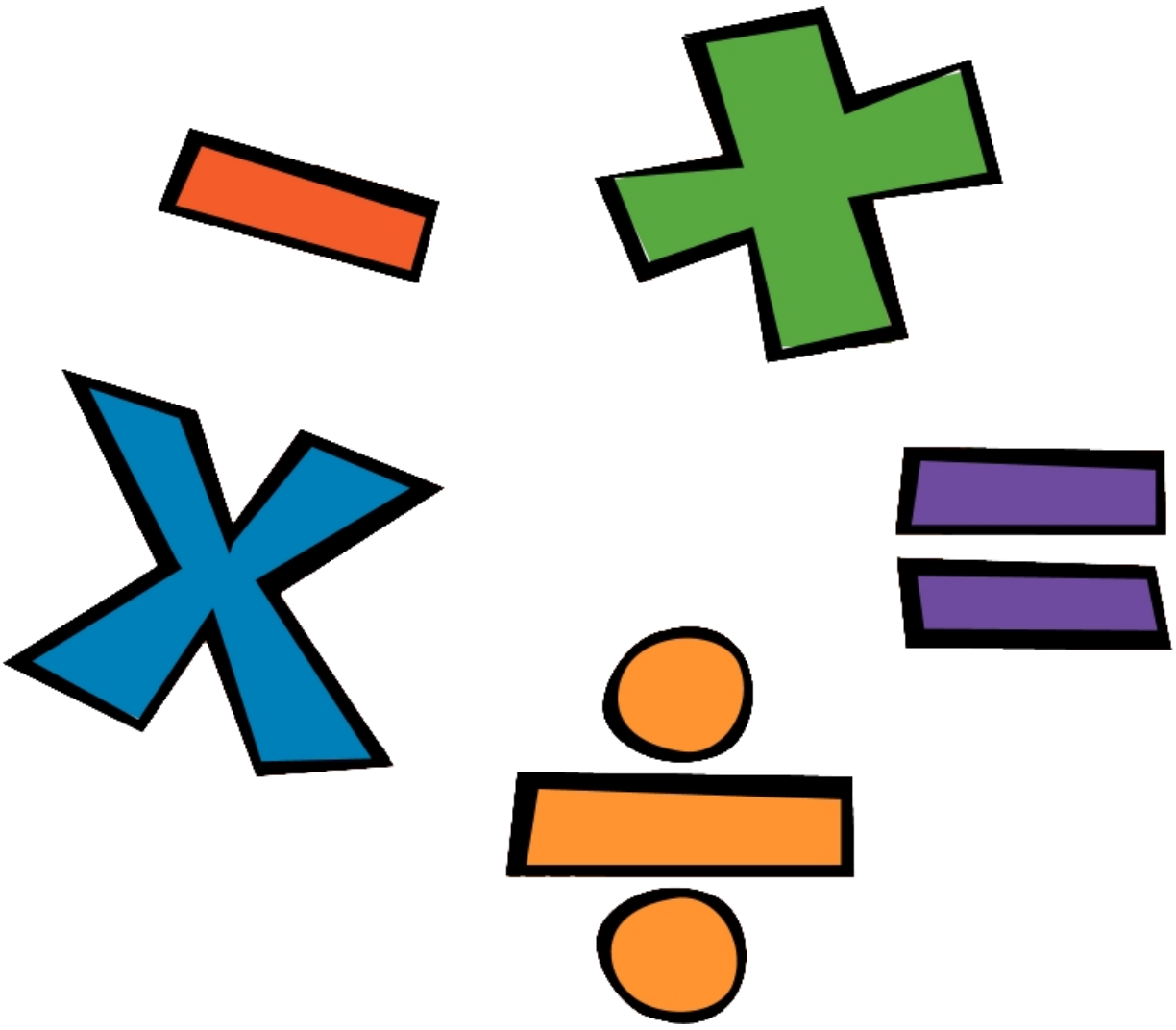
Overton C of E Primary School

Written Calculation

Progression Policy



Expectations of presentation:

KS1:

- The short date and title/LO should be stuck into the maths book
- Numerals should be formed and oriented correctly
- Numerals should be an appropriate size – it may help to draw a line for children to write calculations on
- Jottings / pictures should be an appropriate size – it may help to divide the page into sections to support children with this
- In Year 2, when introducing expanded column addition, this should be done on squared paper, writing 'one digit per box'
- Worksheets should not be stuck into books – these are treasury tagged in date order and attached in back of maths books or in folders (year group preference)

KS2:

- Children must underline their previous piece of work using a ruler and work underneath it if there is sufficient space.
- The date and title/LO must be written by the child into their maths book.
- Short date to be written on the left of the page and underlined with a ruler.
- Title to be written starting from the left of the page and underlined with a ruler.
- Children use a ruler to draw lines.
- 1 digit per box for written methods.
- If children are practising written calculations, they work across the page.
- If self-marking, children dot or tick using green pen.
- A rubber may be used only if the child notices they have written a number incorrectly whilst setting out a calculation
- Worksheets should not be stuck into books – these are treasury tagged in date order and attached in back of maths books or in folders (year group preference)

