

# **East Hanningfield C of E Primary School**



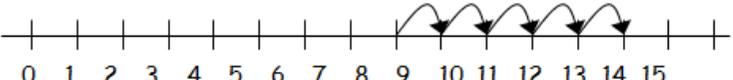
## **Mathematics Calculation Policy**

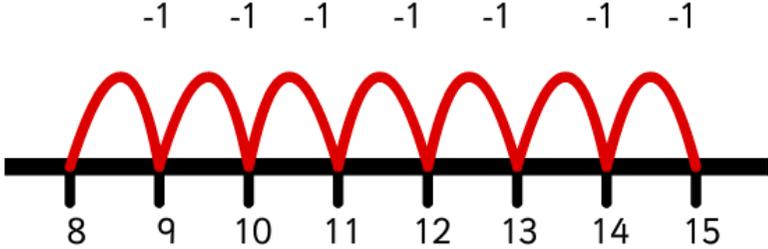
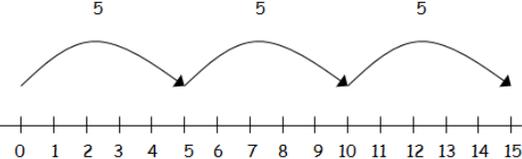
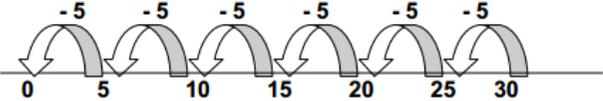
**2016**

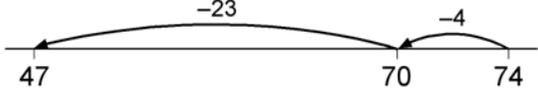
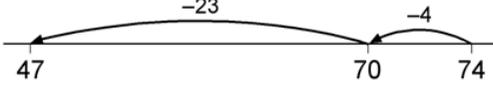
*(review date September 2017)*

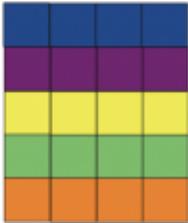
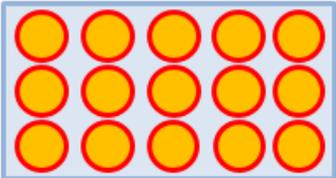
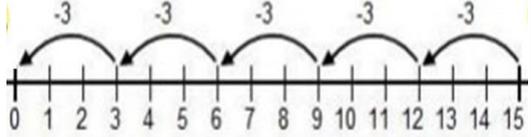
## East Hanningfield Calculation Policy

