Division.

Year 6

2-digit divisors

Children build on their understanding of dividing up to 4-digits by 1-digit by now dividing by up to two digits. They use the short division method and focus on the grouping structure of division.

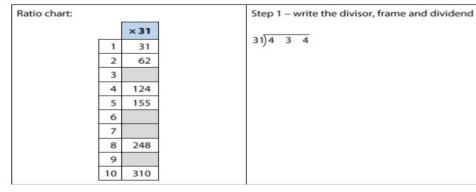
Recording as long division

Short Division

Ratio chart and long division:

'Becky has 434 cm of ribbon to wrap up prizes for a school competition. Each prize needs 31 cm of ribbon. How many prizes can she wrap?'

$$434 \div 31 = ?$$



Step 2 – divide the hundreds

 $4 \text{ hundreds} \div 31 = 0 \text{ hundreds r } 4 \text{ hundreds}$

 Write "0" in the hundreds column of the answer line.' Step 3 – exchange hundreds for tens, combine with the existing tens and divide...

1 (1ten×31=31tens)

4 hundreds = 40 tens

40 tens + 3 tens = 43 tens

 $43 \text{ tens} \div 31 = 1 \text{ ten and a remainder}$

 'Write "1" in the tens column of the answer line and write "31" underneath the "43".'

Division.

Step 4 – subtract to find the remainder 0 1	Step 5 – exchange tens for ones and combine with the existing ones
31)4 3 4 3 1 (1ten×31=31tens) 1 2 43 tens – 31 tens = 12 tens • Write "12" underneath the "31".'	0 1 31)4 3 4 3 1 ↓ (1ten×31=31tens) 12 tens = 120 ones 120 ones + 4 ones = 124 ones • 'Write "4" after the "12".'
Step 6 – divide the ones 0 1 4 31)4 3 4 3 1 (1ten×31=31tens) 1 2 4 1 2 4 (4 ones×31=124 ones) 124 ones ÷ 31 = 4 ones (refer to the ratio chart) • Write "4" in the ones column of the answer line and write "124" underneath the "124", aligning the digits.'	Step 7 – subtract to show there is no remainder 0 1 4 31)4 3 4 3 1 (1ten×31=31tens) 1 2 4 1 2 4 (4 ones×31=124 ones) 124 ones – 124 ones = 0 ones • 'Write "0" underneath the "31".'

Division.

Division using factors

Children use their number sense, specifically their knowledge of factors, to be able to see the relationship between the dividend (number being divided) and the divisor (number that the dividend is being divided by).

Calculate 780 ÷ 20

Now calculate 780 \div 10 \div 2

What do you notice? Why does this work?

Use the same method to calculate 480 ÷ 60

Long Division (1)

Children are introduced to long division as a different method of dividing by a 2-digit number.

They divide 3-digit numbers by a 2-digit number without remainders, starting with a more expanded method (with multiples shown), before progressing to the more formal long division method.

		0	3	6
1	2	4	3	2
	_	3	6	0
			7	2
	_		7	2
				0

Multiples of 12:	12 × 1 = 12
	$12 \times 2 = 24$
	$12 \times 3 = 36$
(×30)	$12 \times 4 = 48$
	$12 \times 5 = 60$
1	$12 \times 6 = 72$
(×6)	$12 \times 7 = 84$
	$12 \times 8 = 96$
	$12 \times 7 = 108$
]	$12 \times 10 = 120$

Division.

DIVISION								
				0	3	6	1	
		1	2	4	3	2	Us	e the long division method to calculate:
		•				Ť	-	0.7.6 . 44
			_	3	6	+	-	836 ÷ 11 798 ÷ 14
		_			7	2		608 ÷ 19
			-		7	2		
	ļ.,					0	<u>L</u>	
	He	ere i	sac	Sivis	ion n	neth	iod.	1
Long Division (2) Building on using long division with 3-			0	4	4	8	9	
digit numbers, children divide 4-digit numbers by 2-digits using the long		15	7	,	3	3	5	
division method.		_	6	(0	0	0	(×400)
			1		3	3	5	
		_	1	- 2	2	0	0	(×80)
					1	3	5	
		_			1	3	5	(×9)

0

Division.

Long Division (3)

Children now divide using long division where answers have remainders. After dividing, they check that the remainder is smaller than the divisor.

Tommy uses this method to calculate 372 divided by 15 He has used his knowledge of multiples to help.