For written calculations:

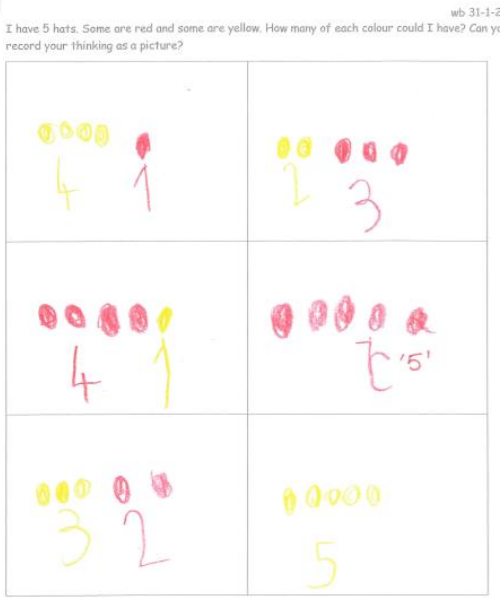
- One digit per box
- A ruler must be used to draw the lines of the calculation
- Where a calculation has an error, the children re-do the whole calculation in green pen.

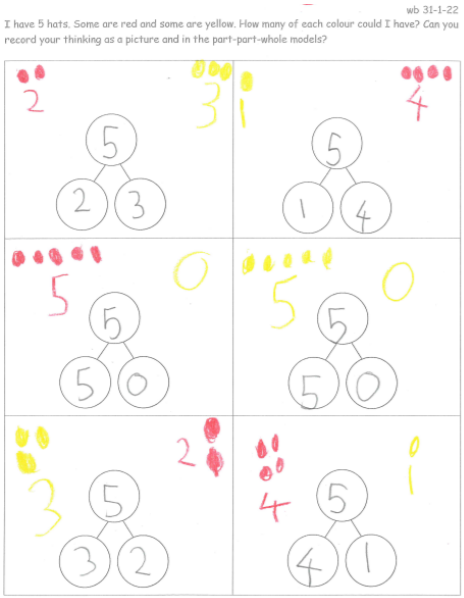
Edit/reviewing work:

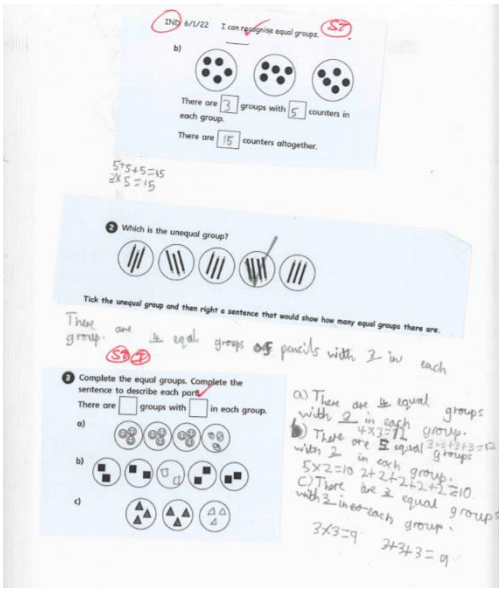
- Children must not be using a rubber to make corrections. Errors are corrected using a green pencil for EYFS/KS1 and a green pen for KS2.
- Corrections in green pencil/pen are done next to or above their previous answer.
- If correcting/improving a written response, children do this in green pen/pencil.
- When correcting an answer that does not require working out, children need to rewrite the whole number correctly (rather than just correcting one digit).
- When correcting an answer where a written method has been used (either informal or formal), they need to re-do this whole method in green pen.

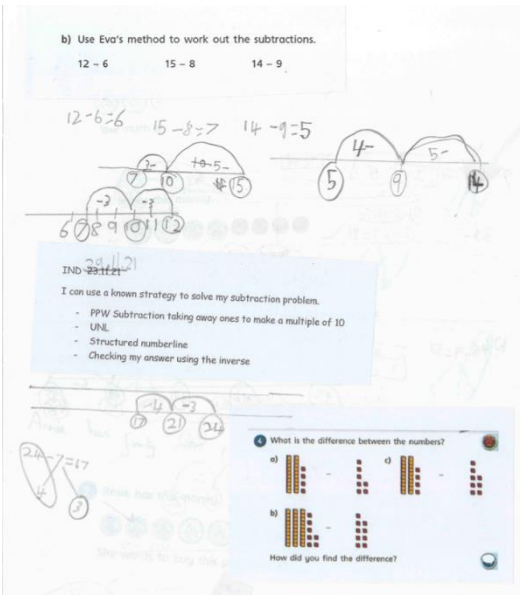
Examples of presentation:

Year R / KS1:



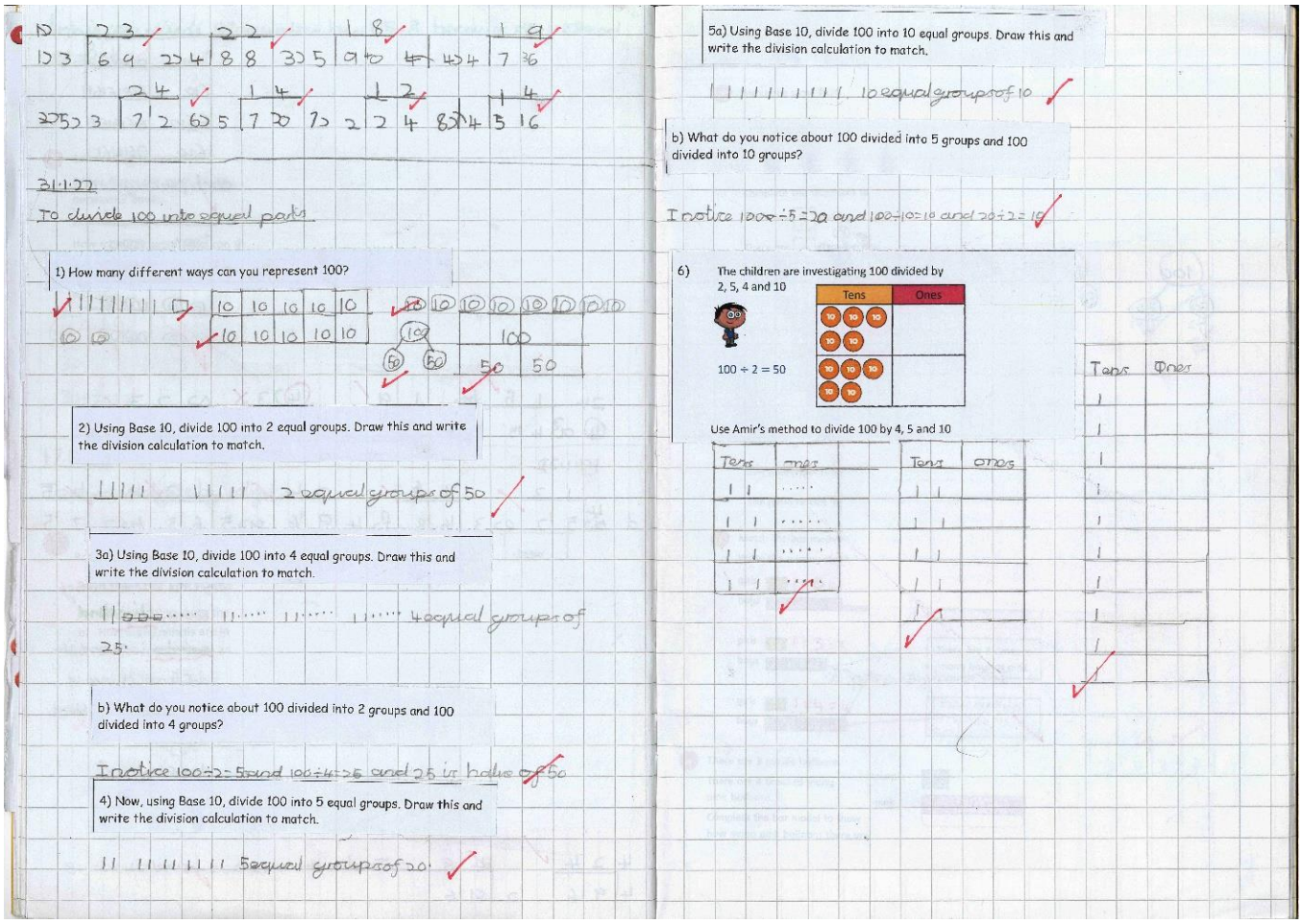




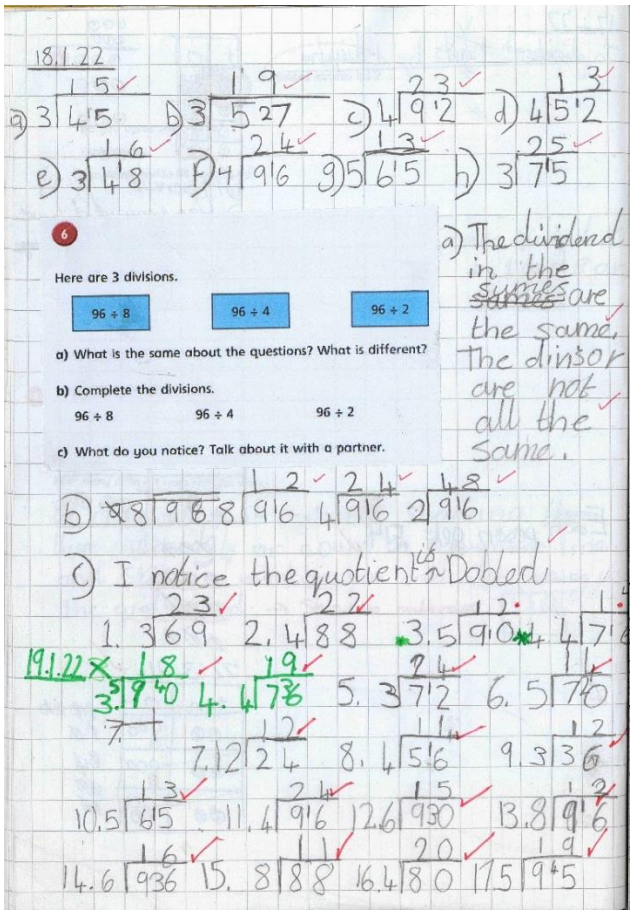


KS2

General presentation:



Working across the page for calculations and green editing:



Addition

Key vocabulary: number, numeral, digit, equation / number sentence, sum

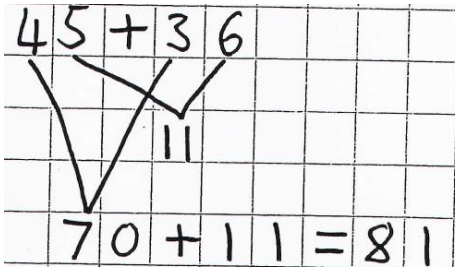
augend add addend equals sum

70 + 11 = 81

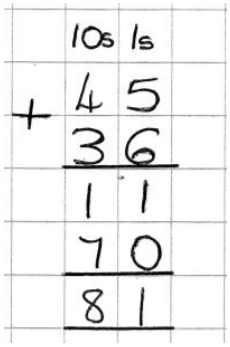
Essential manipulatives: bundles of 'tens' and separate ones (eg counting sticks), numicon, diennes, place value counters

Year 2

- At the start of Year 2, children should be confident using jottings alongside a variety of concrete resources
- Introduce **'v' method** when children are ready for more formal recording
  - always add the 1s first to make stronger links between this method and column addition
  - continue to use manipulatives alongside



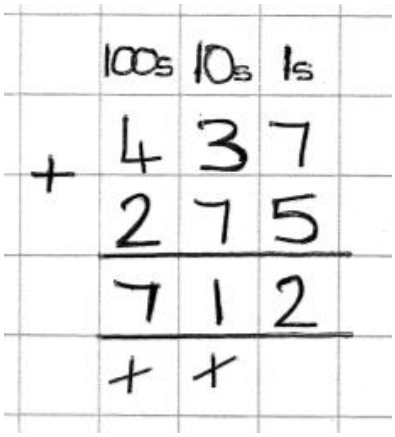
- By the end of Year 2, most children should be using the **expanded column addition** method
  - add the ones first
  - continue to use manipulatives alongside as needed
