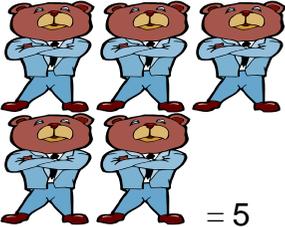
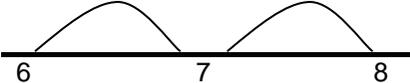


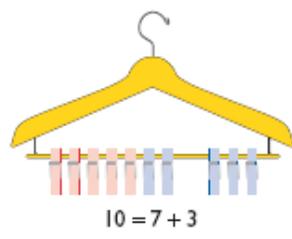
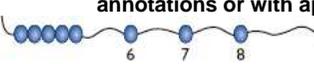
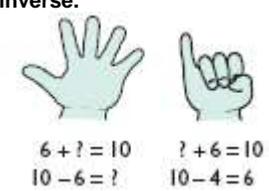
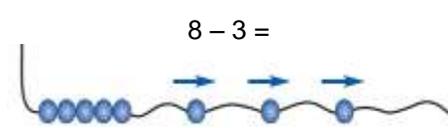
St Mary's Catholic Primary School

Calculations Policy: Addition and Subtraction

September 2015

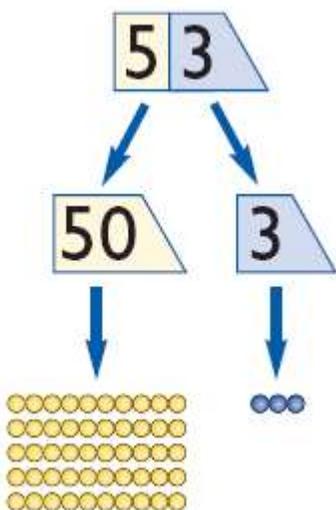
Children should be encouraged to estimate answers to their calculations- trying to get a feel for the numbers that they are working with.
Autumn 2012

Stage	Addition	Notes	Subtraction	Notes
A	<ul style="list-style-type: none"> Counting objects. Partitioning and recombining sets. Understand that the number gets bigger. Addition is cumulative. <p>Jane had 3 bears. She was given 2 more. How many does she have now?</p>  <p style="text-align: right;">= 5</p> <p>Pictorial representations. Writing numerals.</p> $3 + 2 = 5$ <p>and vice versa (commutative) Decision making, statements and word problems Count 5 objects into a bag. How many objects in the bag? Count 2 more objects into the bag. How many objects are in the bag now?</p>	<p>See primary framework site for vocabulary expected at each stage.</p> <p>Use number stories. Begin to use the vocabulary involving adding and subtracting.</p> <p>Using a calculator in role play.</p>	<ul style="list-style-type: none"> Know that the number gets smaller Counting back on fingers, orally, number lines. Find the difference, counting on. Models and Images charts. <p>Practical demonstrations of take away. <i>There were 9 balloons. Two popped. How many are left?</i></p>  <p>Writing numerals $9 - 2 = 7$</p> <ul style="list-style-type: none"> Find the difference where numbers are close together. <i>How many more do I add to 6 to get to 8?</i> $8 - 6 = 2$  <p>Decision making, statements and word problems We made 6 mince pies. We ate 2 of them. How many pies are left?</p>	NNS p14-17 Section 4

