



Calculation Policy 2019

Addition																											
Year 1	Year 2																										
Guided maths Practice + Grids Counting on in ones, 2s and 10s on 0-99(IWB) /1-100 pupil grids, number lines/ number tracks, fingers or mentally Finding 1 more, 2 more, 3 more and so on from any single digit, 2 digit or 3 digit numbers on grids, number lines, fingers or mentally Addition pairs with total up to 10, 20 Practice adding multiples of 10s (10,20,30,40) Practice adding multiples of 100s (100,200,300,400.....) Partition 2 digit numbers Related facts : If I know 3cups + 2 Cups = 5 cups I also know 3 0(ty) + 2 0(ty) = 5 0 (ty) 3 00(H) + 2 00(H) = 5 00(H) 3 000(TH)+2 000(TH)= 5 000(TH) H → Hundreds TH → Thousands MMS Read and copy addition maths stories 3+2=5, 3+2+4=9, 3+ ½+½ =4 And then act out the real stories with pupil cups 3 cups+2 cups=5 cups With pencils 3 pencils+2 pencils=5 pencils With 0 (ty) 0(ty) + 2 0(ty) = 5 0 (ty) With 00 (hundred) 3 00(H) + 2 00(H) = 5 00(H) With 000 (Thousand) 3 000(TH)+2 000(TH)= 5 000(TH) Add multiples of 10 with single digit 4 0 (ty) +2	Guided maths Practice + Grids Counting on in 1s, 2s, 5s, and 10s on 0-99(IWB) /1-100 pupil grids, number lines/ number tracks, fingers or mentally Finding 1,2,3, 10,100 more than from any 2 digit or 3 digit numbers on grids, number lines, fingers or mentally Addition pairs with total up to 10, 20,100 Quick Recall of addition facts to 10,20 and 100 Addition of 2 digit to single digit e.g. 37+6 Practice adding multiples of 10s (10,20,30,40) e.g. 43+ 20, 56+30 Practice adding multiples of 100s (100,200,300,400.....) e.g. 341+200, 356+300 Partition and add 2digit numbers e.g. 64 + 25 36 + 67 60 4 20 5 30 6 60 7 80 9 90 13 89 103 Related facts : If I know 3cups + 2 Cups = 5 cups I also know 3 0(ty) + 2 0(ty) = 5 0 (ty) 3 00(H) + 2 00(H) = 5 00(H) 3 000(TH)+2 000(TH)= 5 000(TH) H → Hundreds TH → Thousands MMS Add 2 digit numbers and 10s e.g. 46+10, 54+40, 80+17, 70+16 Add 2 digit numbers to single digit using number lines Add 3 digit numbers and 10s e.g.1 40+13, 150+17, Use Bar models for addition, partition (part- whole models). Refer to year 1 for number bonds to 10,15,20,30 etc																										
<table><tr><td>Partition and add</td><td>Column addition</td></tr><tr><td>43 + 21 = 64</td><td>43</td></tr><tr><td>40 + 20 = 60</td><td>+ 21</td></tr><tr><td>3+ 1 = 4</td><td>-----</td></tr><tr><td></td><td>60 (4ty +2ty)</td></tr><tr><td></td><td>+ 4 (3+1)</td></tr><tr><td></td><td>-----</td></tr><tr><td></td><td>64</td></tr></table>	Partition and add	Column addition	43 + 21 = 64	43	40 + 20 = 60	+ 21	3+ 1 = 4	-----		60 (4ty +2ty)		+ 4 (3+1)		-----		64	<table><tr><td colspan="2">100</td></tr><tr><td>30</td><td>70</td></tr></table> <table><tr><td colspan="3">100</td></tr><tr><td>50</td><td>30</td><td>20</td></tr></table>	100		30	70	100			50	30	20
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Extend to 3digit+2digit																											

$\begin{array}{r} 425 \\ + 32 \\ \hline 400 \text{ (4 h + 0 h)} \\ 50 \text{ (2ty + 3ty)} \\ + 7 \text{ (5+2)} \\ \hline 457 \end{array}$	$\begin{array}{r} 2357 \\ + 21 \\ \hline 2000 \text{ (2Th + 0 Th)} \\ 300 \text{ (3 h+0 h)} \\ 70 \text{ (5ty +2ty)} \\ + 8 \text{ (7+1)} \\ \hline 2378 \end{array}$
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$\frac{1}{2} + \frac{1}{2}$ (pupil cups)
 $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ (pupil cups)
 $\frac{1}{2} + \frac{1}{4} + \frac{1}{4}$ (pupil cups)
 $2 + \frac{1}{2} + \frac{1}{4} + \frac{1}{4} = 0$ (pupil cups)

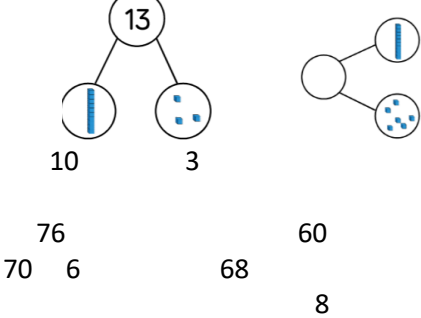
Use Bar models for addition, partition (part- whole models). The children need to see number representations in different ways. Bar Model for making 10. The number lines and 10 frames for making 10 or other numbers.

10	
3	7

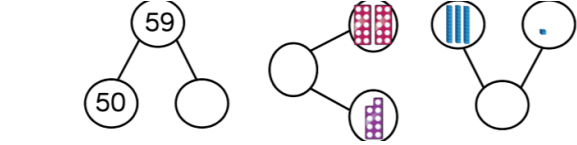
10	
6	4

10		
5	3	2

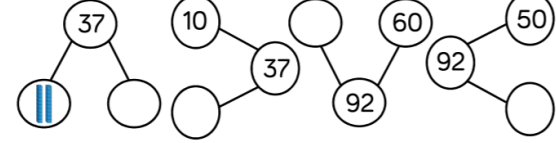
Part- whole model / partition



Part- whole model / partition



Partition for purpose / part –whole models



Progression in addition calculations

Partition and add $43 + 26 = 69$ $40 + 20 = 60$ $3 + 6 = 9$	Column addition $\begin{array}{r} 43 \\ + 26 \\ \hline 60 \text{ (4ty +2ty)} \\ + 9 \text{ (3+6)} \\ \hline 69 \end{array}$
Partition and add $68 + 27 = 95$ $60 + 20 = 80$ $8 + 7 = 15$	Column addition $\begin{array}{r} 68 \\ + 27 \\ \hline 80 \text{ (6ty +2ty)} \\ + 15 \text{ (8+7)} \\ \hline 95 \end{array}$
Partition and add $78 + 56 = 134$ $70 + 50 = 120$ $8 + 6 = 14$	Column addition $\begin{array}{r} 78 \\ + 56 \\ \hline 120 \text{ (7ty +5ty)} \\ + 14 \text{ (8+6)} \\ \hline 134 \end{array}$



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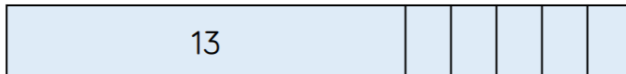
Problem solving using addition. The children use variety of model and images to solve addition problems.

Screen shots from White Rose:

Eva has 13 prize tokens.

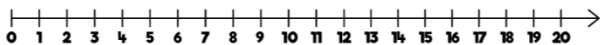
She wins 5 more.

How many prize tokens does Eva have now?

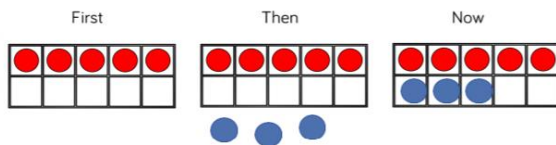


Mo starts at 9 and counts on 6 $9 + 6 = \square$

Show his calculation on the number line.



Use ten frames to complete the number story.



First there were ___ cars in the car park.

Then ___ more cars parked in the car park.

Now there are ___ cars in the car park.

Complete addition and subtraction maths stories (number sentences) using bar models.



Extend to 3digit+3digit

435

+ 543

900 (4 h + 5 h)

70 (3ty + 4ty)

+ 3 (5+3)

978

457

+ 346

700 (4 h + 3 h)

90 (5ty + 4ty)

+ 13 (7+6)

803

Extend to 4digit+3digit

2435

+ 543

2978

Extend to 4digit+3digit

2535

+ 3143

5678

$\frac{1}{2} + \frac{1}{2}$ (pupil cups) – glue glue glue strategy(MMS)

$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ (pupil cups)- glue glue glue strategy(MMS)

$\frac{1}{2} + \frac{1}{4} + \frac{3}{4} - \frac{1}{2}$ (pupil cups)- glue glue glue strategy

$3 + \frac{1}{2} + \frac{1}{4} + \frac{3}{4} - \frac{1}{2} - 0$ (pupil cups)- glue glue glue strategy

Problem solving using addition. The children use variety of models and images to solve addition problems. (Refer to year1)

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621	4ty+7ty+1ty=12tysame as 1h2ty, write 1 h with hs then add hs	1300 (4H +7H) + 5000 (3TH+2TH) ----- 6425	8+7 =15 (1ty 5) write ty with ty s 6ty+5ty+1ty=12tysame as 1h2ty, write 1 h with hs then add hs, write 1Th with Th s and add Ths.
Extend to 4 digit additions and add more than two numbers to add complexity for G&T Add money £3.48 + £ 4.76 = £8.24 £3 + £ 4 = £7 48p + 76p = 124p= £1.24 110p 14p £3 . 48 +£4 . 76 ----- £7 . 00 Add pounds £1 . 10 40p+70p =110p=£1.10 £0 . 14 8p+ 6p = 14p =£0.14 ----- £8 . 24		Extend to more than two numbers to add complexity for G&T Add money and measures £53.64 + £ 48.79 = £102.43 £53 + £ 48 = £101 64p + 79p = 143p= £1.43 130p 13p £53 . 64 +£48 . 79 ----- £90 . 00 £ 5ty +£4ty £11 . 00 £ 3 + £ 8 £ 1 . 30 60p+70p =130p=£1.30 £ 0 . 13 4p+ 9p = 13p =£0.13 ----- £102 . 43	
£3 . 48 +£4 . 76 ----- £0 . 14 add 8p &6p £1 . 10 70p & 60p £7 . 00 add pounds ----- £8 . 24	Column addition £3 . 48 +£4 . 76 ----- 1 1 ----- £8 . 24 -----	£53 . 64 +£48 . 79 ----- £0 . 13 add 4p &9p £1 . 30 70p & 60p £11 . 00 add pounds £90 . 00 add ty £ ----- £102 . 43	Column addition £53 . 64 + £48 . 79 ----- 11 1 ----- £102 . 43 -----
Add fractions with same denominator. $\frac{3}{8} + \frac{1}{8} + \frac{5}{8}$; $\frac{1}{5} + \frac{2}{5} + \frac{3}{5}$ Different strategies for representing addition and problem solving in addition. The children use variety of models and images for addition such as Bar Models, Part- whole models, number lines, base 10 and place value counters as demonstrated in White Rose. The children would be shown exchange method for column addition however preferred method would be		Add fractions with same denominator and negative numbers. Different strategies for representing addition and problem solving in addition. The children use variety of models and images for addition such as Bar Models, Part- whole models, number lines, base 10 and place value counters as demonstrated in White Rose. The children would be shown exchange method for column addition however preferred method would be	



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using partition to develop fluency and pace. Whenever the children use column addition we would like them to show their calculation using partition methods to ensure accuracy, pace and progression.