			2	Λ	r	1	2
1	5	3	7	2			
	_	3	0	0			
			7	2			
	_		6	0			
			1	2			

$$1 \times 15 = 15$$

$$2 \times 15 = 30$$

$$3 \times 15 = 45$$

$$4 \times 15 = 60$$

$$5 \times 15 = 75$$

$$10 \times 15 = 150$$

Long Division (4)

Children now divide four-digit numbers using long division where their answers have remainders. After dividing, they check that their remainder is smaller than their divisor.

Children start to understand when rounding is appropriate to use for interpreting the remainder and when the context means that it is not applicable.

Amir used this method to calculate 1,426 divided by 13

			1	0	9	r	9
1	3	1	4	2	6		
	_	1	3	0	0		
			1	2	6		
	_		1	1	7		
					9		

$$(\times 100)$$

Division.

$$\textit{Four-digit} \div \textit{two-digit} \text{ calculation without remainder:}$$

$$4,945 \div 23 = ?$$

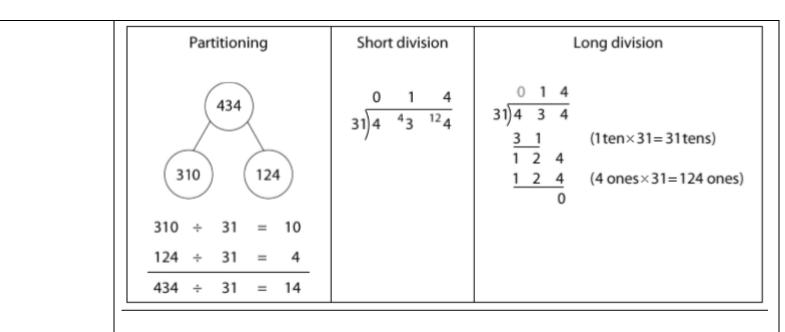
Long division	Short division
2 1 5 23)4 9 4 5 4 6 3 4 2 3 1 1 5 1 1 5	0 2 1 5 23 4 ⁴ 9 ³ 4 ¹¹ 5

Four-digit ÷ two-digit calculation with remainder:

$$7,283 \div 28 = ?$$

Long division Short division

Division.



 $\textit{Three-digit} \div \textit{two-digit} \text{ calculation with a remainder:}$

Ratio chart				Short d	livis	ion		
		×33			0	2	1	r 25
	1	33		33	7	⁷ 1	⁵ 8	
	2	66			/			
	3							
	4	132						

Long division

Long division – remainder expressed as a whole number:

"Sue has seven hundred and thirty books. She packs them into boxes of twenty-five."

- 'How many full boxes are there?'
- "How many boxes does she need to pack all of the books?"
- "How many books are not in a full box?" 730 ÷ 25 = ?

	× 25
1	25
2	50
4	100
5	125
8	200
10	250

So, 730 ÷ 25 = 29 r 5

Full boxes: 29

Boxes needed: 30

Books not in a full box: 5

Short division alternative:

Progression in Calculations. Y6 Division.

Long division – remainder converted to decimal fraction:

'Dinesh sells twenty-five jumpers, each for the same amount, and makes a total of £730. How much did each jumper sell for?'

$$730 \div 25 = ?$$

Step 1 - calculate the whole-number quotient:

- 73 tens + 25 = 2 tens and a remainder
 Write "2" in the tens column of the answer line and write "50" underneath the "73".'
- 73 tens 50 tens = 23 tens
 Write "23" underneath the "50"."
- 23 tens = 230 ones
 Write "0" after the "23"."
- 230 ones + 25 = 9 ones and a remainder
 Write "9" in the ones column of the answer line and write "225" underneath the "230".
- 230 ones 225 ones = 5 ones
 Write "5" underneath the "225".

Division.

Step 2 - introduce the decimal point:

 There is a remainder. To represent this as a decimal fraction, first write a decimal point after the ones digit of both the dividend and the quotient. Write a placeholder zero in the tenths column of the dividend."

Division.

Step 3 - continue: 5 ones = 50 tenths Write "0" after the "5". Step 4 - complete the calculation: 5 0 2 3 0 50 tenths + 25 = 2 tenths 'Write "2" in the tenths column of the answer line and write "50" underneath the "50"." 50 tenths – 50 tenths = 0 tenths Write "0" underneath the "50".' So, 730 ÷ 25 = 29.2 'Each jumper sold for £29.20.' Short division alternative: 0 2 9.2 25 7 73 230 .50

Division.

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$\frac{9}{15} = \frac{3}{5}$ So, 354 ÷ 15 = 23 $\frac{3}{5}$ So, 354 ÷ 15 = 23.6	