<p>B</p>	<ul style="list-style-type: none"> • Key skills of knowing number bonds to 10.  <p>$10 = 7 + 3$</p> <ul style="list-style-type: none"> • Counting forwards and recording on a number line. $\begin{array}{r} 3 + 5 = \\ \underline{3} \qquad \qquad \qquad 8 \end{array}$ <ul style="list-style-type: none"> • Reordering – largest number first. • Recording in number sentences and communication along number lines, with annotations or with appropriate equipment.  $\begin{array}{r} 5 \qquad \qquad \qquad 8 \\ \hline \end{array}$ <p>(Use a counting stick both horizontally and vertically)</p> <ul style="list-style-type: none"> • Addition is the inverse of subtraction. $\begin{array}{r} 2 + 3 = 5 \\ 3 + 2 = 5 \\ 5 - 3 = 2 \end{array}$	<p>Recognise the use of symbols to stand for an unknown number.</p> <p>Recognise that more than two numbers can be added together.</p> <p>Explain strategies.</p> <p>Record using informal recording.</p> <p>Using a calculator to support mathematical learning.</p>	<ul style="list-style-type: none"> • Subtraction sentences and jumps along number lines. • Check with the inverse.  <p>$6 + ? = 10$ $10 - 6 = ?$</p> <p>$? + 6 = 10$ $10 - 4 = 6$</p>  <p>$8 - 3 =$</p> $15 - 8 = 7$ $\begin{array}{r} \qquad \qquad \qquad -1-1-1-1-1-1-1 \\ \hline 0 \qquad \qquad 7 \qquad \qquad \qquad 15 \end{array}$ <ul style="list-style-type: none"> • Know that 8 can be thought of as 5 and 3. $\begin{array}{r} -3 \qquad \qquad -5 \\ \hline 7 \qquad 10 \qquad 15 \end{array}$ <ul style="list-style-type: none"> • Find the difference by counting on along a number line. $15 - 8 =$ $\begin{array}{r} 8 \quad +1 \\ \hline 9 \quad 10 \quad 11 \quad 12 \quad 13 \quad 14 \quad 15 \end{array}$ $\begin{array}{r} 8 \quad +2 \qquad \qquad +5 \\ \hline 10 \qquad \qquad \qquad 15 \end{array}$	<p>Emphasis should be on mental calculation. Taking away. Difference Use of a number line.</p>
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Children should be encouraged to estimate answers to their calculations- trying to get a feel for the numbers that they are working with.
Autumn 2012