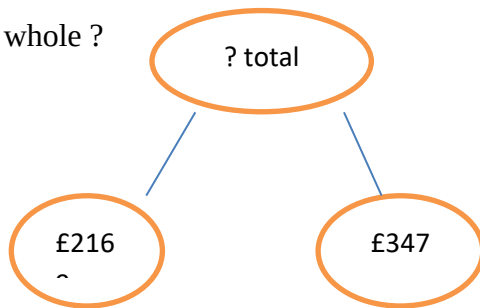
Using bar models when solving addition problems:

There are some marbles in a jar. 35 are red. 28 are green and 37 are blue. How many marbles are there?

? Total/ Whole		
Red	Green	Blue
35	28	37

Using part – whole model to solve addition problem.

Total/ whole ?

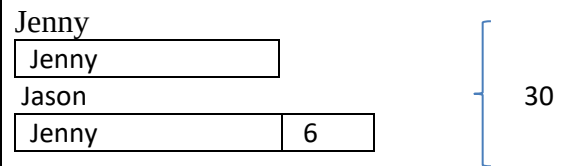


Mila pays £216 for her flight to France and £347 for a week at a hotel. How much did she pay altogether?

using partition to develop fluency and pace. Whenever the children use column addition we would like them to show their calculation using partition methods to ensure accuracy, pace and progression.

Using bar models when solving addition problems:
Refer to year 3 calculations.

Jenny and Jason shared 30 chocolates. Jenny received 6 more than Jason. How much did they each get?



Add it altogether

30		
Jenny 12	Jenny 12	6
24		

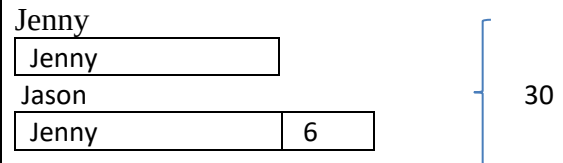
Half of twice Jenny (24)=12

Or

2x Jenny +6=30

Use inverse to solve this problem.

OR



Add it altogether.

2x Jenny +6=30

Use inverse to solve this problem.

Year 5	Year 6				
Guided Practice Related facts -same as year 4 and to increase complexity add tenths, hundredths, thousandths Partition and add 2 or 3 digit numbers $\begin{array}{r} 34 + 53 = 87 \\ 304503 + 10s, + 1s \\ 807 \text{ add} \\ 48 + 76 = 124 \\ 408706 + 10s, + 1s \\ 11014 \text{ add} \end{array}$ $\begin{array}{r} 326 + 453 = 779 \\ 300206 + 400503 \\ 700709 \\ 478 + 859 = 1337 \\ 400708 + 800509 \\ 120012017 \end{array}$ $\begin{array}{r} 3.8 + 5.4 = 9.2 \\ 30.850.4 + 1s, + \frac{1}{10} \\ 81.2 \text{ add} \end{array}$ $\begin{array}{r} 3.76 + 4.53 = 8.29 \\ 30.7640.53 + 1s, + \frac{1}{100} \\ 71.29 \end{array}$ $\frac{3}{4} + \frac{1}{4}, \frac{3}{8} + \frac{5}{8} + \frac{3}{8}, \frac{4}{5} + \frac{3}{5}, 3\frac{2}{5} + 2\frac{2}{5}$ Written calculations Add numbers with more than 4 digits <table border="1"> <tr> <td> Column addition $\begin{array}{r} 23467 \\ + 2358 \\ \hline 20000 \\ 5000 \text{ (3TH+2TH)} \\ 700 \text{ (4H +3H)} \\ 110 \text{ (6ty+5ty)} \\ + 15 \text{ (8 + 7)} \\ \hline 25825 \end{array}$ → </td><td> Column addition $\begin{array}{r} 23467 \\ + 2358 \\ \hline 15 \text{ (8 + 7)} \\ 110 \text{ (6ty+5ty)} \\ 700 \text{ (4H +3H)} \\ 5000 \text{ (3TH+2TH)} \\ 20000 \\ \hline 25825 \end{array}$ ↓ </td></tr> </table>	Column addition $\begin{array}{r} 23467 \\ + 2358 \\ \hline 20000 \\ 5000 \text{ (3TH+2TH)} \\ 700 \text{ (4H +3H)} \\ 110 \text{ (6ty+5ty)} \\ + 15 \text{ (8 + 7)} \\ \hline 25825 \end{array}$ →	Column addition $\begin{array}{r} 23467 \\ + 2358 \\ \hline 15 \text{ (8 + 7)} \\ 110 \text{ (6ty+5ty)} \\ 700 \text{ (4H +3H)} \\ 5000 \text{ (3TH+2TH)} \\ 20000 \\ \hline 25825 \end{array}$ ↓	Guided Practice Related facts same as year 5 Partition and add 2 or 3 digit numbers $\begin{array}{r} 34 + 53 = 87 \\ 304503 + 10s, + 1s \\ 807 \text{ add} \\ 48 + 76 = 124 \\ 408706 + 10s, + 1s \\ 11014 \text{ add} \end{array}$ $\begin{array}{r} 326 + 453 = 779 \\ 300206 + 400503 \\ 700709 \\ 478 + 859 = 1337 \\ 400708 + 800509 \\ 120012017 \end{array}$ $\begin{array}{r} 3.8 + 5.4 = 9.2 \\ 30.850.4 + 1s, + \frac{1}{10} \\ 81.2 \text{ add} \end{array}$ $\begin{array}{r} 3.76 + 4.53 = 8.29 \\ 30.7640.53 + 1s, + \frac{1}{100} \\ 71.29 \end{array}$ $\frac{3}{4} + \frac{1}{4}, \frac{3}{8} + \frac{5}{8} + \frac{3}{8}, \frac{4}{5} + \frac{3}{5}, 3\frac{2}{5} + 2\frac{2}{5}, 4\frac{3}{8} + 3\frac{3}{8}$ Written calculations Add 3,4 and 5 digit numbers as in previous years. Adding several numbers with more than 4 digits with increasing complexity <table border="1"> <tr> <td> Column addition $\begin{array}{r} 42456 \\ 2358 \\ 65467 \\ + 20364 \\ \hline 120000 \\ 9000 \text{ (+thousands)} \\ 1400 \text{ (+ hundreds)} \\ 220 \text{ (+ tens)} \\ + 25 \text{ (+units)} \\ \hline 130645 \end{array}$ → </td><td> Column addition $\begin{array}{r} 42456 \\ 2358 \\ 65467 \\ + 20364 \\ \hline 122 \\ 130645 \end{array}$ ↓ </td></tr> </table>	Column addition $\begin{array}{r} 42456 \\ 2358 \\ 65467 \\ + 20364 \\ \hline 120000 \\ 9000 \text{ (+thousands)} \\ 1400 \text{ (+ hundreds)} \\ 220 \text{ (+ tens)} \\ + 25 \text{ (+units)} \\ \hline 130645 \end{array}$ →	Column addition $\begin{array}{r} 42456 \\ 2358 \\ 65467 \\ + 20364 \\ \hline 122 \\ 130645 \end{array}$ ↓
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23467 + 2358 11 ----- 25825 ----- 8+7 =15 (1ty 5) write ty with ty s 6ty+5ty+1ty=12tysame as 1h2ty, write 1 h with hs then add hs, followed by thousands	43236 + 58787 1111 ----- 102023 -----	Adding more than 2 or 3 decimal numbers with different decimal places 58 . 061 5 . 790 27 . 080 + 2 . 400 ----- 70 . 000 21 . 000 1 . 1 0 . 23 0 . 001 ----- 93 . 331 ----- add tens add units add tenths add 100ths add 1000ths
23467 + 2358 11 ----- 25825 ----- 8+7 =15 (1ty 5) write ty with ty s 6ty+5ty+1ty=12tysame as 1h2ty, write 1 h with hs then add hs, followed by thousands	43236 + 58787 1111 ----- 102023 -----	
53 . 64 +48 . 79 ----- 90 . 00 (5ty +4ty) 11 . 00 (3 + 8)	Column addition (more than 2 values) 58 . 061 5 . 790 27 . 080 + 2 . 400	

1 . 30 (6 tenths + 7 tenths)
0 . 13 (4 hundredths+ 9 hundredths)

102 . 43

53 . 64 + 48 . 79 ----- 0 . 13 (0.04+0.09) 1 . 30 (0.6 +0 .7) 11 . 00 (3+8) 90 . 00 (50+40) ----- 102 . 43 Say 4 hundredth add 9 hundredth and 6tenth add 7 tenth to reinforce place value.	53 . 64 + 48 . 79 ----- 101 . 00 (53+48) 1 . 43 (0.64+0.79) ----- 102 . 43
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Column addition 53 . 64 + 48 . 79 1 1 1 ----- 102 .43 -----	Column addition (more than 2 values) 58 . 06 45 . 79 + 7 . 60 2 1 1 ----- 111 . 45 -----
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Different strategies for representing addition and problem solving in addition. The children use variety of models and images for addition such as Bar Models, Part- whole models, number lines, base 10 and place value counters as demonstrated in White Rose. The children would also use pyramids, magic square and arithmagons and gattegno charts to do addition. The children would be shown exchange method for column addition however preferred method would be using partition to develop fluency and pace. Whenever the children use column addition we would like them to show their calculation using partition methods to ensure accuracy, pace and progression.

Using bar models when solving addition problems:

2 1 2

93 . 331

Adding fractions with different denominators and adding mixed numbers

$3\frac{3}{8} + 4\frac{7}{8}$
 $\frac{3}{5} + \frac{5}{8}$

Different strategies for representing addition and problem solving in addition. The children use variety of models and images for addition such as Bar Models, Part- whole models, number lines, base 10 and place value counters as demonstrated in White Rose. The children would also use pyramids, magic square and arithmagons and gattegno charts to do addition. The children would be shown exchange method for column addition however preferred method would be using partition to develop fluency and pace. Whenever the children use column addition we would like them to show their calculation using partition methods to ensure accuracy, pace and progression.

Using bar models when solving addition problems:
Refer to year 5 calculations.

$C = 4A + 3B$, where $A = 5$ and $B = 7$, what is C ?

C						
A	A	A	A	B	B	B
5	5	5	5	7	7	7

20

21

$C = 41$

Jenny, lily and Jason shared 275 beads. Jenny received 25 beads more than Lily. Jason received 75 beads more than Jenny. How many beads did Lily receive?

Whole 275 beads

Lily	Jenny	Jason	
Lily	Lily+25	Jenny	75
		Lily +25	75



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The three children in year 5 has earned merits for their class. They earned 45 merits, 36 merits and 25 merits. How many merits did they earn altogether?

?	Total/ Whole
45	36 25

In a class favourite fruit survey 40% liked strawberries, 30% liked apples, 1/5 liked grapes and 5 children liked bananas. How many children took part in the survey?

? =50 Total/ Whole/ 100%			
40% Strawberries	30% apples	1/5 grapes	5 bananas
40%	30%	20%	? = 10%=5
20	15	10	5

30 children are going on a trip. It costs £5 including lunch. Some children take their own packed lunch. They pay only £3. The 30 children pay a total of £110. How many children are taking their own packed lunch?

