

By the end of the year all pupils should be able to add and subtract 3 digit numbers (check using the inverse) and relate to real life problems.
All pupils should be able to multiply and divide 2 digit numbers by 1 digit numbers (progressing to 3 digit by 1) and relate to real life problems.
Year 3 They should know 2x,5x and 10x, 3x, 4x and 8x times table facts and related division facts

+ Addition	- Subtraction	X Multiplication	÷ Division
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Method 1 (informal partition)

$$\begin{array}{r} 200^* + 30 + 6 \\ \quad 70 + 6 \\ \hline 200 + 100 + 9 = 309 \end{array}$$

*potential error: getting correct number of zeros.

Method 2 (Vertical expanded column)
 e.g. 236 + 73
 Use of manipulation

$$\begin{array}{r} 236 \\ + 73 \\ \hline 309 \end{array}$$

Leads to carrying method

*potential error: remembering to include zero.

Move on to 3 digit by 3 digit

Ensure images and models and manipulatives are used, and numberline method referred to
Alongside this method to show how one links to the other.

Refer to success@Arithmetic manual for further support.

Year 3 Subtracting with 2 and 3-digit numbers.

Introduce **partitioned column subtraction method.**

STEP 1: Introduce this method with examples where no exchanging is required. (Numicon picture below)

$$\begin{array}{r} 89 - 35 = 54 \\ \quad 80 + 9 \\ - \quad 30 + 5 \\ \hline \quad 50 + 4 \end{array}$$

When learning to 'exchange', explore 'partitioning in different ways' so that pupils understand that when you exchange, the **VALUE** is the same i.e. $72 = 70 + 2 = 60 + 12 = 50 + 22$ etc. Emphasise that the **value has not changed**, we have just partitioned it in a different way.

STEP 2: introduce 'exchanging' through practical subtraction. Make the larger number with Base 10, then subtract 47 from it.

$$\begin{array}{r} 72 - 47 \\ \quad 60 + 12 \\ - \quad 40 + 7 \\ \hline \quad 20 + 5 = 25 \end{array}$$

Before subtracting '7' from the 72 blocks, they will need to exchange a row of 10 for ten units. Then subtract 7, and subtract 4 tens.

STEP 3: Once pupils are secure with the understanding of 'exchanging', they can use the partitioned column method to subtract any 2 and 3-digit numbers.

$$\begin{array}{r} 238 - 146 = 92 \\ \quad 100 \\ \hline 200 + 30 + 8 \\ - 100 + 40 + 6 \\ \hline \quad 0 + 90 + 2 \end{array}$$

Use of Numicon to demonstrate the subtraction that is happening in the partitioned column subtraction method.

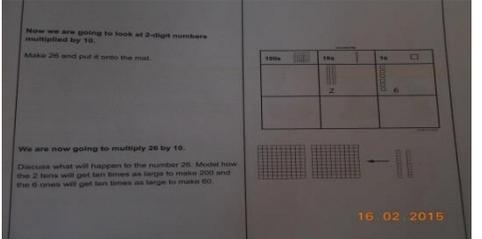
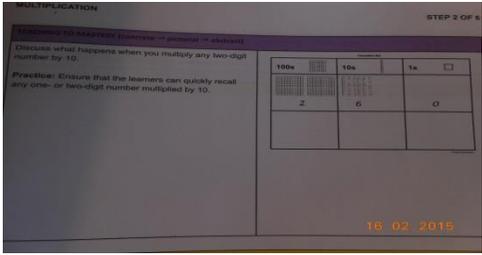
(Ensure children are still using counting on as a mental strategy for subtraction)

Continue from development of multiplication as repeated addition and understanding of arrays.

Know at speed the times table facts for 2x, 5x, 10 x, 3x, 4x and 8x.

Understand the key vocabulary related to division.

Teach effect of multiplying by 10 on whole numbers using calculation mat and denes;

Move on to:
Grid method.
 Grid method (TU x U and then HTU X U)
 e.g. **246 x 5 (Est 200 x 5 = 1000)**

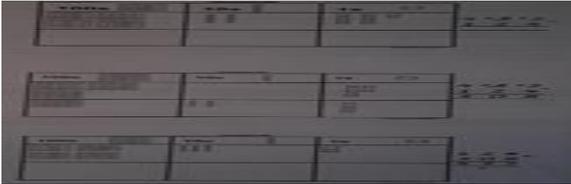
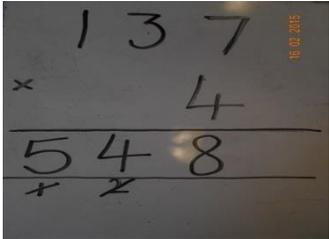
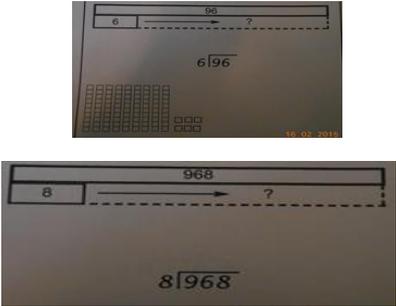
X	200	40	6
5	1000	200	30

NB: national expectation is that children will be using an efficient method by the end of Y4.

Derive quickly division facts corresponding to 2x, 5x and 10x, 3x, 4x and 8x times table.