<ul style="list-style-type: none"> Using shapes to represent a missing number. $\square + \square = \triangle$ $6 + 6 = 12$ $\triangle = \square + \square$ $12 = 6 + 6$ <ul style="list-style-type: none"> Adding more than two number <p>Reorder $5+3+1=9$</p> <ul style="list-style-type: none"> Strategy to include looking for bonds that are useful eg bonds to 10 $6+3+2+7+4=22$ <ul style="list-style-type: none"> Compensation strategy $5 + 9 =$ $5 + 10 - 1$ <ul style="list-style-type: none"> Doubles then near doubles $5 + 6 =$ $5 + 5 + 1 =$ <p>Decision making Statements and word problems Using statements such as: Ben did $14 + 9 = 23$ How could he have done it?</p>		<ul style="list-style-type: none"> Use patterns to find answers to subtractions $10 + 4 = 14$ $20 + 4 = 24$ $10 - 4 = 6$ $20 - 4 = 16$ <p>Introduce using \square to stand for an unknown number.</p> <p>Decision making Statements and word problems</p> $17 - \square = 12$ <p>Sam works out $17 - 5 = 12$. How could he have done this?</p>	<p>Practical work leading to horizontal number sentences and a number line.</p>
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C	<p>Combining sets to make a total. Progression in use of the number line. Reordering.</p> <p>$25 + 58 = 83$ $58 + 25 = 83$</p> <p>adding in 10s and 1s</p> $\begin{array}{cccccccc} & +10 & +10 & +1 & +1 & +1 & +1 & +1 \\ \hline 58 & 68 & 78 & 79 & 80 & 81 & 82 & 83 \end{array}$ <p>add 20, add on to next ten, add on</p> $\begin{array}{cccc} & +20 & +2 & +3 \\ \hline 58 & 78 & 80 & 83 \end{array}$ <p>add 20, bridge the 10</p> $\begin{array}{ccc} & +20 & +5 \\ \hline 58 & 78 & 83 \end{array}$ <p>Record partitioned steps in number sentences underneath each other and add mentally.</p> $\begin{array}{rcl} 58 & + & 25 \\ \\ 50 & + & 20 & = & \mathbf{70} \\ 8 & + & 5 & = & \mathbf{13} \\ 58 & + & 25 & = & \mathbf{83} \end{array}$ <p>Check answers using a suitable strategy eg</p>	<p>Use and read vocabulary related to addition.</p> <p>Explain strategies.</p> <p>Using a calculator to support mathematical learning.</p>	<p>Place value. Partitioning of numbers into T and U then HTU. Know what each digit represents.</p>  <p>Counting back from the larger number in partitioned steps of the smaller number to reach the unknown.</p> <p>$55 - 27$ <i>Partitioning the 27 into 20, 5 and 2.</i></p> $\begin{array}{ccccccc} & -2 & -5 & -20 & & & \\ \hline 28 & 30 & 35 & & 55 & & \end{array}$ <p>$55 - 27 = 28$</p> <p><i>Find the difference</i> $55 - 27 = 28$</p>	<p>Emphasis on mental calculation. Understand that subtraction can NOT be done in any order.</p>
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<p>70+10+3 or 10+70+3</p> <p>Begin to partition numbers and recombine e.g.</p> <p>58 + 24</p>  <p>70 + 12 = 82</p> <p>Decision making, statements and word problems</p> <p>Tell me 3 numbers that add up to 20. Are there any others?</p> <p>How many steps must be taken to get from 13 to 20 on a number line?</p>		$ \begin{array}{ccccccc} & +3 & & +20 & & +5 & \\ \hline 27 & & 30 & & & 50 & 55 \end{array} $	
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D	<ul style="list-style-type: none"> • Calculations involving three digit numbers. • Using a calculator to solve / support addition calculations. • Children to begin to use the extended method of calculating (formalising the above partitioning method). $67 + 24 =$ $\begin{array}{r} 60 + 7 \\ 20 + 4 \\ \hline 80 + 11 = 91 \end{array}$ <p>Moving on to</p> $\begin{array}{r} 67 \\ + 24 \\ \hline 80 \text{ (60 + 20)} \\ 11 \text{ (7 + 4)} \\ \hline 91 \end{array}$ <p>Decision making, statements and word problems</p> <p>Find as many totals as you can make by using three of these 5 numbers: 19, 63, 54, 106, 97.</p> <p>There are 18 apples, 21 pears and 19 bananas in some boxes of fruit. How many pieces of fruit are there altogether?</p>	<p>Using a calculator in line with the framework objectives.</p> <p>Adding most significant digits first.