30 children =£ 110	Whole
Trip paid	Lunch paid
£3 x30 = £90	? =£20
	£2 x ?= 10

30 children	
Pack Lunch 20	Lunch paid 10

Or draw separately

Lily

L	50
---	----

Jenny

L	50	25
---	----	----

Jason

L	50	25	75
---	----	----	----

3x Lily+125= 275 Use inverse operations to solve.

Can use instead of Lily.

$$\begin{array}{rcl}
 & 50 & \\
 3 \times \text{Lily} + 125 & = & 275 \\
 \begin{array}{c} \leftarrow 150 \rightarrow \\ 275 - 125 \end{array} & & \\
 150 \div 3 & = & 50
 \end{array}$$

L =50

Jenny= 75

Jason= 150

Subtraction	
Year 1	Year 2
Guided maths Practice Subtraction Grids Counting back in ones, 2s and 10s on 0-99(IWB) /1-100 pupil grids, number lines/ number tracks, fingers or mentally Finding 1less(fewer), 2 less(fewer), 3 less(fewer) and so on from any single digit, 2 digit or 3 digit numbers on grids, number lines, fingers or mentally Subtraction pairs with total up to 10, 20 Practice subtracting with pairs of numbers total up to 10 or 20 Counting on to make 10,20, 30...100 on number lines. Complements to 10 (3→7 use cups or unifix cubes to introduce until they become secure) and use related facts to find complements to 100 (30→70) Practice subtracting multiples of 10s (10,20,30,40) Practice subtracting multiples of 100s (100,200,300,400.....) Related facts : If I know 6cups - 2 Cups = 4 cups I also know 6 0(ty) - 2 0(ty) = 4 0 (ty) 6 00(H) - 2 00(H) = 4 00(H) 6 000(TH)-2 000(TH)= 4 000(TH) H → Hundreds TH → Thousands MMS Read and copy subtraction maths stories	Guided maths Practice Subtraction Grids Counting back in 1s, 2s, 5s, and 10s on 0-99(IWB) /1-100 pupil grids, number lines/ number tracks, using fingers or mentally Finding 1,2,3, 10,100 less(fewer)than from any 2 digit or 3 digit numbers on grids, number lines, fingers or mentally Subtraction pairs with total up to 10, 20,100 Quick Recall of subtraction facts to 10,20 and 100 Subtracting 10, 20, 30100 from given 2 digit and 3 digit numbers Subtracting single digit from 2 digit/ 3digit e.g. 27-6, 132-5 Practice subtracting multiples of 10s (10,20,30,40) e.g. 43 - 20, 56 - 30 Practice subtracting multiples of 100s (100,200,300,400.....) e.g. 341-200, 356-300 Complements to 10 (3→7 use cups or unifix cubes to introduce until they become secure) and use related facts to find complements to 100 (30→70) Related facts : If I know 6cups - 2 Cups = 4 cups I also know 6 0(ty) - 2 0(ty) = 4 0 (ty) 6 00(H) - 2 00(H) = 4 00(H) 6 000(TH)-2 000(TH)= 4 000(TH) H → Hundreds TH → Thousands MMS Subtract 2 digit numbers and 10s e.g. 46-10, 54-40, Subtract 2 digit numbers to single digit using number lines



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5-2=3, 6-2-1=3, 3-½-½=2

And then act out the real stories with pupil cups

5 cups-2 cups=3 cups

With pencils 5 pencils-2 pencils=3 pencils

With 0 (ty) 5 0(ty) - 2 0(ty) = 2 0 (ty)

With 00 (hundred)

5 00(H) - 2 00(H) = 3 00(H)

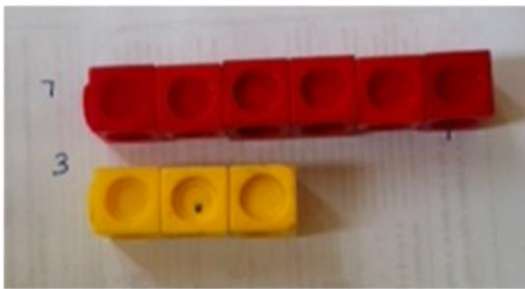
With 000 (Thousand)

5 000(TH)-2 000(TH)= 3 000(TH)

Subtraction by taking away(real life stories about cups, bananas, ladybirds)

Counting on to make 10,20,30..... using number lines

Find the difference between

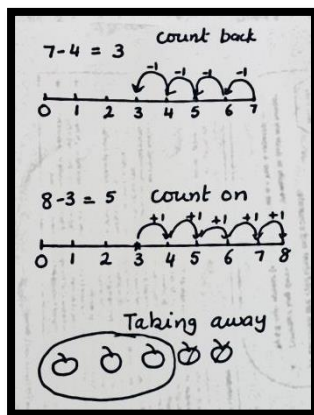


How many/ much more

How many/ much fewer /less

Practice on number lines or on the grid 'how many more to 20, 30, 34, 43 from a given number'

Subtract single digit numbers using different strategies.

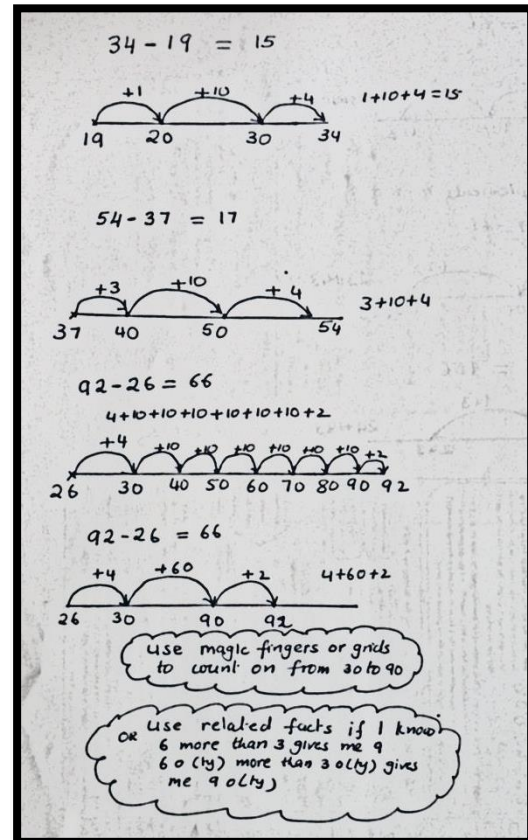


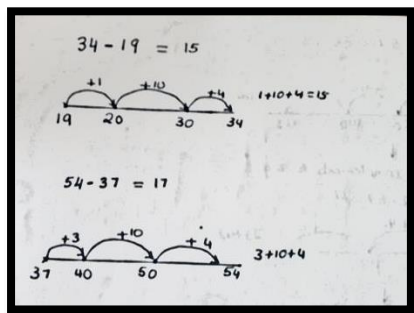
Subtract 2 digit numbers using number lines.

Subtract 3 digit numbers and 10s e.g.1 43-10, 157-10

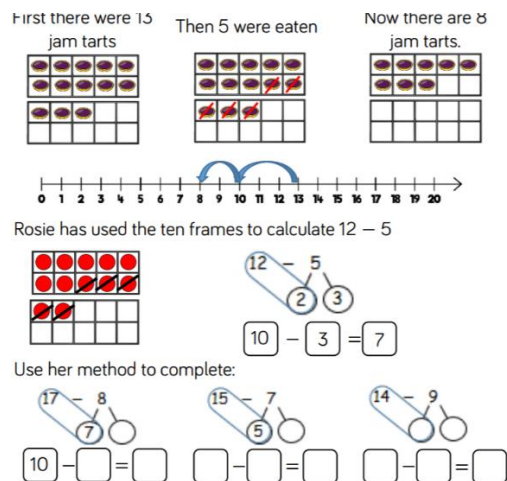
Practice subtraction as in year 1. Use blank number lines

Progression in subtraction calculations (counting on)

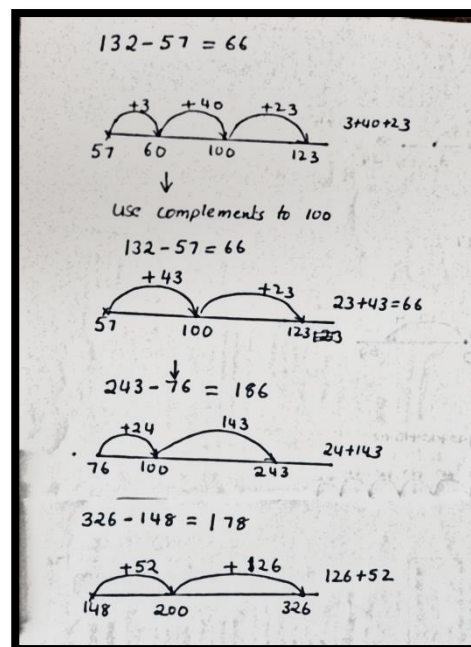




The children would also use visuals and concrete objects to experiment with different strategies. Especially developing mental calculations. Use Bar models for subtraction, partition (part-whole models). The children need to see number representations in different ways. Bar Models, the number lines, other visuals and 10 frames for subtraction strategies. Screen shots from White Rose:



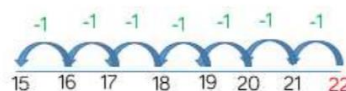
Subtract 2 digit numbers from 3 digit numbers and extend to three digit numbers



The children would also use visuals and concrete objects to experiment with different strategies. Especially developing mental calculations. Use Bar models for subtraction, partition (part-whole models). The children need to see number representations in different ways. Bar Models, the number lines, other visuals and 10 frames for subtraction strategies. Screen shots from White Rose:

Counting back method for subtraction.

$$22 - 7 =$$



Can you put the larger number in your head and count back the smaller number? Start at 22 and count back 7.

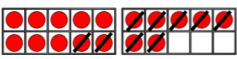
Can we use number bonds to subtract more efficiently?

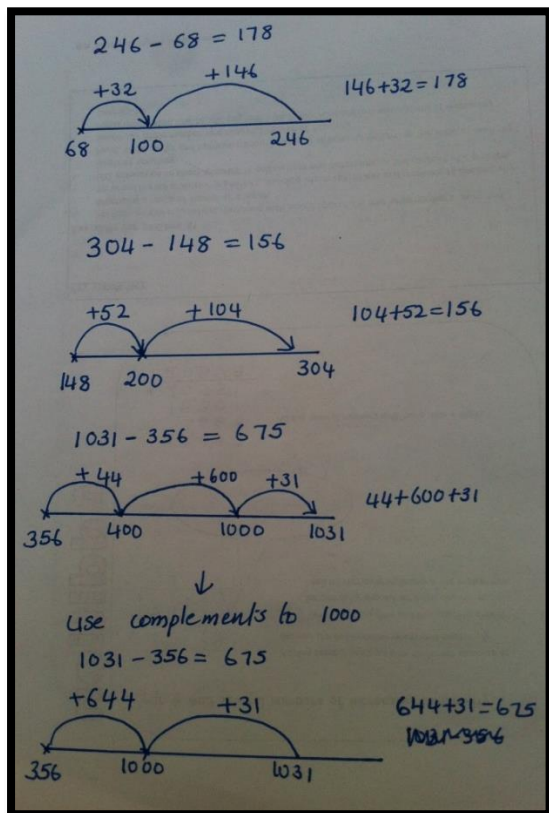


We can partition 7 into 5 and 2 and use this to bridge the 10.

