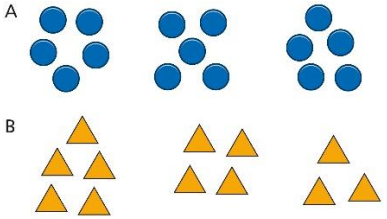
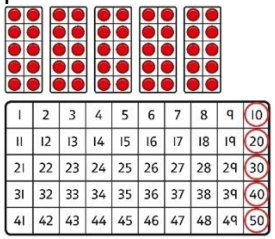
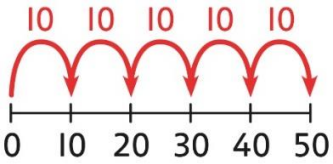
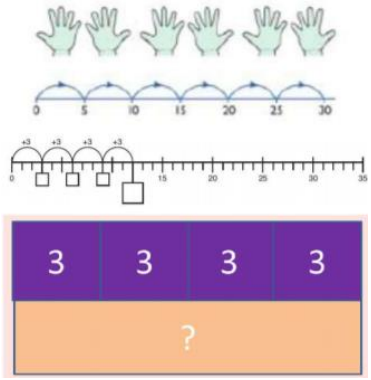
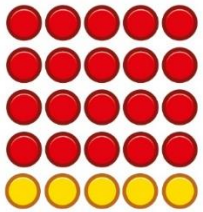
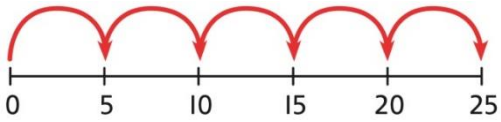
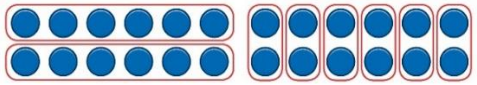
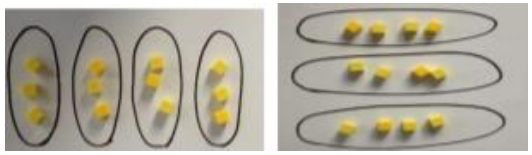
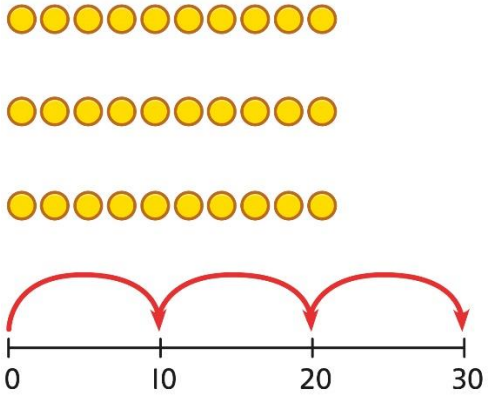
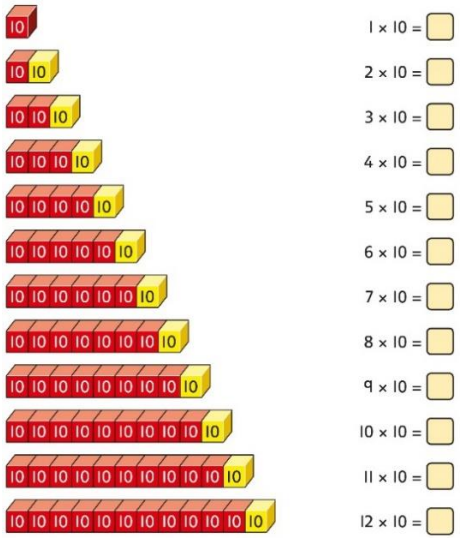
Calculation Policy

John Harrison CE Primary School
Multiplication

Year 1			
Recognising and making equal groups	Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal. 	Children draw and represent equal and unequal groups. 	Describe equal groups using words *Three equal groups of 4.* *Four equal groups of 3.*
Finding the total of equal groups by counting in 2s, 5s and 10s	 There are 5 pens in each pack … 5…10…15…20…25…30…35…40…	100 squares and ten frames support counting in 2s, 5s and 10s. Spotting the patterns. 	Use a number line to support repeated addition through counting in 2s, 5s and 10s. 
Year 2			
Equal groups and repeated addition	Recognise equal groups and write as repeated addition and as multiplication. 	Use number lines, counting sticks and bar models to show represetantion of counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers.