</p> <p>Moving onto vertical addition.</p> <p>All language in the context of place value and the mental addition of the totals to be done in any order.</p>	<p>Counting beyond zero, negative numbers. TU – TU, HTU – TU, HTU – HTU Lead on to decomposition method in expanded format. Ensure understanding of number partitioning and exchange. Least significant digit is always dealt with first to establish if the exchange is needed.</p> $783 - 356 \quad 300, 50 \text{ and } 6$ $\begin{array}{r} 783 \\ - 356 \\ \hline 427 \end{array}$ <p>783 – 356 = 427</p> <p>Difference strategy</p> $\begin{array}{r} 783 \\ - 356 \\ \hline 427 \end{array}$ <p>Both strategies need to record the answer in a number sentence</p> <p>783 - 356 = 427 "783 to subtract 356 equals 427"</p> $\begin{array}{r} 8 = 80 \text{ and } 9 \\ 9 \\ - 2 = 20 \text{ and } 4 \\ 4 \\ \hline 6 = 60 \text{ and } 5 \\ 5 \\ \hline \end{array}$ <p>"9 subtract 4 equals 5 and 80 subtract 20 equals 60. 60 and 5 make 65"</p>	<p>Check for mental approach first before written method. "Can I do this in my head?"</p>
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		<p>Adding on method:</p> $ \begin{array}{r} 89 \\ - 24 \\ \hline 6 \text{ (30)} \\ 50 \text{ (80)} \\ 9 \text{ (89)} \\ \hline 65 \end{array} $ <p>“ Add 6 to 24 to make 30. Add 50 to 30 to make 80. Add 9 to 80 to make 89. So 6 add 50 add 9 equals 65.”</p> <p>Expanded form Recap: use of apparatus to understand rearrangements, eg 55 as 40 and 15, not as part of calculations.</p> <p>36 can be rearranged with dienes to show 20 and 16.</p> $ \begin{array}{r} 81 = 80 \text{ and } 1 \quad 70 \text{ and } 11 \\ - 57 = 50 \text{ and } 7 \quad 50 \text{ and } 7 \\ \hline 24 = \underline{\quad\quad\quad} 20 \text{ and } 4 \end{array} $ <p>“ 1 subtract 7 is tricky so I will exchange 81 into 70 and 11. 11 subtract 7 equals 4 and 70 subtract 50 equals 20. 20 and 4 make 24.”</p> <p>Decision making, statements and word problems A box holds 35 mangos. How many mangos are left if you eat 17?</p> <p>I think of a number then subtract 12. The answer is 26. What was my number?</p>	
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<p>E</p>	<p>HTU + TU, then HTU + HTU. Cross 10s, 100s boundary. Add least significant digits first. Check for mental approach first before written method.</p> <p>Record steps in brackets then move to working without. Double lines for answer.</p> $\begin{array}{r} 625 \\ + 48 \\ \hline 13 \quad (5+8) \\ 60 \quad (20 + 40) \\ + 600 \quad (600) \\ \hline 673 \end{array}$ $\begin{array}{r} 356 \\ + 97 \\ \hline 13 \\ 140 \\ + 300 \\ \hline 453 \end{array}$ <p>Add mentally from top <u>or</u> bottom.</p> <p>Simple decimals £ and pence notation</p> $\begin{array}{r} £ \\ 1.45 \\ 0.55 \\ + 0.32 \end{array}$	<p>Use informal pencil and paper methods to support, record and explain partial mental methods.</p> <p>Calculator skills enhanced.</p> <p>Children to be encouraged to check for a mental calculation method first.</p> <p>Approximate, calculate and check it mate!</p>	<p>HTU – TU, then HTU – HTU Extend to simple decimals with or without exchange from pence to pounds. Ensure that all calculation is checked before started for any other possible ‘tricky’ bits. Ensure that the setting out is accurate.</p> <p>Subtraction using the complementary addition (adding on)</p> $754 - 86 =$ $\begin{array}{r} +14 \qquad \qquad +654 \\ \hline 86 \quad 100 \qquad \qquad \qquad 754 \end{array}$ <p>Decomposition (expanded form)</p> $\begin{array}{r} 754 \\ - 86 \\ \hline \end{array} \qquad \begin{array}{r} 40 \quad 1 \\ 700 + 50 + 4 \\ 80 + 6 \end{array}$ <p>Exchange from T to U Exchange from H to T</p> <p>Subtraction with decimals using the complementary addition £8.95 - £4.38 =</p> $\begin{array}{r} +0.62 \qquad \qquad +3.00 \qquad \qquad +0.95 \\ \hline 4.38 \quad 5.00 \qquad \qquad 8.00 \qquad \qquad 8.95 \end{array}$ $0.62 + 3.00 + 0.95 = 4.57$	
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Autumn 2012