  - use squared paper and teach children to write one digit in each box and line up the digits



Year 3

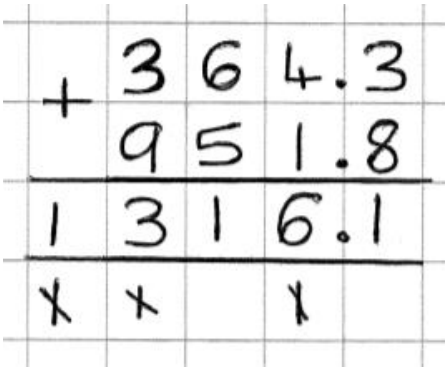
- At the start of Year 3, most children should be confident using the **expanded column addition** method (see Year 2)
  - some children may still use manipulatives alongside this
- Introduce standard **column addition** – retain column headings as needed

By the end of Year 3…



Year 4

- At the start of Year 4, most children should be confident using the standard **column addition** method (see Year 3)
  - many children may still use column headings to support their thinking
- Introduce numbers with decimals – the method does not change
- By the end of Year 4, most children should have dropped the column headings.



Year 5 and Year 6

- standard column addition (as above)

Subtraction

Key vocabulary: number, numeral, digit, equation / number sentence, difference, exchange (not borrow)

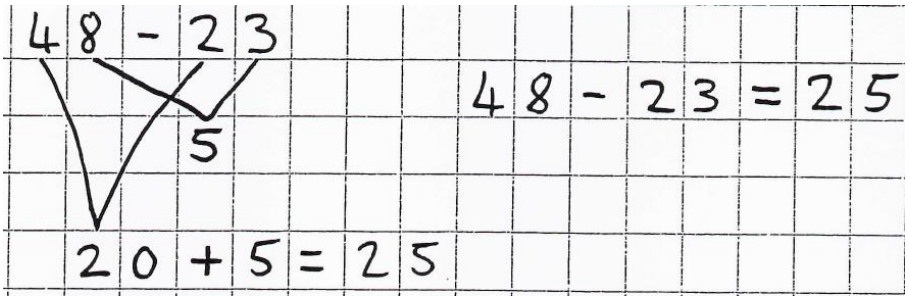
minuend subtract subtrahend equals difference