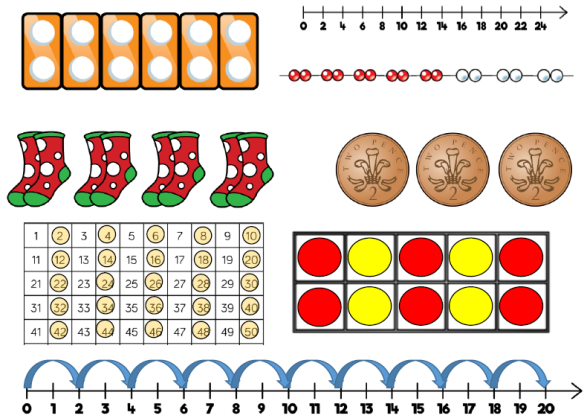
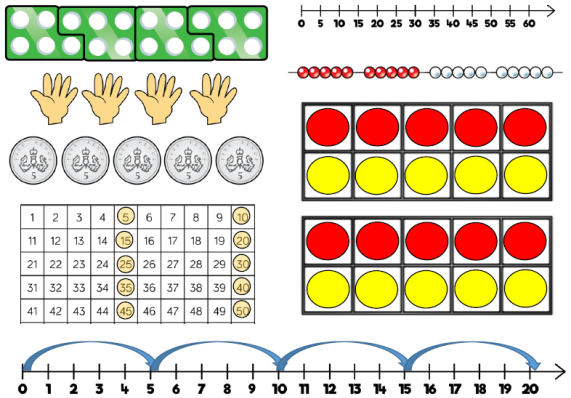
Multiplication

	3 groups of 5 chairs *15 chairs altogether* *5 + 5 + 5 = 15* *3 x 5 = 15*		
Using arrays to represent multiplication and support understanding	Understand the relationship between arrays, multiplication and repeated addition.  *4 groups of 5* *4 lots of 5*	 *4 groups of 5 … 5 groups of 5*	 *5 × 5 = 25* *The children can start to become aware of the 'switcher'.*
Understanding commutativity	Create arrays using counters, cubes and numicon.  Pupils should understand that an array can represent different equations and that, as	Form arrays using counters to visualise commutativity. Rotate the array to show that orientation does not change the multiplication. 	Use arrays to visualise commutativity. 

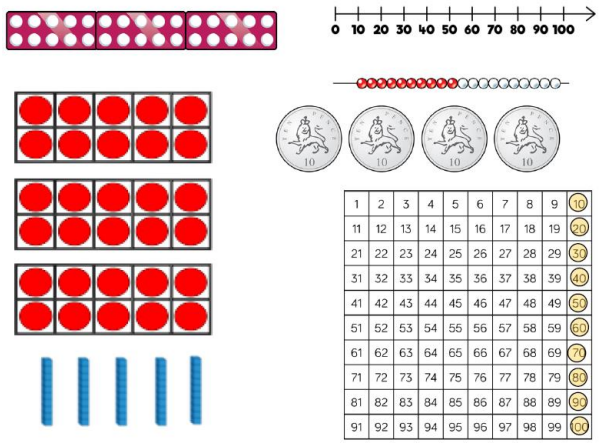
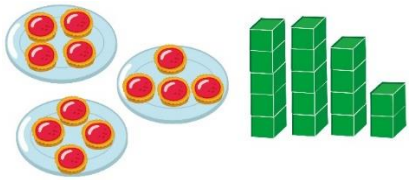
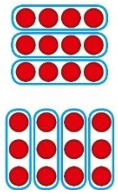
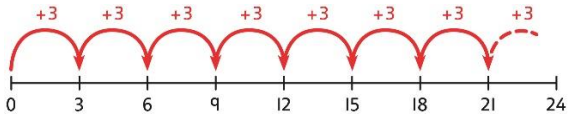
	multiplication is commutative, the order of the multiplication does not affect the answer. 	*This is 2 groups of 6 and also 6 groups of 2.*	*4 + 4 + 4 + 4 + 4 = 20* *5 + 5 + 5 + 5 = 20* *4 × 5 = 20 and 5 × 4 = 20*
Learning ×2, ×5 and ×10 table facts	Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts.  *3 groups of 10 … 10, 20, 30* *3 × 10 = 30*	Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.  *10 + 10 + 10 = 30* *3 × 10 = 30*	Understand how the times-tables increase and contain patterns and be able to use them to work out answers.  Rapid recall in and out of order.