### Key Stage 1

Year		Mental calculation	Written Calculation	Default for ALL children																																																																																																				
	<b>Overview of KS1</b>	<p>Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, they will develop an understanding of how numbers work, so that they are confident in 2-digit numbers and beginning to read and say numbers above 100. A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and ensures that all children leave Y2 knowing the pairs of numbers which make all the numbers up to 10 at least. They will also have experienced and been taught pairs to 20. Their knowledge of number facts enables them to add several single-digit numbers, and to add/subtract a single digit number to/from a 2-digit number. Another important conceptual tool is their ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of ten to and from any 2-digit number. The most important application of this knowledge is their ability to add or subtract any pair of 2-digit numbers by counting on or back in tens and ones. Children may extend this to adding by partitioning numbers into tens and ones. Children will be taught to count in 2s, 3s, 5s and 10s, and will have related this skill to repeated addition. They will have met and begun to learn the associated 2x, 3x, 5x and 10x tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division. They will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division. Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.</p>																																																																																																						
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<b>Year 1</b>	<b>Addition</b>	<p>Number bonds</p> <p>Count on in ones from a given 2-digit number</p> <p>Add two single-digit numbers</p> <p>Add three single-digit numbers spotting doubles or pairs to 10</p> <p>Count on in tens from any given 2-digit number</p> <p>Add 10 to any given 2-digit number</p> <p>Use number facts to add single-digit numbers to two-digit numbers, e.g. use <math>4 + 3</math> to work out <math>24 + 3</math>, <math>34 + 3</math>...</p> <p>Add by putting the larger number first</p>	<p><math>9 + 5 = 14</math></p> <p style="text-align: center;">+1 +1 +1 +1 +1</p>  <p style="text-align: center;">0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15</p> <p>Use of 100 square:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td></tr> <tr><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td></tr> <tr><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>70</td></tr> <tr><td>71</td><td>72</td><td>73</td><td>74</td><td>75</td><td>76</td><td>77</td><td>78</td><td>79</td><td>80</td></tr> <tr><td>81</td><td>82</td><td>83</td><td>84</td><td>85</td><td>86</td><td>87</td><td>88</td><td>89</td><td>90</td></tr> <tr><td>91</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td><td>100</td></tr> </tbody> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	<p>Pairs with a total of 10</p> <p>Counting in ones</p> <p>Counting in tens</p> <p>Count on 1 from any given 2-digit number</p>
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Year		Mental calculation	Written Calculation	Default for ALL children
	<b>Subtraction</b>	<p>Number bonds to 10</p> <p>Count back in ones from a given 2-digit number</p> <p>Subtract one single-digit number from another</p> <p>Count back in tens from any given 2-digit number</p> <p>Subtract 10 from any given 2-digit number</p> <p>Use number facts to subtract single-digit numbers from two-digit numbers, e.g. use <math>7 - 2</math> to work out <math>27 - 2</math>, <math>37 - 2</math>...</p>		<p>Pairs with a total of 10</p> <p>Counting back in ones from 20 to 0</p> <p>Counting back in tens from 100 to 0</p> <p>Count back 1 from any given 2-digit number</p>
	<b>Multiplication</b>	<p>Begin to count in 2s, 5s and 10s</p> <p>Begin to say what three 5s are by counting in 5s or what four 2s are by counting in 2s, etc.</p> <p>Double numbers to 10</p>	<p><b>Stage 1: Repeated addition</b></p> <p>3 times 5 is <math>5 + 5 + 5 = 15</math> or 3 lots of 5 or <math>5 \times 3</math></p> <p>Repeated addition can be shown easily on a number line:</p> <p><math>5 \times 3 = 5 + 5 + 5</math></p> 	<p>Begin to count in 2s and 10s</p> <p>Double numbers to 5 using fingers</p>
	<b>Division</b>	<p>Begin to count in 2s, 5s and 10s</p> <p>Find half of even numbers to 12 and know it is hard to halve odd numbers</p> <p>Find half of even numbers by sharing</p> <p>Begin to use visual and concrete arrays or 'sets of' to find how many sets of a small number make a larger number.</p>	<p><b><math>30 \div 5 = 6</math></b></p> <p>'How many groups of five?'</p> 	<p>Begin to count in 2s and 10s</p> <p>Find half of even numbers by sharing</p>

Year		Mental calculation	Written Calculation	Default for ALL children
Year 2	Addition	<p>Number bonds – knowing all the pairs of numbers which make all the numbers to 12, and pairs with a total of 20</p> <p>Count on in ones and tens from any given 2-digit number</p> <p>Add two or three single-digit numbers</p> <p>Add a single-digit number to any 2-digit number using number facts, including bridging multiples of 10. (E.g. <math>45 + 4</math>, <math>38 + 7</math>)</p> <p>Add 10 and small multiples of 10 to any given 2-digit number</p> <p>Add any pair of 2-digit numbers</p>	<p><math>48 + 36 = 84</math></p>  <p>or</p>  <p>Use of 100 square to count on and back in tens and ones</p>	<p>Know pairs of numbers which make each total up to 10</p> <p>Add two single digit numbers</p> <p>Add a single-digit number to a 2-digit number by counting on in ones</p> <p>Add 10 and small multiples of 10 to a 2-digit number by counting on in tens</p>
		Subtraction	<p>Number bonds – knowing all the pairs of numbers which make all the numbers to 12</p> <p>Count back in ones and tens from any given 2-digit number</p> <p>Subtract a single-digit number from any 2-digit number using number facts, including bridging multiples of 10, e.g. <math>56 - 3</math>, <math>53 - 5</math>.</p> <p>Subtract 10 and small multiples of 10 from any given 2-digit number</p> <p>Subtract any pair of 2-digit numbers by counting back in tens and ones or by counting up.</p>	 <p>The steps may be recorded in a different order:</p>  <p>or combined:</p>  

