Maths Mastery Policy

MULTIPLICATION

Reception:

EHLT are implementing Mastering Number at Reception in September 2024.

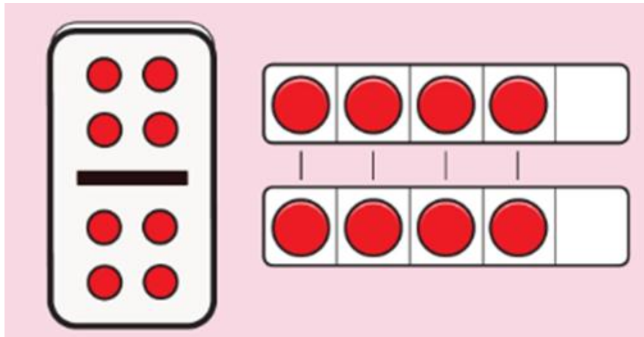
The programme aims to secure firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2. The aim over time is that children will leave KS1 with fluency in calculation and a confidence and flexibility with number. Attention will be given to key knowledge and understanding needed in Reception classes, and progression through KS1 to support success in the future. Over the year, the children will experience using a range of resources and representations.

Research shows that children with secure 'number sense' early on will make more progress later on in maths and across the curriculum.

MULTIPLICATION KEY VOCABULARY					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Groups of; lots of; times; array; altogether; multiply; count	Groups of; lots of; times; array; altogether; multiply; count; multiplied by; repeated addition; factor	Groups of; lots of; times; array; altogether; multiply; count; multiplied by; repeated addition; column; row; commutative; sets of; equal groups; times as big as; once, twice, three times..; product; factor; grid method	Groups of; lots of; times; array; altogether; multiply; count; multiplied by; repeated addition; column; row; commutative; sets of; equal groups; times as big as; once, twice, three times..; product; factor; grid method; multiple; tens; ones; value; factor pair; approximate	Groups of; lots of; times; array; altogether; multiply; count; multiplied by; repeated addition; column; row; commutative; sets of; equal groups; times as big as; once, twice, three times..; product; factor; grid method; multiple; tens; ones; value; factor pair; approximate; integer; decimal; short/long multiplication; regroup	Groups of; lots of; times; array; altogether; multiply; count; multiplied by; repeated addition; column; row; commutative; sets of; equal groups; times as big as; once, twice, three times..; product; factor; grid method; multiple; tens; ones; value; factor pair; approximate; integer; decimal; short/long multiplication; regroup; tenths; hundredths

***This vocabulary is not an exhaustive list. Teachers will use recommended NCETM vocabulary in lessons.**

RECEPTION MULTIPLICATION

	REAL-LIFE REPRESENTATION	OTHER REPRESENTATION
Making doubles	**Children explore doubles in their environment including in games such as on dominoes or dice. They focus on the understanding of doubles being 2 equal groups.**  ***Double 4 is 8.*** ***Double 2 is 4.*** ***Double 3 is 6.***	**Children use five frames to find doubles by lining up counters or cubes.**  ***Double 4 is 8.***

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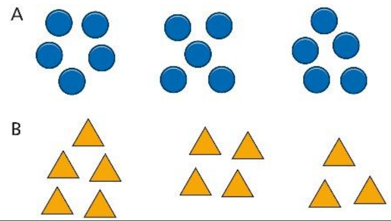
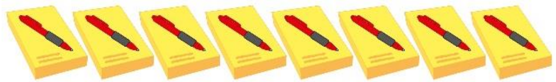
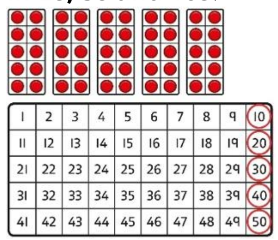
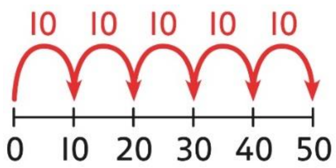
YEAR 1 MULTIPLICATION

	CONCRETE	PICTORIAL	ABSTRACT
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.** 	***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.** 	**Use a number line to support repeated addition through counting in 2s, 5s and 10s.** 

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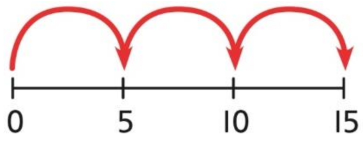
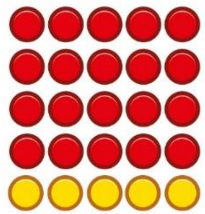
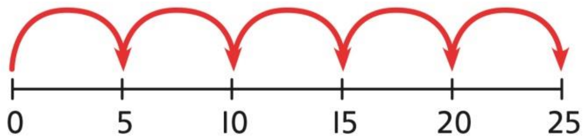
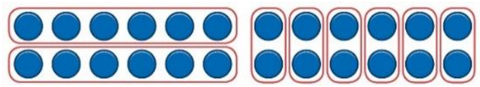
YEAR 2 MULTIPLICATION