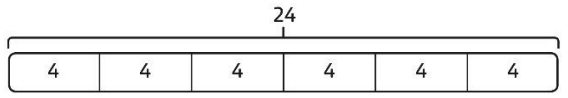
Calculation Policy

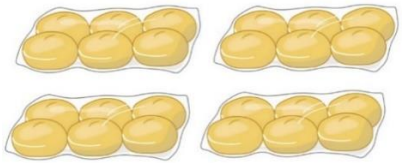
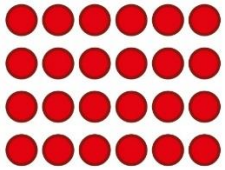
John Harrison CE Primary School
Multiplication

Specific to the 2 times table	
Specific to the 5 times table	

Multiplication

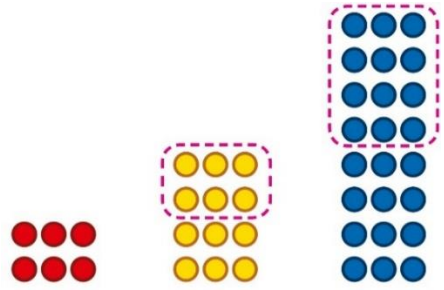
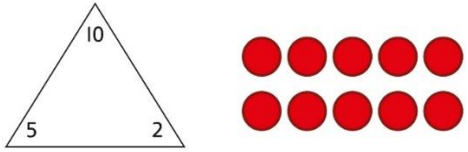
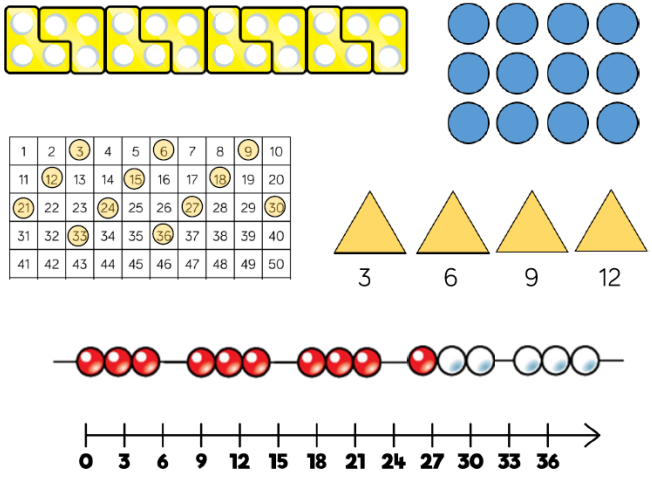
<table>
<tr><td>Specific to the 10 times table</td><td colspan="3"> 
</td></tr>
<tr><td colspan="4">Year 3</td></tr>
<tr><td>Understanding equal grouping and repeated addition</td><td>Children continue to build understanding of equal groups and the relationship with repeated addition.
They recognise both examples and non-examples using objects.
 
Children recognise that arrays can be used to model commutative multiplications.</td><td>Children recognise that arrays demonstrate commutativity.
 
This is 3 groups of 4.
This is 4 groups of 3.</td><td>Children understand the link between repeated addition and multiplication.
 

8 groups of 3 is 24.
3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24
8 × 3 = 24
A bar model may represent multiplications as equal groups.
 
</td></tr>
</table>

	 *I can see 3 groups of 8.* *I can see 8 groups of 3.*		*6 × 4 = 24*
Using commutativity to support understanding of the times-tables	Understand how to use times-tables facts flexibly.   *There are 6 groups of 4 pens.* *There are 4 groups of 6 bread rolls.* *I can use 6 × 4 = 24 to work out both totals.*	Understand how times-table facts relate to commutativity.  *6 × 4 = 24* *4 × 6 = 24*	Understand how times-table facts relate to commutativity. *I need to work out 4 groups of 7.* *I know that 7 × 4 = 28* *so, I know that* *4 groups of 7 = 28* *and* *7 groups of 4 = 28.*

Calculation Policy

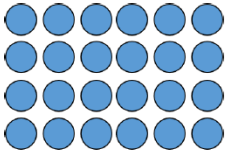
John Harrison CE Primary School
Multiplication

<table>
<tr>
<td>Understanding and using ×3, ×4 and ×8 tables.</td>
<td>Children learn the times-tables as 'groups of', but apply their knowledge of commutativity.
 