Year		Mental calculation	Written Calculation	Default for ALL children
<b>Multiplication</b>		<p>Count in 2s, 5s and 10s</p> <p>Begin to count in 3s.</p> <p>Begin to understand that multiplication is repeated addition and to use arrays (E.g. 3 x 4 is three rows of 4 dots)</p> <p>Begin to learn the 2x, 3x, 5x and 10x tables, seeing these as 'lots of', e.g. 5 lots of 2, 6 lots of 2, 7 lots of 2, etc.</p> <p>Double numbers up to 20</p> <p>Begin to double multiples of 5 to 100</p> <p>Begin to double two-digit numbers less than 50 with 1s digits of 1, 2, 3 4 or 5</p>	<p><u>    </u> 5 <u>    </u> groups of <u>    </u> 4 <u>    </u></p> <p>4 + 4 + 4 + 4</p> 	<p>Count in 2s, 5s and 10s</p> <p>Begin to use and understand simple arrays, e.g. 2 x 4 is two lots of four buns.</p> <p>Double numbers up to 10</p> <p>Double multiples of 10 to 50</p>
	<b>Division</b>	<p>Count in 2s, 5s and 10s</p> <p>Begin to count in 3s</p> <p>Using fingers, say where a given number is in the 2s, 5s or 10s count. (E.g. 8 is the fourth number when I count in twos.)</p> <p>Relate division to grouping. (E.g. how many groups of five in fifteen?)</p> <p>Halve numbers to 20</p> <p>Begin to halve numbers to 40 and multiples of 10 to 100</p> <p>Find <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math> and <math>\frac{3}{4}</math> of a quantity of objects and of amounts (whole number answers)</p>	<p style="color: purple; text-align: center;"><b>What is 15 ÷ 5?</b></p>   <p style="text-align: center;">15 - 3 - 3 - 3 - 3 - 3 = 0 15 ÷ 3 = 5</p>	<p>Count in 2s, 5s and 10s</p> <p>Say how many rows in a given array. (E.g. how many rows of 5 in an array of 3 x 5)</p> <p>Halve numbers to 12</p> <p>Find <math>\frac{1}{2}</math> of amounts</p>

## Lower Key stage 2

	<b>Overview of LKS2</b>	<p>In the lower juniors, children build on the concrete and conceptual understandings they have gained in the Infants to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers. In addition and subtraction, they are taught to use place value and number facts to add and subtract numbers mentally and will develop a range of strategies to enable them to discard the ‘counting in ones’ or fingers-based methods of the infants. In particular, they will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced. This key stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to the 12 x 12 table. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a single-digit number are taught, as are mental strategies for multiplication or division with large but friendly numbers, e.g. when dividing by 5 or multiplying by 20. Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of one-place decimals, multiplying and dividing whole numbers by 10 and 100.</p>		
<b>Year 3</b>	<b>Addition</b>	<p>Know pairs with each total to 20</p> <p>Know pairs of multiples of 10 with a total of 100</p> <p>Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning</p> <p>Add multiples and near multiples of 10 and 100</p> <p>Perform place value additions. (E.g. <math>300 + 8 + 50 = 358</math>)</p> <p>Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number. (E.g. <math>104 + 56</math> is 160 since <math>104+50=154</math> and <math>6+4=10</math> and <math>676 + 8</math> is 684 since <math>8=4+4</math> and <math>76+4+4=84</math>)</p> <p>Add pairs of 3-digit numbers, e.g. <math>320 + 450</math></p> <p>Begin to add amounts of money using partitioning.</p>	<p>Use expanded column addition to add two or three 3-digit numbers or three 2-digit numbers</p> <p>Adding the units first:</p> $\begin{array}{r} 47 \\ + 76 \\ \hline 13 \quad (7+6) \\ 110 \quad (40+70) \\ \hline 123 \end{array}$ <p>Begin to use compact column addition to add numbers with three digits.</p> $\begin{array}{r} 47 \\ + 76 \\ \hline 123 \\ \cancel{11} \end{array} \quad \begin{array}{r} 258 \\ + 87 \\ \hline 345 \\ \cancel{11} \end{array} \quad \begin{array}{r} 366 \\ + 458 \\ \hline 824 \\ \cancel{11} \end{array}$ <p>Begin to add like fractions. (E.g. <math>\frac{3}{8} + \frac{1}{8} + \frac{1}{8}</math>) Recognise fractions that add to 1. (E.g. <math>\frac{1}{4} + \frac{3}{4}</math> or <math>\frac{3}{5} + \frac{2}{5}</math>)</p>	<p>Know pairs of numbers which make each total up to 10, and which total 20</p> <p>Add two 2-digit numbers by counting on in tens and ones (E.g. <math>56 + 35</math> is <math>56 + 30</math> and then add the 5)</p> <p>Understand simple place value additions: <math>200 + 40 + 5 = 245</math></p> <p>Use place value to add multiples of 10 or 100</p>

Know pairs with each total to 20

Subtract any two 2-digit numbers

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

Perform place value subtractions without a struggle. (E.g.  $536 - 30 = 506$ , etc.)

