18

Make up three similar statements using >, < or =.

Mastery

A soup recipe uses $\frac{3}{4}$ as many onions as carrots. Jo is making the soup and has 8 carrots.

How many onions does Jo use?

Mastery with Greater Depth

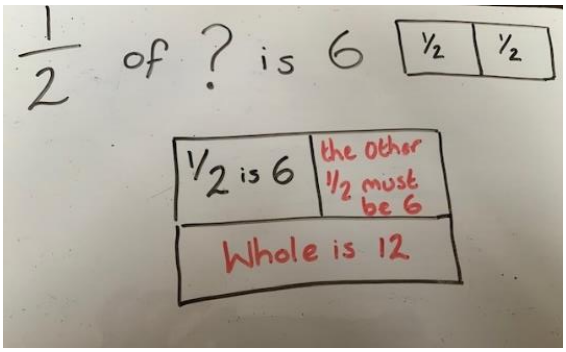
A soup recipe uses $\frac{3}{4}$ as many onions as carrots.

Complete the table below.

Carrots	Onions
1	
2	
3	
4	
5	
6	

Explain how you worked out the number of onions. Did you use the same method each time?

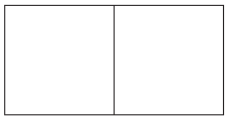
Give children questions where they know the fraction but have to work out the full amount, e.g. Gill spent ½ of her money on a pair of socks, she has £6 left, how much did she have to start?



Mastery

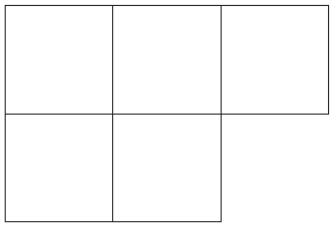
If the picture represents $\frac{2}{12}$ of a rectangle, draw a picture of the whole rectangle.

Can you draw it in two different ways?



Mastery with Greater Depth

If the picture represents $\frac{1}{3}$ of a shape, draw the whole shape.



NRICH – Andy's Marbles

Andy's Marbles

Age 7 to 11
Challenge Level ★★

Andy and his friend Sam were walking along the road together. Andy had a big bag of marbles.

Unfortunately the bottom of the bag split and all the marbles spilled out. Poor Andy!

One third ($\frac{1}{3}$) of the marbles rolled down the slope too quickly for Andy to pick them up. One sixth ($\frac{1}{6}$) of all the marbles disappeared into the rain-water drain.

Mastery

8 girls share 6 bars of chocolate equally.
12 boys share 9 bars of chocolate equally.
Who gets more chocolate to eat, each boy or each girl? How do you know?

Draw a diagram to explain your reasoning.

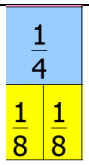
Mastery with Greater Depth

8 girls share 6 bars of chocolate equally.
12 boys share 9 bars of chocolate equally.

Clare says each girl got more to eat as there were fewer of them.
Rob says each boy got more to eat as they had more chocolate to share.

Explain why Clare and Rob are both wrong.

Add fractions



Using the fraction cards, ask children to complete calculations such as $\frac{2}{8} + \frac{4}{8}$

Ensure that they understand why the denominator doesn't change unless we are simplifying the answer at the end.

Mastery

True or false?

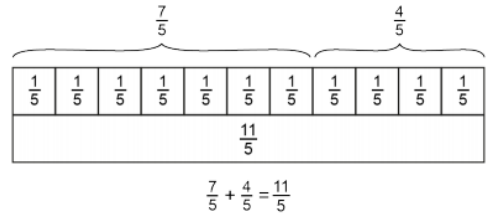
$\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

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

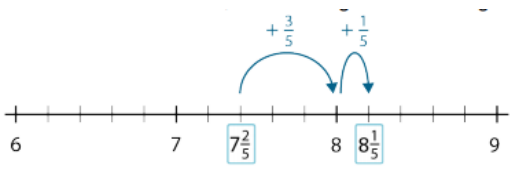
$\frac{1}{5} + \frac{2}{5} = \frac{6}{10}$

Explain your reasoning.

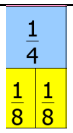
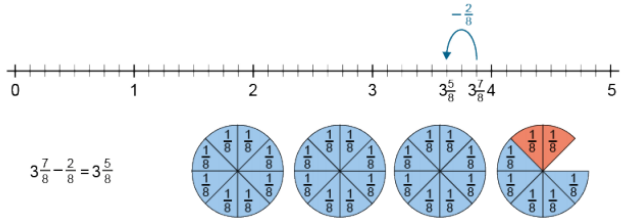
Extend children's understanding to add beyond 1. Use fractions wall, number lines or bar models to help them to do this.



$\frac{7}{5} + \frac{4}{5} = \frac{11}{5}$



Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England

Subtract fractions	 Using the fraction cards, ask children to complete calculations such as $\frac{5}{8} - \frac{2}{8}$ Ensure that they understand that the denominator doesn't change **Mastery with Greater Depth** Peter wrote down two fractions. He subtracted the smaller fraction from the larger and got $\frac{1}{8}$ as the answer. Write down two fractions that Peter could have subtracted. Can you find another pair? Extend the children's understanding to calculate fractions greater than 1  $3\frac{7}{8} - \frac{2}{8} = 3\frac{5}{8}$ Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England