



Math Calculation Policy

Reviewed-Spring 2024
Next Review-Spring 2024
(Reviewed yearly)

Agreed by Staff

The following Calculation Policy has been largely adapted from the White Rose Maths Hub Calculation Policy, with additional material from Classroom Secrets, and meets requirements of the National Curriculum 2014 for the teaching and learning of mathematics, in accordance with an increased emphasis on fluency and mastery of concepts.

It is designed to provide pupils with a clear and smooth progression of learning through KS1 and KS2 and ensure that the teaching of calculation methods remains consistent across the 4 operations of addition, subtraction, multiplication, and division.

Age-stage expectations

The calculation policy is organised according to age-stage expectations as set out in the National Curriculum (2014); however, we recognise that pupils need to be taught at an appropriate level 'based on the security of pupil's understanding and their readiness to progress to the next stage' (National Curriculum). This 'readiness to progress' is a clear focus and there will be a clear emphasis on recapping and reviewing methods from previous years where needed.

In the statutory framework for EYFS, an Early Learning Goal is the standard children are expected to achieve by the end of their reception year.

The ELG relevant to calculations is Number:

Have a deep understanding of number to 10, including the composition of each number.

Subitise (recognise quantities without counting) up to 5.

Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts).

Calculations will be taught in a purposeful, practical way and children will use play and exploration to acquire the relevant mathematical skills to solve them. A large majority of mathematical work is practical, and learning will happen in many different contexts around the classroom and outside. Some mathematical concepts relating to calculations will be teacher led and children can also freely explore these concepts through a variety of different activities and resources set up each day. Learning is repeated using different resources and representations to embed understanding. It illustrates the resources used in Reception to support the development of mathematical concepts and an understanding of number that lead to embedding the skills and increasing confidence to perform calculations. Pupils will leave us prepared for the next stage in their lives with:

- Quick recall of facts and procedures
- The flexibility and fluidity to move between different contexts and representations of mathematics
- The ability to recognise relationships and make connections in mathematics
- Confidence and belief that they can achieve
- The knowledge that maths underpins most of our daily lives
- Skills and concepts that have been mastered
- Have a positive and inquisitive attitude to mathematics as an interesting and attractive subject in which all children gain success.

A mathematical concept or skill has been mastered when a child can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations and this is the goal for our children. These will be assessed through: assessment, tracking, pupil progress meetings, performance management, moderation and standardisation.

Progression from year 1 to year 6 in Addition and Subtraction – calculations and problems

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> add and subtract one-digit and two-digit numbers to 20, including zero 	<ul style="list-style-type: none"> add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> a two-digit number and ones a two-digit number and tens two two-digit numbers adding three one-digit numbers 	<ul style="list-style-type: none"> add and subtract numbers mentally, including: <ul style="list-style-type: none"> a three-digit number and ones a three-digit number and tens a three-digit number and hundreds add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction 	<ul style="list-style-type: none"> add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate 	<ul style="list-style-type: none"> add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) add and subtract numbers mentally with increasingly large numbers 	<ul style="list-style-type: none"> perform mental calculations, including with mixed operations and large numbers use their knowledge of the order of operations to carry out calculations involving the four operations

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$ 	<ul style="list-style-type: none"> solve problems with addition and subtraction: <ul style="list-style-type: none"> using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods 	<ul style="list-style-type: none"> solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction 	<ul style="list-style-type: none"> solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why 	<ul style="list-style-type: none"> solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign 	<ul style="list-style-type: none"> solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Progression from year 1 to year 6 in Multiplication and Division – recall, calculations, and problems

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<ul style="list-style-type: none"> recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot 	<ul style="list-style-type: none"> recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables 	<ul style="list-style-type: none"> recall multiplication and division facts for multiplication tables up to 12×12 use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers recognise and use factor pairs and commutativity in mental calculations 	<ul style="list-style-type: none"> identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers establish whether a number up to 100 is prime and recall prime numbers up to 19 recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) 	<ul style="list-style-type: none"> identify common factors, common multiples and prime numbers use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<ul style="list-style-type: none"> calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs 	<ul style="list-style-type: none"> write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods 	<ul style="list-style-type: none"> multiply two-digit and three-digit numbers by a one-digit number using formal written layout 	<ul style="list-style-type: none"> multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers multiply and divide numbers mentally drawing upon known facts divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 	<ul style="list-style-type: none"> multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context perform mental calculations, including with mixed operations and large numbers

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher 	<ul style="list-style-type: none"> solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts 	<ul style="list-style-type: none"> solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects 	<ul style="list-style-type: none"> solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects 	<ul style="list-style-type: none"> solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates 	<ul style="list-style-type: none"> solve problems involving addition, subtraction, multiplication and division

Children will use a wide range of resources to support their learning throughout their maths lessons.

Children will learn how to adapt and progress to use The Concrete Pictorial Abstract (CPA) approach is a system of learning that uses physical and visual aids to build a child's understanding of abstract topics.

Addition

Skill	Year	Representations and models	
Add two 1-digit numbers to 10	1	Part-whole model Bar model Number shapes	Ten frames (within 10) Bead strings (10) Number tracks
Add 1 and 2-digit numbers to 20	1	Part-whole model Bar model Number shapes Ten frames (within 20)	Bead strings (20) Number tracks Number lines (labelled) Straws
Add three 1-digit numbers	2	Part-whole model Bar model	Ten frames (within 20) Number shapes
Add 1 and 2-digit numbers to 100	2	Part-whole model Bar model Number lines (labelled)	Number lines (blank) Straws Hundred square

Skill	Year	Representations and models
Add two 2-digit numbers	2	Part-whole model Bar model Number lines (blank) Straws Base 10 Place value counters
Add with up to 3-digits	3	Part-whole model Bar model Base 10 Place value counters Column addition
Add with up to 4-digits	4	Part-whole model Bar model Base 10 Place value counters Column addition
Add with more than 4 digits	5	Part-whole model Bar model Place value counters Column addition
Add with up to 3 decimal places	5	Part-whole model Bar model Place value counters Column addition

These are the methods of Addition and Subtraction that we follow and are taken from White Rose Math of how children would move from concrete, pictorial and abstract.

