Fractions

KS1

The bar model is valuable for all sorts of problems involving fractions. An initial step would be for pupils to appreciate the bar as a whole divided into equal pieces. The number of equal pieces that the bar is divided into is defined by the denominator. To represent thirds, I divide the bar into three equal pieces, to represent fifths I divide the bar into five equal pieces etc.

e.g.

What fractions can you see?

What fraction of the orange is each yellow piece?

If the value of the orange rod is ten, what is the value of each yellow rod?

Extension: What if the value of the orange rod is 63 100? Etc

Find $^1/_4$ of 12:

12			
3	**3**	**3**	**3**

Find $^3/_4$ of 12:

12			
3	**3**	**3**	**3**

3+3+3 = 9

Use to show equivalence:

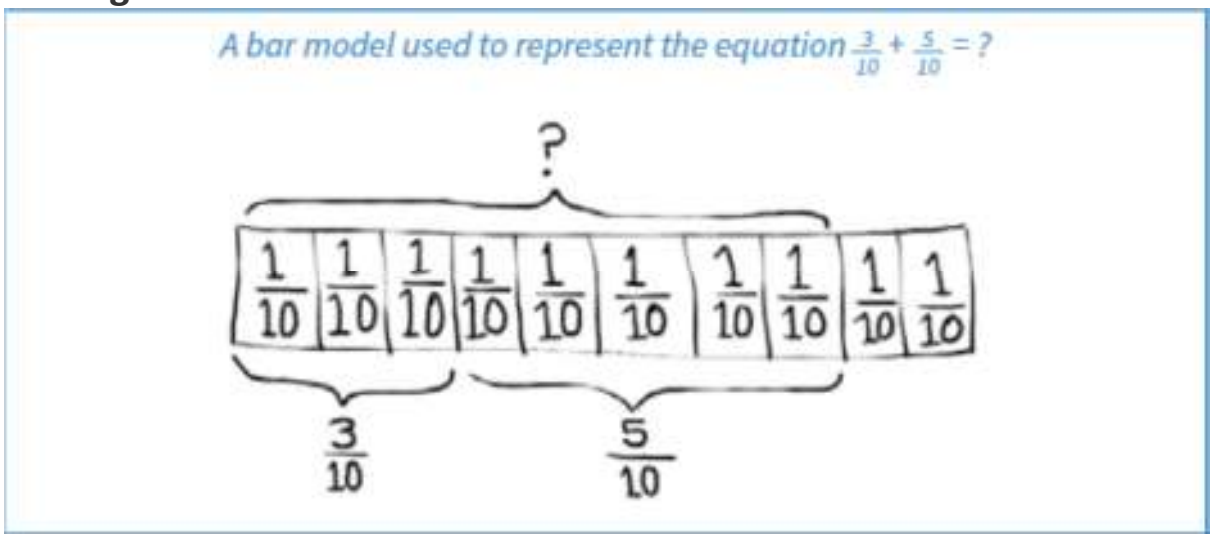
$^1/_2$		$^1/_2$	
$^1/_4$	$^1/_4$	$^1/_4$	$^1/_4$

KS2

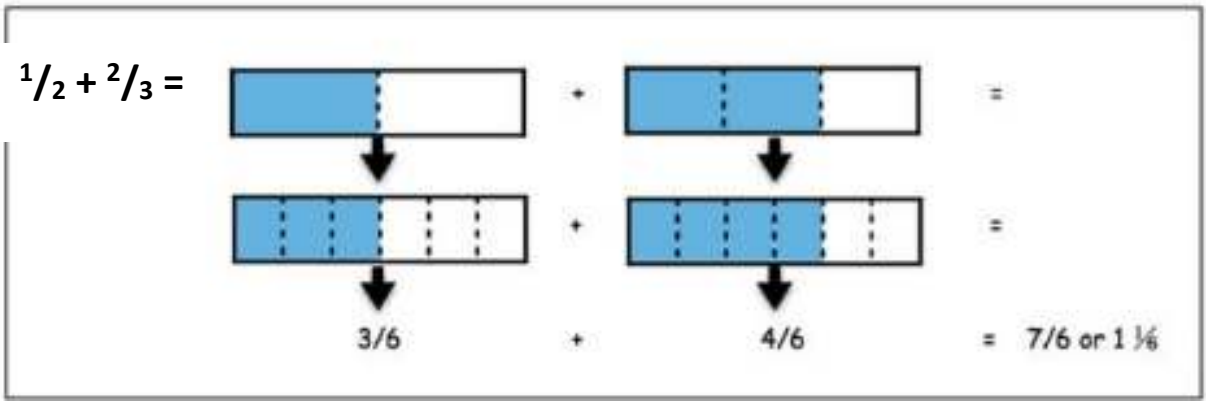
Use as in KS1 but with stage appropriate fractions.