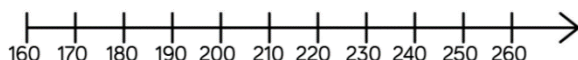


Calculation Policy 2019

Complete the number sentences to describe what happens to the sweets.  First there were ____ sweets. Then ____ sweets were eaten. Now there are ____ sweets. - = There are 12 cars in the car park. 5 of them are blue. How many are red? - = ____ of the cars are red. Adam has 13 playing cards. Oliver has 5 playing cards. How many more cards does Adam have?  - =	
Year 3	Year 4
Guided Maths Practice Complements to 10,100, 1000(G&T), £1 Mentally Subtract 2 digit and 3 digit numbers using number lines(counting on method or using knowledge of complements) MMS For subtraction, counting on method is the preferred method as it enables all children to calculate larger numbers including decimals at the faster pace with no errors.	Guided Maths Practice Complements to 10,100, 1000,£1 Subtract 2 digit and 3 digit numbers using number lines Mentally Subtract 2 digit and 3 digit numbers using number lines(counting on method or using knowledge of complements) MMS For subtraction, counting on method is the preferred method as it enables all children to calculate larger numbers including decimals at the faster pace with no errors.

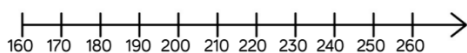


Counting on in 10s and 100s using number lines.



Screen Shots from White Rose:

Count back in tens to solve the calculation $240 - 70$



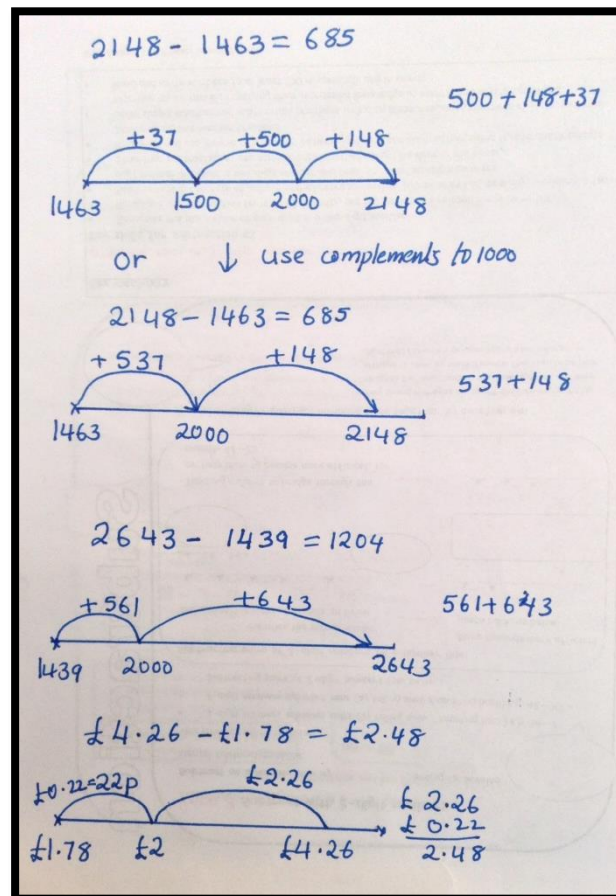
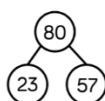
You can solve $425 - 90$ by subtracting 100 and then adding 10

$$\begin{aligned} 425 - 100 &= 325 \\ 325 + 10 &= 335 \end{aligned}$$

Use this method to solve:

$$386 - 90 \qquad 574 - 90 \qquad 212 - 90$$

How can the part-whole model help you solve five hundred and twenty-three subtract eighty?



Screenshot from White Rose:

A shop has 8,435 magazines.
367 are sold in the morning and 579 are sold in the afternoon.

How many magazines are left?

8,435		
367	579	?

There are ____ magazines left.

The blank number lines are used to calculate problems involving time and time temperature.

The children use variety of models and images for subtraction such as Bar Models, Part- whole models,



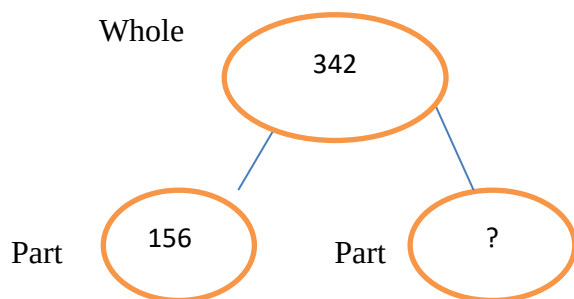
Calculation Policy 2019

Using bar models to solve subtraction problems.

The supermarket had 342 boxes of chocolates. At the end of the day 156 were left. How many were sold?

Whole		342		
Left	Part	Sold	?	Part
156				

Using part whole model:



number lines, base 10 and place value counters as demonstrated in White Rose.

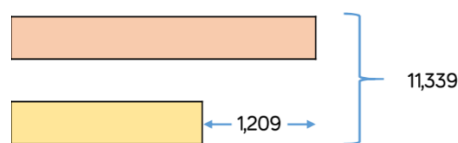
The children would be shown decomposition method for column subtraction however preferred method would be using number lines to develop fluency and pace.

Whenever the children use column subtraction we would like them to show their calculation using number lines to ensure accuracy, pace and progression.

Using bar models when solving subtraction problems: Some screenshots from White Rose for year 5 subtraction and addition demonstrate the importance of using different strategies and images.(Refer to year 3 and 4 calculations.)

Adam is twice as old as Barry.
Charlie is 3 years younger than Barry.
The sum of all their ages is 53.
How old is Barry?

The sum of two numbers is 11,339
The difference between the same two numbers is 1,209
Use the bar model to help you find the numbers.



Year 5

Year 6

Guided Maths Practice

Complements to 10,100, 1000,1,0.1,0.01
Subtract 2 digit and 3 digit numbers using number lines

Mentally Subtract 2 digit, 3 digit, 4 digit numbers including decimals using number lines(counting on method or using knowledge of complements)

Mentally subtract fractions with same denominations

Guided Maths Practice

Complements to 10,100, 1000,1,0.1,0.01
Subtract 2 digit and 3 digit numbers using number lines
Mentally Subtract 2 digit, 3 digit, 4 digit numbers including decimals using number lines(counting on method or using knowledge of complements)

Mentally subtract fractions and mixed numbers

Written Calculations

Written Calculations

For subtraction, counting on method is the preferred method as it enables all children to calculate larger numbers including decimals at the faster pace with no errors.

$736 - 349 = 387$

Diagram showing counting on from 349 to 736:

349 → 400 (+51) → 736 (+336)

$336 + 51 = 387$

↓

$336 + 51$
 $736 - 349 = 387$
 400

51 more to 400, write 51 above 349, 400 below 736, 336 more to 736.

$148 \quad 537$
 $2148 - 1463 = 685$
 2000

$11036 + 5244$
 $21036 - 4756 = 16280$
 10000

$11036 \quad 5244$
 $+ 5244$
 16280

$3.41 \quad 3.11$
 $13.41 - 6.89 = 6.52$
 10

3.41
 3.11
 6.52

$3349.5 \quad 543.1$
 $4349.5 - 456.9 = 3892.6$
 1000

3349.5
 543.1
 3892.6

For subtraction, counting on method is the preferred method as it enables all children to calculate larger numbers including decimals at the faster pace with no errors.

$50699 + 10051$
 $150699 - 89949 = 60750$
 100000

50699
 $+ 10051$
 60750

↓ check using

Compact column method

$149 \quad 1699$
 $- 89949$
 60750

$5.419 + 63.92$
 $105.419 - 36.08 = 69.339$
 100

5.419
 $+ 63.92$
 69.339

↓ check using

compact column method

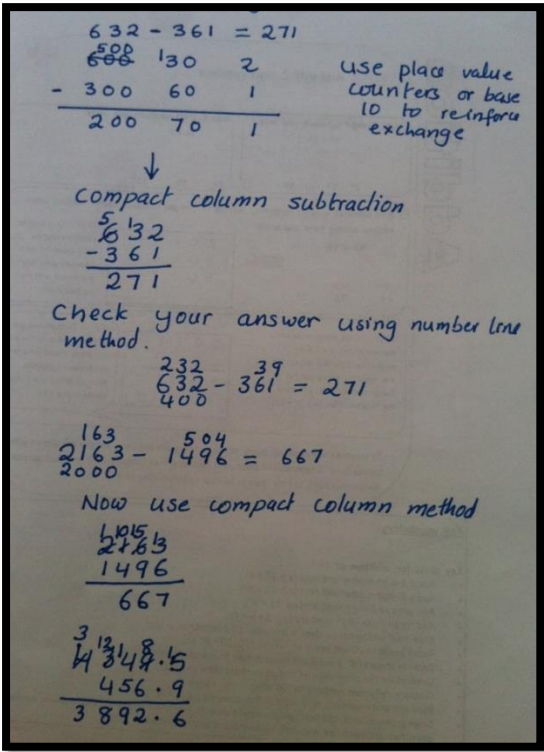
$9 \quad 15 \quad 3419$
 $- 36.080$
 69.339

Subtracting fractions and mixed numbers with different denominators.e.g.

$\frac{3}{4} - \frac{5}{8}$, $3\frac{3}{8} - 1\frac{1}{8}$, $4\frac{5}{8} - 2\frac{3}{8}$



Calculation Policy 2019

Introduce decomposition  The image shows handwritten notes on a piece of paper. At the top, it says '632 - 361 = 271'. Below this, there's a decomposition method: 632 is written as 500 + 130 + 2, and 361 is written as 300 + 60 + 1. A line is drawn under 300 and 60, and the result 200 + 70 + 1 is written below. To the right, it says 'use place value counters or base 10 to reinforce exchange'. Below this, an arrow points down to 'compact column subtraction', which shows the standard subtraction: 632 minus 361 equals 271. Then, it says 'Check your answer using number line method.' and shows a number line from 232 to 361, with the result 271. Finally, it shows another example: 2163 minus 1496 equals 667, and then says 'Now use compact column method' and shows the compact column subtraction for 2163 minus 1496, resulting in 667. At the bottom, there's a decimal subtraction: 4348.5 minus 456.9 equals 3892.6.	
Multiplication	
Year 1	Year2
Guided maths Practice Repeated addition grids e.g. 2+2, 2+2+2, 2+2+2+2, 10+10, 10+10+10, 10+10+10+10... so on 5+5, 5+5+5, 5+5+5+5.....and so on Use repeated addition on number lines Starting from 0 and counting in 1s, 2s, 10s and 5s on 0-99(IWB) /1-100 pupil grids, number lines/ number tracks, fingers or mentally Counting in money -Use tin and drop real coins or pretend ones to count in 2ps, 10ps, 5p, 20p	Guided maths Practice X grids 2, 5 and 10 Repeated addition grids e.g. 2+2, 2+2+2, 2+2+2+2, 3+3+3, 4+4+4+4+4 10+10, 10+10+10, 10+10+10+10... so on 5+5, 5+5+5, 5+5+5+5.....and so on Use repeated addition on number lines. Use arrays. Teach them to understand commutative law of multiplication.