I can use the ×3 table to work out how many keys.
I can also use the ×3 table to work out how many batteries.</td>
<td>Children understand how the ×2, ×4 and ×8 tables are related through repeated doubling.
 
3 × 2 = 6
3 × 4 = 12
3 × 8 = 24</td>
<td>Children understand the relationship between related multiplication and division facts in known times-tables.
 
2 × 5 = 10
5 × 2 = 10
10 ÷ 5 = 2
10 ÷ 2 = 5</td>
</tr>
<tr>
<td>Specific to the 3 times table</td>
<td colspan="3"> 
3 6 9 12
0 3 6 9 12 15 18 21 24 27 30 33 36</td>
</tr>
</table>

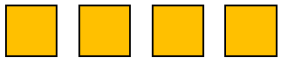
Calculation Policy

John Harrison CE Primary School
Multiplication

Specific to the 4 times table

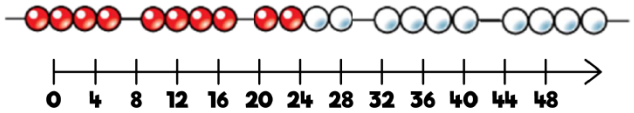


1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

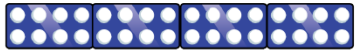


4 8 12 16

4	8	12	16	20
24	28	32	36	40
44	48	52	56	60



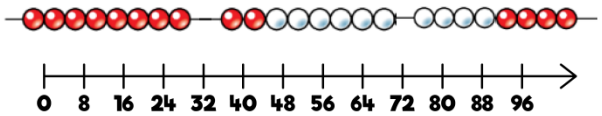
Specific to the 8 times table



8 16 24 32

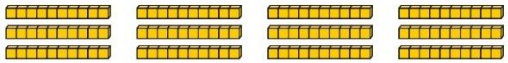
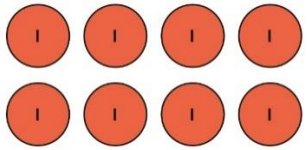
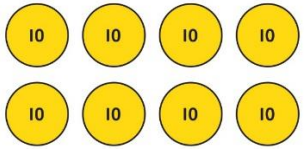
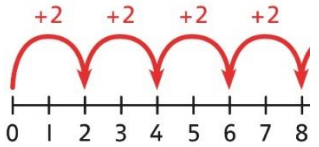
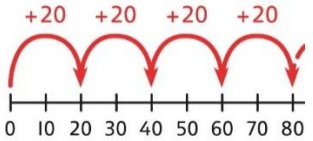
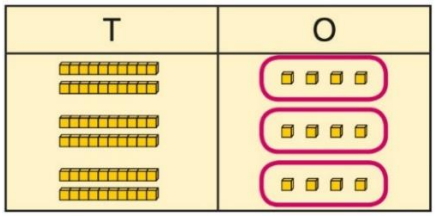
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

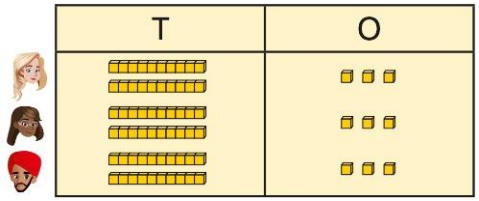
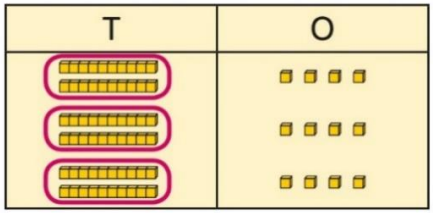
8	16	24	32	40
48	56	64	72	80