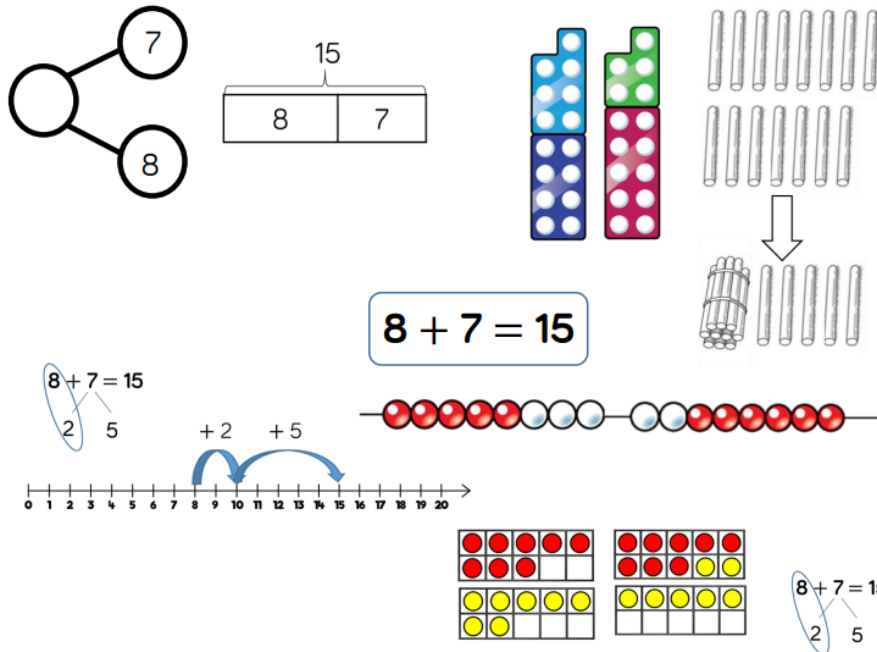
Addition

EYFS

Addition- EYFS			
Objectives	Concrete	Pictorial	Abstract
<p>Knows that a group of things change in quantity when something is added.</p> <p>Find the total number of items in two groups by counting all of them.</p> <p>Says the number that is one more than a given number.</p> <p>Finds one more from a group of up to five objects, then ten objects.</p> <p>In practical activities and discussion, beginning to use the vocabulary involved in adding.</p> <p>Using quantities and objects, they add two single digit numbers and count on to find the answer.</p> <p>Solve problems including doubling.</p>	<p>Use toys and general classroom resources for children to physically manipulate, group/regroup.</p> <p>Use specific maths resources such as counters, snap cubes, Numicon etc.</p> <p>Use visual supports such as ten frames, part part whole and addition mats, with the physical objects and resources that can be manipulated.</p>	<p>Two groups of pictures so children are able to count the total.</p> <p>Bar model using visuals, pictures/icons or colours.</p> <p>Use visual supports such as ten frames, part part whole and addition mats with pictures/icons.</p>	<p>A focus on symbols and numbers to form a calculation.</p> <p>$5+2=7$</p> <p>whole 5, part 3, part 2</p> <p>No expectation for children to be able to record a number sentence/addition calculation.</p>

Skill: Add 1 and 2-digit numbers to 20

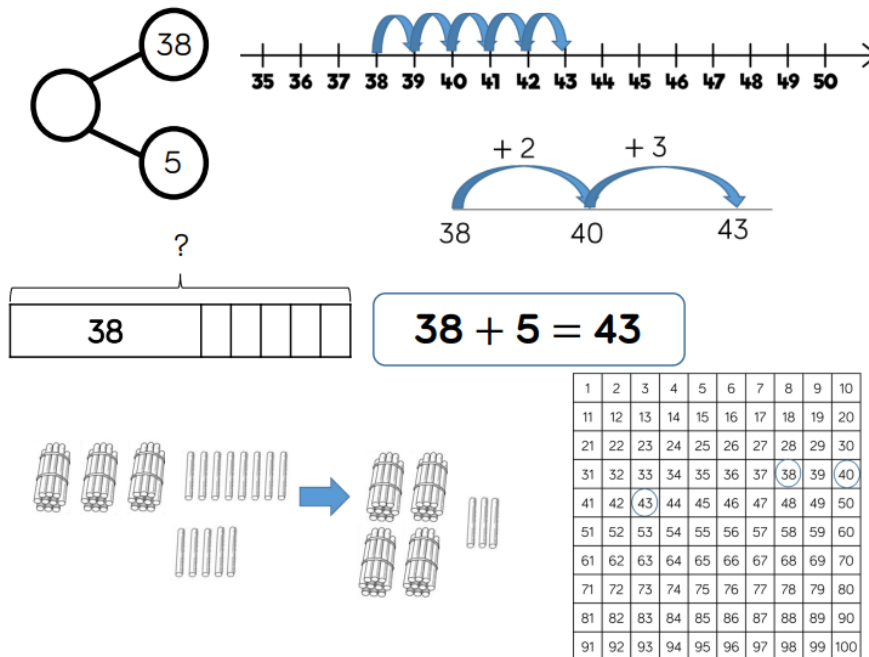
Year: 1/2



When adding one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten. In Year 1, this is only done just by counting on. From Year 2, use different manipulatives can be used to represent this exchange alongside number lines to support children in understanding how to partition their jumps.