48 - 23 = 25

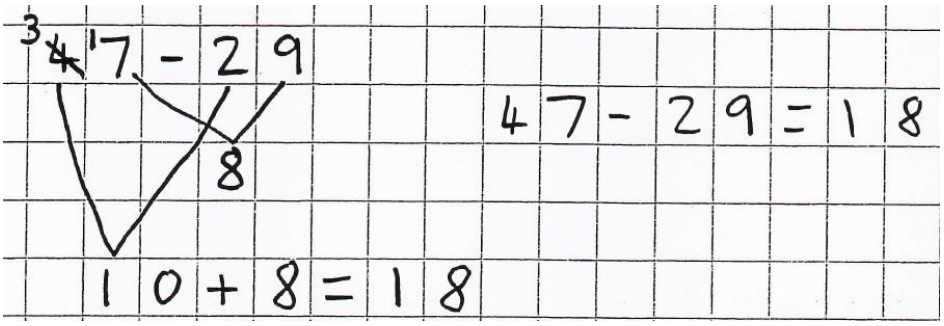
Essential manipulatives: bundles of 'tens' and separate ones (eg counting sticks), numicon, diennes, place value counters

Year 2

- At the start of Year 2, children should be confident using jottings alongside a variety of concrete resources
- Introduce **'v' method** when children are ready for more formal recording
  - always subtract the 1s first to make stronger links between this method and column addition
  - 'say' what you are doing to build understanding / number sense eg 'eight ones subtract three ones'
  - continue to use manipulatives alongside



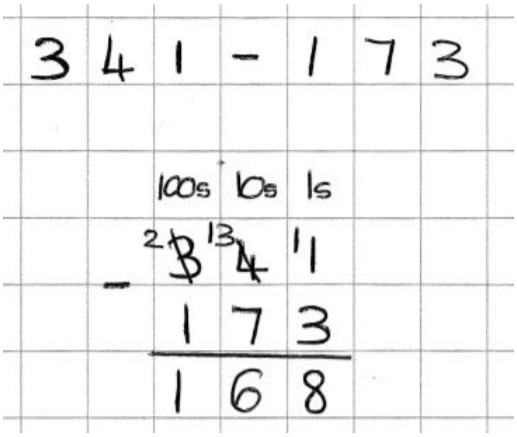
- use diennes to model exchanging



Year 3

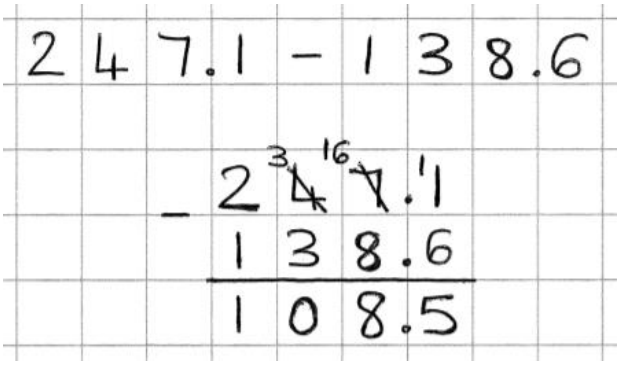
- At the start of Year 3, most children should be confident using the **'v' method** and should have an understanding of **exchanging** using **manipulatives** alongside

- Introduce standard **column subtraction**
  - use manipulatives to support understanding



Year 4

- At the start of Year 4, most children should be confident using the standard **column subtraction** method (see Year 3)
  - many children may still use column headings to support their thinking
- Introduce numbers with decimals – the method does not change
- By the end of Year 4, most children should have dropped the column headings.



Year 5 and Year 6

- standard column subtraction (as above)

Multiplication

Key vocabulary: number, numeral, digit, equation / number sentence, product, array

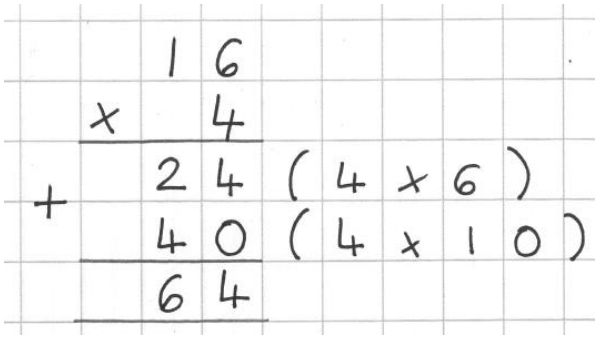
multiplicand **multiplied by** multiplier equals *product*

