

Kibworth CE Primary School

Let Your Light Shine Matthew 5:16

Bar Modelling Policy

EYFS

	Concrete	Pictorial	Show me
EYFS	Concrete - Real ObjectsImage: Concrete - Real ObjectsImage: Concrete ObjectsIm	Children progress to using pictures of objects and are encouraged to draw their own on empty bars. This resource is helpful for lining objects up, facilitating counting and maintaining a consistent size so that comparisons between amounts are easier to make.	Examples •There are six glasses of apple juice U U U U •Hannah has more than five friends O O O O •Sam has more conkers than Tom
	Concrete - Iconic Objects Image: Concret - Iconic Objects Image: Concre	Some children will progress to understanding that any mark can represent an object and will use the empty bars to create increasingly abstract representations of a problem.	"Tom"

	Concrete	Pictorial
Addition	Peter has 4 apples. He buys 2 more apples. How many does he have altogether? Building from the iconic objects used in EYFS, cubes are used in a connected bar. One cube represents one object (discrete bar model) and each part is a different colour. 4+2=6 "Four plus two equals six" "Peter has six apples".	4+2=6 Children progress to drawing bars, using one square to represent one object (discrete bar model).
Subtraction: Take away/ Reduction	Sam had 6 sweets and ate 2 sweets. How many sweets are left?	6-2 = 4 Children draw a bar to represent the whole and cross out to take away, labelling the whole and remaining part.

	Concrete	Pictorial
Subtraction: Partitioning	There are six sweets. Two are lollipops and the rest are marshmallows. How many marshmallows are there? There are six sweets. Two many marshmallows are there? There are six sweets. Two many marshmallows are there? There are four makes six''. "There are four marshmallows."	6-2=4 Children draw a bar of the whole (six squares), because the problem is partitioning, there is no need to cross out two, but to simply partition the whole.
Subtraction: Difference	There are six marshmallows and two lollipops. How many more marshmallows are there than lollipops?	6-2 = 4 Children draw a bar to represent the whole and draw the part alongside, counting the remaining squares to find the difference.

	Concrete	Pictorial
Multiplication	John has 5 pots, in each pot he has 2 pencils, how many pencils does he have all together? Children are taught to count in multiples of 2s, 5s, and 10s. To begin with, practice counting using concrete images. 2+2+2+2+2=10 ' two add two add two add two equals ten' 'John has 10 pencils altogether'	Represent the concrete resources as a pictorial image. Each square has the value of one (discrete).

	F	Pictorial
Addition	John has 25 chocolate buttons and 9 milky way stars. How many pieces of chocolate does he have? Building on from the discrete bar model in year 1, children now start to use the continuous bar model, whereby the value of each block can represent more than the total number of squares. This can be created by drawing bars on plain paper. 25 + 9 = 34 'twenty- five add nine equals thirty- four' 'John has 34 pieces of chocolate.'	$\begin{array}{c} 34\\ \hline 25\\ \hline 9=34 \end{array}$
Subtraction: Take away/ Reduction	John has 34 chocolate buttons, he eats 9 of them. How many ch Building on from Year 1, children now use pictorial bars to repro- larger values without needing one cube to represent the unit of 34 - 9 = 25 'John has 16 pieces of chocolate left.' The value that is reduced is crossed out, to show that it has been taken from the whole (34).	nocolate buttons does he have left? esent fone. away ?

	Pictorial		
Subtraction:	John has 34 chocolates. 9 are chocolate stars. How many chocolate buttons does he have?		
Partitioning	Children use pictorial bars to represent the calculation, however, instead of taking away, children partition to show two parts of the whole (34), part (9 chocolate stars) and the other part (25 chocolate buttons). 34 - 9 = 25 'thirty- four subtract nine equals 25' 'John has 25 chocolate buttons'		
Subtraction: Difference	John has 34 chocolate buttons and 9 chocolate stars How many more chocolate buttons does John have that chocolate stars? Children represent the two amounts alongside each other to compare, using a continuous model. 34 will be a wider bar because it is more than 9. Children can then see that in order to find the difference between 34 and 9, they either need to count on from 9 or back from 34. 34-9 = 25 ' the different between thirty- four and nine is twenty- five' ' There are 25 more chocolate buttons than chocolate stars' Query Council Co		

	Pictorial		
Multiplication	There are 5 plates, with 3 cupcakes on each plate. How many cupcakes are there altogether? Children use the continuous model to represent multiplication number sentences. Adding the same amount to each part to build a bar model.		
	3 x 5 = 15 3 + 3 + 3 + 3 + 3 = 15 ' three multiplied by five equals fifteen' 'There are 15 cupcakes altogether'	15 33333	