Subtract 2-digit numbers from numbers  $>100$  by counting up. (E.g.  $143 - 76$  is done by starting at 76, add 4 (80) then add 20 (100) then add 43 making the difference a total of 67)

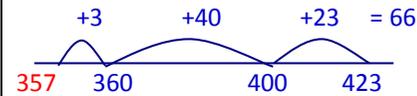
Subtract multiples and near multiples of 10 and 100

Subtract, when appropriate, by counting back or taking away, using place value and number facts.

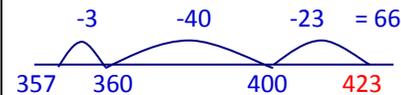
Find change from £1, £5 and £10.

Use counting up and counting down as an informal written strategy for subtracting pairs of three-digit numbers, e.g.

$423 - 357$  is



OR:



Use expanded methods for column subtraction.

$$\begin{array}{r} 56 \\ -22 \\ \hline 34 \end{array} \quad \begin{array}{r} \text{T T U} \\ 506 \\ \underline{202} \\ 304 = 34 \end{array}$$

Use formal written method for column subtraction.

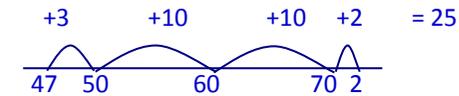
$$948 - 263 =$$

$$\begin{array}{r} 8 \text{ } 1 \\ 948 \\ -263 \\ \hline 685 \end{array}$$

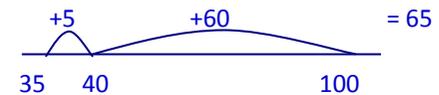
Begin to subtract like fractions. (E.g.  $\frac{7}{8} - \frac{3}{8}$ )

Know pairs of numbers which make each total up to 10, and which total 20

Count up to subtract 2-digit numbers:  $72 - 47$  is



Subtract multiples of 5 from 100 by counting up



Subtract multiples of 10 and 100

**Multiplication**

Know by heart all the multiplication facts in the 2x, 3x, 4x, 5x, 8x and 10x tables

Multiply whole numbers by 10 and 100

Recognise that multiplication is commutative

Use place value and number facts in mental multiplication.  
(E.g. 30 x 5 is 15 x 10)

Partition teen numbers to multiply by a single-digit number.  
(E.g. 3 x 14 as 3 x 10 and 3 x 4)

Double numbers up to 50

EITHER: Use partitioning (grid multiplication) to multiply 2-digit and 3-digit numbers by single digit numbers.

×	7
30	210
8	56
	266

OR: Use expanded and formal written method for short multiplication, two digits X one digit.

38	
X 7	
56 (7 X 8)	
210 (7 X 30)	
266	

→

	38
×	7
	266
	5

Know by heart the 2x, 3x, 5x and 10x tables

Double given tables facts to get others

Double numbers up to 25 and multiples of 5 to 50

**Division**

Know by heart all the division facts derived from the 2x, 3x, 4x, 5x, 8x and 10x tables.

Divide whole numbers by 10 or 100 to give whole number answers

Recognise that division is not commutative.

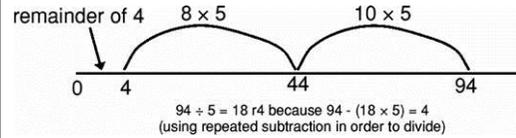
Use place value and number facts in mental division. (E.g.  $84 \div 4$  is half of 42)

Divide larger numbers mentally by subtracting the tenth multiple, including those with remainders. (E.g.  $57 \div 3$  is  $10 + 9$  as  $10 \times 3 = 30$  and  $9 \times 3 = 27$ )

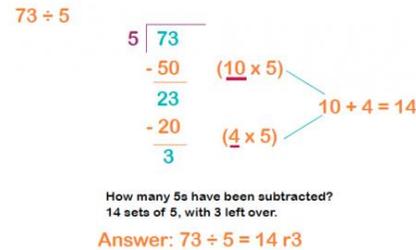
Halve even numbers to 100, halve odd numbers to 20

Use 'chunking' for short division for two digit divided by one digit numbers.

First beginning with division on a number line:



Then a more formalised approach:



Use formal method for short division for two digit divided by one digit numbers.

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \end{array}$$

Perform divisions just above the 10<sup>th</sup> multiple using the written layout and understanding how to give a remainder as a whole number.

Find unit fractions of quantities and begin to find non-unit fractions of quantities

Know by heart the division facts derived from the 2x, 3x, 5x and 10x tables

Halve even numbers up to 50 and multiples of ten to 100

Perform divisions within the tables including those with remainders, e.g.  $38 \div 5$ .