$$\begin{array}{r} 0.12 \\ 1.20 \\ + 1.00 \\ \hline 2.32 \end{array}$$

Decision making, statements and word problems

What is the total cost of a £4.70 book and a £6.10 game?

Two shelves are 75 cm and 83cm long.
What is their total length in metres?
What is the difference in their lengths in centimetres?

Decomposition (expanded form)

$$\begin{array}{r} \pounds \qquad \pounds \\ 8.95 \quad 8 \text{ . } 90 \text{ and } 5 \\ - 4.38 \quad 4 \text{ . } 30 \text{ and } 8 \\ \hline 4.57 \end{array}$$

$$\begin{array}{r} \pounds \qquad \pounds \\ 8.95 \quad 8 \text{ . } 80 \text{ and } 15 \\ - 4.38 \quad - 4 \text{ . } 30 \text{ and } 8 \\ \hline 4.57 \quad 4 \text{ . } 50 \text{ and } 7 \end{array}$$

Decision making, statements and word problems

Lauren has 3 50p coins and 3 20p coins. She plays 90p for a Big Dipper ride.
How much does she have left?

A family sets off to drive 524 miles. After 267 miles how much further do they have to go?

F	<p>Children to consolidate vertical method.</p> <p>HTU + HTU, then ThHTU + ThHTU.</p> <p>Refer to the carried digit as a ten or a hundred.</p> <p>Carry below the line under appropriate column</p> $\begin{array}{r} 587 \\ + 475 \\ \hline 12 \\ 150 \\ + 900 \\ \hline 1062 \end{array}$ $\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \end{array}$ $\begin{array}{r} 7648 \\ + 1486 \\ \hline 14 \\ 120 \\ 1000 \\ 8000 \\ \hline 9134 \end{array}$ $\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \end{array}$ <p>Fix the decimal point.</p> $\begin{array}{r} 12.45 \\ 7.36 \\ + 24.50 \\ \hline 0.11 \\ 1.20 \\ 13.00 \\ 30.00 \\ \hline 44.31 \end{array}$ $\begin{array}{r} 12.45 \\ + 7.36 \\ \hline 44.31 \end{array}$	<p>Stress importance of columns and place value.</p> <p>Double lines for answers.</p> <p>Check the mental approach first before written method.</p> <p>Encourage mental methods and informal recording using efficient, reliable and appropriate methods.</p>	<p>Consolidate decomposition & complementary addition. (HTU – HTU) (ThHTU – ThHTU) (THHTU – HTU)</p> <p>Pupils taught to cross out the numbers and replace them with the exchanged number (care re vocabulary).</p> <p>Consolidate decimals</p> <p>Check answers through inverse and equivalent calculations.</p> <p>Teach checking strategy</p> <p>Decomposition (expanded form)</p> $\begin{array}{r} 754 \\ - 86 \\ \hline 468 \end{array}$ $\begin{array}{r} 600 & 140 & 14 \\ 700 & 50 & 4 \\ - 200 & 80 & 6 \\ \hline 400 & 60 & 8 \end{array}$ <p>Decomposition (compact)</p> $\begin{array}{r} \overset{6}{7} \overset{14}{5} \overset{1}{4} \\ - 286 \\ \hline 468 \end{array}$	
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	<p>Language must be in the context of place value.</p> <p>“5 hundredths add 6 hundredths equals 11 hundredths or 1 tenth and 1 hundredth.”</p>		<p>Decision making, statements and word problems</p> <p>12 500 people visited the museum this year. This is 2568 more than last year. How many people visited the museum last year?</p> <p>There is 300ml of oil in a small bottle. There is 6 ¼ times as much in the big bottle. How much oil is in the big bottle?</p>	
G	<p>Promote decision making so that pupils choose an appropriate method/strategy.</p> <p>Continue the use of number lines, including vertical, in appropriate contexts e.g. temperature, negative numbers.</p> <p>Ensure understanding of standard written method.</p> <p>Practice ThHTU + ThHTU then calculations with any number of digits.</p> $\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 111 \end{array}$ <p><i>Calculator display 0.37 is then interpreted as 37p in the context of money.</i></p> <p>When adding numbers with one and two decimal places, use a zero as a place holder e.g.</p>	<p>Extend to more complex decimals and large numbers.</p> <p>Stress importance of columns and place value and estimating first.</p> <p>Encourage use of most efficient method for the question.</p>	<p>ThHTU – ThHTU then any number of digits including decimals.</p> <p>Appropriate use of a calculator including interpretation of displays.</p> <p>Money, measures and real life contexts.</p> <p>Subtraction using the decomposition</p> $6467 - 2684$ $\begin{array}{r} 5131 \\ 6467 \\ - 2684 \\ \hline 3783 \end{array}$ $324.9 - 7.25$ $\begin{array}{r} 1181 \\ 324.90 \\ - 7.25 \\ \hline 317.65 \end{array}$	

$$124.9 + 7.25$$

$$\begin{array}{r} 124.90 \\ + 7.25 \\ \hline 132.15 \\ 11 \end{array}$$

Interpreting calculator display and understanding that the zero placeholder is not always present.

3.8 on the display represents £3.80

Or if 2 decimal places are required $3.8 = 3.80$

Decision making, statements and word problems

Mr Singh buys paving slabs to go around his pond.

PAVING SLABS	
£1.95 each	Square slabs 50 cm by 50 cm
£3.50 each	Rectangular slabs 100 cm by 50 cm

He buys 4 rectangular slabs and 4 square slabs. What is the total cost of the slabs he buys?

Mr Singh says: 'It would cost more to use square slabs all the way round.' Explain why Mr Singh is correct. How did you decide whether Mr Singh was right or wrong? What calculations did you do?

Decision making, statements and word problems

I went shopping and bought food which cost £137.50. I had £243.48 in my purse. How much did I have left once I had paid for my shopping?