BUTTSBURY JUNIOR SCHOOL

AN ACADEMY SCHOOL

Mathematics Calculation Policy

October 2022

Maximum Effort for Maximum Achievement

About our Calculation Policy

This policy has been written in response to the National Curriculum September 2014 and aims to ensure consistency in the mathematical written methods and approaches to calculation across the school.

At Buttsbury Junior School we believe that children should be introduced to the processes of calculation through practical, oral and mental activities. As children begin to understand the underlying concepts, they develop ways of recording their workings to support their thinking and calculation methods, use particular methods that apply to special cases and learn to interpret and use the signs and symbols involved.

Strategies

Choosing the appropriate strategy and recording jottings in Mathematics is an important tool both for furthering the understanding of ideas and for communicating these ideas to others. The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads, they use an efficient written method accurately and with confidence. A useful written method is one that helps children carry out a calculation and can be understood by others. Written methods are complementary to mental methods and should not be seen as separate from them. It is important children acquire secure mental methods of calculation and one efficient written method each for calculation for addition, subtraction, multiplication and division, which they know they can rely on when mental methods are not appropriate.

Progression

The majority of children will move through the policy at broadly the same pace. However, decisions about when to progress should always be based on the security of children's understanding and their readiness to progress to the next stage (stage before age). Children who grasp concepts rapidly should be challenged through being offered deepening problems that are thought stimulating and applicable to real life. However, those who are not sufficiently fluent at a particular stage should not be progressed. It is essential that children's mental methods in all four operations are secure and they are able to use a variety of strategies as appropriate.

This document is organised according to age related expectation, however it may be necessary for teachers to consult with lower year groups for children in order to meet their needs at the stage these children are working at. By the end of Year 6, children are expected to use the formal methods for the four operations.

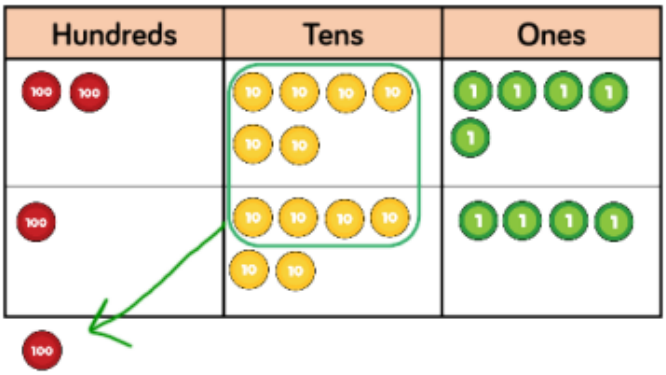
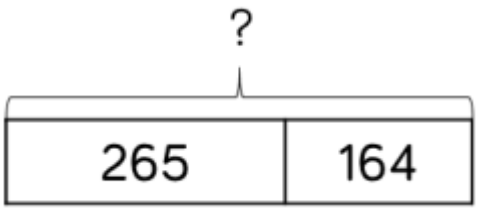
Addition and Subtraction

Year 3

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

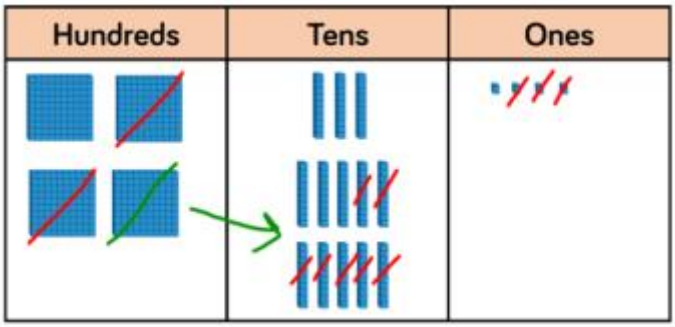
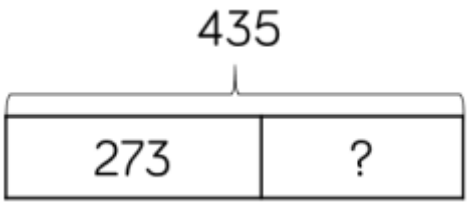
Addition