Skill: Add 1-digit and 2-digit numbers to 100

Year: 2/3



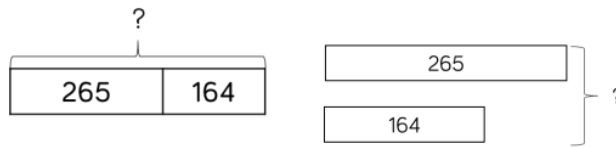
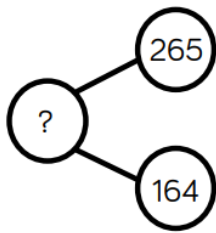
When adding single digits to a two-digit number, children should be encouraged to count on from the larger number.

They should also apply their knowledge of number bonds to add more efficiently e.g. $8 + 5 = 13$ so $38 + 5 = 43$.

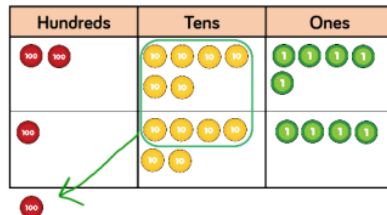
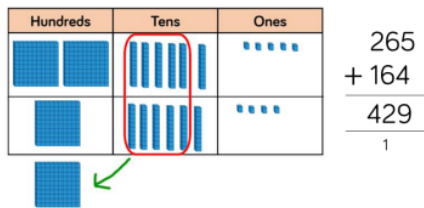
Hundred squares and straws can support children to find the number bond to 10.

Skill: Add numbers with up to 3 digits

Year: 3



$$265 + 164 = 429$$



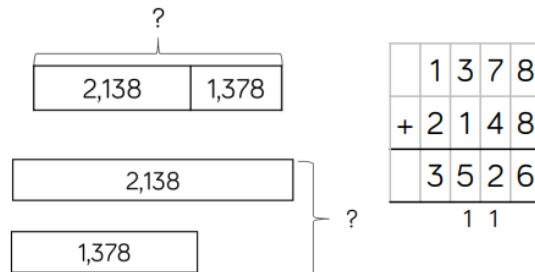
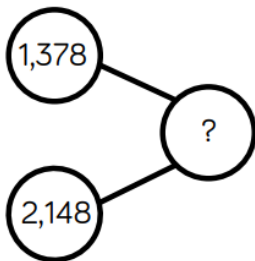
Base 10 and place value counters are the most effective manipulatives when adding numbers with up to 3 digits.

Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method.

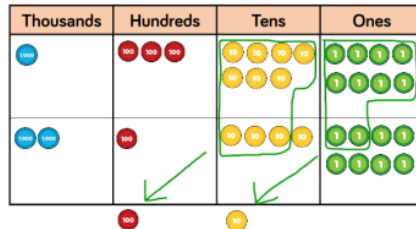
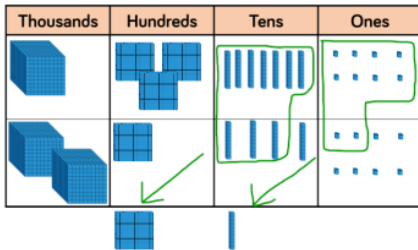
Plain counters on a place value grid can also be used to support learning.

Skill: Add numbers with up to 4 digits

Year: 4



$$1,378 + 2,148 = 3,526$$



Base 10 and place value counters are the most effective manipulatives when adding numbers with up to 4 digits.

Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method.

Plain counters on a place value grid can also be used to support learning.

Skill: Add numbers with more than 4 digits	Year: 5/6																																										
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div> <div style="text-align: center; margin: 10px 0;"> </div> <div style="text-align: center; margin: 10px 0;"> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;"> $104,328 + 61,731 = 166,059$ </div> </div> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <table border="1" style="border-collapse: collapse; text-align: center; width: 45%;"> <thead> <tr style="background-color: #d9e1f2;"> <th style="width: 12.5%;">HTh</th> <th style="width: 12.5%;">TTh</th> <th style="width: 12.5%;">Th</th> <th style="width: 12.5%;">H</th> <th style="width: 12.5%;">T</th> <th style="width: 12.5%;">O</th> </tr> </thead> <tbody> <tr> <td style="background-color: #f4cccc;">10000</td> <td></td> <td style="background-color: #d9ead3;">1000 1000 1000 1000</td> <td style="background-color: #d9ead3;">100 100 100</td> <td style="background-color: #fff2cc;">10 10</td> <td style="background-color: #f4cccc;">1 1 1 1 1</td> </tr> <tr> <td></td> <td style="background-color: #f4cccc;">1000 1000 1000 1000</td> <td style="background-color: #d9ead3;">1000</td> <td style="background-color: #d9ead3;">100 100 100 100</td> <td style="background-color: #fff2cc;">10 10 10</td> <td style="background-color: #f4cccc;">1</td> </tr> </tbody> </table> <table border="1" style="border-collapse: collapse; text-align: center; width: 45%;"> <tbody> <tr><td>1</td><td>0</td><td>4</td><td>3</td><td>2</td><td>8</td></tr> <tr><td>+</td><td>6</td><td>1</td><td>7</td><td>3</td><td>1</td></tr> <tr><td colspan="6" style="border-top: 1px solid black;">1</td></tr> <tr><td>1</td><td>6</td><td>6</td><td>0</td><td>5</td><td>9</td></tr> </tbody> </table> </div>	HTh	TTh	Th	H	T	O	10000		1000 1000 1000 1000	100 100 100	10 10	1 1 1 1 1		1000 1000 1000 1000	1000	100 100 100 100	10 10 10	1	1	0	4	3	2	8	+	6	1	7	3	1	1						1	6	6	0	5	9	<p>Place value counters or plain counters on a place value grid are the most effective concrete resources when adding numbers with more than 4 digits.</p> <p>At this stage, children should be encouraged to work in the abstract, using the column method to add larger numbers efficiently.</p>
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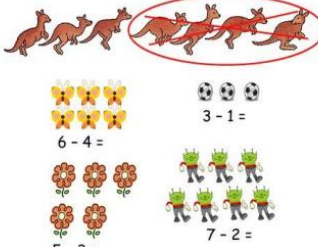
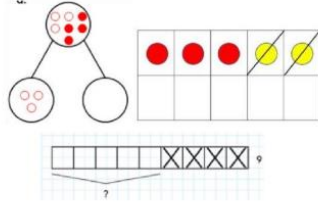

