

Ashfield Primary School – subtraction calculation policy

Our aim is for children to use mental methods when appropriate but for calculations that they cannot solve in their heads, we aim to teach children to use an appropriate written method which they can use accurately and confidently. This policy shows how to build up to a compact, efficient method of Subtraction. **Please see the attached appendix for further examples of concrete, pictorial and abstract methods**



	Year group
<p>Pre-requisites:</p> <ul style="list-style-type: none"> - Uses some number names and number language accurately. - Recites numbers in order to 10. <p>Knows that numbers identify how many objects are in a set.</p> <ul style="list-style-type: none"> - Beginning to represent numbers using fingers, marks on paper or pictures. - Compare sets and say when they have the same number. <p>Key vocabulary:</p> <p>More, not enough, too much, gone, all gone, bigger, hotter, older, faster, smaller, colder, younger, slower, lots, fewer, more than, less than, same, big, long, hot, old, far fast, small, short, cold, young, new, slow.</p> <p>Number, take, take away, leave, fewer, left, less, count back, altogether, how many are left / left over? How many have gone? One less, two less, ten less, how many fewer is ... than ...? Difference between, is the same as.</p>	<p>Reception</p> <p>Find one less from a group of up to 5 objects then 10.</p> <p>Subtract two single digit numbers and count back to find the answer.</p> <p>Records, using marks that they can interpret and explain.</p> <p>Opportunities to develop subtraction skills begin in Foundation Stage 1 when children will have opportunities to engage in a wide variety of songs and rhymes, games and activities that link to taking 1 away.</p> <div style="text-align: center;"> </div> <p>Children should be able to find one less from a group of objects using practical equipment.</p> <p>e.g. $3 - 1 = 2$</p> <div style="text-align: center;"> </div> <p>They should also learn to relate subtraction to 'taking away', using objects to count 'how many are left' after some have been taken away.</p>

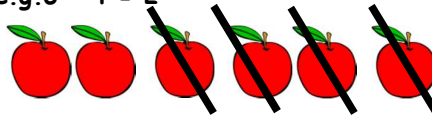
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Physically taking away and removing objects from a whole (use various objects too) rather than crossing out – children will physically remove the objects

$$4 - 3 = 1$$



e.g. $6 - 4 = 2$



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Pre-requisites:

- count reliably with numbers from 1 - 20 and place them in order
- say 1 less than a given number
- subtract two single digit numbers
- count back to find answers

Key vocabulary:

Number bonds, number line, difference between, subtract, take away, minus, leave, gone, less than, how many fewer? How much less? Distance between, equals, sign

Year 1

Subtract one-digit and two-digit numbers to 20, including 0.

Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs.

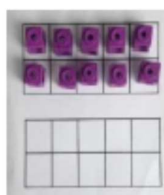
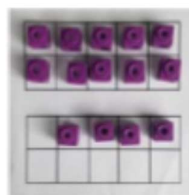
Children should be taught to use concrete objects and pictorial representations to calculate such as bead strings, counting equipment, Numicon and Numicon subtraction covers. They should also learn how to subtract using number lines. Jumps on the number line should be drawn **above** the line.

e.g. $13 - 5 = 8$



Children should be taught how to use ten frames.

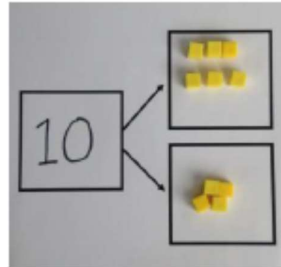
$14 - 5$



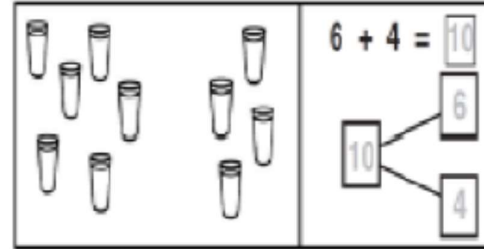
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Children can also be taught using the part part whole model.