265 + 164 = 429

Concrete	Pictorial	Abstract
		265 + 164 429 1

Subtraction

435 – 273 = 162

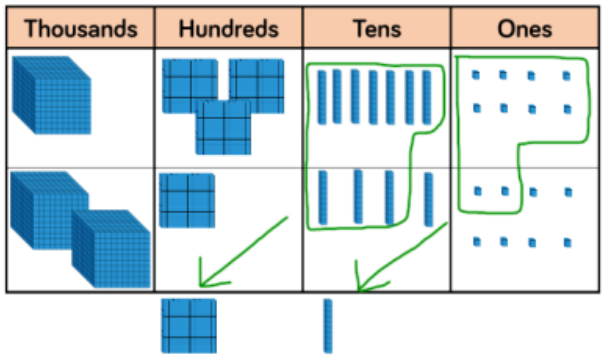
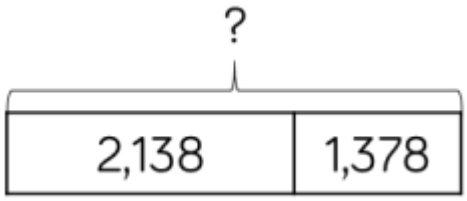
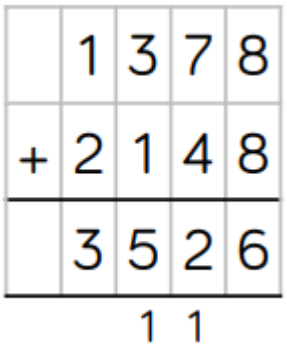
Concrete	Pictorial	Abstract
		3 1 435 – 273 162

Year 4

- Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

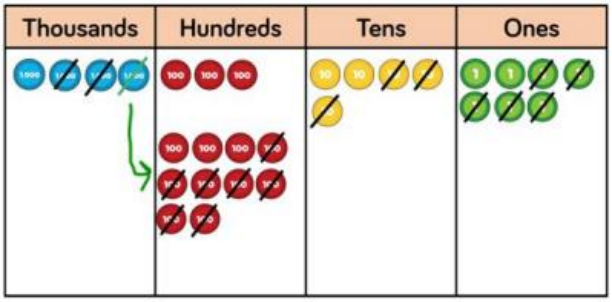
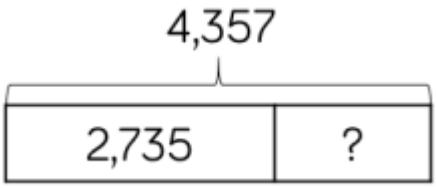
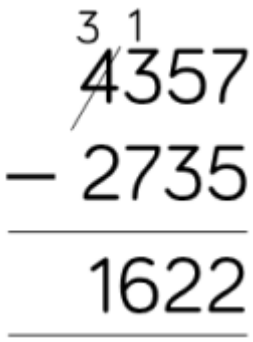
Addition

1,378 + 2,148 = 3,526

Concrete	Pictorial	Abstract
		

Subtraction

4,357 – 2,735 = 1,622

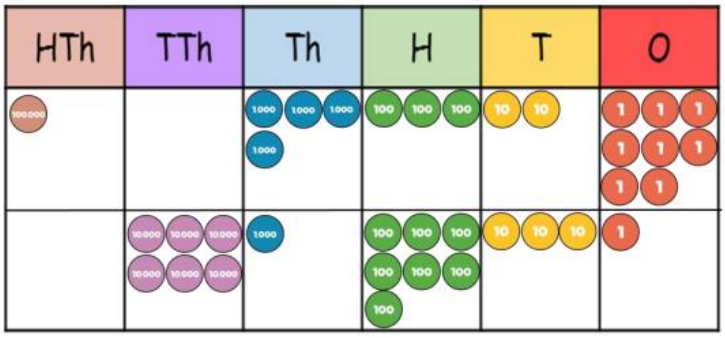
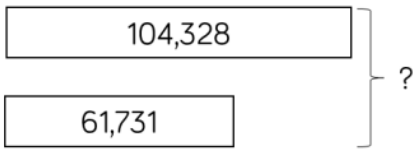
Concrete	Pictorial	Abstract
		

Year 5 and 6

- Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)

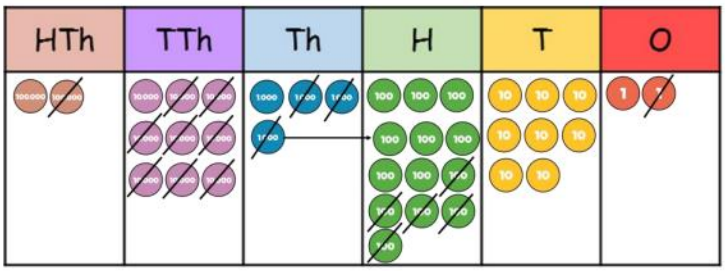
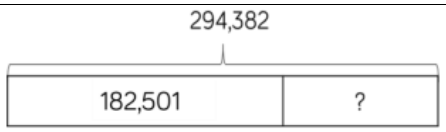
Addition