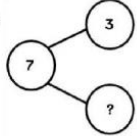
Subtraction

Skill	Year	Representations and models
Subtract two 1-digit numbers to 10	1	Part-whole model Bar model Number shapes Ten frames (within 10) Bead strings (10) Number tracks
Subtract 1 and 2-digit numbers to 20	1	Part-whole model Bar model Number shapes Ten frames (within 20) Bead string (20) Number tracks Number lines (labelled) Straws
Subtract 1 and 2-digit numbers to 100	2	Part-whole model Bar model Number lines (labelled) Number lines (blank) Straws Hundred square
Subtract two 2-digit numbers	2	Part-whole model Bar model Number lines (blank) Straws Base 10 Place value counters

Skill	Year	Representations and models	
Subtract with up to 3-digits	3	Part-whole model Bar model	Base 10 Place value counters Column subtraction
Subtract with up to 4-digits	4	Part-whole model Bar model	Base 10 Place value counters Column subtraction
Subtract with more than 4 digits	5	Part-whole model Bar model	Place value counters Column subtraction
Subtract with up to 3 decimal places	5	Part-whole model Bar model	Place value counters Column subtraction

Subtraction

EYFS

Subtraction- EYFS							
Objectives	Concrete	Pictorial	Abstract				
<p>Knows that a group of things change in quantity when something is taken away</p> <p>Find one less from a group of five objects, then ten objects.</p> <p>In practical activities and discussion, beginning to use the vocabulary involved in subtracting.</p> <p>Using quantities and objects, they subtract two single digit numbers and count back to find the answer.</p>	<p>Use toys and general classroom resources for children to physically manipulate, group/regroup.</p>  <p>Take away 2 cubes 3 are left</p>  <p>Use specific maths resources such as snap cubes, Numicon, bead strings etc.</p>  <p>Use visual supports such as ten frames, part part whole and subtraction mats, with the physical objects and resources that can be manipulated.</p>	<p>A group of pictures for children to cross out or cover quantities to support subtraction.</p>  <p>6 - 4 =</p> <p>3 - 1 =</p> <p>5 - 3 =</p> <p>7 - 2 =</p> <p>A group of pictures for children to cross out or cover quantities to support subtraction.</p>  <p>Use visual supports such as ten frames, part part whole and bar model with pictures/icons.</p>	<p>A focus on symbols and numbers to form a calculation.</p>  <p>10 - 1 = ?</p> <p>10 - 6 = 4</p> <table border="1" data-bbox="1093 1400 1300 1478"> <tr> <td>3</td> <td>?</td> </tr> <tr> <td colspan="2">7</td> </tr> </table> <p>7 - 3 = ?</p>  <p>* No expectation for children to be able to record a number sentence/addition calculation.</p>	3	?	7	
3	?						
7							

Skill: Subtract 1 and 2-digit numbers to 20

Year: 1/2

$14 - 6 = 8$

In Year 1, subtracting one-digit numbers that cross 10, is done by counting back, using objects, number tracks and number lines. From Year 2, children should be encouraged to find the number bond to 10 when partitioning the subtracted number. Ten frames, number shapes and number lines are particularly useful for this.

Skill: Subtract 1 and 2-digit numbers to 100

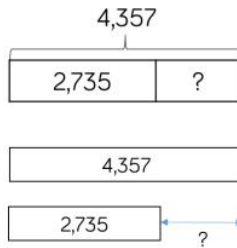
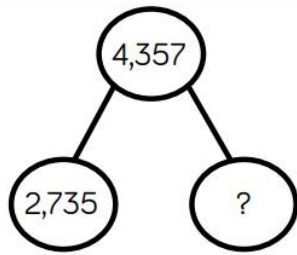
Year: 2/3

$65 - 28 = 37$

Children can also use a blank number line to count back to find the difference. Encourage them to jump to multiples of 10 to become more efficient. From Year 3, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger, straws become less efficient.

Skill: Subtract numbers with up to 4 digits

Year: 4



$$\begin{array}{r} 3 \ 1 \\ 4357 \\ - 2735 \\ \hline 1622 \end{array}$$

$$4,357 - 2,735 = 1,622$$

Thousands	Hundreds	Tens	Ones

Thousands	Hundreds	Tens	Ones

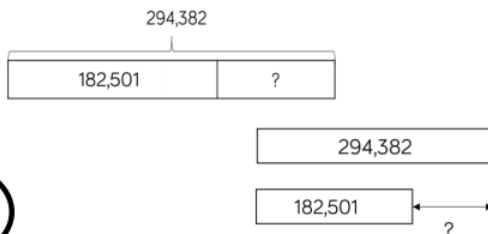
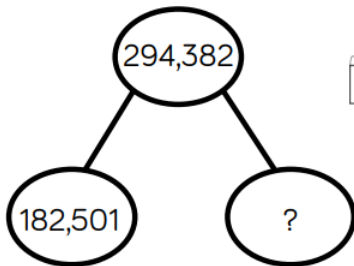
Base 10 and place value counters are the most effective manipulatives when subtracting numbers with up to 4 digits.

Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method.

Plain counters on a place value grid can also be used to support learning.

Skill: Subtract numbers with more than 4 digits

Year: 5/6



$$294,382 - 182,501 = 111,881$$

HTh	TTh	Th	H	T	O

	2	9	3	1 3	8	2
-	1	8	2	5	0	1
	1	1	1	8	8	1

Place value counters or plain counters on a place value grid are the most effective concrete resource when subtracting numbers with more than 4 digits.

At this stage, children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently.

Skill: Subtract with up to 3 decimal places	Year: 5/6
<p style="text-align: center;">5.43 – 2.7 = 2.73</p>	<p>Place value counters and plain counters on a place value grid are the most effective manipulative when subtracting decimals with 1, 2 and then 3 decimal places.</p> <p>Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures.</p>

These are the methods of Multiplication and Division that we follow and are taken from White Rose Math of how children would move from concrete, pictorial and abstract.

Time Tables

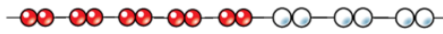
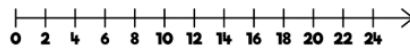
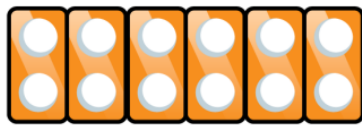
Skill	Year	Representations and models
Recall and use multiplication and division facts for the 2-times table	2	Bar model Number shapes Counters Money Ten frames Bead strings Number lines Everyday objects
Recall and use multiplication and division facts for the 5-times table	2	Bar model Number shapes Counters Money Ten frames Bead strings Number lines Everyday objects
Recall and use multiplication and division facts for the 10-times table	2	Hundred square Number shapes Counters Money Ten frames Bead strings Number lines Base 10

Skill	Year	Representations and models	
Recall and use multiplication and division facts for the 3-times table	3	Hundred square Number shapes Counters	Bead strings Number lines Everyday objects
Recall and use multiplication and division facts for the 4-times table	3	Hundred square Number shapes Counters	Bead strings Number lines Everyday objects
Recall and use multiplication and division facts for the 8-times table	3	Hundred square Number shapes	Bead strings Number tracks Everyday objects
Recall and use multiplication and division facts for the 6-times table	4	Hundred square Number shapes	Bead strings Number tracks Everyday objects

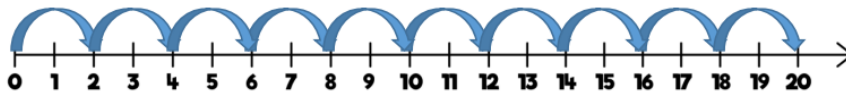
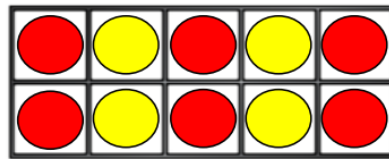
Skill	Year	Representations and models	
Recall and use multiplication and division facts for the 7-times table	4	Hundred square Number shapes	Bead strings Number lines
Recall and use multiplication and division facts for the 9-times table	4	Hundred square Number shapes	Bead strings Number lines
Recall and use multiplication and division facts for the 11-times table	4	Hundred square Base 10	Place value counters Number lines
Recall and use multiplication and division facts for the 12-times table	4	Hundred square Base 10	Place value counters Number lines

Skill: 2 times table

Year: 2



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



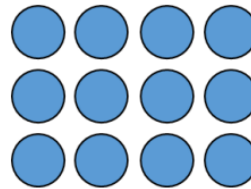
Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square.

Look for patterns in the two times table, using concrete manipulatives to support. Notice how all the numbers are even and there is a pattern in the ones.

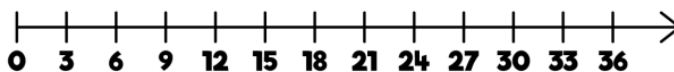
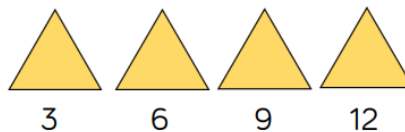
Use different models to develop fluency.

Skill: 3 times table

Year: 3



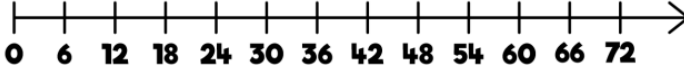


1	2	3	4	5	6	7	8	9	10
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21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50



Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square.

Look for patterns in the three times table, using concrete manipulatives to support. Notice the odd, even, odd, even pattern using number shapes to support. Highlight the pattern in the ones using a hundred square.