<b>Year 4</b>	<b>Addition</b>	<p>Add any two 2-digit numbers by partitioning or counting on</p> <p>Know by heart/quickly derive number bonds to 100 and to £1</p> <p>Add to the next hundred, pound and whole number. (E.g. <math>234 + 66 = 300</math>, <math>3.4 + 0.6 = 4</math>)</p> <p>Perform place value additions without a struggle. (E.g. <math>300 + 8 + 50 + 4000 = 4358</math>)</p> <p>Add multiples and near multiples of 10, 100 and 1000.</p> <p>Add £1, 10p, 1p to amounts of money</p> <p>Use place value and number facts to add 1-, 2-, 3- and 4-digit numbers where a mental calculation is appropriate'. (E.g. <math>4004 + 156</math> by knowing that <math>6+4=10</math> and that <math>4004+150=4154</math> so total is 4160)</p>	<p>Column addition for 3-digit and 4-digit numbers</p> <p>Add like fractions, e.g. <math>\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1 \frac{2}{5}</math>.</p> <p>Be confident with fractions that add to 1 and fraction complements to 1. (E.g. <math>\frac{2}{3} + ? = 1</math>)</p>	<p>Add any 2-digit numbers by partitioning or counting on</p> <p>Number bonds to 20</p> <p>Know pairs of multiples of 10 with a total of 100</p> <p>Add friendly larger numbers using knowledge of place value and number facts</p> <p>Use expanded column addition to add 3-digit numbers</p>
	<b>Subtraction</b>	<p>Subtract any two 2-digit numbers</p> <p>Know by heart/quickly derive number bonds to 100</p> <p>Perform place value subtractions without a struggle. (E.g. <math>4736 - 706 = 4030</math>, etc.)</p> <p>Subtract multiples and near multiples of 10, 100 and 100</p> <p>Subtract by counting up. (E.g. <math>503 - 368</math> is done by adding: <math>368 + 2 + 30 + 100 + 3</math> so we added 135)</p> <p>Subtract, when appropriate, by counting back or taking away, using place value and number facts.</p> <p>Subtract £1, 10p, 1p from amounts of money</p> <p>Find change from £10, £20 and £50.</p>	<p>Use expanded column subtraction for 3-digit and 4-digit numbers</p> <p>Use formal written method for column subtraction for up to 4 digits.</p> <p>Subtract like fractions, e.g. <math>\frac{1}{4} + \frac{1}{8} = \frac{3}{8}</math></p> <p>Use fractions that add to 1 to find fraction complements to 1, e.g. <math>1 - \frac{2}{3} = \frac{1}{3}</math></p>	<p>Use counting up with confidence to solve most subtractions, including finding complements to multiples of 100. (E.g. <math>512 - 287</math> is done by</p> <div style="text-align: center;"> <math display="block">  \begin{array}{cccccccc}  &amp; +3 &amp; +10 &amp; +100 &amp; +100 &amp; +12 &amp; = &amp; \\  225 &amp; &amp; &amp; &amp; &amp; &amp; &amp; \\  \hline  287 &amp; 290 &amp; 300 &amp; 400 &amp; 500 &amp; 512 &amp; &amp; \\  \hline  \end{array}  </math>   <math display="block">  \begin{array}{ccccccc}  67 + ? = 100 &amp; &amp; +3 &amp; +30 &amp; &amp; = &amp; 33 \\  \hline  &amp; 67 &amp; 70 &amp; &amp; 100 &amp; &amp; \\  \hline  \end{array}  </math> </div>

**Multiplication**

Know by heart all the multiplication facts up to 12 x 12.

Recognise factors up to 12 of two-digit numbers.

Multiply whole numbers and one-place decimals by 10, 100, 1000

Multiply multiples of 10, 100, 1000 by single digit numbers. (E.g. 300 x 6 or 4000 x 8)

Use understanding of place value and number facts in mental multiplication. (E.g. 36 x 5 is half of 36 x 10 and 50 x 60 = 3000)

Partition 2-digit numbers to multiply by a single-digit number mentally. (E.g. 4 x 24 as 4 x 20 and 4 x 4)

Multiply near multiples using rounding. (E.g. 33 x 19 as 33 x 20 – 33)

Find doubles to double 100 and beyond using partitioning

Begin to double amounts of money. (E.g. £35.60 doubled = £71.20.)

Use a formal written method to multiply a one-digit by a 3-digit number.