Chn close their eyes and count in hearing the number of taps on the table or number of coins in the tin and link it to e.g. 2p times 4 equals 8p

Try different objects/ parts of body – 1 nose x 5 children, 2 eyes x 10 children, 2 hands x 4 children, 10 fingers x 3 children

Doubling single digit numbers, doubling multiples of 10, partitioning and doubling

Related facts :

If I know $2 \text{ cups} \times 3 = 6 \text{ cups}$

I also know $2 \text{ pencils} \times 3 = 6 \text{ pencils}$

$20(\text{ty}) \times 3 = 60(\text{ty})$

$200(\text{H}) \times 3 = 600(\text{H})$

$2000(\text{TH}) \times 3 = 6000(\text{TH})$

H → Hundreds TH → Thousands

MMS

Copy multiplication maths stories with 1 digit whole numbers e.g. $2 \times 4 = 8$

Act the real stories using X maths stories with 1 digit whole numbers

Look at the maths stories read what it says

$2 \times 4 = 8$ (2 times 4 equals 8)

And read what it means

$2 \text{ cups} \times 4 = 8 \text{ cups}$ (2 cups times 4 equals 8 cups)

Screenshots from White Rose:

Starting from 0 and counting in 1s, 2s, 10s and 5s on 0-99(IWB) / 1-100 pupil grids, number lines/ number tracks, fingers or mentally

Counting in money - Use tin and drop real coins or pretend ones to count in 2ps, 10ps, 5p, 20p, 50p

Chn close their eyes and count in hearing the number of taps on the table or number of coins in the tin and link it to e.g. 2p times 4 equals 8p

Try different objects/ parts of body – 1 nose x 5 children, 2 eyes x 10 children, 10 fingers x 3 children

Doubling single digit numbers, doubling multiples of 10, partitioning and doubling

Related facts :

If I know $3 \text{ cups} \times 4 = 12 \text{ cups}$

I also know $3 \text{ pencils} \times 4 = 12 \text{ pencils}$

$30(\text{ty}) \times 4 = 120(\text{ty})$

$300(\text{H}) \times 4 = 1200(\text{H})$

$3000(\text{TH}) \times 4 = 12000(\text{TH})$

$3 \text{ tenths} \times 4 = 12 \text{ tenths}$

H → Hundreds TH → Thousands

MMS

Multiplication maths stories and real life stories as in year 1

Copy and calculate multiplication maths stories with 1 digit whole numbers including 0, $\frac{1}{2}$ and $\frac{1}{4}$

e.g. 5×7 , 4×10 , 3×0 , $\frac{1}{2} \times 4$, $\frac{1}{4} \times 3$

$2 \times 4 = 8$

x	4
2	8

X grids 2, 5 and 10 (3, 4, 6, G&T)

Embellished real life stories involving multiplication

Screenshots from White Rose:

Refer to year 1

Use arrays



Calculation Policy 2019

How many wheels altogether?



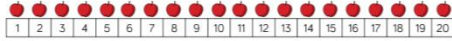
$$2 + 2 + 2 + 2 + 2 =$$

How many fingers altogether?



$$5 + 5 + 5 =$$

How many apples are there? Complete the sentences.



$$5 + 5 + 5 + 5 =$$

There are ___ apples.

There are ___ groups of ___ apples which is equal to ___

How many fish are there?

Complete the sentences.



Can you show this using ten frames?

$$+ + =$$

There are ___ fish.

Build an array with counters to represent the apples.
Complete the sentences.

There are ___ apples in each row.

There are ___ rows.

$$+ + =$$

There are ___ apples altogether.



Complete the table.

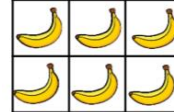
Array	Description - columns	Description - rows	Totals
	5 columns 2 cookies in each column	2 rows 5 cookies in each row	$2 + 2 + 2 + 2 + 2 = 10$ $5 + 5 = 10$
	___ columns ___ donuts in each column	___ rows ___ donuts in each row	
	___ columns ___ fish in each column	___ rows ___ fish in each row	
	3 columns 5 cupcakes in each column	5 rows 3 cupcakes in each row	

On the image, find 2×5 and 5×2

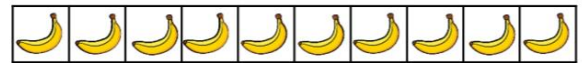


Can you represent this array using another object?

Complete the number sentences to describe the arrays.



$$2 \times 3 \quad \text{and} \quad \times$$



$$\times \quad \text{and} \quad \times$$

Draw an array to show:

$$3 \times 5 = 5 \times 3$$

$$2 \text{ lots of } 10 = 10 \text{ lots of } 2$$

Year 3

Year 4

Guided Maths Practice

X grids

Multiplying 2 digit by 1 digit

32	x 4	27	x 6
30	2 partition	20	7 (partition)
X4	x 4 x by 4	x6	x 6 x by 6
120	8 add	120	42 add
128		162	

Related facts:

If I know 4cups x 6 = 24 cups

I also know 4 pencils x6=24pencils

4 0(ty) x 6 = 24 0 (ty)

4 00(H) x 6 = 24 00(H)

4 000(TH)x6 =24 000(TH)

H → Hundreds TH → Thousands

4m x6=24m (measures)

4 fifths x 6= 24 fifths (fractions)

24÷6=4, 240÷6=40 (inverse)

MMS

Write and calculate x maths stories including negative numbers, fractions with same denominations e.g. fifths, sevenths and mixed numbers

$\frac{1}{2}$ x4, $1\frac{1}{2}$ x2, -2x4

X 2digit numbers with single digit

2x4=8	34x6=204													
<table><tbody><tr><td>x</td><td>4</td></tr><tr><td>2</td><td>8</td></tr></tbody></table>	x	4	2	8	<table><tbody><tr><td>x</td><td>30</td><td>4</td></tr><tr><td></td><td>180</td><td>24</td></tr><tr><td>6</td><td></td><td></td></tr></tbody></table>	x	30	4		180	24	6		
x	4													
2	8													
x	30	4												
	180	24												
6														
	180 + 24 204													

Multiply money (G&T)

£2.24 x4= £8.96

£2x4 24px4

£8 96p

Guided Maths Practice

X grids 10x10 12x12

Multiplying 2 digit by 1 digit

34	x 6
30	4 partition
x6	x 6 x by 6
180	24 add
204	

Related facts:

If I know 8cups x 6 = 48 cups

I also know 8 pencils x6=48pencils

8 0(ty) x 6 =48 0 (ty)

8 00(H) x 6 = 48 00(H)

8 000(TH)x6 =48 000(TH)

H → Hundreds TH → Thousands

8m x6=48m (measures)

8 fifths x 6= 48 fifths (fractions)

8 tenthsx6=48 tenths=48/10=4.8 (svda)

-8 x 6= -48

48÷6=8, 480÷6=80, 48 tenths÷6=8 (inverse)

Svda means same value different appearance

MMS

Write and calculate x maths stories including negative numbers, fractions with same denominations e.g. fifths, sevenths and mixed numbers

$\frac{3}{4}$ x4, $1\frac{1}{2}$ x2, -2x4

Progression in multiplication

X 2digit numbers and 3 digit numbers with single digit

34x6=204	148x7= 1036																						
<table><tbody><tr><td>x</td><td>30</td><td>4</td></tr><tr><td>6</td><td>180</td><td>24</td></tr></tbody></table>	x	30	4	6	180	24	<table><tbody><tr><td>x</td><td>10</td><td>40</td><td>8</td></tr><tr><td></td><td>0</td><td></td><td></td></tr><tr><td>7</td><td>70</td><td>28</td><td>56</td></tr><tr><td></td><td>0</td><td>0</td><td></td></tr></tbody></table>	x	10	40	8		0			7	70	28	56		0	0	
x	30	4																					
6	180	24																					
x	10	40	8																				
	0																						
7	70	28	56																				
	0	0																					
180 + 24 204	700 280 + 56 1036																						

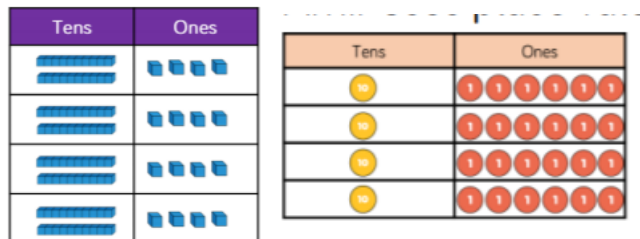
Use grid to multiply 2digit by 2 digit numbers



Calculation Policy 2019

The children use variety of models and images for representing multiplication such as arrays(refer to year1&2), bar models, number lines, base 10 and place value counters as demonstrated in White Rose. The children would be use partitioning method and grid to calculate multiplication.

Screenshots from White Rose:



Base 10 used to calculate 24×4 and 16×4 calculated by using place value counters.

The screenshots from White Rose images relate to MMS model for multiplication. The children in year 3 and 4 would be using grids to calculate multiplication.

x	20	4
4	80	16

$$\begin{array}{r} 80 \\ + 16 \\ \hline 96 \end{array}$$

Problem solving using multiplication

The children would use variety of models and images including bar models and double number lines.

Ben is planting seeds in pots. He had 6 pots. He planted 3 seeds in each pot. How many seeds did he plant?

18					
3	3	3	3	3	3

For multiplication problem solving the children would use mostly MMS to acquire through knowledge of the Basic Real life Stories and Maths Stories (The associated number sentences). The bar models and double number lines are used to develop understanding of the problem.

$$23 \times 12 = 204$$

x	20	3
10	200	30
2	40	6

$$\begin{array}{r} 240 \\ + 36 \\ \hline 276 \end{array}$$

$$45 \times 23 =$$

x	40	5
20	800	100
3	120	15

$$\begin{array}{r} 920 \\ + 115 \\ \hline 1035 \end{array}$$

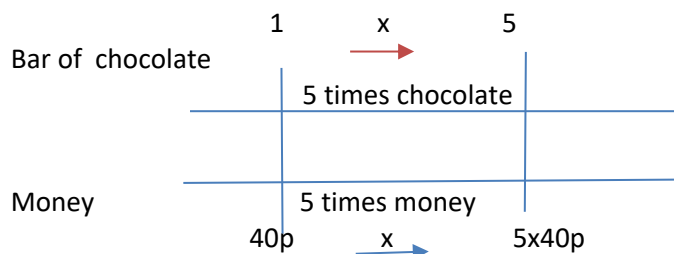
Multiply money

$\pounds 2.24 \times 4 = \pounds 8.96$	Multiply money (G&T)
$\pounds 2 \times 4 = 24p \times 4$	$\pounds 4.53 \times 5 = \pounds 21.12$
$\pounds 8 \times 4 = 32p$	$\pounds 4 \times 5 = 20p \times 4$
	$\pounds 20 \times 5 = 100p = \pounds 1.00$

The children would use variety of models and images to develop an understanding of multiplication. For multiplicative reasoning and problem solving the children would use MMS to acquire through knowledge of the Basic Real life Stories and Maths Stories (The associated number sentences). Also bar models and double number lines are used to develop an understanding of problems and to enable them to break down the multi -step problems. (Also refer to year 3)

One bar of chocolate costs 40p. How much would Simona pay to buy 5 bars?

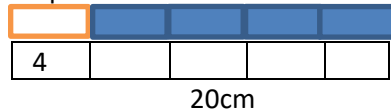
Problem solving using double number lines:




Yellow strip of a paper



Blue strip of paper is 4 times as long as the yellow strip of a paper. The both strips are joined together and their total length is 20cm. How long is the blue strip?