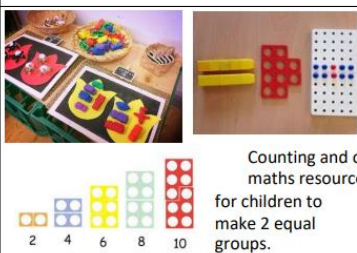

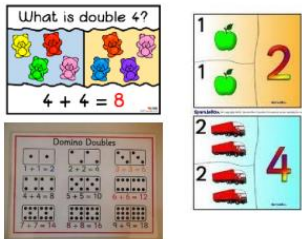
Skill: 6 times table						Year: 4																																																																																																				
		<table border="1" style="font-size: small; border-collapse: collapse;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td style="background-color: yellow;">6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td style="background-color: yellow;">12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td style="background-color: yellow;">18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td style="background-color: yellow;">24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td style="background-color: yellow;">30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td style="background-color: yellow;">36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>41</td><td style="background-color: yellow;">42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td style="background-color: yellow;">48</td><td>49</td><td>50</td></tr> <tr><td>51</td><td>52</td><td>53</td><td style="background-color: yellow;">54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td style="background-color: yellow;">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> </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>Encourage daily counting in multiples, supported by a number line or a hundred square. Look for patterns in the six times table, using manipulatives to support. Make links to the 3 times table, seeing how each multiple is double the threes. Notice the pattern in the ones within each group of five multiples. Highlight that all the multiples are even using number shapes to support.</p>
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Multiplication

Skill	Year	Representations and models	
Solve one-step problems with multiplication	1/2	Bar model Number shapes Counters	Ten frames Bead strings Number lines
Multiply 2-digit by 1-digit numbers	3/4	Place value counters Base 10	Expanded written method Short written method
Multiply 3-digit by 1-digit numbers	4	Place value counters Base 10	Short written method
Multiply 4-digit by 1-digit numbers	5	Place value counters	Short written method

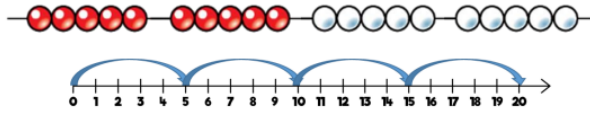
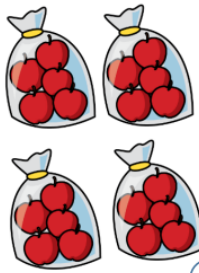
Skill	Year	Representations and models
Multiply 2-digit by 2-digit numbers	5	Place value counters Base 10 Short written method Grid method
Multiply 2-digit by 3-digit numbers	5	Place value counters Short written method Grid method
Multiply 2-digit by 4-digit numbers	5/6	Formal written method

EYFS

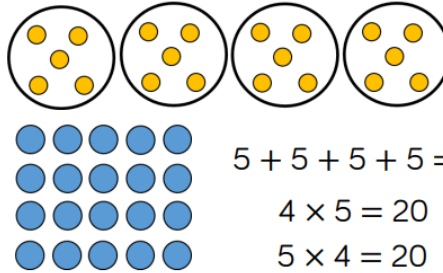
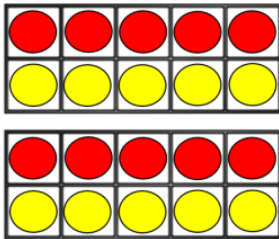
Multiplication-EYFS															
Objectives	Concrete	Pictorial	Abstract												
Solve problems including doubling	 <p>Counting and other maths resources for children to make 2 equal groups.</p>  <p>Physical and real life examples that encourage children to see concept of doubling as adding two equal groups.</p>	 <p>Pictures and icons that encourage children to see concept of doubling as adding two equal groups.</p>	<table border="1"> <tr> <td>1+1=</td> <td>7+7=</td> </tr> <tr> <td>2+2=</td> <td>8+8=</td> </tr> <tr> <td>3+3=</td> <td>9+9=</td> </tr> <tr> <td>4+4=</td> <td>10+10=</td> </tr> <tr> <td>5+5=</td> <td>11+11=</td> </tr> <tr> <td>6+6=</td> <td>12+12=</td> </tr> </table> <p>Addition calculations to model adding two equal groups.</p>	1+1=	7+7=	2+2=	8+8=	3+3=	9+9=	4+4=	10+10=	5+5=	11+11=	6+6=	12+12=
1+1=	7+7=														
2+2=	8+8=														
3+3=	9+9=														
4+4=	10+10=														
5+5=	11+11=														
6+6=	12+12=														

Skill: Solve 1-step problems using multiplication

Year: 1/2



One bag holds 5 apples.
How many apples do 4 bags hold?



$$5 + 5 + 5 + 5 = 20$$

$$4 \times 5 = 20$$

$$5 \times 4 = 20$$

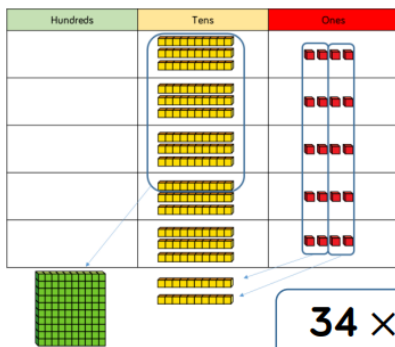
Children represent multiplication as repeated addition in many different ways.

In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally.

In Year 2, children are introduced to the multiplication symbol.

Skill: Multiply 2-digit numbers by 1-digit numbers

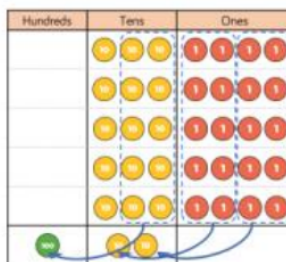
Year: 3/4



	H	T	O
		3	4
x			5
		2	0
	1	5	0
	1	7	0

$34 \times 5 = 170$

	H	T	O
		3	4
x			5
	1	7	0
	1	2	



Informal methods and the expanded method are used in Year 3 before moving on to the short multiplication method in Year 4.

Place value counters should be used to support the understanding of the method rather than supporting the multiplication, as children should use times table knowledge.

Calculations need to be set out one digit per square and a ruler is used to draw lines.