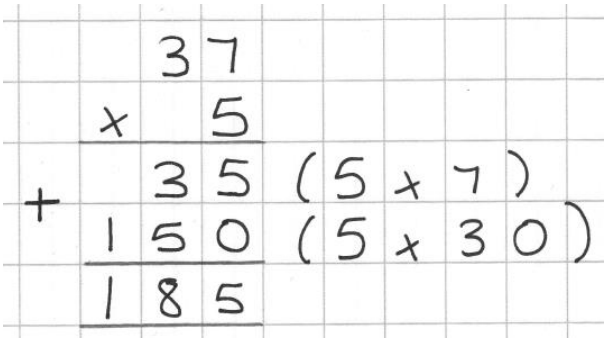
19 **x** 3 = 57

Essential manipulatives: bundles of 'tens' and separate ones (eg counting sticks), diennes, place value counters

Year 3

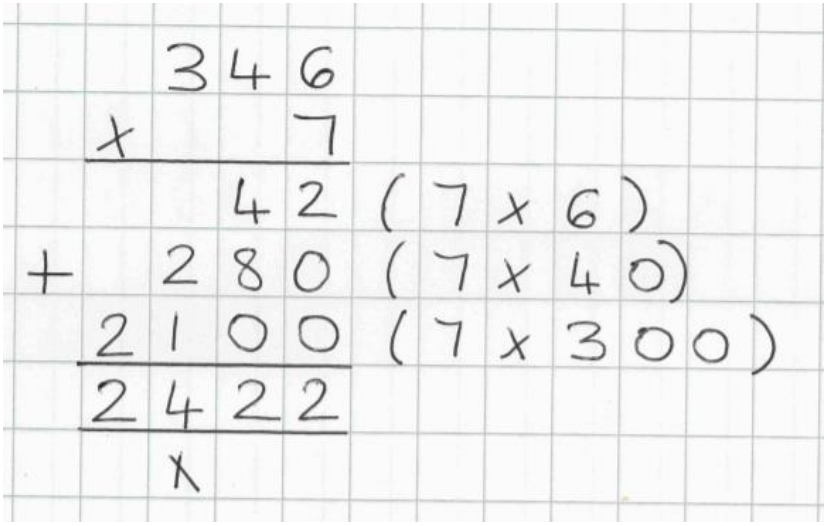
- **Prior knowledge** – children should have a secure understanding of how numbers can be partitioned into tens and ones
- Introduce the **expanded column multiplication method,** initially multiplying a single digit by a 'teens' number
  - always put the number with fewer digits underneath (the multiplier)
  - use column headings (10s, 1s) to support understanding
  - multiply the ones first
  - 'say' what you are doing to support understanding eg '4 times 6, 4 times 10'
  - use 'know it' brackets to record the multiplication for each row
  - use manipulatives alongside
  - Move towards multiplying a single digit number by any 2-digit number





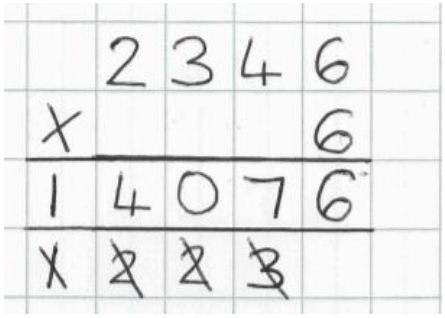
Year 4

- At the start of Year 4, most children should be using the **expanded column multiplication method** multiplying by a single digit (see Year 3)
- Progress to multiplying a 3-digit number by a single digit



Year 5

Introduce **short multiplication.** Model alongside the expanded column method used in Year 3 and 4, so children can see how the two methods are linked.



When secure, introduce decimals.

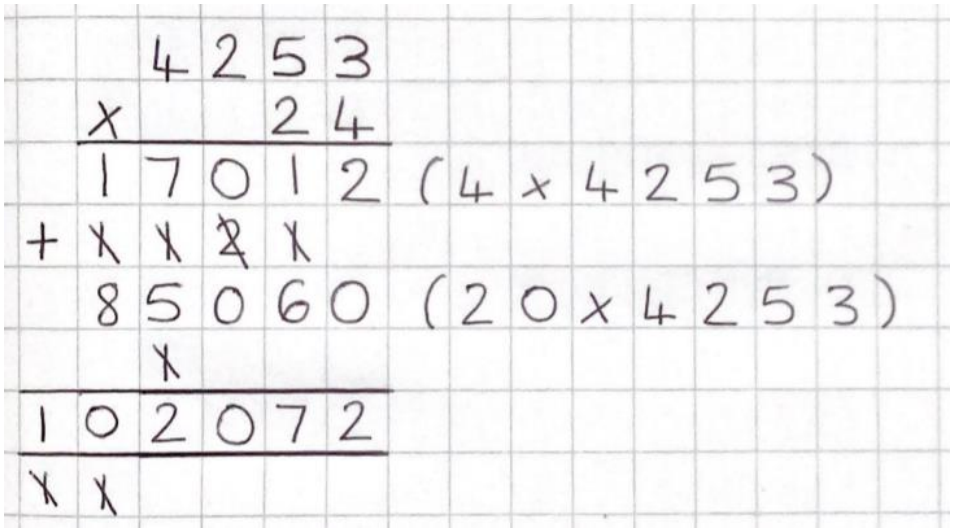
Before the end of Year 5, introduce **long multiplication** for multiplying 2-digit numbers by 2, 3 or 4-digit numbers