Use an efficient written method to multiply a 2-digit number by a number between 10 and 20 by partitioning (grid method)

Know by heart multiplication tables up to 10 x 10

Multiply whole numbers by 10 and 100

Use grid method to multiply a 2-digit or a 3-digit number by a number up to and including 6



## Upper Key stage 2

	<b>Overview of LKS2</b>	<p>Children move on from dealing mainly with whole numbers to performing arithmetic operations with both decimals and fractions. They will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to two decimal places. Mental strategies for adding and subtracting increasingly large numbers will also be taught. These will draw upon children's robust understanding of place value and knowledge of number facts. Efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as <math>40,000 \times 6</math> or <math>40,000 \div 8</math>. In addition, it is in Y5 and Y6 that children extend their knowledge and confidence in using written algorithms for multiplication and division. Fractions and decimals are also added, subtracted, divided and multiplied, within the bounds of children's understanding of these more complicated numbers, and they will also calculate simple percentages and ratios. Negative numbers will be added and subtracted.</p>		
<b>Year 5</b>	<b>Addition</b>	<p>Know numbers bonds to 1 and to the next whole number</p> <p>Add to the next 10 from a decimal number, e.g. <math>13.6 + 6.4 = 20</math></p> <p>Add numbers with two significant digits only, using mental strategies. (E.g. <math>3.4 + 4.8</math> or <math>23,000 + 47,000</math>)</p> <p>Add one or two-digit multiples of 10, 100, 1000, 10,000 and 100,000. (E.g. <math>8000 + 7000</math> or <math>600,000 + 700,000</math>)</p> <p>Add near multiples of 10, 100, 1000, 10,000 and 100,000 to other numbers. (E.g. <math>82,472 + 30,004</math>) Add decimal numbers which are near multiples of 1 or 10, including money. (E.g. <math>6.34 + 1.99</math> or <math>£34.59 + £19.95</math>)</p> <p>Use place value and number facts to add two or more friendly numbers including money and decimals. (E.g. <math>3 + 8 + 6 + 4 + 7</math>, <math>0.6 + 0.7 + 0.4</math>, or <math>2,056 + 44</math>)</p>	<p>Use column addition to add two or three whole numbers with up to 5 digits</p> <p>Use column addition to add any pair of two-place decimal numbers including amounts of money.</p> <p>Begin to add related fractions using equivalences. (E.g. <math>\frac{1}{2} + \frac{1}{6} = \frac{3}{6} + \frac{1}{6}</math>)</p> <p>Choose the most efficient method in any given situation</p>	<p>Add numbers with only 2-digits which are not zeros, e.g. <math>3.4 + 5.8</math></p> <p>Derive swiftly and without any difficulty number bonds to 100</p> <p>Add friendly large numbers using knowledge of place value and number facts</p> <p>Use expanded column addition to add pairs of 4- and 5-digit numbers</p>

**Subtraction**

Subtract numbers with two significant digits only, using mental strategies. (E.g.  $6.2 - 4.5$  or  $72,000 - 47,000$ )

Subtract one or two-digit multiples of 100, 1000, 10,000 and 100,000. (E.g.  $8000 - 3000$  or  $600,000 - 200,000$ )

Subtract one or two digit near multiples of 100, 1000, 10,000 and 100,000 from other numbers. (E.g.  $82,472 - 30,004$ )

Subtract decimal numbers which are near multiples of 1 or 10, including money. (E.g.  $6.34 - 1.99$  or  $£34.59 - £19.95$ )

Use counting up subtraction, with knowledge of number bonds to 10/100 or £1, as a strategy to perform mental subtraction. (E.g.  $£10 - £3.45$  or  $1000 - 782$ )

Recognise fraction complements to 1 and to the next whole number. (E.g.  $1 \frac{2}{5} + \frac{3}{5} = 2$ )  $4 - 5$

Use formal methods for subtraction to subtract numbers with up to 5 digits.

Use complementary addition for subtractions where the larger number is a multiple or near multiple of 1000.

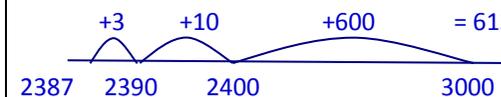
Use complementary addition for subtractions of decimals with up to two places incl. amounts of money

Begin to subtract related fractions using equivalences. (E.g.  $\frac{1}{2} - \frac{1}{6} = \frac{2}{6}$ )

Choose the most efficient method in any given situation

Derive swiftly and without difficulty number bonds to 100

Use counting up with confidence to solve most subtractions, including finding complements to multiples of 1000. (E.g.  $3000 - 2387$  is done by



Multiplication

Know by heart all the multiplication facts up to 12 x 12.