Problem solving using bar model:

Whole unknown ?

Whole ?				
40p	40p	40p	40p	40p

$$5 \times 40p = 200p = £2.00$$



Year 5

Guided Maths Practice

X grids

Related facts

If I know $7 \times 6 = 42$

I also know 70×6 , 70×60 , 700×6 , 0.7×6 , 0.7×0.6 , 0.07×6 , 0.07×0.6 , 70×0.6 , 600×0.7 , 7 fifths $\times$ 6 fifths, $42 \div 0.6$, $42 \div 60$, $4.2 \div 0.7$, 42 eighths $\div$ 6, 42 ninths $\div$ 6 ninths

....

so on

Multiply 2digit, 3digit and decimal by 1 digit

34×6	$\rightarrow$	248×6
30 4 partition		200 40 8 Partition
$\times 6$ $\times 6$ $\times$ by 6		$\times 6$ $\times 6$ $\times 6$ $\times$ by 6
180 24 add		1200 240 48 add
204		1488

4.8×7	48×0.6
4 0.8 partition	40 8
$\times 7$ $\times 7$ $\times$ by 7	$\times 0.6$ $\times 0.6$
28 5.6 add	24 4.8
33.6	28.8

Written calculations

Write and calculate x maths stories including negative numbers, fractions with same denominations e.g. fifths, sevenths and mixed numbers

$\frac{3}{5} \times 6$, $1\frac{3}{5} \times 2$, -2×4

Year 6

Guided maths Practice

X grids

Related facts

Related facts

If I know $7 \times 6 = 42$

I also know 70×6 , 70×60 , 700×6 , 0.7×6 , 0.7×0.6 , 0.07×6 , 0.07×0.6 , 70×0.6 , 600×0.7 , 7 fifths $\times$ 6 fifths, $42 \div 0.6$, $42 \div 60$, $4.2 \div 0.7$, 42 eighths $\div$ 6, 42 ninths $\div$ 6 ninths

.....and so on

34×6	$\rightarrow$	248×6
30 4 partition		200 40 8 Partition
$\times 6$ $\times 6$ $\times$ by 6		$\times 6$ $\times 6$ $\times 6$ $\times$ by 6
180 24 add		1200 240 48 add
204		1488

4.8×7	4.79×8	4.8×0.6
4 0.8 partition	4 0.7 0.09	4 0.8
$\times 7$ $\times 7$ $\times$ by 7	$\times 8$ $\times 8$ $\times 8$	$\times 0.6$ $\times 0.6$
28 5.6 add	32 5.6 0.72	2.4 0.48
33.6	38.32	2.88

Written calculations

Long multiplication as in year 5 and introduce short multiplication and standard written method.

$$\begin{array}{r} 2456 \\ \times 4 \\ \hline 1224 \\ \hline 9824 \end{array}$$



Calculation Policy 2019

Progression in multiplication
X 3digit numbers by 2 digit numbers

534x16=8544				368 x 4	
x	500	30	4	368	
10	5000	300	40	X 4	
6	3000	180	24	-----	
	8000	480	64	1200	300x4
	8000			240	60x4
+	480			32	8x4
	64			-----	
				1472	
	8544				

Multiply 2digit by 2 digit numbers

36		36 x 24	
X 24		20 4 (partition)	
-----		36	
600	30x20	X 24	
120	30x4	-----	
120	6x20	720	36x20
24	6x4	144	36x4
-----		-----	
864		864	

Multiply 3 digit and 4 digit numbers by single digit and 2 digit numbers

468		2314	
X 34		X 25	
-----		-----	
14040	468x30	46280	2314x20
1872	468x4	11570	2314x5
-----		-----	
15912		57850	

Multiply decimal numbers

Multiply money £4.53		4.39 X 8 -----	
-------------------------	--	----------------------	--

2456 X 4 -----		2456 X 4 -----	
24	(4x6)		
200	(4x50)		
1600	(4x400)		
8000	(4x2000)		

9824			9824

Multiply decimals

4.39 X 8 -----		4.39 X 8 -----	
32.00	8x4	32.00	8x4
2.4	8x0.3	3.12	
0.72	8x0.09	8x0.39	
-----		-----	
34.00	or 35.12 if chn	35.12	
1.12	are secure in	Use related facts if I	
-----	adding decimals	know 8x39 I also	
35.12		know 8x0.39	

4.39 X 8 -----		12.78 X 0.7 -----	
35.12		8.4	12x0.7
		0.546	0.78x0.7

		8.946	
		Use related facts	
		Discuss does x two	
		numbers always gives	
		larger answers.	

Multiply fractions $\frac{3}{4} \times \frac{2}{5}$, $3\frac{3}{4} \times 3$, $4\frac{2}{5} \times \frac{3}{5}$

X 6	32.00	8x4
-----	2.4	8x0.3
£24.00 6x£4	0.72	8x0.09
£ 3.00 6x0.5 (50p)	-----	
£ 0.18 6x0.03 (3p)	34.00 or 35.12 if chn	
-----	1.12 are secure in	
£27.18	----- adding decimals	
	35.12	

The children would use variety of models and images to conceptualise context of problems. Double number lines and bar modelling enables pupils to draw and visualise mathematical concepts to solve problems. (Refer to years 3, 4 and 5)

A runner is training to participate in the London Marathon. She calculated that she runs 12 laps for every hour on the training track. Knowing that today she is going to train for three hours, calculate the total number of laps the runner will run at the track.

Multiply fractions $\frac{3}{5} \times \frac{2}{5}$, $\frac{3}{8} \times \frac{3}{5}$, $4\frac{3}{4} \times 3$

The children would use variety of models and images to conceptualise context of problems. Double number lines and bar modelling enables pupils to draw and visualise mathematical concepts to solve problems. (Also refer to years 3, 4 and 6)

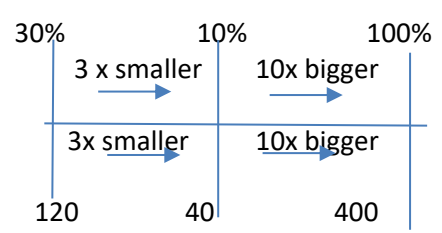
Whole ?		
1 hour	1hour	1hour
12 laps	12laps	12 laps

Screenshots from White Rose:
Base 10 used to calculate 44x32

x	40	4
30	1,200	120
2	80	8

$12 \times 3 = 36$ laps

30% of my number is 120. What is my number?



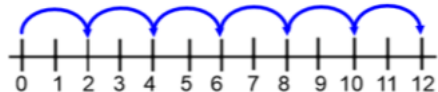
Compare using place value counters and a grid to calculate:

45 x 42 52 x 24 34 x 43



Calculation Policy 2019

DIVISION												
Year1	Year 2											
Guided maths Practice Making piles (groups/ sets) of 2,3,1,5,10 Start from multiples of 1,2,5and 10 and count back in 1s,2s,5s,10s on 0-99(IWB) /1-100 pupil grids, number lines/ number tracks, fingers or mentally For example start from 10 and counting back in 1s,2s,10s and 5s represent counting back on number lines and write corresponding division sentence Chn close their eyes and count back hearing the number of taps on the table and write corresponding division sentence Share pencils, sweets and other real life objects and wrote division stories Share money e.g. 10p (5 coins of2p) among 5 children, 60p (6 coins of 10p) write repeated subtraction sentence 10p-2p-2p-2p-2p-2p corresponding to the sharing Write repeated subtraction grids e.g. 10-2-2-2-2-2 40-10-10-10-10 25-5-5-5-5-5.....and so on for chn to complete Use repeated subtraction on number lines Halving 2,4,6,10 and use related facts to find halves of 20,40,60,80,100. Find halves of multiples of 2 and 10 by partitioning and halving Related facts : If I know 8cups ÷ 2 = 4 cups I also know 8 pencils ÷ 2 = 4pencils 8pence ÷ 2= 4pence 8 0(ty) ÷ 2 = 4 0 (ty)	Guided maths Practice Making piles (groups/ sets) of 2,3,1,5,10 Start from multiples of 1,2,5and 10 and count back in 1s,2s,5s,10s on 0-99(IWB) /1-100 pupil grids, number lines/ number tracks, fingers or mentally For example start from 10 and counting back in 1s,2s,10s and 5s represent counting back on number lines and write corresponding division sentence Chn close their eyes and count back hearing the number of taps on the table and write corresponding division sentence Share pencils, sweets and other real life objects and wrote division stories Share money e.g. 10p (5 coins of2p) among 5 children, 60p (6 coins of 10p) write repeated subtraction sentence 10p-2p-2p-2p-2p-2p corresponding to the sharing Write repeated subtraction grids e.g. 10-2-2-2-2-2 40-10-10-10-10 25-5-5-5-5-5.....and so on for chn to complete Use repeated subtraction on number lines Halving 2,4,6,10 and use related facts to find halves of 20,40,60,80,100. Find halves of multiples of 2 and 10 by partitioning and halving <table><tr><td>46→23</td><td>78→39</td></tr><tr><td>40 6 partition</td><td>70 8 partition</td></tr><tr><td>20 3 halve</td><td>35 4 halve</td></tr><tr><td>23 add</td><td>39 add</td></tr></table> Extend to 3 digit e.g. 112→56 <table><tr><td>100 12 Partition</td></tr><tr><td>50 6 halve</td></tr><tr><td>56 add</td></tr></table>	46→23	78→39	40 6 partition	70 8 partition	20 3 halve	35 4 halve	23 add	39 add	100 12 Partition	50 6 halve	56 add
46→23	78→39											
40 6 partition	70 8 partition											
20 3 halve	35 4 halve											
23 add	39 add											
100 12 Partition												
50 6 halve												
56 add												

