

The importance of Bar Models resources: side notes

Resources needed for the CPD session:

- PowerPoint presentation
- White Rose Maths Hub video
- Counters and cubes

Ask your members of staff to bring any examples of bar models that they have used.

Slide 3



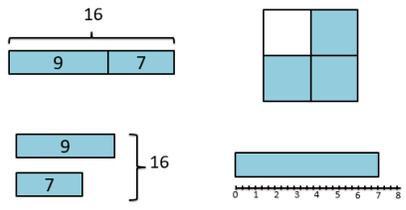
Discussion

- What do bar models look like?
- Why are bar models used?

Give teachers time to discuss the questions displayed.

Slide 4

What Are Bar Models? 



This is what most bar models tend to look like.

- Sometimes they are floating in space; Sometimes they are above a number line. Sometimes there are more than one. Sometimes they are square shaped, rather than rectangular.

It is important to encourage children to represent what they see in different ways.

Slide 5

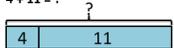
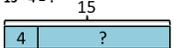
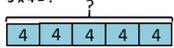
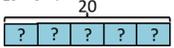
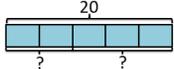
A Consistent Picture 

For slide 5, explain that it is good to use different representations for topics and that each of these diagrams do the same thing as the bar models do.

However, if this was the only way students saw ratio and this was the only way that they saw fractions, then they might struggle to see the links.

Slide 6

A Consistent Picture 

<p>$4 + 11 = ?$</p> 	<p>$15 - 4 = ?$</p> 
<p>$5 \times 4 = ?$</p> 	<p>$20 \div 5 = ?$</p> 
<p>$\frac{2}{5}$ of 20 = ?</p> 	<p>Share 20 in the ratio 2:3</p> 

Share that if we are using different concrete and pictorial representations for each topic, it is important to have one representation that acts as a common spine through the curriculum.

By representing each of these topics with a bar model then students don't need to try and remember which diagram you use for each topic – they know they can always use a bar.

After this slide, show the White Rose Maths Hub video on bar modelling.

Slide 7

Discussion 

What are the positives and negatives of using bar models?

Give your team time to discuss the video and the slides prior to watching the video. How could they adapt the models and images that they currently use?

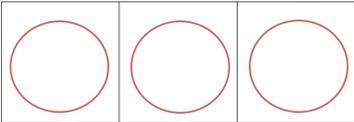
Slide 9

The importance of bar modelling 

Go through the different quotes to summarise why bar modelling is important

Slide 10

Introducing Bar Models in EYFS 



Go through the small steps for introducing simple bar models in Early Years. It is important that children start with the concrete object, in this case apples, and transition to iconic representations (counters or cubes). The final stage would be to draw boxes to show a bar.

Slide 11

Show me... 

- There are six glasses of apple juice
- Hannah has more than five friends
- Sam has more conkers than Tom

Give your members of staff time to explore the different representations. Encourage them to represent each statement in a linear way using pictures, counters and boxes.

Slide 12

KS1 bar modelling 

Peter has 5 toy cars and Jane has 3 toy cars.
How many toy cars do they have altogether?

Go through the 'gif' and explain that bar models can be a tool to illustrate what each of the four operations mean. Like in Early Years, it's important to start with the literal, in this case cars, and transition through the iconic to the bar.

Slide 13



KS1 Bar Modelling

Tim has 4 sweets and Ben has 2 sweets.
How many sweets do they have altogether?

Now, give time for your members of staff to have a go at representing this word problem, like the stages in the 'gif'. Once they have had a go, display the different stages:

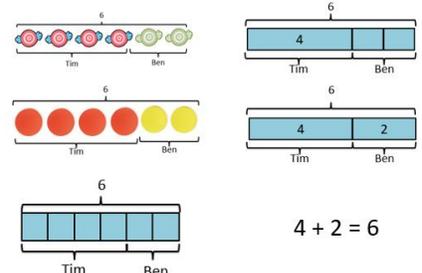
- 1) Using actual sweets or images of sweets
- 2) Use counters to represent the sweets.
- 3) Use of the 'discrete bar model' where each box represents one whole.
- 4) Use of the mixture of a continuous and discrete bar model to encourage counting on, rather than counting all.
- 5) Use of the 'continuous model' where each rectangle represents a number.
- 6) Use of the abstract calculation should be used when children are confident with the concept introduced.

In all representations, it is important to label what each part represents and what it is you are finding out.

Slide 14



Small steps



$4 + 2 = 6$

Reinforce the different representations and allow time for discussion.

Slide 15

KS2 barmodelling 

$\frac{3}{5}$ of 20 = ?

Go through the 'gif' and discuss the steps taken.

- 1) Label the whole bar as '20'.
- 2) The denominator is 5, so the bar model needs to have 5 boxes.
- 3) The first calculation is $20 \div 5 = 4$ so we can now write 4 into each box.
- 4) Label that you want three fifths, alongside the calculation $3 \times 4 = 12$

Slide 16

KS2 Bar Modelling 

Solve... Matthew has a 300g block of cheese. He eats $\frac{2}{5}$ of the cheese and puts the rest back in the fridge.
How much cheese did Matthew put back in the fridge?

Model	Calculations

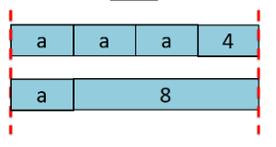
Give your members of stage time to solve the problem, using the same steps modelled in the 'gif'. Then go through the different animations.

Slide 17



KS3 Bar Modelling

$3a + 4 = a + 8$

Model	Calculations
	$3a + 4 = a + 8$

Go through the different steps to solve $3a + 4 = a + 8$

- 1) Draw each part of the calculation beneath each other. We know that 'a's' are the same size
- 2) Think about what can be taken away from each side. We can take an 'a' from each side, which will leave us with $2a + 4 = 8$
- 3) We can now take 4 from each side which leaves us with $2a = 4$
- 4) If $2a$ is equal to 4, we must divide this by 2 to get $a = 2$

Slide 18



KS3 Bar Modelling

Solve $2a + 3 = a + 7$

Model	Calculations
	

Before going through the animations on this slide, give your members of staff time to solve $2a + 3 = a + 7$ using a bar model. Then go through the steps.

Discuss how this can be adapted for the KS2 curriculum.