- When first introducing long multiplication,

  - write the 'know it' brackets to support understanding

  - write the 'place holder' in a different colour to draw attention to it and to ensure it's not forgotten (this is a common error)

  - these steps can be dropped once children are confident with the method



<u>Year 6</u>

Consolidate short and long multiplication, introducing decimals to long multiplication.

Division

Key vocabulary: number, numeral, digit, division bracket

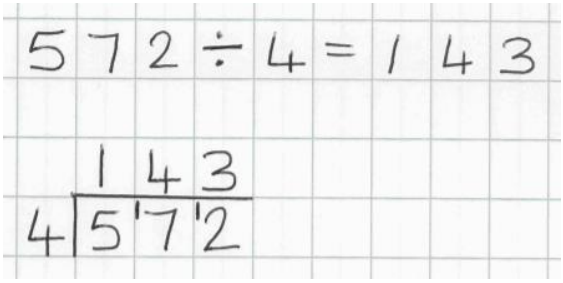
dividend divided by divisor equals quotient

96 ÷ 3 = 33

Essential manipulatives: place value counters, diennes (may support some children in visualising the value of the numbers)

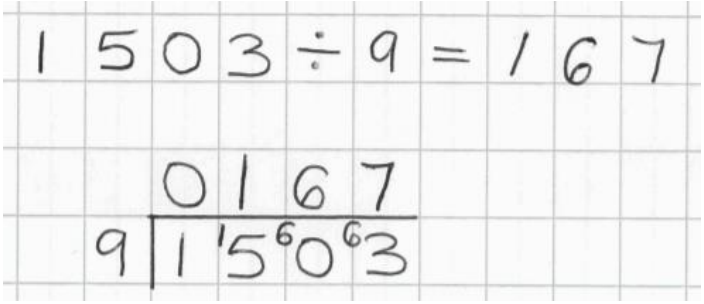
Year 3

- **Prior knowledge** – recording in Year 1 and Year 2 will have been informal jottings
- Introduce the **short division** method with **no remainders**
  - Use a divisor that is one of the taught Year 2 or 3 tables to reinforce learning of times tables (2, 5, 3, 4, 8)
  - Ensure the divisor is greater than 12 x the dividend; if it is not, children should be using mental methods / recall.
  - Always work from left to right to divide the digits of the dividend (eg 100s, then 10s, then 1s)
  - Use place value counters to support the introduction of short division



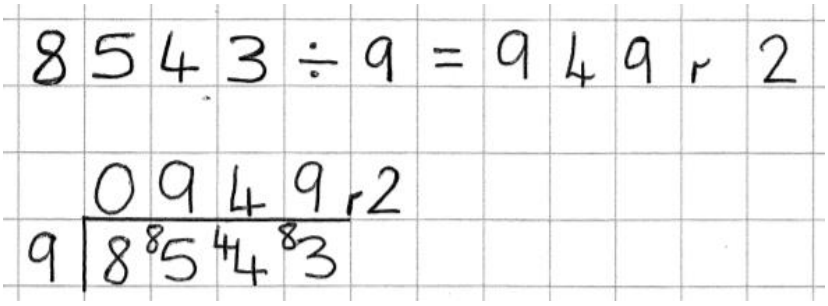
Year 4

- At the start of Year 4, most children should be using the **short division method** (with no remainder)
  - use a divisor between 3 and 9 to reinforce learning of times tables

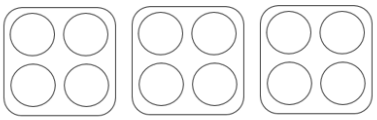
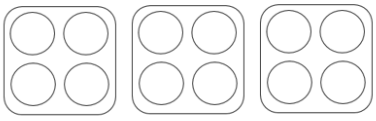


Year 5

- At the start of Year 5, most children should be using the **short division method** (with no remainder)
- Introduce short division with remainders. Firstly explore remainders expressed as 'r' followed by the amount (see example below)



- Next, explore remainders in the **context of word problems** where children need to consider how to **interpret the remainder** and decide whether they need to round their answer up or down. Make it explicit that this is not due to whether the digit that represents the remainder rounds up or down, it is due to the context of the question. See the examples below of how to explore this:

Ethan has 11 apples. How many full trays of 4 can be made?	***Ethan has 11 apples. How many trays of 4 apples will be needed for all the apples?***
 =	 =
Why are the answers to these questions different?	