	Pictorial	Worked Example
Complex Problem	Together Jack and Sam have £12. Jack has £2 more than Sam. How much money does Sam have? f12 - f2 = f10 $f10 \div 2 = f5$ Som $f10 \Rightarrow 2 = f5$ f12 - f2 = f10 $f10 \Rightarrow 2 = f5$ f12 - f2 = f10 f12 - f2 =	Step 1: £ 12 - £2 = £ 10 Step 2 : £ 10 ÷ 2 = £5
	By drawing out a comparative bar, children can visualise that between Jack and Sam they have £12 altogether, Jack's bar (amount) has £2 more. Modelling this example will really help children to be able to complete complex problems were children don't know where to start or don't know what to do with the numbers within the problem (£12 and £2). First, children subtract £2 away from £12 pounds. Then divide £10 by 2, to represent how much money Sam has, labelling each unknown amount as it is calculated.	Step 3: Jack: $f5 = f2 = f7$ Sam: $f5$ Jack 52 Sam 5 $f12$



















	Pictorial	Calculation
Complex Problem	Tom ate 9 grapes at the picnic. Sam ate 3 times as many grapes as Tom. How many grapes did they eat altogether? Tom 9 36 Sam 9 9 9 9 9 36 Drawing out a comparative bar between Tom and Sam, and labelling how many grapes Tom eats. Children then draw out 3 times as many as Tom, $9 + 9 + 9 = 27$ or $9 \times 3 = 27$ 9 + 27 = 36	Step 1: 9 x 3 = 27 (Sam has 3 times as many as Tom) Step 2: 9 + 27 = 36 (Add how many both Tom and Sam have altogether)











	Pictorial	
Multiplication	In van there are 5, 600 cases of eggs. How many cases of eggs are in 5 vans?	
Division	There are 25,500 closes of eggs in 5 vans. In 5 vans there are 25, 500 cases of eggs altogether. Each van has the same number of egg cases, how many egg cases are in two vans? 25,500 25,500 Children can use the continuous bar model to show the whole of 25,500, then to divide it in to 5 equal groups to show 5 vans. Children can then lead on to the calculation of 25,500 ÷ 5 = 5100 25,500 ÷ 5 = 5,600 'twenty- five thousand, five hundred divided by five is five thousand, six hundred' 'There are 5,600 cases of eggs in each van.' 5100 × 2 = 10,200 'There are 10,200 cases of eggs in two vans.'	



	Pictorial
Fractions	⁷ / ₁₆ of a class are boys. There are 18 girls in the class. How many children are there altogether? Image: style="text-align: center;">Image: style="text-align: center;"/>Image: style="text-align: center;"//_16; as boys. Children can then visualise that 9/_16; are girls; with the label of 18. Children can then visualise that 9/_16; are girls; with the label of 18. Children can then visualise that 9/_16; are girls; style="text-align: center;"/>Image: style="text-align: center;"///////////////////////////
Ratio	Annie is making some necklaces to sell. For every one pink bead, she uses three purple beads. Each necklace has 32 beads in total. How many pink beads does he use to make one necklace? 31 beads ? 1:3 To represent this ratio problem, children will draw a continuous bar to represent the whole of 32 beads. They will then divide the bar in to four parts to represent the 1: 3 ratio. 32 ÷ 4 = 8 'thirty- two divided by four is eight' 'Annie uses 8 beads to make one necklace.'







	Pictorial	Calculation
Complex Problems:	3 pineapples cost the same as 2 mangoes. One mango costs £1.35.	
Money	How much does one pineapple cost?	Step 1: £1.35 x 2 = £2.70 Step 2:
Several bars should be used where several steps need to be completed	$\begin{array}{c c} & & & & \\ \hline \hline & & & \\ \hline & & & \\ \hline \hline \hline \\ \hline \hline & & & \\ \hline \hline \hline \hline$	£ 2.70 ÷ 3 = 90p



	Pictorial	Calculation
Complex Problems: Fractions Several bars should be used where several steps need to be completed	Tom and Jane have read pages of a book with 240 pages. Tom read ¾ of the book and Jane read $\frac{1}{4}$. How many more pages did Tom read than Jane. $\begin{array}{c} \hline & 60 & 60 & 160 \\ \hline & & 60 & 60 & 160 \\ \hline & & & & & & & \\ \hline & & & & & & & \\ \hline & & & &$	Step 1: 240 ÷ 4 = 60 Step 2: 180 – 60 = 120



	Pictorial	Calculation
Complex Problems: Compare 2 or more objects Several bars should be used where several steps need to be completed	Jessie, Lisa and David share £60 in the ratio of $1: 2: 3$. How much more money does David get than Jessie? i = 1 $i = 1$	Step 1: £60 ÷ 6 = £10 Step 2: £30 - £10 = £20

Glossary

Vocabulary	Definition
Aggregation	The combining of two or more quantities.
Augmentation	Where one quantity is increased by an amount.
Partitioning	Splitting one quantity into two or more component parts: the inverse of augmentation.
Reduction	Decreasing the value of one quantity by an amount, known as 'take-away': the inverse of augmentation
Difference	The result of a subtraction.
Discrete Model	Where each box represent a single item (to scale).
Continuous Model	Where each box represents a group of items (not to scale).

Consistent Representations

Consistent Picture







15

?

15 - 4 = ?

4