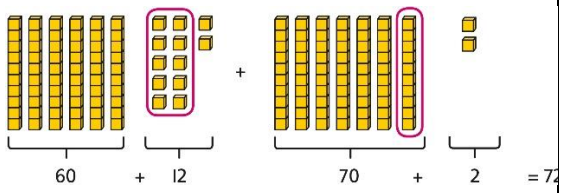
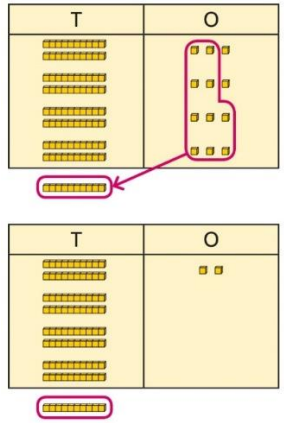
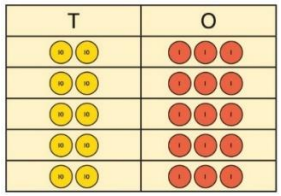
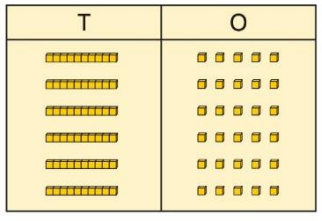
Calculation Policy

John Harrison CE Primary School
Multiplication

Using known facts to multiply 10s, for example 3 × 40	Explore the relationship between known times-tables and multiples of 10 using place value equipment. *Make 4 groups of 3 ones.*  *Make 4 groups of 3 tens.*  *What is the same?* *What is different?*	Understand how unitising 10s supports multiplying by multiples of 10.   *4 groups of 2 ones is 8 ones.* *4 groups of 2 tens is 8 tens.* *4 × 2 = 8* *4 × 20 = 80*	Understand how to use known times-tables to multiply multiples of 10.   *4 × 2 = 8* *4 × 20 = 80*
Multiplying a 2-digit number by a 1-digit number	Understand how to link partitioning a 2-digit number with multiplying. *Each person has 23 flowers.* *Each person has 2 tens and 3 ones.* 	Use place value to support how partitioning is linked with multiplying by a 2-digit number. *3 × 24 = ?*  	Use addition to complete multiplications of 2-digit numbers by a 1-digit number. *4 × 13 = ?* *4 × 3 = 12* *4 × 10 = 40* *12 + 40 = 52* *4 × 13 = 52*

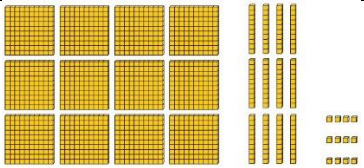
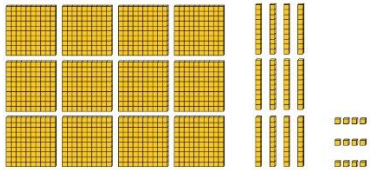
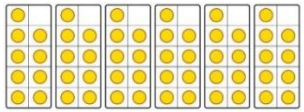
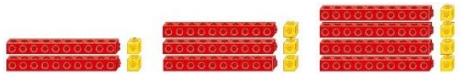
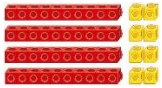
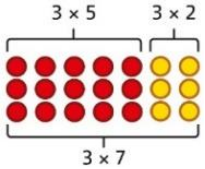
	There are 3 groups of 2 tens. *There are 3 groups of 3 ones.* Use place value equipment to model the multiplication context.  *There are 3 groups of 3 ones.* *There are 3 groups of 2 tens.*	*3 × 4 = 12*  *3 × 20 = 60* *60 + 12 = 72* *3 × 24 = 72*	
Multiplying a 2-digit number by a 1-digit number, expanded column method	Use place value equipment to model how 10 ones are exchanged for a 10 in some multiplications. *3 × 24 = ?* *3 × 20 = 60* *3 × 4 = 12*	Understand that multiplications may require an exchange of 1s for 10s, and also 10s for 100s. *4 × 23 = ?*	Children may write calculations in expanded column form, but must understand the link with place value and exchange. Children are encouraged to write the expanded parts of the calculation separately.