Pupils could place ten on top of the whole as well as writing it down. The parts could also be written in



along side the concrete representation.



$$10 = 6 + 4$$

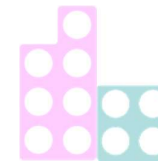
$$10 - 6 = 4$$

$$10 - 4 = 6$$

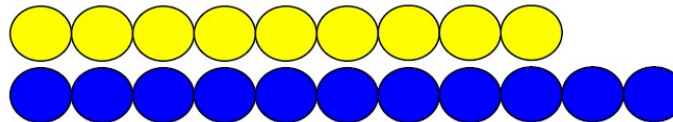
$$10 = 4 + 6$$

Children should be taught how to find small differences using apparatus like cubes, beads or Numicon etc. Children should use models so they can see the difference clearly.

e.g. $7 - 4 = 3$ 'The difference between 7 and 4 is 3.'



The difference between nine and eleven is two.



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<p>Pre-requisites:</p> <ul style="list-style-type: none"> - count from and across 100 backwards - count, read and write numbers to 100 in numerals - count in tens - understand how to use a numbered number line - memorise number bonds to 10 and 20 - subtract one and two-digit numbers using numbers to 20 using apparatus <p>Key vocabulary: Number bonds, number line, difference between, subtract, take away, decrease, minus, leave, gone, less than, how many fewer? How much less? Distance between, tens boundary equals, sign</p>	<p><u>Year 2</u></p> <p>Subtract numbers using concrete objects, pictorial representations and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers and three one-digit numbers together.</p> <div data-bbox="741 521 1444 808" data-label="Image"> </div> <p>Children should be taught to use a hundred square to count back in ones and tens. Children should partition the number to be subtracted into tens and ones and should represent this using pictorial representations under the tens and ones columns (tens sticks and ones dots). They should then count back in tens first, then count back in ones.</p> <p>Children should be able to use their knowledge of place value in order to subtract 2 (or 3 digit numbers if able), using base ten equipment e.g. 156 – 24 = 132</p> <div data-bbox="711 1175 1222 1338" data-label="Image"> </div>
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Children should then move onto using pictorial representations to calculate. Children should be confident in their understanding that for a subtraction calculation, they **do not add pictorial representations under the second number (number being subtracted)**



e.g. $156 - 24 = 132$


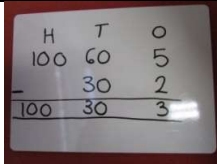
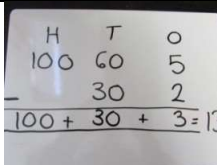
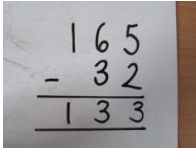

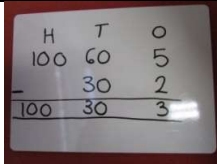
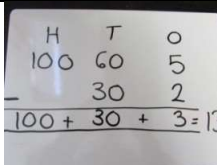

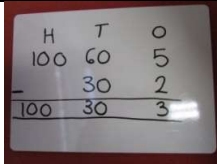
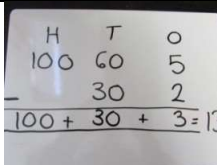
Children should be able to draw their own empty number lines to solve subtraction calculations and should be able to subtract multiples of 10 in one go. Children could split the 27 into tens and ones to remind them how many tens and ones to subtract before calculating. Children should work up to the tens boundary when subtracting ones **e.g. $74 - 27 = 47$**

Another important step is to teach children to find the difference. Instead of subtracting from the largest number, children work from the smallest number up to the largest number, drawing their own number line (still finding the same answer). **e.g. $74 - 27 = 47$**