Skill: Multiply 4-digit numbers by 2-digit numbers	Year: 5/6																																													
<table border="1" style="margin: auto;"> <tr> <td>TTh</td> <td>Th</td> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td></td> <td>2</td> <td>7</td> <td>3</td> <td>9</td> </tr> <tr> <td>×</td> <td></td> <td></td> <td>2</td> <td>8</td> </tr> <tr> <td style="border-top: 1px solid black;">2</td> <td style="border-top: 1px solid black;">1</td> <td style="border-top: 1px solid black;">9</td> <td style="border-top: 1px solid black;">1</td> <td style="border-top: 1px solid black;">2</td> </tr> <tr> <td><small>2</small></td> <td><small>5</small></td> <td><small>3</small></td> <td><small>7</small></td> <td></td> </tr> <tr> <td style="border-top: 1px solid black;">5</td> <td style="border-top: 1px solid black;">4</td> <td style="border-top: 1px solid black;">7</td> <td style="border-top: 1px solid black;">8</td> <td style="border-top: 1px solid black;">0</td> </tr> <tr> <td><small>1</small></td> <td></td> <td><small>1</small></td> <td></td> <td></td> </tr> <tr> <td style="border-top: 1px solid black;">7</td> <td style="border-top: 1px solid black;">6</td> <td style="border-top: 1px solid black;">6</td> <td style="border-top: 1px solid black;">9</td> <td style="border-top: 1px solid black;">2</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p style="text-align: center; margin-top: 5px;">1</p>	TTh	Th	H	T	O		2	7	3	9	×			2	8	2	1	9	1	2	<small>2</small>	<small>5</small>	<small>3</small>	<small>7</small>		5	4	7	8	0	<small>1</small>		<small>1</small>			7	6	6	9	2						<p>When multiplying 4-digits by 2-digits, children should be confident in using the formal written method.</p> <p>If they are still struggling with times tables, provide multiplication grids to support when they are focusing on the use of the method.</p> <p>Consider where exchanged digits are placed and make sure this is consistent.</p>
TTh	Th	H	T	O																																										
	2	7	3	9																																										
×			2	8																																										
2	1	9	1	2																																										
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$2,739 \times 28 = 76,692$																																														


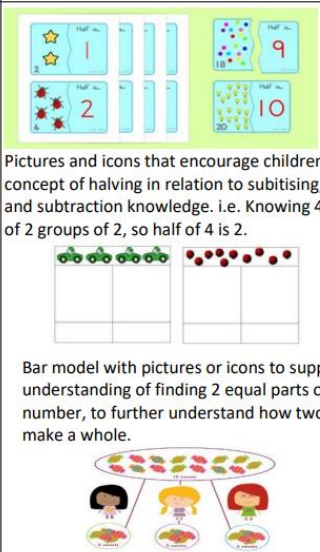
Division

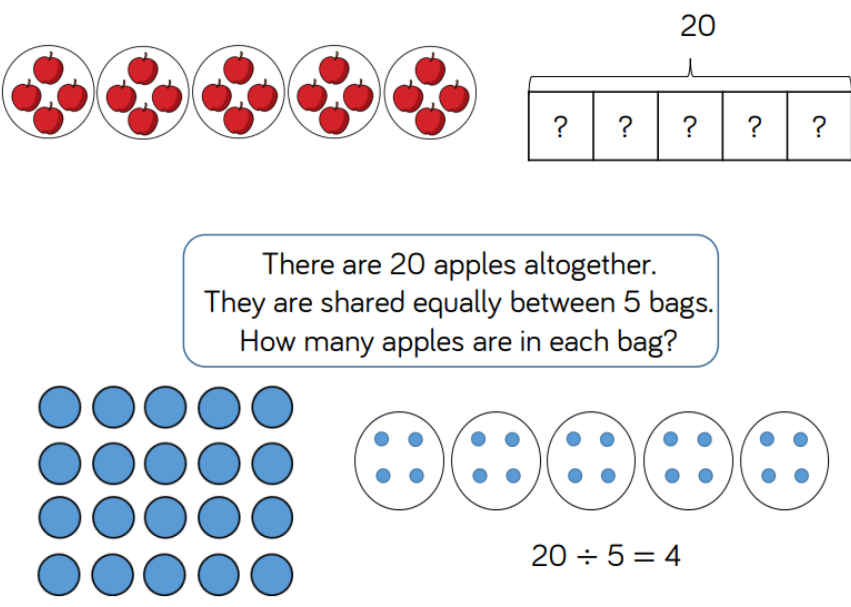
Skill	Year	Representations and models	
Solve one-step problems with division (sharing)	1/2	Bar model Real life objects	Arrays Counters
Solve one-step problems with division (grouping)	1/2	Real life objects Number shapes Bead strings Ten frames	Number lines Arrays Counters
Divide 2-digits by 1-digit (no exchange sharing)	3	Straws Base 10 Bar model	Place value counters Part-whole model
Divide 2-digits by 1-digit (sharing with exchange)	3	Straws Base 10 Bar model	Place value counters Part-whole model

Skill	Year	Representations and models	
Divide 2-digits by 1-digit (sharing with remainders)	3/4	Straws Base 10 Bar model	Place value counters Part-whole model
Divide 2-digits by 1-digit (grouping)	4/5	Place value counters Counters	Place value grid Written short division
Divide 3-digits by 1-digit (sharing with exchange)	4	Base 10 Bar model	Place value counters Part-whole model
Divide 3-digits by 1-digit (grouping)	4/5	Place value counters Counters	Place value grid Written short division

Skill	Year	Representations and models	
Divide 4-digits by 1-digit (grouping)	5	Place value counters Counters	Place value grid Written short division
Divide multi-digits by 2-digits (short division)	6	Written short division	List of multiples
Divide multi-digits by 2-digits (long division)	6	Written long division	List of multiples