Multiplication

	 *3 × 24 = 60 + 12* *3 × 24 = 70 + 2* *3 × 24 = 72*	 *4 × 23 = 92*  *5 × 23 = ?* *5 × 3 = 15* *5 × 20 = 100* *5 × 23 = 115*	 T O 1 5 × 6 + 6 × 5 6 × 10 *5 × 28 = ?* T O 2 8 × 5 4 0 5 × 8 1 0 0 5 × 20 1 4 0

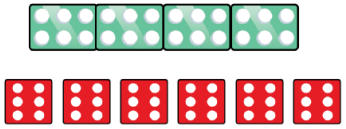
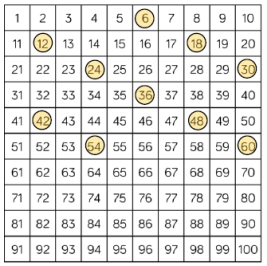
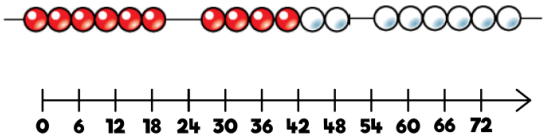
Year 4			
Multiplying by multiples of 10 and 100	Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.	Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.	Use known facts and understanding of place value and commutativity to multiply mentally. *4 × 7 = 28*

Multiplication

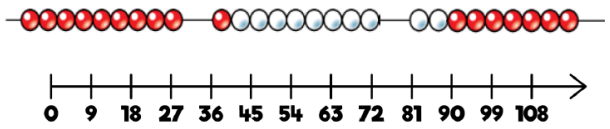
	 *3 groups of 4 ones is 12 ones.* *3 groups of 4 tens is 12 tens.* *3 groups of 4 hundreds is 12 hundreds.*	 *3 × 4 = 12* *3 × 40 = 120* *3 × 400 = 1,200*	*4 × 70 = 280* *40 × 7 = 280* *4 × 700 = 2,800* *400 × 7 = 2,800*
Understanding times-tables up to 12 × 12	Understand the special cases of multiplying by 1 and 0.  *5 × 1 = 5* *5 × 0 = 0*	Represent the relationship between the ×9 table and the ×10 table.  Represent the ×11 table and ×12 tables in relation to the ×10 table.  *2 × 11 = 20 + 2* *3 × 11 = 30 + 3* *4 × 11 = 40 + 4*  *4 × 12 = 40 + 8*	Understand how times-tables relate to counting patterns. Understand links between the ×3 table, ×6 table and ×9 table *5 × 6 is double 5 × 3* ×5 table and ×6 table *I know that 7 × 5 = 35* *so I know that 7 × 6 = 35 + 7.* ×5 table and ×7 table *3 × 7 = 3 × 5 + 3 × 2*  ×9 table and ×10 table *6 × 10 = 60* *6 × 9 = 60 – 6*

Calculation Policy

John Harrison CE Primary School
Multiplication

<table>
<tr>
<td>Specific to the 6 times table</td>
<td>


<table>
<tr><td>6</td><td>12</td><td>18</td><td>24</td><td>30</td></tr>
<tr><td>36</td><td>42</td><td>48</td><td>54</td><td>60</td></tr>
<tr><td>66</td><td>72</td><td>78</td><td>84</td><td>90</td></tr>
</table>


</td>
</tr>
<tr>
<td>Specific to the 9 times table</td>
<td>

<table>
<tr><td>9</td><td>18</td><td>27</td><td>36</td><td>45</td></tr>
<tr><td>54</td><td>63</td><td>72</td><td>81</td><td>90</td></tr>
</table>


