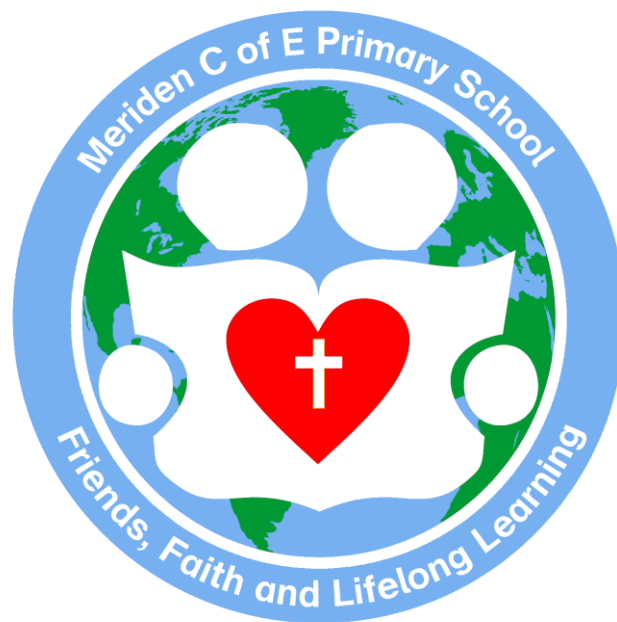


National Curriculum For Mathematics



Calculation Policy Routes through Division

2021

EARLY SKILLS - Most children in Year 1 and Year 2

Children use concrete and pictorial representation to solve division problems. They share amounts into equal groups but are not expected to record division formally in Year 1. At Year 2, children are using the division sign in abstract methods.

When dividing larger numbers, use concrete materials that will model how to partition tens and ones. Grouping allows children to count in multiples and links to repeat subtraction on a number line. Concrete representations can allow pupils to see the link between multiplication and division.

Include halving

Include number rhymes

Bar models - represents the total and of the bar model and then dividing it into equal groups.

Number tracks - support children counting in multiples backwards for division

Number line - Children can record how many jumps they have made.

Arrays - supports understanding that division links with multiplication.

Part-whole models.

Very practical:

- **Number shapes (numicon)** - supports understanding of division as grouping.
- **Cubes/counters** - support children to use cubes/counters in groups of an amounts or arrays.
- **Tens Frame** - To support dividing in 2's 5's and 10s
- **Bead Strings** - to show amounts equally shared and support understanding of multiplication as repeated addition
- **Real life objects** - to show how to share and divide in real life.
- **Straws** - to partition numbers when dividing larger amounts.
- **Base 10** - to partition numbers when dividing larger amounts.
- **Place Value counters** - use place value counters to share between groups and can link well to part-whole models.

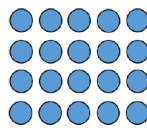
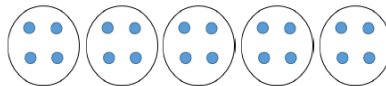
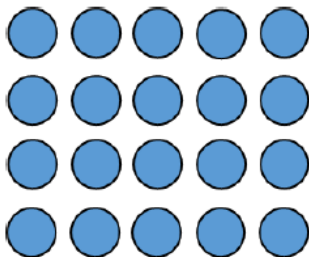
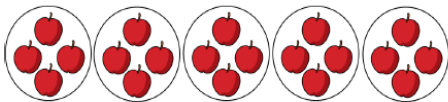
Concrete

Pictorial

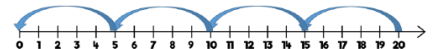
Abstract

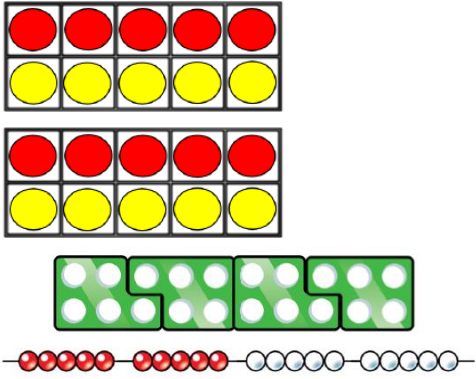
Example for the sum:

$$20 \div 5 = 4$$



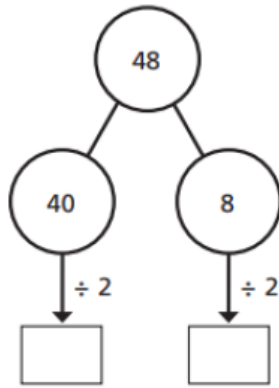
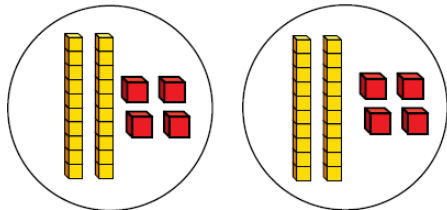
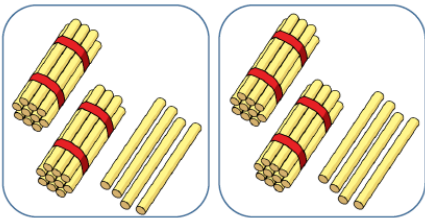
20





Example for the sum:
 $48 \div 2 = 24$

Tens	Ones
10 10	1 1 1 1
10 10	1 1 1 1



Most children in year 3 and 4

Children will begin to divide involving exchange and finding remainders. Concrete materials are used so pupils can visualise this exchange when replacing the ten with ten ones (use of place value counters and base 10 is best) Equipment should be used outside the grid before sharing in the place value grids.

Practical:

- Place Value counters - use for exchange and remainders.
- Base 10 - use for exchange and remainders.

Bar model

Part-whole model - for flexible partitioning.

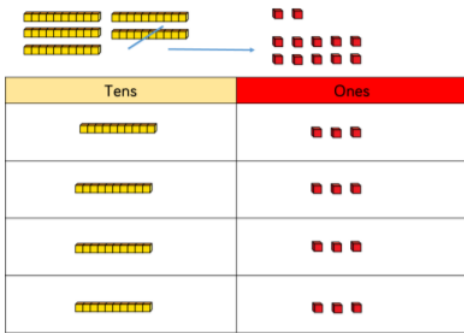
Short division method - use 'grouping' to support this written method.

Concrete	Pictorial	Abstract
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Example for the sum:

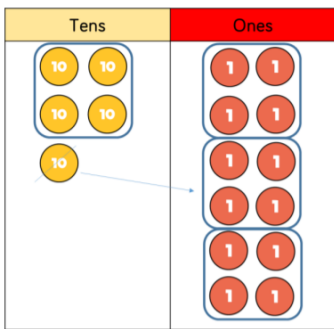
$52 \div 4 = 13$

Sharing with exchange:

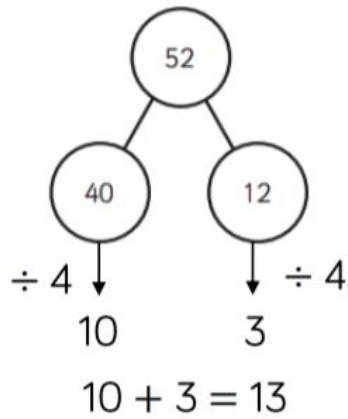
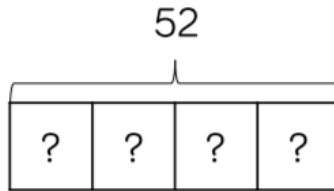


From Year 4 onwards:

Grouping



Sharing with exchange:



Year 4



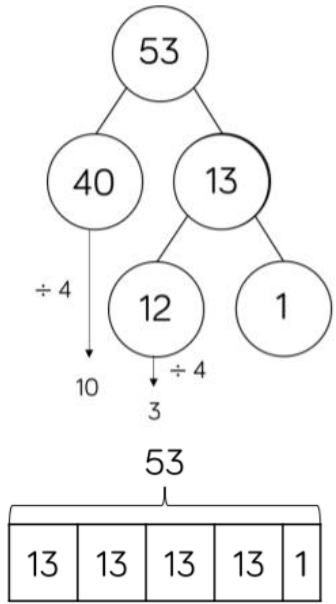
Sharing with remainders:

Examples for the sum:

$$53 \div 4 = 13 \text{ r}1$$

Two representations of the number 53 are shown. The top one uses yellow rods (tens) and red units (ones). The bottom one uses yellow disks (tens) and red disks (ones). Below each is a place value chart with columns for Tens and Ones.