Multiply whole numbers and one-and two-place decimals by 10, 100, 1000, 10,000

Use knowledge of factors and multiples in multiplication. (E.g.  $43 \times 6$  is double  $43 \times 3$ , and  $28 \times 50$  is  $\frac{1}{2}$  of  $28 \times 100 = 1400$ )

Use knowledge of place value and rounding in mental multiplication. (E.g.  $67 \times 199$  as  $67 \times 200 - 67$ )

Use doubling and halving as a strategy in mental multiplication. (E.g.  $58 \times 5 = \text{half of } 58 \times 10$ , and  $34 \times 4$  is  $34$  doubled twice)

Partition 2-digit numbers, including decimals, to multiply by a single-digit number mentally. (E.g.  $6 \times 27$  as  $6 \times 20$  (120) plus  $6 \times 7$  (42) making 162 or  $6.3 \times 7$  as  $6 \times 7$  plus  $0.3 \times 7$ )

Double amounts of money by partitioning. (E.g.  $\pounds 37.45$  doubled =  $\pounds 37$  doubled ( $\pounds 74$ ) plus 45p doubled (90p)  $\pounds 74.90$ )

Use short multiplication to multiply a 1-digit number by a number with up to 4 digits

Use long multiplication to multiply 2-digit, 3 digit and 4-digit number by a two digit number.

	56	
x	27	
	42	$7 \times 6 = 42$
	350	$7 \times 50 = 350$
	120	$20 \times 6 = 120$
	1000	$20 \times 50 = 1000$
	1512	
	1	

OR

$$\begin{array}{r} 53 \\ \times 24 \\ \hline 212 \\ 1060 \\ \hline 1272 \end{array}$$

Choose the most efficient method in any given situation

Find simple percentages of amounts 9e.g. 10%, 5%, 20%, 155 and 50%)

Begin to multiply fractions and mixed numbers by whole numbers  $\leq 10$ , e.g.  $4 \times \frac{2}{3} = \frac{8}{3} = 2\frac{2}{3}$ .

Know multiplication tables to 11 x 11

Multiply whole numbers and one-place decimals by 10, 100 and 1000

Use knowledge of factors as aids to mental multiplication. (E.g.  $13 \times 6 = \text{double } 13 \times 3$  and  $23 \times 5$  is  $\frac{1}{2}$  of  $23 \times 10$ )

Use grid method to multiply numbers with up to 4-digits by one-digit numbers.

Use grid method to multiply 2-digit by 2-digit numbers.

**Division**

Know by heart all the division facts up to  $144 \div 12$ .

Divide whole numbers by 10, 100, 1000, 10,000 to give whole number answers or answers with 1, 2 or 3 decimal places

Use doubling and halving as mental division strategies. (E.g.  $34 \div 5$  is  $(34 \div 10) \times 2$ )

Use knowledge of multiples and factors, also tests for divisibility, in mental division. (E.g.  $246 \div 6$  is  $123 \div 3$  and we know that 525 divides by 25 and by 3)

Halve amounts of money by partitioning. (E.g. Half of  $\pounds 75.40 =$  half of  $\pounds 75$  ( $37.50$ ) plus half of 40p (20p) which is  $\pounds 37.70$ )

Divide larger numbers mentally by subtracting the  $10^{\text{th}}$  or  $100^{\text{th}}$  multiple as appropriate. (E.g.  $96 \div 6$  is  $10 + 6$ , as  $10 \times 6 = 60$  and  $6 \times 6 = 36$ ;  $312 \div 3$  is  $100 + 4$  as  $100 \times 3 = 300$  and  $4 \times 3 = 12$ )

Reduce fractions to their simplest form.

Use short division to divide a number with up to 4 digits by a number  $\leq 12$ .

Give remainders as whole numbers or as fractions.

Find non-unit fractions of large amounts.

Turn improper fractions into mixed numbers and vice versa.

Choose the most efficient method in any given situation

Know by heart division facts up to  $121 \div 11$

Divide whole numbers by 10, 100 or 1000 to give answers with up to one decimal place.

Use doubling and halving as mental division strategies

Use efficient chunking to divide numbers  $\leq 1000$  by 1-digit numbers.