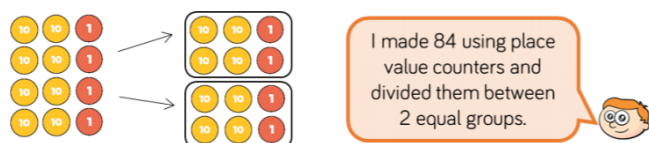
8 00(H) ÷ 2 = 4 00(H) 8 000(TH) ÷ 2 =4 000(TH) H → Hundreds TH → Thousands MMS Grouping and Sharing (Type1 and Type 2 division stories) Copy written maths stories with 1 digit whole numbers. e.g. 6 ÷ 3 = 2 Act out the real life stories with cups 6 cups÷ 3 cups= 2 (2 piles) How many piles? ↳ piles of 3 cups (grouping) 6 cups ÷ 3 = 2 cups (How much is there here) ↳ making 3 piles (Sharing) 1 cup÷ ½ cup= 2 (How many piles) ↳making piles of ½ cups The teachers would use variety of models and images to conceptualise learning. The number lines, making piles of and sharing in to equal piles would be demonstrated to the children. There are 12 cups. How many equal piles of two cups can be made? 	Related facts : If I know 8cups ÷ 2 = 4 cups I also know 8 pencils ÷ 2 = 4pencils 8pence ÷ 2= 4pence 8 0(ty) ÷ 2 = 4 0 (ty) 8 00(H) ÷ 2 = 4 00(H) 8 000(TH) ÷ 2 =4 000(TH) H → Hundreds TH → Thousands MMS Grouping and Sharing (Type1 and Type 2 division stories) Copy written maths stories with 1 digit whole numbers. e.g. 12 ÷ 4 = 3 , 24÷ 4=6 Act out the real life stories with cups 24 cups÷ 4 cups= 6 (6 piles) How many piles? ↳ piles of 4 cups (grouping) 24 cups ÷ 4 = 6 cups (How much is there here) ↳ making 4 piles (Sharing) 1 cup÷ ¼ cup= 4 (How many piles) ↳making piles of ¼ cups <table border="1"><tr><td>÷</td><td>24</td></tr><tr><td>4</td><td>6</td></tr></table> The teachers would use variety of models and images to conceptualise learning. The number lines, making piles of and sharing in to equal piles would be demonstrated to the children. There are 30 cups. How many equal piles of 10 cups can be made? <table border="1"><tr><td colspan="3">30 cups</td></tr><tr><td>Pile of 10 cups</td><td>Pile of 10 cups</td><td>Pile of 10 cups</td></tr></table>	÷	24	4	6	30 cups			Pile of 10 cups	Pile of 10 cups	Pile of 10 cups
÷	24										
4	6										
30 cups											
Pile of 10 cups	Pile of 10 cups	Pile of 10 cups									
Year 3 Guided Maths Practice ÷ grids Related facts If I know 12÷4=3 I also know 120÷3=40, 1200÷3=400, 12÷3=4,120÷3 12 fifths÷4=3fifths, 12 fifths÷6fifths=7, 12 eighths÷ 6, 12ninths÷4 ninths related inverse facts 30x4, 300x4, 3fifthsx 4, 3mx4... so on	Year 4 Guided Maths Practice ÷ grids Related facts If I know 12÷4=3 I also know 120÷3=40, 1200÷3=400, 12÷3=4,120÷3 12 fifths÷4=3fifths, 12 fifths÷6fifths=7, 12 eighths÷ 6, 12ninths÷4 ninths related inverse facts 30x4, 300x4, 3fifthsx 4, 3mx4... so on										



Calculation Policy 2019

Divide 2digit, 3digit by 1 digit $\begin{array}{r} 36 \div 3 \rightarrow 48 \div 3 \\ 30 \quad 6 \text{ partition} \quad 30 \quad 18 \text{ Partition for purpose} \\ \div 3 \quad \div 3 \div \quad \div \text{ by } 3 \quad \div 3 \quad \div 3 \quad \div \text{ by } 3 \\ 10 \quad 2 \text{ add} \quad 10 \quad 6 \text{ add} \\ 12 \quad 16 \end{array}$ $\begin{array}{r} 92 \div 4 \rightarrow 92 \div 4 \\ 40 \quad 40 \quad 12 \text{ (partition for purpose)} \quad 80 \quad 12 \\ \div 4 \quad \div 4 \quad \div 4 \quad \div \text{ by } 4 \quad \div 4 \quad \div 4 \\ 10 \quad 10 \quad 3 \text{ add} \quad 20 \quad 3 \\ 23 \quad 23 \end{array}$ $\begin{array}{r} 132 \div 6 \text{ (G\&T)} \quad 94 \div 4 \text{ (G\&T)} \\ 120 \quad 12 \text{ (partition for purpose)} \quad 80 \quad 14 \\ \div 6 \quad \div 6 \quad \div \text{ by } 6 \quad \div 4 \quad \div 4 \\ 20 \quad 2 \text{ add} \quad 20 \quad 3 \text{ remainder } 2 \\ 22 \quad 23 \text{ r } 2 \end{array}$ MMS Write and calculate $\div$ maths stories including mixed numbers and fractions e.g. $1\frac{1}{2} \div 2$, $1\frac{1}{2} \div \frac{3}{4}$ Grouping and Sharing (Type1 and Type 2 division stories) Copy written maths stories with 1 digit whole numbers. e.g. $15 \div 3 = 5$ Act out the real life stories with cups $15 \text{ cups} \div 3 \text{ cups} = 5$ (5 piles) How many piles? $\searrow$ piles of 3 cups (grouping) $15 \text{ cups} \div 3 = 5 \text{ cups}$ (How much is there here) $\searrow$ making 3 piles (Sharing) Use fair swaps to calculate mixed numbers and fractions division stories $1\frac{1}{2} \text{ cup} \div \frac{1}{2} \text{ cup} = 2$ (How many piles) $\searrow$ making piles of $\frac{1}{2}$ cups Screenshots from White Rose:	Divide 2digit, 3digit by 1 digit $\begin{array}{r} 36 \div 3 \rightarrow 48 \div 3 \\ 30 \quad 6 \text{ partition} \quad 30 \quad 18 \text{ Partition for purpose} \\ \div 3 \quad \div 3 \div \quad \div \text{ by } 3 \quad \div 3 \quad \div 3 \quad \div \text{ by } 3 \\ 10 \quad 2 \text{ add} \quad 10 \quad 6 \text{ add} \\ 12 \quad 16 \end{array}$ $\begin{array}{r} 92 \div 4 \rightarrow 94 \div 4 \\ 80 \quad 12 \text{ (partition for purpose)} \quad 80 \quad 12 \quad 2 \\ \div 4 \quad \div 4 \quad \div 4 \quad \div \text{ by } 4 \quad \div 4 \quad \div 4 \quad \div 4 \\ 10 \quad 10 \quad 3 \text{ add} \quad 20 \quad 3 \quad 2/4 \text{ (svda)} \\ 23 \quad 23 \end{array}$ $\begin{array}{r} 132 \div 6 \quad 733 \div 8 \\ 120 \quad 12 \text{ (partition for purpose)} \quad 720 \quad 8 \quad 5 \\ \div 6 \quad \div 6 \quad \div \text{ by } 6 \quad \div 8 \quad \div 8 \quad \div 8 \quad (5 \div 8 = \frac{5}{8}) \\ 20 \quad 2 \text{ add} \quad 90 \quad 1 \text{ r } 5 \text{ or } (\frac{5}{8}) \\ 22 \quad 91\frac{5}{8} \end{array}$ 3digit numbers by single digit and extend to 3digit by 11 and 12 (see guidance for year 5) MMS Write and calculate $\div$ maths stories (type1 and type 2) including mixed numbers and fractions as in year 3 Use partition for purpose to divide 3 digit numbers by single digit e.g. $536 \div 4$, $846 \div 9$ Write remainders as fractions e.g. $753 \div 6 = 125 \text{ r } 3 = 125 \frac{3}{6} = 125 \frac{1}{2}$ Introduce long division(chunking). Children use both methods until they become secure. $\begin{array}{r} 846 \div 9 \rightarrow 846 \div 9 = 94 \\ 810 \quad 36 \quad \text{Making piles/ groups of } 9 \\ \div 9 \quad \div 9 \quad 846 \\ 90 \quad 4 \quad - 810 \quad 9 \times 90 \text{ (90 groups/piles of 9)} \\ 94 \quad \text{-----} \\ \quad 36 \quad 9 \times 4 \text{ (4 groups/piles of 9)} \\ \quad - 36 \quad \text{-----} \\ \quad \quad 0 \quad 90 + 4 = 94 \text{ piles of } 9 \end{array}$
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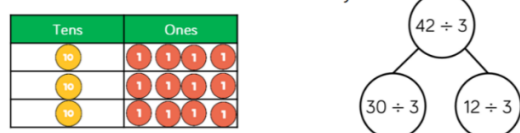
Ron uses place value counters to solve $84 \div 2$



Eva uses a place value grid and part-whole model to solve $66 \div 3$



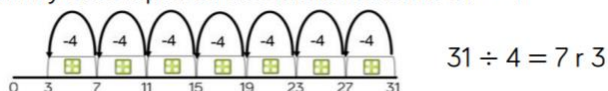
Annie uses a similar method to divide 42 by 3



Use Annie's method to calculate:

$$96 \div 8 \quad 96 \div 4 \quad 96 \div 3 \quad 96 \div 6$$

Tommy uses repeated subtraction to solve $31 \div 4$



Use Tommy's method to solve 38 divided by 3

The children would use variety of models and images to conceptualise context of problems. The bar modelling enables pupils to draw and visualise mathematical concepts to solve problems.
(Refer to years 4 and 5)

The children would use variety of models and images to conceptualise context of problems. The bar modelling enables pupils to draw and visualise mathematical concepts to solve problems.
(Refer to years 3 and 5)

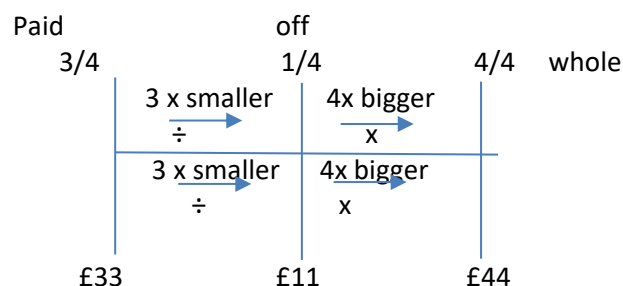
A computer game is £33 in the sale. This is one quarter off its original price. How much did it cost before the sale?

Problem solved using bar model:

Whole £33			
Off 1/4	Paid 3/4		
£11	£11	£11	£11

Total price =£44

Problem solving using double number lines:



Year 5

Guided Maths Practice

÷ grids

Related facts

If I know $42 \div 6 = 7$

I also know $420 \div 6 = 70$, $4200 \div 6 = 700$, $42\,000 \div 6 = 7000$,
 $4.2 \div 6 = 0.7$,
 $4.2 \div 0.6 = 0.7$, $42 \text{ fifths} \div 6 = 7 \text{ fifths}$, $42 \text{ fifths} \div 6 \text{ fifths} = 7$, $42 \text{ eighths} \div 6$, $42 \text{ ninths} \div 6 \text{ ninths} \dots$

Year 6

Guided Maths Practice

÷ grids

Related facts

If I know $42 \div 6 = 7$

I also know $420 \div 6 = 70$, $42\,00 \div 6 = 700$, $42\,000 \div 6 = 7000$,
 $4.2 \div 6 = 0.7$, $42 \div 7$, $420 \div 7$,
 $4.2 \div 0.6 = 0.7$, $42 \text{ fifths} \div 6 = 7 \text{ fifths}$, $42 \text{ fifths} \div 6 \text{ fifths} = 7$, $42 \text{ eighths} \div 6$, $42 \text{ ninths} \div 6 \text{ ninths} \dots$