Use for adding, subtracting, multiplying and dividing fractions:

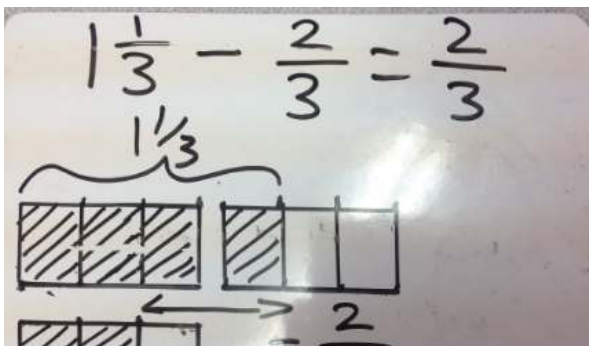
Adding fractions with the same denominator:



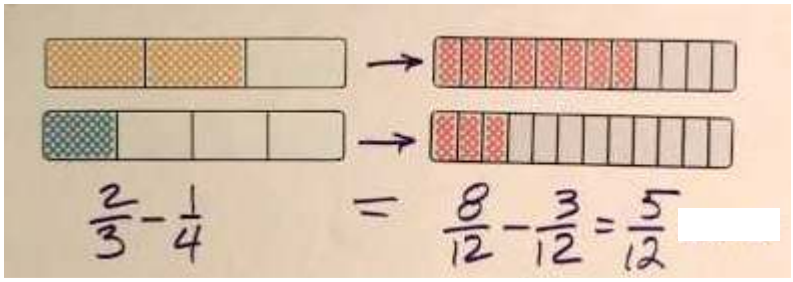
Adding fractions with different denominators:



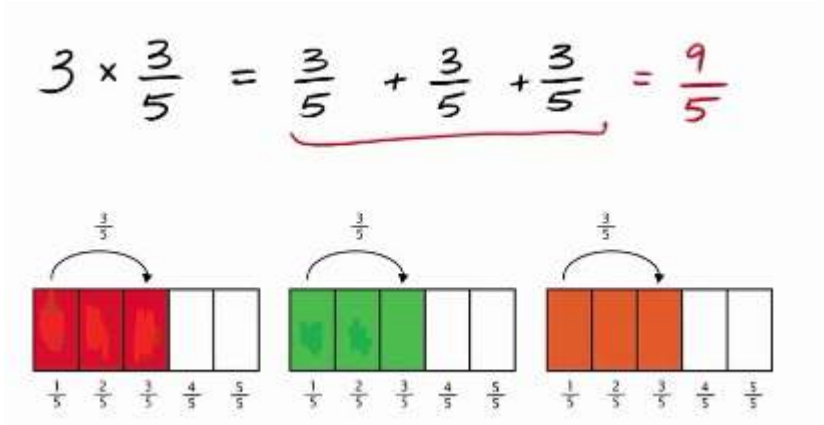
Subtracting fractions with the same denominator:



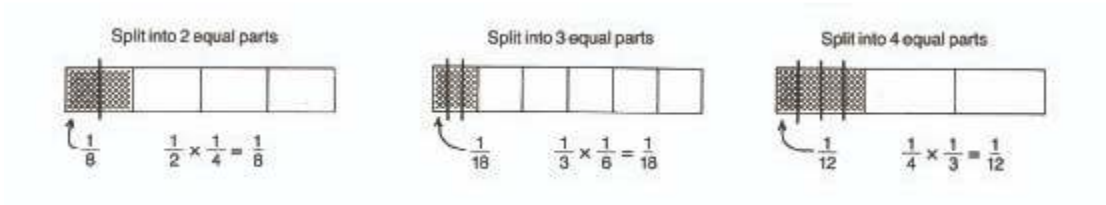
Subtracting fractions with different denominators:



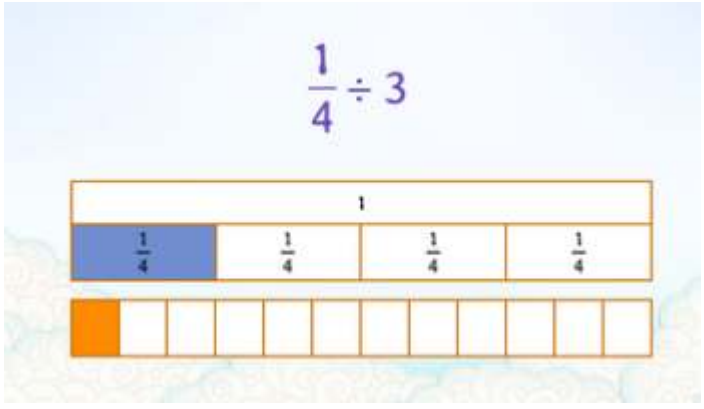
Multiplying a whole number and a fraction:



Multiplying a fraction and a fraction:



Dividing a fraction by a whole number:



Other types of fractions problem

Finding the original cost of an item that has been reduced in a sale:

e.g. A computer game is £24 in the sale. This is one quarter of its original price. How much did it cost before the sale?

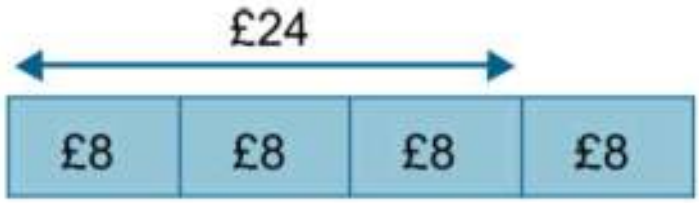
Before:	£24	£24	£24	£24

After:	£24

If $^1/_4$ of the price is £24 then the whole price ($^4/_4$) must be 4 lots of £24.

Or

A computer game is £24 in the sale. This is one quarter off its original price. How much did it cost before the sale?



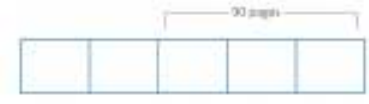
The bar represents the original cost. It is divided into quarters to show the reduced cost of £24.

£24 ÷ 3 = £8, giving the value of three sections of the bar. The final section of the bar must also be £8, since it represents the same proportion as each of the other sections.

£8 × 4 = £32

The original cost of the computer game is £32

On Saturday Lara read two fifths of her book. On Sunday, she read the other 90 pages to finish the book. How many pages are there in Lara's book?



Pupils will then see that they can divide 90 by 3:

Percentages

Problems involving percentages are solved in a similar way to those involving fractions. The key is to divide the whole into equal parts.

A computer game is reduced in a sale by 30%. Its reduced price is £77. How much was the original price?

Dividing the bar into ten equal pieces allows us to represent 30% and keep the other pieces the same size.

£77 ÷ 7 = £11

The original cost (the whole bar) is £11 × 10 = £110

Examples of fractions worded problems:

Year 1	Year 2
1. Jack has 10 beans. He keeps half and gives half to his mum. How many beans do they have each? 2. Bob cuts his pizza into 8 equal slices. He eats $^1/_4$ of	1. Last week Ellie got £1.00 pocket money. She spent half of it. How much has she got left?

the pizza – how many slice does he eat?	2. Mr Siddique shares £18 equally between his three sons. How much does each son get? 3. Charlotte-May had to find a $^1/_4$ of a number. Her answer was 4. What number did she start with? 4. Danny cuts his pizza into 8 equal slices. He eats $^3/_4$ of the pizza and gives the rest to his dog, Gruff. How many pieces does Danny eat?
Year 3 1. Which is the larger amount, one third of £60 or one quarter of £88? 2. A computer game is £24 in the sale. This is one quarter of its original price. How much did it cost before the sale?	**Year 4** 1. Sally has 40 football cards. She gives 2 fifths of them away. How many does she give away? 2. Sally has 30 football cards. She gives 2 fifths of them to her friend. How many does she have left? 3. Kelly buys four fifths of the shop's oranges. If the shop had 20 oranges, how many does she have?
Year 5 **1.** Robert calculated 25% of 600. What answer does he get? 2. Sam calculated 40% of 120. What answer does he get?	**Year 6** 1. Three quarters of a number is 54. What is the number?

3. Rita worked out that one sixth of a number was 12. What was the number she started with?	2. Which is more; five ninths of 252 or four sevenths of 238? 3. There are 36 packets of biscuits. One half are chocolate, a ninth are digestive and a third are wafer biscuits. The rest are ginger nuts. How many biscuits are ginger nuts? 4. There is 20% off in a sale. How much would a track suit cost, if the normal price was £44.50? 5. There is 20% off in a sale. The reduced price of the jeans is £36. What was the original price?