29

Concrete	Pictorial	Abstract
		1 0 4 3 2 8 + 6 1 7 3 1 1 6 6 0 5 9 1

Subtraction

294,382 – 182,501 = 111,881

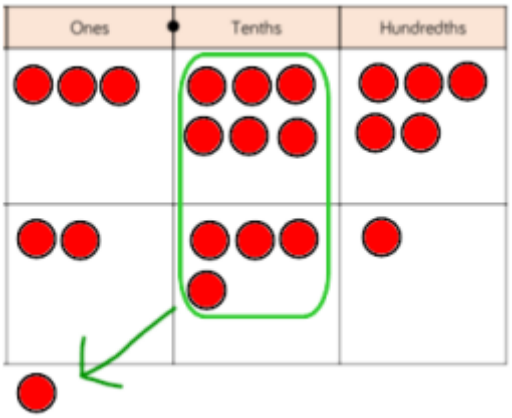
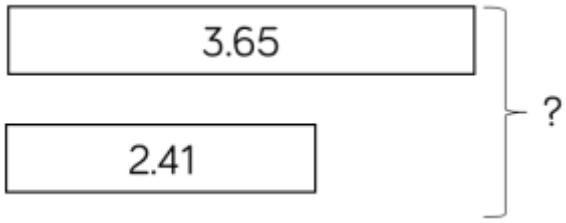
Concrete	Pictorial	Abstract
		2 9 3 4 13 8 2 – 1 8 2 5 0 1 1 1 1 8 8 1

Year 6

- add and subtract whole numbers with more than 4 digits, including decimals, including using formal written methods (columnar addition and subtraction)

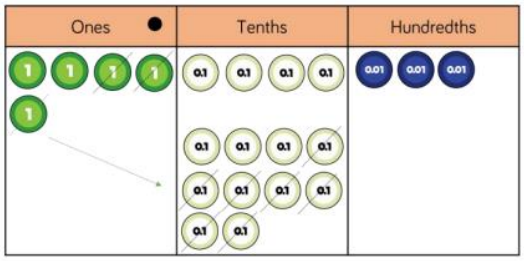
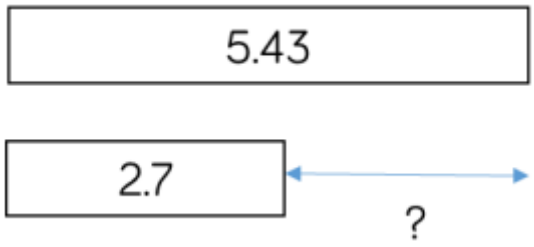
Addition

3.65 + 2.41 = 6.06

Concrete	Pictorial	Abstract
		3.65 + 2.41 6.06 1

Subtraction

5.43 – 2.7 = 2.73

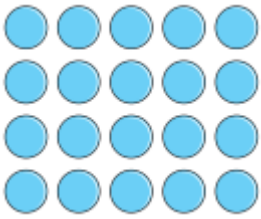
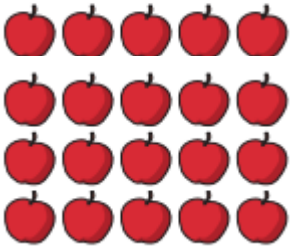
Concrete	Pictorial	Abstract
		4 1 5.43 – 2.7 2.73

Multiplication and Division

Year 3

- Multiply using multiplication tables that they know, including 2-digit numbers x 1 digit numbers

5x4 = 20

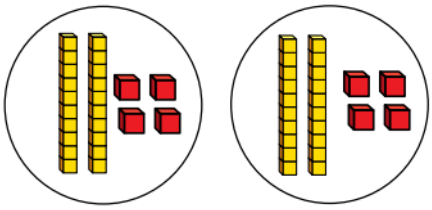
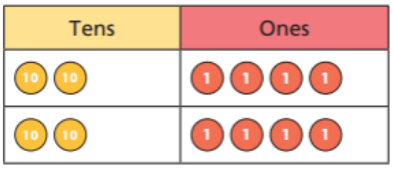
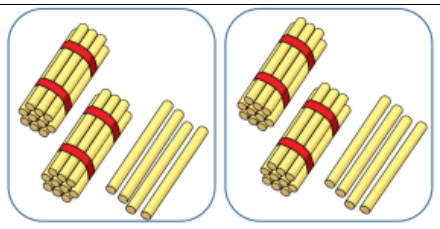
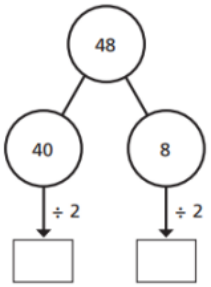
Concrete	Pictorial	Abstract
 Display findings using arrays		5 x 4 = 20

- Divide using multiplication tables that they know.