Tens	Ones
5 rods	3 units
4 rods	13 units
3 rods	13 units
2 rods	13 units
1 rod	13 units



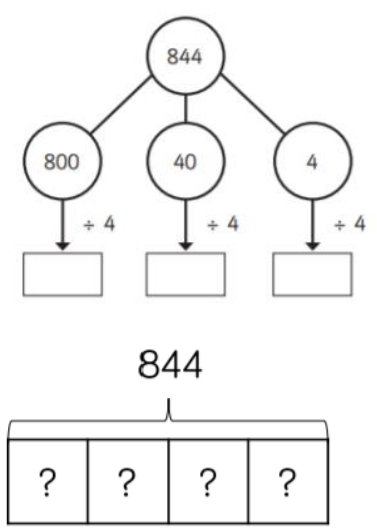
From Year 4 onwards:

Grouping

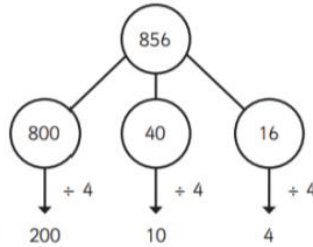
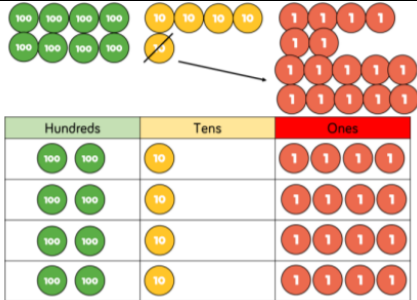
Examples for the sum:

$$844 \div 4 = 211$$

H	T	O
100 100	10	1
100 100	10	1
100 100	10	1
100 100	10	1



Sharing:
Examples for the sum:
 $856 \div 4$



Most children in Year 5 and 6.

Children will continue to divide involving exchange and finding remainders. Concrete materials are used so pupils can visualise this exchange when replacing the ten with ten ones (use of place value counters and base 10 is best) Equipment should start outside the grid before the children share the counters. When multiple exchanges are needed, children should be encouraged to 'move away' from use of practical resources (see abstract column) as they become less effective. When dividing by two digit numbers, long division is most effective as children can write out multiples to support their calculations.

Practical:

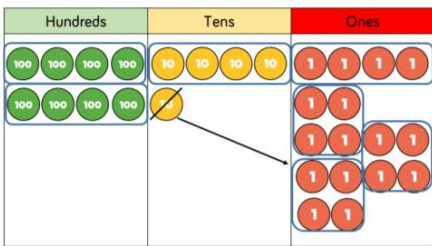
Place Value counters - use for exchange and remainders.
Base 10 - use for exchange and remainders.

Bar model

Part-whole model - for flexible partitioning.
Short division method - use 'grouping' to support this written method.

Concrete

Eg for the sum $856 \div 4 = 214$

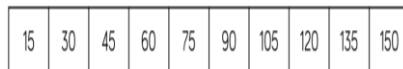


Multiple exchanges:

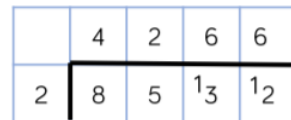
Eg for the sum $8,532 \div 2 = 4,266$

Pictorial

Drawing number tracks: counting in multiples eg $90 \div 15 = 6$



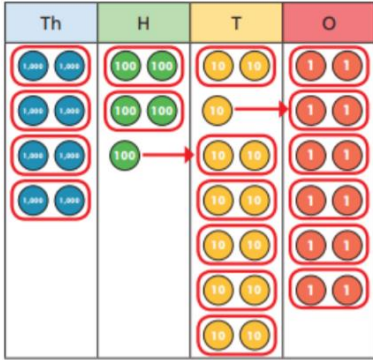
Abstract



Multiple exchanges:



Long division:



		0	3	6
1	2	4	3	2
	-	3	6	0
			7	2
	-		7	2
				0

- 12 × 1 = 12
- 12 × 2 = 24
- 12 × 3 = 36
- 12 × 4 = 48
- 12 × 5 = 60
- 12 × 6 = 72
- 12 × 7 = 84
- 12 × 8 = 96
- 12 × 7 = 108
- 12 × 10 = 120

		0	4	8	9
15	7	3	3	5	
-	6	0	0	0	
	1	3	3	5	
-	1	2	0	0	
		1	3	5	
-		1	3	5	
				0	

- 1 × 15 = 15
- 2 × 15 = 30
- 3 × 15 = 45
- 4 × 15 = 60
- 5 × 15 = 75
- 10 × 15 = 150

... with remainders:

		2	4	r	1	2
1	5	3	7	2		
	-	3	0	0		
			7	2		
	-		6	0		
			1	2		

- 1 × 15 = 15
- 2 × 15 = 30
- 3 × 15 = 45
- 4 × 15 = 60
- 5 × 15 = 75
- 10 × 15 = 150