- E.g. that if $3 \times 2 = 6$, then $2 \times 3 = 6$ and therefore $6 \div 3 = 2$ and $6 \div 2 = 3$ but that also $60 \div 3 = 20$ and $60 \div 20 = 3$ etc...
- E.g. Given three numbers such as 4, 5, 20; say or write different multiplication and division statements.
- Continue to use empty number lines for division and introduce remainders.
- Understand effect of dividing by 10
- Divide a 3-digit multiple of 100 by 10 or 100
 - $800 \div 100 = 8$
 - $300 \div 10 = 30$
- Solve division calculations by using multiplication strategies. Learning the inverse to check multiplication and to solve missing number calculations.
- Round remainders up or down depending on the context.
- Know the vocabulary related to division.

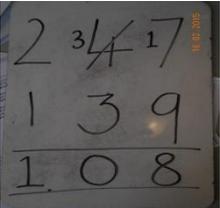
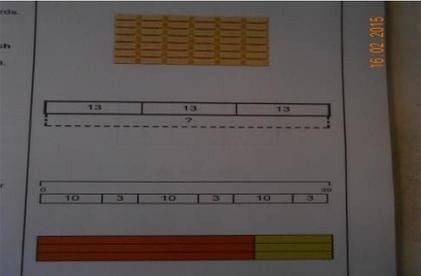
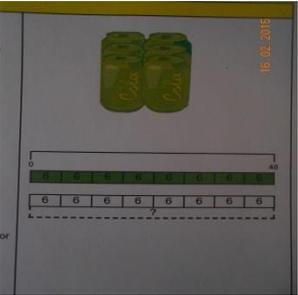
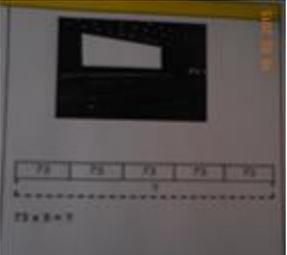
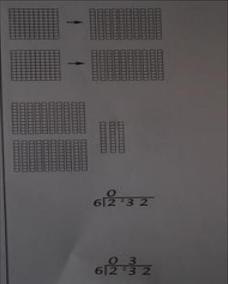
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	<p>Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer, how many less than, most, least, count back, how many left, how much is _? difference, count on, strategy partition, tens, units exchange, decrease, hundreds, value, digit</p> <p>Key Skills for subtraction at Y3</p> <ul style="list-style-type: none"> Subtract mental a: 3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds. Estimate answers and use inverse operations to check. Solve problems, including missing number problems. Find 10 or 100 more or less than a given number. Recognise the place value of each digit in a 3-digit number. Counting up differences as a mental strategy when numbers are close together or near multiples of 10. Read and write numbers up to 1000 in numerals and words. Practise mental subtraction strategies, such as subtracting near multiples of 10 and adjusting (e.g. subtracting 19 or 21), and select most appropriate methods to subtract, explaining why. <p>Alongside: Count ON in number line not back- use of manipulatives to cement understanding. Keep using for mental maths techniques</p> <p>Move on to use of calculation mats and denes, or other manipulatives to show how the numbers can be subtracted without partitioning</p> 	$\begin{array}{r} 1000 \\ +200 \\ \hline 30 \end{array}$ <p><i>This can be taught with the grid vertically drawn so that they can add up the numbers still in the grid.</i></p> <p>Begin using the grid alongside the short method to show how the two link and their skills can be transferred to the more efficient method of:</p> <p>Short multiplication TU x U and HTU X U</p> <p>Multiplying a 2 (AND THEN 3 DIGIT) digit number by a 1 digit number by partitioning.</p> <p>By jotting: $32 \times 2 = 30 \times 2 \text{ and } 2 \times 2$ $= 60 \text{ and } 4 = 64$</p> <p>Or Short multiplication HTU x U (with no carrying then on to carrying once they understand the concept) e.g. 137 x 4</p>  <p>Use to solve real life 1 and 2 stage problems (Testbase /NRich)</p> <ul style="list-style-type: none"> Repeated addition 	<p>Develop and refine written methods for division, building upon mental strategies.</p> <ul style="list-style-type: none"> Divide a 2-digit number by a single-digit, by using multiples of the divisor <p>Either:</p> <ul style="list-style-type: none"> Use informal jottings <p>e.g: $84 \div 7 = -$ $70 + 14$ $\downarrow \quad \downarrow \quad \div 7$ $10 + 2 = 12$</p> <p>As the mental method is recorded, ask “How many sevens in seventy?” and: “How many sevens in fourteen?”</p> <p>Or: Record mental division using partitioning: $64 \div 4 = (40 + 24) \div 4$ $= (40 \div 4) + (24 \div 4)$ $= 10 + 6 = 16$</p> <p>Begin to use short compacted method (called Bus Stop at WJS) Alongside bar method and visual representation of denes.</p> 

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	<p>Therefore moving on to using the efficient method of column subtraction to solve real life 1 and 2 step problems, with a range of units.</p> 	<ul style="list-style-type: none"> • Arrays • Partitioning • Simple grid/No decimals <p>Also refer to the Bar Method for solving problems: (refer to Success@Arithmetic Multiplication booklet)</p>   	 <p>Use without remainders and with remainders. Related to real life problem solving and using inverse and estimation to check.</p>

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