Concrete	Pictorial	Abstract
Arrange the counters in groups of 3 and complete the division. ____ ÷ 3 = ____		18 ÷ 3 = 6

- Divide 2-digits by 1-digit (sharing and no exchange)

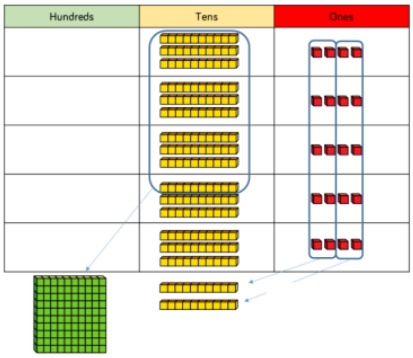
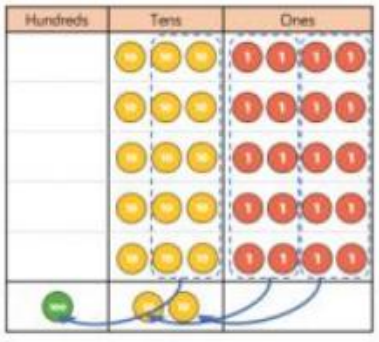
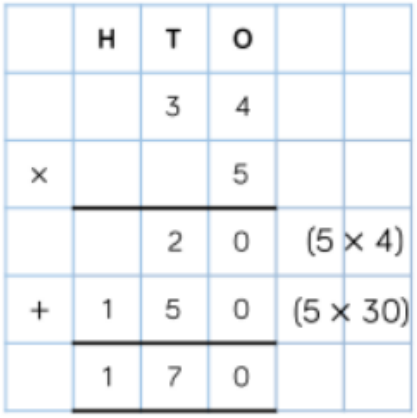
48 ÷ 2 = 24

Concrete	Pictorial	Abstract
 	 	48 ÷ 2 = 24

Year 3/4

- Multiply 2-digit numbers by 1-digit numbers

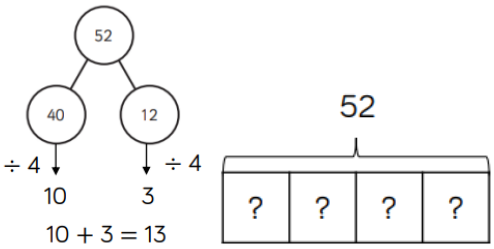
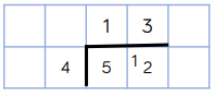
34 x 5 = 170

Concrete	Pictorial	Abstract
		

Year 3 & 4

- Divide 2-digits by 1-digit (sharing with exchange)

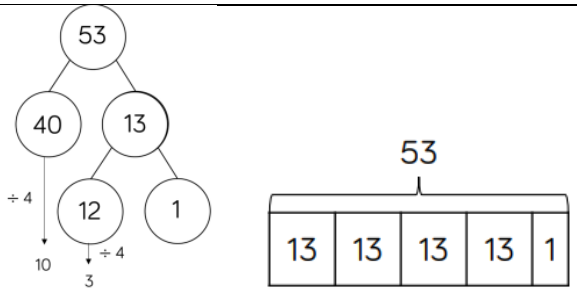
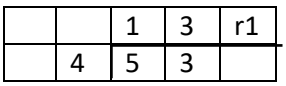
52 ÷4 = 13

Concrete	Pictorial	Abstract
		52 ÷4 = 13 

Year 3 & 4

- Divide 2-digits by 1-digit (sharing with remainders)