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	 <p>A handwritten number line on a piece of paper. The line starts at 27 and ends at 74. There are three jumps marked with arcs above the line: a jump of 3 from 27 to 30, a jump of 40 from 30 to 70, and a jump of 4 from 70 to 74. The numbers 27, 30, 70, and 74 are written below the line. The jumps are labeled with '+3', '+40', and '+4' above the arcs. To the right of the number line, the number 4 is written vertically.</p>	
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<p>Pre-requisites:</p> <ul style="list-style-type: none"> - understanding of the place value of 2 digit numbers - be able to count back in tens from any number - be able to subtract multiples of 10 - understand how to draw a blank number line - understand bridging - recall subtraction facts to 20 fluently <p>Key vocabulary:</p> <p>Difference between, subtract, take away, decrease, minus, leave, gone, less than, how many fewer? How much less?</p> <p>Distance between, tens/hundreds boundary, equals, sign, column subtraction, column, exchange</p>	<p>Year 3</p> <p>Subtract numbers with up to three digits, using formal written methods of columnar subtraction.</p> <p>Chn should be shown the expanded column method alongside the compact column method. The expanded column method should be taught using base ten equipment in a Hs, Ts and Os grid before expecting children to record their method. This is an important step as it ensures children understand the place value of each digit before moving onto the compact method. Children should become confident solving expanded and compact calculations without exchange before moving onto exchanging tens or hundreds.</p> <p>Expanded method (no exchange)e.g. $165 - 32 = 133$</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> <p>Children should be able to partition both numbers into hundreds, tens and ones and make the first number using base ten equipment. Children should expand their numbers in the calculation and write out as shown.</p> </td><td style="width: 50%; padding: 5px;">  </td></tr> <tr> <td style="padding: 5px;"> <p>Always beginning with the ones column, children subtract the numbers in the ones column, in the Tens then in the Hundreds. Children can use a 0-20 number line for quick recall of subtraction facts if needed.</p> </td><td style="padding: 5px;">  </td></tr> <tr> <td style="padding: 5px;"> <p>Children should then recombine the numbers in the hundreds, tens and ones columns together to produce their answer.</p> </td><td style="padding: 5px;">  </td></tr> </table> <p>Children should also be shown alongside this method that you can also write the calculation in the compact form (not partitioned or expanded).</p> <div style="text-align: right;">  </div>	<p>Children should be able to partition both numbers into hundreds, tens and ones and make the first number using base ten equipment. Children should expand their numbers in the calculation and write out as shown.</p>		<p>Always beginning with the ones column, children subtract the numbers in the ones column, in the Tens then in the Hundreds. Children can use a 0-20 number line for quick recall of subtraction facts if needed.</p>		<p>Children should then recombine the numbers in the hundreds, tens and ones columns together to produce their answer.</p>	
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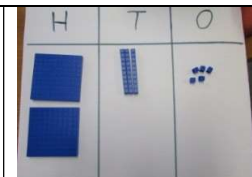
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Once children are confident solving expanded and compact calculations, children should move onto calculations involving exchange (where you have to 'exchange' a ten or hundred from the next column). This should be taught using base ten equipment alongside. Use the words "exchange ten" or "exchange one hundred."

e.g. $235 - 142 =$ (involving exchange)

Children begin by partitioning only the first number into hundreds, tens and ones using base ten equipment. Children should write the compact calculation alongside.

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 2 \quad 3 \quad 5 \\ - 1 \quad 4 \quad 2 \\ \hline \end{array}$$

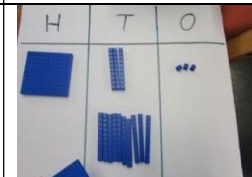


Always starting with the ones column, children takeaway 2 from 5 ones. Moving onto the tens, children realise they cannot take 4 tens from 3 tens so they exchange one hundred for 10 tens and cross the 2 out to write 1.

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ \cancel{2} \quad 3 \quad 5 \\ - 1 \quad 4 \quad 2 \\ \hline \quad \quad 3 \end{array}$$

Children then need to be shown how to move across the exchanged hundred into the tens column by writing a 1 (worth 100) - regroup. They can now solve 13 tens take away 4 tens which equals 9 tens (written as a 9).

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ \cancel{2} \quad 13 \quad 5 \\ - 1 \quad 4 \quad 2 \\ \hline \quad 9 \quad 3 \end{array}$$



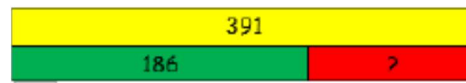
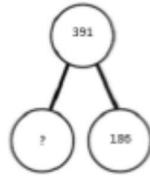
Children should finally subtract the numbers in the hundreds column and record their answer.

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ \cancel{2} \quad 13 \quad 5 \\ - 1 \quad 4 \quad 2 \\ \hline 0 \quad 9 \quad 3 \end{array}$$



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Bar model can also be used:



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Pre-requisites:

- understanding of place value up to 3 digits
- understanding of how to subtract accurately using compact column subtraction
- good recall of subtraction facts from 20
- an understanding you begin column calculations from the right hand side first

Key vocabulary:

Difference between, subtract, take away, decrease, minus, leave, gone, less than, how many fewer? How much less?
Distance between,
tens/hundreds/thousands boundary,
equals, sign, column subtraction, column, exchange

Year 4

Subtract numbers with up to 4 digits using the formal methods of columnar subtraction.