Calculation Policy 2019

related inverse facts 70x6, 700x6.0.7x6, 0.06x7 0.07x0.6, 70x0.6, 600x0.7, 42÷60, 4.2÷0.7, 6eighthsx7, 7 ninths x 6 so on Divide 2digit, 3digit and decimal by 1 digit $\begin{array}{r} 92 \div 4 \quad \rightarrow \quad 94 \div 4 \\ 80 \quad 12 \text{ (partition for purpose)} \quad 80 \quad 12 \quad 2 \\ \div 4 \quad \div 4 \quad \div \text{ by } 4 \quad \div 4 \quad \div 4 \quad \div 4 \\ 10 \quad 3 \quad \text{add} \quad 20 \quad 3 \quad 2/4 \text{ (svda)} \\ 23 \quad \quad \quad 23 \end{array}$ $\begin{array}{r} 132 \div 6 \quad \quad \quad 733 \div 8 \\ 120 \quad 12 \text{ (partition for purpose)} \quad 720 \quad 8 \quad 5 \\ \div 6 \quad \div 6 \quad \div \text{ by } 6 \quad \div 8 \quad \div 8 \quad \div 8 \quad (5 \div 8 = 5/8) \\ 20 \quad 2 \quad \text{add} \quad 90 \quad 1 \text{ r } 5 \text{ or } (5/8) \\ 22 \quad \quad \quad 91\% \end{array}$ $\begin{array}{r} 473 \div 11 \quad 504 \div 12 \quad 73.6 \div 8 \\ 440 \quad 33 \quad 480 \quad 24 \quad 72 \quad 1.6 \\ \div 11 \quad \div 11 \quad \div 12 \quad \div 12 \quad \div 8 \quad \div 8 \\ 40 \quad 3 \quad 40 \quad 2 \quad 9 \quad 0.2 \\ 43 \quad \quad \quad 42 \quad \quad \quad 9.2 \end{array}$ Extend to 3digit by 2digit and decimals with 2 d.p. Written Calculations Use partition for purpose to divide 3 digit numbers by single digit e.g. 536 ÷ 4, 846÷9 Write remainders as fractions e.g. 753÷6=125 r 3= 125 3/6= 125 ½ Use partition for purpose and chunking 846÷9 → 846 ÷9=94 810 36 Making piles/ groups of 9 ÷9 ÷9 846 90 4 - 810 9 x90 (90 groups/piles of 9) 94 ----- 36 9 x4 (4 groups/piles of 9) - 36 ----- 90+4= 94 piles of 9 0 Divide 3digit/4digit numbers by 2 digit numbers	related inverse facts 70x6, 700x6.0.7x6, 0.06x7 0.07x0.6, 70x0.6, 600x0.7, 42÷60, 4.2÷0.7, 6eighthsx7, 7 ninths x 6 so on Divide 2digit, 3digit and decimal by 1 digit $\begin{array}{r} 92 \div 4 \quad \rightarrow \quad 94 \div 4 \\ 80 \quad 12 \text{ (partition for purpose)} \quad 80 \quad 12 \quad 2 \\ \div 4 \quad \div 4 \quad \div \text{ by } 4 \quad \div 4 \quad \div 4 \quad \div 4 \\ 10 \quad 10 \quad 3 \quad \text{add} \quad 20 \quad 3 \quad 2/4 \text{ (svda)} \\ 23 \quad \quad \quad 23 \end{array}$ $\begin{array}{r} 132 \div 6 \quad \quad \quad 733 \div 8 \\ 120 \quad 12 \text{ (partition for purpose)} \quad 720 \quad 8 \quad 5 \\ \div 6 \quad \div 6 \quad \div \text{ by } 6 \quad \div 8 \quad \div 8 \quad \div 8 \quad (5 \div 8 = 5/8) \\ 20 \quad 2 \quad \text{add} \quad 90 \quad 1 \text{ r } 5 \text{ or } (5/8) \\ 22 \quad \quad \quad 91\% \end{array}$ $\begin{array}{r} 495 \div 15 \quad 512 \div 16 \quad 73.6 \div 8 \quad 35.04 \div 8 \\ 450 \quad 45 \quad 480 \quad 32 \quad 72 \quad 1.6 \quad 32 \quad 2.4 \quad 0.64 \\ \div 15 \quad \div 15 \quad \div 16 \quad \div 16 \quad \div 8 \quad \div 8 \quad \div 8 \quad \div 8 \quad \div 8 \\ 30 \quad 3 \quad 30 \quad 2 \quad 9 \quad 0.2 \quad 4 \quad 0.3 \quad 0.08 \\ 33 \quad \quad \quad 32 \quad \quad \quad 9.2 \quad \quad \quad 4.38 \end{array}$ Extend to 4digit by 1digit including decimals Written Calculations Write and calculate ÷ maths stories (type1 and type 2) including mixed numbers and fractions as in year 3 Use partition for purpose to divide 3 digit numbers by single digit e.g. 536 ÷ 4, 846÷9 Write remainders as fractions e.g. 753÷6=125 r 3= 125 3/6= 125 ½ Children use both methods partition for purpose until they become secure. Chunking → long division → short division <table border="1"> <tr> <td> 846 ÷9=94 Making piles/ groups of 9 9 846 - 810 9 x90 ----- 36 9 x4 - 36 </td><td> <u>94</u> 9 846 810 ----- 36 36 </td></tr> </table>	846 ÷9=94 Making piles/ groups of 9 9 846 - 810 9 x90 ----- 36 9 x4 - 36	<u>94</u> 9 846 810 ----- 36 36
846 ÷9=94 Making piles/ groups of 9 9 846 - 810 9 x90 ----- 36 9 x4 - 36	<u>94</u> 9 846 810 ----- 36 36		

$2988 \div 9 = 332$ Making piles/ sets or groups of 9 $\begin{array}{r} 2988 \\ - 2700 \quad 9 \times 300 \\ \hline 288 \\ - 270 \quad 9 \times 30 \\ \hline 18 \\ - 18 \quad 9 \times 2 \\ \hline 0 \end{array}$ $300 + 30 + 2 = 332$	$5348 \div 16 = 321 \text{ r } 12 = 321 \frac{12}{16} = 321 \frac{3}{4}$ (svda) Making piles/ sets or groups of 16 $\begin{array}{r} 5148 \\ - 4800 \quad 16 \times 300 \\ \hline 348 \\ - 320 \quad 16 \times 20 \\ \hline 28 \quad 16 \times 1 \\ - 16 \\ \hline 12 \end{array}$ $300 + 20 + 1 = 321$	$90 + 4 = 94$ $\begin{array}{r} \underline{94} _ _ \\ 9 \overline{) 846} \\ \underline{81} \downarrow \\ 36 \\ \underline{36} \\ 0 \end{array}$	$\begin{array}{r} \underline{94.4} _ \\ 9 \overline{) 849.6} \\ \underline{81} \downarrow \downarrow \\ 39 \downarrow \\ \underline{36} \downarrow \\ 3.6 \\ \underline{3.6} \\ 0 \end{array}$
Calculate decimal remainders and divide decimal numbers $5404 \div 8 = 675.5$ Making piles/ sets or groups of 8 $\begin{array}{r} 5404 \\ - 4800 \quad 8 \times 600 \\ \hline 604 \\ - 560 \quad 8 \times 70 \\ \hline 44 \\ - 40 \quad 8 \times 5 \\ \hline 4 \\ - 4 \quad 8 \times 0.5 \\ \hline 0 \end{array}$ $600 + 70 + 5 + 0.5$ $334.8 \div 8 = 41.85$ Making piles/ sets or groups of 8 $\begin{array}{r} 334.8 \\ - 320 \quad 8 \times 40 \\ \hline 14.8 \\ - 8 \quad 8 \times 1 \\ \hline 6.8 \quad 8 \times 0.8 \\ - 6.4 \\ \hline 0.4 \\ - 0.4 \quad 8 \times 0.05 \\ \hline 0 \end{array}$ $40 + 1 + 0.8 + 0.05$		Short Division $98 \div 7 = 14$ $\begin{array}{r} 70 \quad 28 \\ \div 7 \quad \div 7 \\ 10 \quad 4 \end{array}$ $98 \div 7$ becomes $\begin{array}{r} 1 \quad 4 \\ 7 \overline{) 98} \end{array}$ Answer: 14 $432 \div 5 = 86 \text{ r } 2$ $\begin{array}{r} 400 \quad 30 \quad 2 \\ \div 5 \quad \div 5 \quad \div 5 \\ 86 \quad 6 \quad \text{r } 2 \end{array}$ $432 \div 5$ becomes $\begin{array}{r} 8 \quad 6 \quad \text{r } 2 \\ 5 \overline{) 432} \end{array}$ Answer: 86 remainder 2	
The children would use variety of models and images to conceptualise context of problems. The bar modelling enables pupils to draw and visualise mathematical concepts to solve problems. (Also refer to years 3 and 4)		$496 \div 11 = 45 \text{ r } 1$ $\begin{array}{r} 440 \quad 55 \quad 1 \\ \div 11 \quad \div 11 \quad \div 11 \\ 40 \quad 5 \quad \text{r } 1 \end{array}$ $496 \div 11$ becomes $\begin{array}{r} 4 \quad 5 \quad \text{r } 1 \\ 1 \quad 1 \overline{) 496} \end{array}$ Answer: $45 \frac{1}{11}$ $7297 \div 8 = 912 \frac{1}{8} = 912.125$ $7297 \div 9 = 912.125$	



Calculation Policy 2019

In a class in year 5, 18 of the children are girls. A quarter of the children in the class are boys. How many children are there in the class 5?

Class		whole?	
Boys $\frac{1}{4}$	Girls $\frac{1}{4}$	Girls $\frac{1}{4}$	Girls $\frac{1}{4}$
6	6	6	6
6	18 girls $18 \div 3 = 6$		

Total children = $18 + 6 = 24$

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

Using Bar Models

Whole ?

£77 70% = £77	30%
------------------	-----

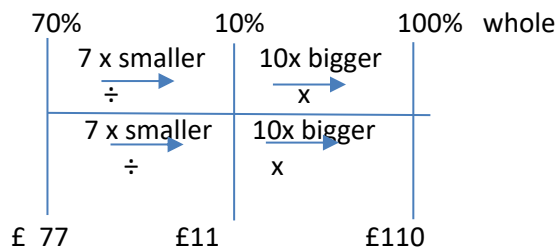
10 %							10 %	10 %	10 %
11	11	11	11	11	11	11	11	11	11

70% = 77

10% = 11 (7x smaller so divide by 7)

Whole = £110

Using Double Number Lines



$$\begin{array}{r}
 7200 \ 96 \quad 1 \\
 \div 8 \quad \div 8 \quad \div 8 \quad r \ 1 = (1/8) \\
 900 \ 12 \quad 1 \div 8 \\
 912 \quad 0.8 \ 0.16 \ 0.04 \\
 \div 8 \quad \div 8 \quad \div 8 \\
 0.1 \ 0.02 \ 0.005 \\
 0.125
 \end{array}$$

Making piles/ sets or groups of 8

$$\begin{array}{r}
 7297 \\
 - 7200 \quad 8 \times 900 \\
 \hline
 97 \\
 - 96 \quad 8 \times 12 \\
 \hline
 1 \\
 - 0.8 \quad 8 \times 0.1 \\
 \hline
 0.2 \\
 - 0.16 \quad 8 \times 0.02 \\
 \hline
 0.04 \\
 - 0.04 \quad 8 \times 0.005 \\
 \hline
 0
 \end{array}$$

Short Division

$$\begin{array}{r}
 9 \ 12 \ . \ 125 \\
 8 \overline{) 7297.000} \\
 \underline{72} \quad \underline{97} \quad \underline{00} \quad \underline{0} \\
 0 \quad 0 \quad 0 \quad 0
 \end{array}$$

Long Division

432 ÷ 15 becomes

$$\begin{array}{r}
 28.8 \\
 15 \overline{) 432.0} \\
 \underline{30} \quad \downarrow \\
 132 \\
 \underline{120} \quad \downarrow \\
 120 \\
 \underline{120} \\
 0
 \end{array}$$

Answer: 28.8

Year 6 refer to year 3,4 and 5 for models and images to solve problems involving division.