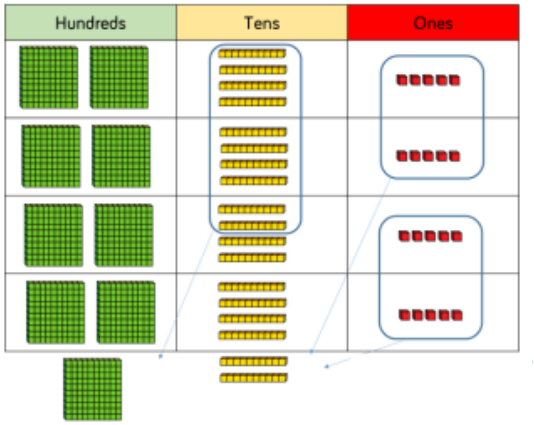
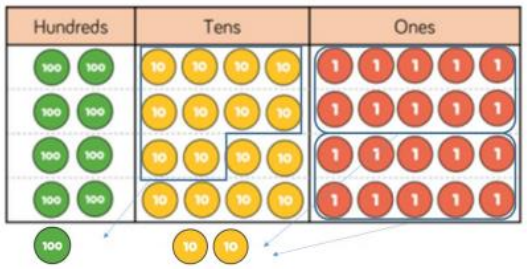
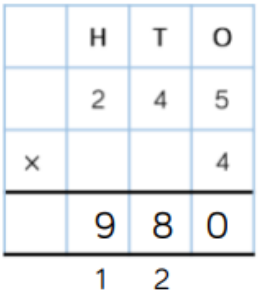
53 ÷4 = 13 r 1

Concrete	Pictorial	Abstract
		53 ÷4 = 13 r 1 

Year 4

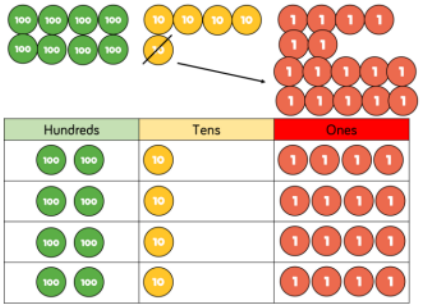
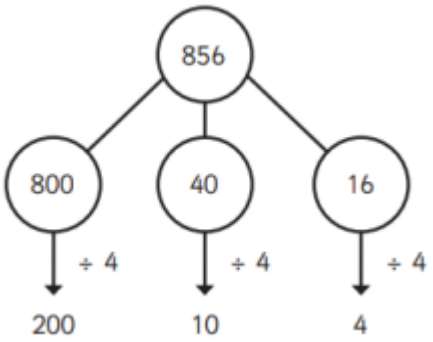
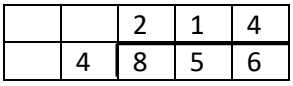
- Multiply 3-digit numbers by 1-digit numbers

245 x 4 = 980

Concrete	Pictorial	Abstract
		

- Divide 3-digit numbers by 1-digit numbers (sharing)

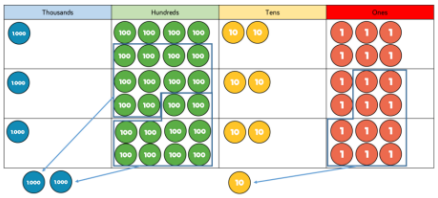
856 ÷ 4 = 214

Concrete	Pictorial	Abstract
		856 ÷ 4 = 214 

Year 5

- Multiply 4-digit numbers by 1-digit numbers

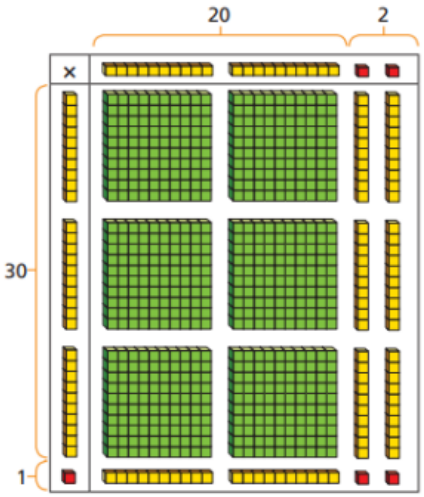
1,826 x 3 = 5,478

Concrete	Pictorial	Abstract
		

	Th	H	T	O
	1	8	2	6
×				3
	5	4	7	8
	2		1	

- Multiply 2-digit numbers by 2-digit numbers

22 x 31 = 682

Concrete	Pictorial	Abstract
 (Area model – to support mental calculations)		Method 1:

×	20	2
30	600	60
1	20	2

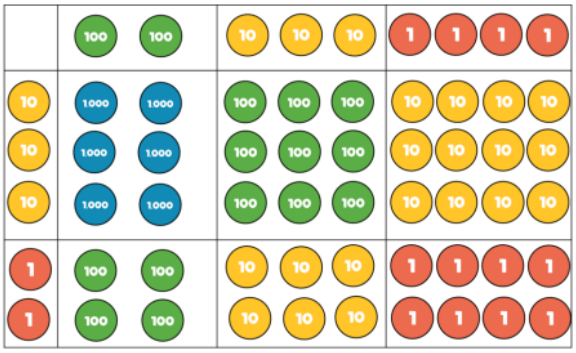
Method 2:

	H	T	O
		2	2
×		3	1
		2	2
	6	6	0
	6	8	2

There is an expectation that all children move onto the Formal Written method (Method 2)

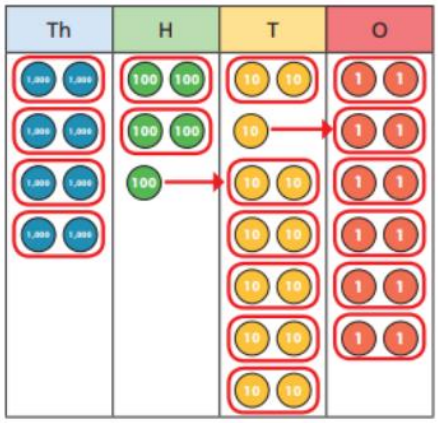
- Multiply 3-digit numbers by 2-digit numbers

234 x 32 = 7,488

Concrete	Pictorial	Abstract
		Method 1: × | 200 | 30 | 4 30 | 6,000 | 900 | 120 2 | 400 | 60 | 8 Method 2: Th H T O 2 3 4 × 3 2 4 6 8 $^{1}7$ $^{1}0$ 2 0 7 4 8 8 There is an expectation that all children move onto the Formal Written method (Method 2)

- Divide 4-digits by 1-digit (grouping)

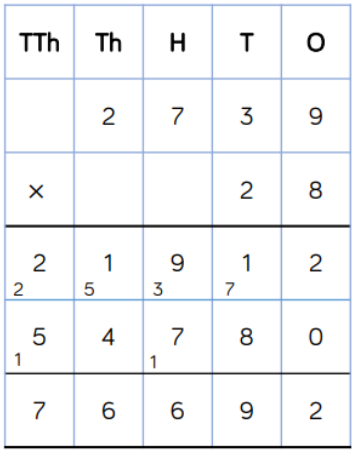
8532 ÷ 2= 4266

Concrete	Pictorial	Abstract
		4 2 6 6 2 | 8 5 $^{1}3$ $^{1}2$

Year 5 & 6

- Multiply 4-digit numbers by 2-digit numbers

2,739 x 28 = 76,692

Concrete	Pictorial	Abstract
		 When multiplying 4-digits by 2-digits, children should be confident in using the formal written method.

Year 6

- Divide 4-digit numbers by 2-digit numbers

432 ÷ 12 = 36 and 7335 ÷ 15 = 489

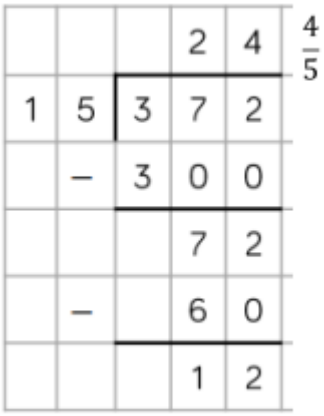
Concrete	Pictorial	Abstract
		3-digits by 2-digits 0 3 6 12 | 4 | 4 3 | 7 2 4-digits by 2-digits 15 30 45 60 75 90 105 120 135 150 0 4 8 9 15 | 7 | 7 3 | 13 3 | 13 5

- Divide multi-digits by 2-digit numbers (long division – chunking)

7,335 ÷ 15 = 489

Concrete	Pictorial	Abstract
		0 4 8 9 15 | 7 3 3 5 – 6 0 0 0 (×400) 1 3 3 5 – 1 2 0 0 (×80) 1 3 5 – 1 3 5 (×9) 0 1 × 15 = 15 2 × 15 = 30 3 × 15 = 45 4 × 15 = 60 5 × 15 = 75 10 × 15 = 150

- Divide multi-digits by 2-digit numbers (long division – chunking) with remainders

$$372 \div 15 = 24 \text{ r}12 \;/\; 24\ \frac{4}{5}$$

Concrete	Pictorial	Abstract
		$1 \times 15 = 15$ $2 \times 15 = 30$ $3 \times 15 = 45$ $4 \times 15 = 60$ $5 \times 15 = 75$ $10 \times 15 = 150$