This method should be taught when children are completely confident in using the compact column method and can understand the need to exchange numbers from the larger columns. Use the words "exchange ten" or "exchange one hundred." Children can continue to write Th, H, T, O above each column to help remind them of the place value of each digit.

e.g. $2761 - 1299 =$

$$\begin{array}{r} 2 \overset{6}{\cancel{7}} \overset{15}{\cancel{6}} \overset{1}{\cancel{1}} \\ - 1 \ 2 \ 9 \ 9 \\ \hline 1 \ 4 \ 6 \ 2 \end{array}$$


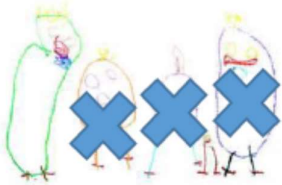

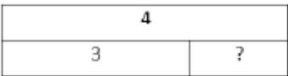
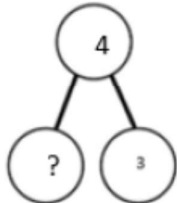
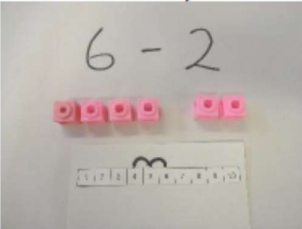

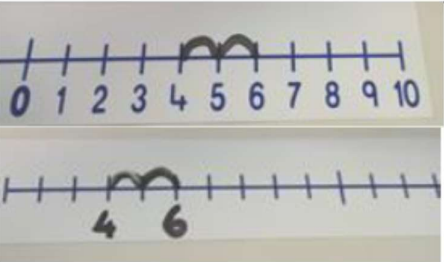
It is important that children say "15 tens take 9 tens" not "15 - 9". Use the term "exchange" not borrow.

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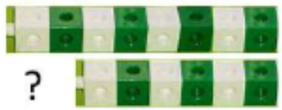
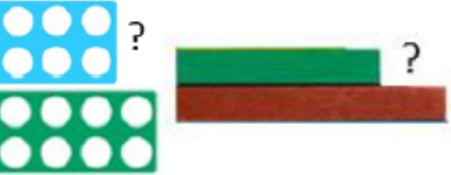
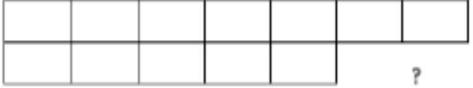


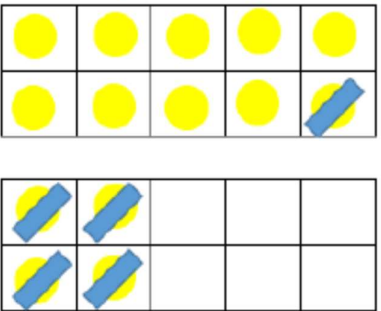
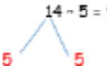


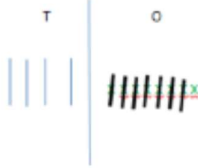
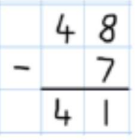
<p>Pre-requisites:</p> <ul style="list-style-type: none">- understanding of place value up to 1, 000, 000 (10,000,000 Year 6)- understanding of decimal numbers <p>Key vocabulary:</p> <p>Difference between, subtract, take away, minus, leave, gone, less than, how many fewer? How much less? Distance between, tens/hundreds/thousands boundary, equals, sign, column subtraction, column, efficient written method, order of operations, exchange</p>	<p><u>Years 5 and 6</u></p> <p>Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction).</p> <p>Larger numbers should be introduced when children are completely confident in using the compact column method and can understand the need to exchange numbers from the larger columns. Continue to use the words "exchange ten" or "exchange one hundred." Children should not need H, T, O etc marked above each column once working with 4 or 5 digit numbers.</p> <p>Introduce estimating and rounding as a method of checking</p> <p>Introduce subtraction of decimals, initially in the context of money and measures.</p> <p>Continue to practise and apply the formal written method with large numbers and decimals throughout year five.</p> <p>Column subtraction calculations using more than 4 digits should be solved as shown above.</p> <p>Children should also have experience subtracting decimal numbers with more than 4 digits.</p>
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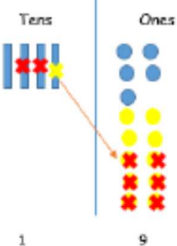