EYFS

Division- EYFS			
Objectives	Concrete	Pictorial	Abstract
<p>Solve problems including halving and sharing.</p> <p>Halving a whole, halving a quantity of objects.</p> <p>Sharing a quantity of objects.</p>	 <p>Children have the opportunity to physically cut objects, food or shapes in half.</p>	 <p>Pictures and icons that encourage children to see concept of halving in relation to subitising, addition and subtraction knowledge. i.e. Knowing 4 is made of 2 groups of 2, so half of 4 is 2.</p> <p>Bar model with pictures or icons to support understanding of finding 2 equal parts of a number, to further understand how two halves make a whole.</p> <p>Pictures for children to create and visualise 3 or more</p>	

Skill: Solve 1-step problems using multiplication (sharing)	Year: 1/2
 <p>There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?</p> $20 \div 5 = 4$	<p>Children solve problems by sharing amounts into equal groups.</p> <p>In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record division formally.</p> <p>In Year 2, children are introduced to the division symbol.</p>

Skill: Divide 2-digits by 1-digit (sharing with exchange)

Year: 3/4

$52 \div 4 = 13$

When dividing numbers involving an exchange, children can use Base 10 and place value counters to exchange one ten for ten ones. Children should start with the equipment outside the place value grid before sharing the tens and ones equally between the rows.

Flexible partitioning in a part-whole model supports this method.

Skill: Divide 4-digits by 1-digit (grouping)

Year: 5

$8,532 \div 2 = 4,266$

Place value counters or plain counters can be used on a place value grid to support children to divide 4-digits by 1-digit. Children can also draw their own counters and group them through a more pictorial method.

Children should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges.

Skill: Divide multi-digits by 2-digits (long division)		Year: 6																																								
<table border="1" style="border-collapse: collapse; text-align: center; margin-bottom: 10px;"> <tr><td></td><td></td><td>0</td><td>3</td><td>6</td></tr> <tr><td>1</td><td>2</td><td>4</td><td>3</td><td>2</td></tr> <tr><td></td><td>-</td><td>3</td><td>6</td><td>0</td></tr> <tr><td></td><td></td><td></td><td>7</td><td>2</td></tr> <tr><td></td><td>-</td><td></td><td>7</td><td>2</td></tr> <tr><td></td><td></td><td></td><td></td><td>0</td></tr> </table> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;"> <p>(x30)</p><p>(x6)</p> </div> <div> <p>· 12 × 1 = 12 12 × 2 = 24 12 × 3 = 36 12 × 4 = 48 12 × 5 = 60 12 × 6 = 72 12 × 7 = 84 12 × 8 = 96 12 × 7 = 108 12 × 10 = 120</p> </div> </div>			0	3	6	1	2	4	3	2		-	3	6	0				7	2		-		7	2					0	<div style="border: 1px solid black; border-radius: 10px; padding: 10px; display: inline-block;"> $432 \div 12 = 36$ </div>	<p>Children can also divide by 2-digit numbers using long division.</p> <p>Children can write out multiples to support their calculations with larger remainders.</p> <p>Children will also solve problems with remainders where the quotient can be rounded as appropriate.</p>										
		0	3	6																																						
1	2	4	3	2																																						
	-	3	6	0																																						
			7	2																																						
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<div style="border: 1px solid black; border-radius: 10px; padding: 10px; display: inline-block; width: 80%;"> $7,335 \div 15 = 489$ </div>	<table border="1" style="border-collapse: collapse; text-align: center; margin-bottom: 10px;"> <tr><td></td><td>0</td><td>4</td><td>8</td><td>9</td></tr> <tr><td>15</td><td>7</td><td>3</td><td>3</td><td>5</td></tr> <tr><td>-</td><td>6</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td>1</td><td>3</td><td>3</td><td>5</td></tr> <tr><td>-</td><td>1</td><td>2</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>1</td><td>3</td><td>5</td></tr> <tr><td>-</td><td></td><td>1</td><td>3</td><td>5</td></tr> <tr><td></td><td></td><td></td><td></td><td>0</td></tr> </table> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;"> <p>(x400)</p><p>(x80)</p><p>(x9)</p> </div> <div> <p>1 × 15 = 15 2 × 15 = 30 3 × 15 = 45 4 × 15 = 60 5 × 15 = 75 10 × 15 = 150</p> </div> </div>		0	4	8	9	15	7	3	3	5	-	6	0	0	0		1	3	3	5	-	1	2	0	0			1	3	5	-		1	3	5					0	
	0	4	8	9																																						
15	7	3	3	5																																						
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Key Mathematical language

Array – An ordered collection of counters, cubes or other item in rows and columns.

Exchange – Change a number or expression for another of an equal value.

Factor – A number that multiplies with another to make a product.

Partitioning – Splitting a number into its component parts.

Product – The result of multiplying one number by another.

Remainder – The amount left over after a division when the divisor is not a factor of the dividend.

Scaling – Enlarging or reducing a number by a given amount, called the scale factor

Difference – the numerical difference between two numbers is found by comparing the quantity in each group.

Exchange – Change a number or expression for another of an equal value.

Partitioning - Splitting a number into its component parts.

Sum - The result of an addition.

Total - The aggregate or the sum found by addition.

KS1

whole, part, ones, ten, tens, number bond, add, addition, plus, total, sum, altogether, subtract, subtraction, find the difference, take away, minus, less, fewer, more, group, share, equal, equals, is equal to, is the same as, groups, equal groups, double, times, multiply, multiplied by, divide, divided by, share, group, shared equally, half, times-table.

LKS2

partition, place value, tens, hundreds, thousands, column method, whole, part, decrease, equal groups, the product of, sharing, grouping, bar model.

UKS2

decimal, column methods, exchange, partition, mental method, ten thousand, hundred thousand, million, factor, multiple, prime number, square number, cube number.