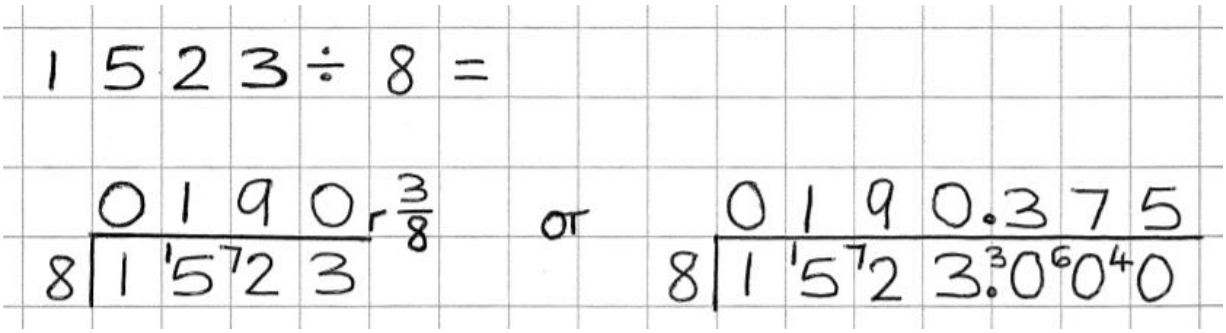
Example problems:

Sanjay has 5467 apples. How many trays of 4 will be needed for all the apples?

Sanjay has 5467 apples. How many trays of 4 will be full?

- Finally, introduce how the remainder for division calculations (not word problems) can be expressed as a fraction. Note some children may be confident to move on to expressing as a decimal.

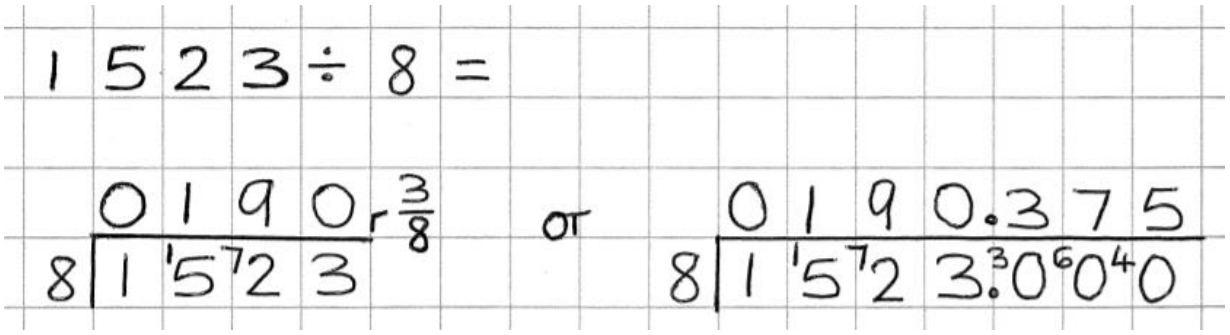
All children: Some children:



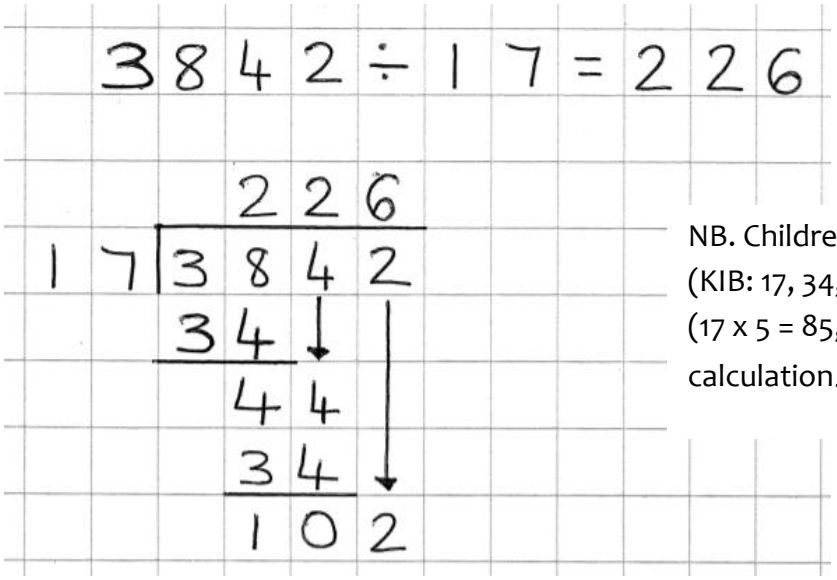
Year 6

At the start of Year 6, children will be using the **short division method**

- Consolidate how to express the remainder as a decimal or a fraction appropriate to context.



- Introduce long division (no remainder)



NB. Children may wish to write a know it box (KIB: 17, 34, 51, 68 etc.) or use near tables facts (17 x 5 = 85, 17 x 6 = 102) to support the calculation.