Find unit fractions of 2 and 3-digit numbers

<p><b>Year 6</b></p>	<p><b>Addition</b></p>	<p>Know by heart number bonds to 100 and use these to derive related facts. (E.g. <math>3.46 + 0.54 = 4</math>)</p> <p>Derive quickly and without difficulty, number bonds to 1000</p> <p>Add small and large whole numbers where the use of place value or number facts makes the calculation do-able 'in our heads'. (E.g. <math>34,000 + 8000</math>.)</p> <p>Add multiples of powers of ten and near multiples of the same. (E.g. <math>6345 + 199</math>.)</p> <p>Add negative numbers in a context such as temperature where the numbers make sense. Add two 1-place decimal numbers or two 2-place decimal numbers less than 1 (E.g. <math>4.5 + 6.3</math> or <math>0.74 + 0.33</math>)</p> <p>Add positive numbers to negative numbers, e.g. calculate a rise in temperature, or continue a sequence beginning with a negative number</p>	<p>Use column addition to add numbers with up to 5 digits.</p> <p>Use column addition to add decimal numbers with up to 3-digits</p> <p>Add mixed numbers and fractions with different denominators.</p>	<p>Derive swiftly and without difficulty, number bonds to 100</p> <p>Use place value and number facts to add friendly large or decimal numbers, e.g. <math>3.4 + 6.6</math> or <math>26,000 + 5,400</math></p> <p>Use column addition to add numbers with up to 4-digits.</p> <p>Use column addition to add pairs of two-place decimal numbers.</p>
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**Subtraction**

Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition. (E.g.  $1000 - 654$  as  $46 + 300$  in our heads)

Use number bonds to 1 and 10 to perform mental subtraction of any pair of one-place or two-place decimal numbers using complementary addition and including money. (E.g.  $10 - 3.65$  as  $0.35 + 6$ ,  $£50 - £34.29$  as  $71p + £15$ )

Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to two places. (E.g.  $467,900 - 3,005$  or  $4.63 - 1.02$ )

Subtract multiples of powers of ten and near multiples of the same.

Subtract negative numbers in a context such as temperature where the numbers make sense.

Use formal methods for subtraction to subtract numbers with up to 6 digits.

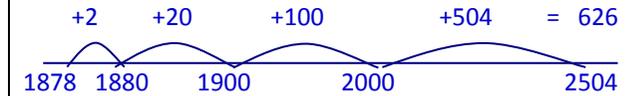
Use complementary addition for subtractions where the larger number is a multiple or near multiple of 1000 or 10,000.

Use complementary addition for subtractions of decimal numbers with up to three places including money.

Subtract mixed numbers and fractions with different denominators.

Use number bonds to 100 to perform mental subtraction of numbers up to 1000 by complementary addition. (E.g.  $1000 - 654$  as  $46 + 300$  in our heads.)

Use complementary addition for subtraction of integers up to 10,000. E.g.  $2504 - 1878$  as



Use complementary addition for subtractions of one-place decimal numbers and amounts of money. (E.g.

$£7.30 - £3.55$  as



Multiplication

Know by heart all the multiplication facts up to 12 x 12.

Multiply whole numbers and decimals with up to three places by 10, 100 or 1000, e.g.  $234 \times 1000 = 234,000$  and  $0.23 \times 1000 = 230$

Identify common factors, common multiples and prime numbers and use factors in mental multiplication. (E.g.  $326 \times 6$  is  $652 \times 3$  which is 1956)

Use place value and number facts in mental multiplication. (E.g.  $40,000 \times 6 = 24,000$  and  $0.03 \times 6 = 0.18$ )

Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20, 50 and 25 (E.g.  $28 \times 25$  is  $\frac{1}{4}$  of  $28 \times 100 = 700$ )

Use rounding in mental multiplication. ( $34 \times 19$  as  $(20 \times 34) - 34$ )

Multiply one and two-place decimals by numbers up to and including 10 using place value and partitioning. (E.g.  $3.6 \times 4$  is  $12 + 2.4$  or  $2.53 \times 3$  is  $6 + 1.5 + 0.09$ )

Double decimal numbers with up to 2 places using partitioning  
*e.g.  $36.73$  doubled is double 36 (72) plus double 0.73 (1.46)*

Use short multiplication to multiply a 1-digit number by a number with up to 4 digits

Use long multiplication to multiply a 2-digit by a number with up to 4 digits

Use short multiplication to multiply a 1-digit number by a number with one or two decimal places, including amounts of money.

Multiply fractions and mixed numbers by whole numbers.

Multiply fractions by proper fractions.

Use percentages for comparison and calculate simple percentages.

Know by heart all the multiplication facts up to 12 x 12.

Multiply whole numbers and one-and two-place decimals by 10, 100 and 1000.

Use an efficient written method to multiply a one-digit or a teens number by a number with up to 4-digits by partitioning (grid method).

Multiply a one-place decimal number up to 10 by a number  $\leq 100$  using grid method.