</td>
</tr>
</table>

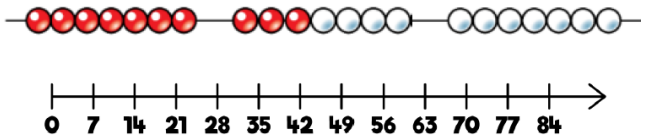
Calculation Policy

John Harrison CE Primary School
Multiplication

Specific to the 7 times table

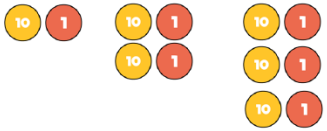
7	14	21	28	35
42	49	56	63	70

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

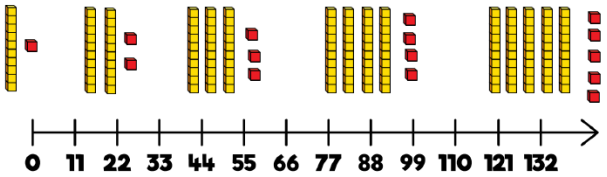


Specific to the 11 times table

11	22	33	44	55	66
77	88	99	110	121	132



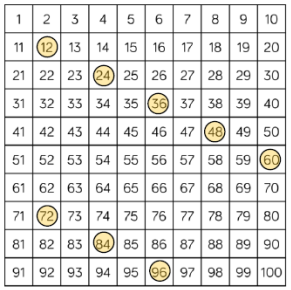
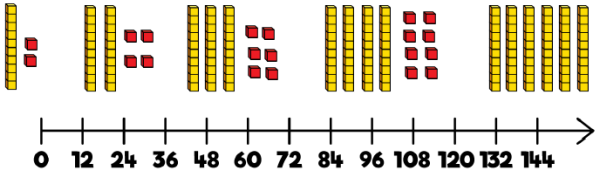
1	2	3	4	5	6	7	8	9	10
(11)	12	13	14	15	16	17	18	19	20
21	(22)	23	24	25	26	27	28	29	30
31	32	(33)	34	35	36	37	38	39	40
41	42	43	(44)	45	46	47	48	49	50
51	52	53	54	(55)	56	57	58	59	60
61	62	63	64	65	(66)	67	68	69	70
71	72	73	74	75	76	(77)	78	79	80
81	82	83	84	85	86	87	(88)	89	90
91	92	93	94	95	96	97	98	(99)	100



Calculation Policy

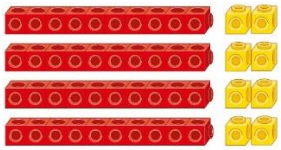
John Harrison CE Primary School
Multiplication

<table>
<tr>
<td>Specific to the 12 times table</td>
<td colspan="3">
<table>
<tr><td>12</td><td>24</td><td>36</td><td>48</td><td>60</td></tr>
<tr><td>72</td><td>84</td><td>96</td><td>108</td><td>120</td></tr>
<tr><td>132</td><td>144</td><td></td><td></td><td></td></tr>
</table>

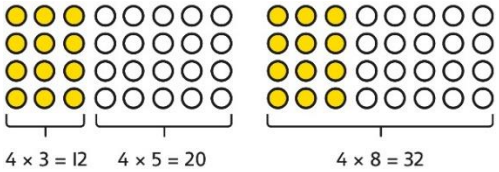



</td>
</tr>
<tr>
<td>Understanding and using partitioning in multiplication</td>
<td>Make multiplications by partitioning.

4 × 12 is 4 groups of 10 and 4 groups of 2.

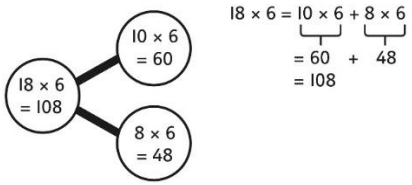
4 × 12 = 40 + 8</td>
<td>Understand how multiplication and partitioning are related through addition.

4 × 3 = 12
4 × 5 = 20
12 + 20 = 32

4 × 8 = 32</td>
<td>Use partitioning to multiply 2-digit numbers by a single digit.

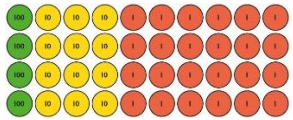
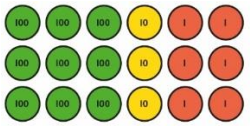
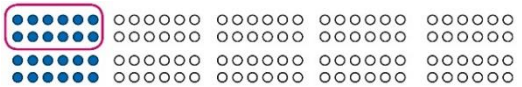
18 × 6 = ?

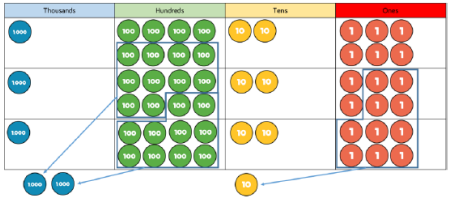
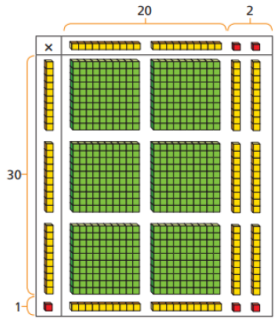
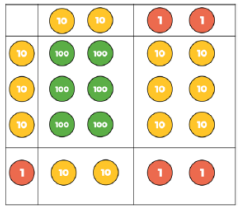
18 × 6 = 10 × 6 + 8 × 6
= 60 + 48
= 108</td>
</tr>
</table>