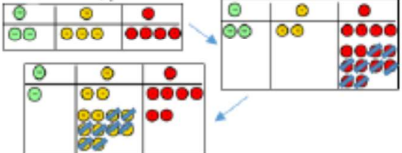
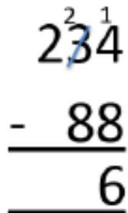
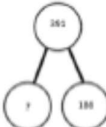

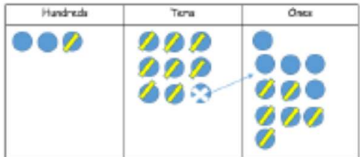
Appendix : Examples of concrete, pictorial and abstract

Concrete	Pictorial	Abstract
<p>Physically taking away and removing objects from a whole (use various objects too) rather than crossing out- children will physically remove the objects</p> <p>$4 - 3 = 1$</p> 	<p>Children to draw the concrete resources they are using and cross out.</p>  <p>Use of the bar model:</p> 	<p>$4 - 3 =$</p> <p> $= 4 - 3$</p>  
<p>Counting back (using number lines or number tracks)</p> 	<p>Children to represent what they see pictorially e.g.</p> <p style="text-align: center;">6</p>  <p style="text-align: center;">? 2</p>	

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<p>Finding the difference (using cubes, numicon or Cuisenaire rods, other objects can also be used)</p>  	<p>Children to draw the cubes/other concrete objects which they have used</p> <p>XXXXXXXXX XXXXXX</p> <p>Use of the bar model</p> 	<p>Find the difference between 8 and 6.</p> <p>8 - 6, the difference is ?</p> <p>Children to also explore why 9 - 7 = 8 - 6 (the difference, of each digit, has changed by 1 so the difference is the same- this will help when solving 10000-9987)</p>
<p>Making 10 (using numicon or ten frames) 14 - 5</p>  <p>Children could also do this by subtracting a 5 from the 10.</p> 	<p>Children to present the ten frame pictorially</p> 	<p>14 - 5 = 9 You also want children to see related facts e.g. 15 - 9 = 5</p> <p>Children to represent how they have solved it e.g.</p> <div style="display: flex; justify-content: space-around;"> <div> <p>14 - 5 = 9</p>  </div> <div> <p>14 is made up of 5, 5 and 4 so I can subtract one 5 to be left with 4 and 5</p> </div> </div> <div style="display: flex; justify-content: space-around;"> <div> <p>14 - 5 = 9</p>  </div> <div> <p>5 is made up of 4 and 1 so I can subtract 4 to make 10 and then 1 to get to 9</p> </div> </div>
<p>Column method (using base 10) 48-7</p> 	<p>T O</p> 	<p>48 - 7 =</p> 

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<p>Column method (using base 10 and having to exchange)</p> <p>45-26</p>  <ol style="list-style-type: none"> 1) Start by partitioning 45 2) Exchange one ten for ten more ones 3) Subtract the ones, then the tens. 	<p>Represent the base 10 pictorially</p> 	<p>It's crucial that the children understand that when they have exchanged the 10 they still have 45. $45 = 30 + 15$</p> 	
<p>Column method (using place value counters) $234-88$</p> 	<p>Once the children have had practice with the concrete, they should be able to apply it to any subtraction.</p> <p>Like the other pictorial representations, children to represent the counters.</p>		
<p>Fluency variation, different ways to ask children to solve $391-186$:</p>			
 	<p>Raj spent £391, Timmy spent £186. How much more did Raj spend?</p> <p>I had 391 metres to run. After 186 I stopped. How many metres do I have left to run?</p>	<p>$391 - 186$</p> <p><input type="text"/> = $391 - 186$</p> $\begin{array}{r} 391 \\ -186 \\ \hline \end{array}$ <p>Find the difference between 391 and 186</p> <p>Subtract 186 from 391.</p> <p>What is 186 less than 391?</p>	<p>What's the calculation? What's the answer?</p>  $\begin{array}{r} 391 \\ -186 \\ \hline \end{array}$