Calculation Policy

John Harrison CE Primary School
Multiplication

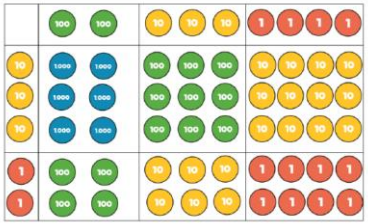
Column multiplication for 2- and 3-digit numbers multiplied by a single digit	Use place value equipment to make multiplications. *Make 4 × 136 using equipment.*  *I can work out how many 1s, 10s and 100s.* *There are 4 × 6 ones… 24 ones* *There are 4 × 3 tens … 12 tens* *There are 4 × 1 hundreds … 4 hundreds* *24 + 120 + 400 = 544*	Use place value equipment alongside a column method for multiplication of up to 3-digit numbers by a single digit.  3 1 2 × 3 9 3 6	Use the formal column method for up to 3-digit numbers multiplied by a single digit. 3 1 2 × 3 9 3 6 Understand how the expanded column method is related to the formal column method and understand how any exchanges are related to place value at each stage of the calculation. 2 3 × 5 1 5 1 0 0 1 1 5 2 3 × 5 1 1 5 1
Multiplying more than two numbers	Represent situations by multiplying three numbers together.  *Each sheet has 2 × 5 stickers.* *There are 3 sheets.*	Understand that commutativity can be used to multiply in different orders.  *2 × 6 × 10 = 120* *12 × 10 = 120* *10 × 6 × 2 = 120* *60 × 2 = 120*	Use knowledge of factors to simplify some multiplications. *24 × 5 = 12 × 2 × 5* 12 × 2 × 5 = 12 × 10 = 120 So, 24 × 5 = 120

Multiplication

	There are 5 × 2 × 3 stickers in total. $5 \times 2 \times 3 = 30$ $10 \times 3 = 30$		
	Year 5		
Multiply 4 digit numbers by 1 digit numbers	Use of counters to represent calculations.  1,826 × 3 = 5,478	Use multiplication grids to support written methods if children are struggling with basic times tables.	Confidently completing calculations using column method. Th H T O 1 8 2 6 × 3 5 4 7 8
Multiply 2 digit numbers by 2 digit numbers	Use the area model to help understanding of the size of the numbers. Use base 10s and denes to represent.  *22 x 31 = 682*	Grid method matches the area model as first method of written calculation.  × 20 2 30 600 60 1 20 2	Confidently completing calculations using column method. H T O 2 2 × 3 1 2 2 6 6 0 6 8 2

Calculation Policy

John Harrison CE Primary School
Multiplication

<table>
<tr>
<td>Multiply 3 digit numbers by 2 digit numbers</td>
<td>Continue to use the area method. Place value counters can be more efficient to use with base 10 allowing the size of the number to be seen.
 
234 x 32 = 7488</td>
<td>Grid method matches the area model as first method of written calculation.
<table><tr><td>×</td><td>200</td><td>30</td><td>4</td></tr><tr><td>30</td><td>6,000</td><td>900</td><td>120</td></tr><tr><td>2</td><td>400</td><td>60</td><td>8</td></tr></table></td>
<td>Confidently completing calculations using column method.
<table><tr><td>Th</td><td>H</td><td>T</td><td>O</td></tr><tr><td></td><td>2</td><td>3</td><td>4</td></tr><tr><td>×</td><td></td><td>3</td><td>2</td></tr><tr><td></td><td>4</td><td>6</td><td>8</td></tr><tr><td>1 7</td><td>1 0</td><td>2</td><td>0</td></tr><tr><td>7</td><td>4</td><td>8</td><td>8</td></tr></table></td>
</tr>
<tr>
<td>Multiply 4 digit numbers by 2 digit numbers</td>
<td></td>
<td></td>
<td>Children should be confident in multiplying smaller numbers before moving on to completing these calculations.
<table><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>2 2</td><td>1 5</td><td>9 3</td><td>1 7</td><td>2</td></tr><tr><td>1 5</td><td>4</td><td>7 1</td><td>8</td><td>0</td></tr><tr><td>7</td><td>6</td><td>6 1</td><td>9</td><td>2</td></tr></table>2,739 × 28 = 76,692</td>
</tr>
</table>

Year 6 has no specific new learning for multiplication. Methods from previous year groups need to be revisited and used, as appropriate.