	CONCRETE	PICTORIAL	ABSTRACT
Equal groups and repeated addition	**Recognise equal groups and write as repeated addition and as multiplication.**  *3 groups of 5 chairs* *15 chairs altogether*	**Recognise equal groups using standard objects such as counters and write as repeated addition and multiplication.**  *3 groups of 5* *15 in total*	**Use a number line and write as repeated addition and as multiplication.**  *5 + 5 + 5 = 15* *3 × 5 = 15*
Using arrays to represent multiplication and support understanding	**Understand the relationship between arrays, multiplication and repeated addition.**  *4 groups of 5*	**Understand the relationship between arrays, multiplication and repeated addition.**  *4 groups of 5 … 5 groups of 5*	**Understand the relationship between arrays, multiplication and repeated addition.**  *5 × 5 = 25*
Understanding commutativity	**Use arrays to visualise commutativity.**  *I can see 6 groups of 3.* *I can see 3 groups of 6.*	**Form arrays using counters to visualise commutativity. Rotate the array to show that orientation does not change the multiplication.**  *This is 2 groups of 6 and also 6 groups of 2.*	**Use arrays to visualise commutativity.**  *4 + 4 + 4 + 4 + 4 = 20* *5 + 5 + 5 + 5 = 20* *4 × 5 = 20 and 5 × 4 = 20*

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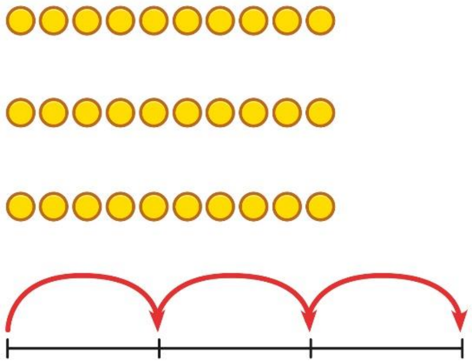
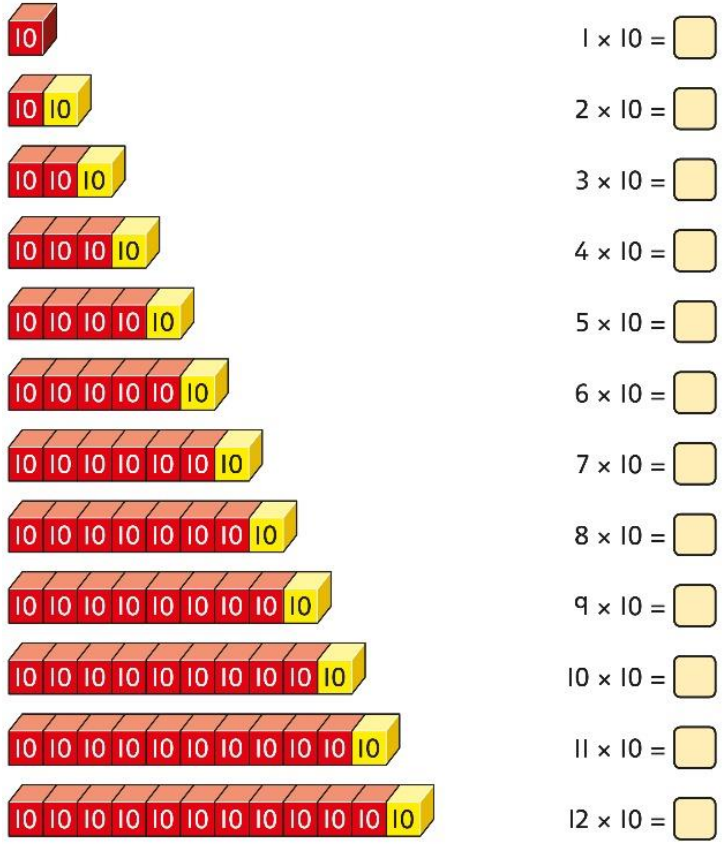
Learning ×2, ×5 and ×10 table facts	**Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts.**  ***3 groups of 10 … 10, 20, 30*** ***3 × 10 = 30***	**Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.**  ***10 + 10 + 10 = 30*** ***3 × 10 = 30***	**Understand how the times-tables increase and contain patterns.**  ***5 × 10 = 50*** ***6 × 10 = 60***

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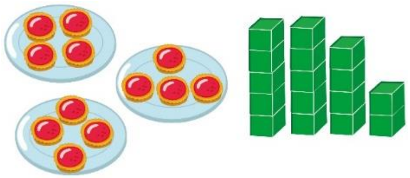
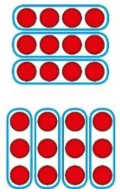
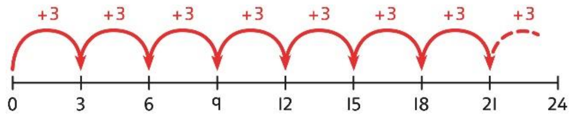
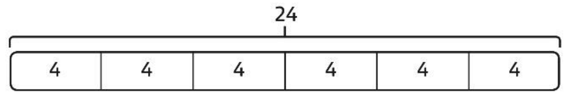
YEAR 3 MULTIPLICATION

	CONCRETE	PICTORIAL	ABSTRACT
Understanding equal grouping and repeated addition	**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.**  *I can see 3 groups of 8.* *I can see 8 groups of 3.*	**Children recognise that arrays demonstrate commutativity.**  *This is 3 groups of 4.* *This is 4 groups of 3.*	**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.**  *6 × 4 = 24*

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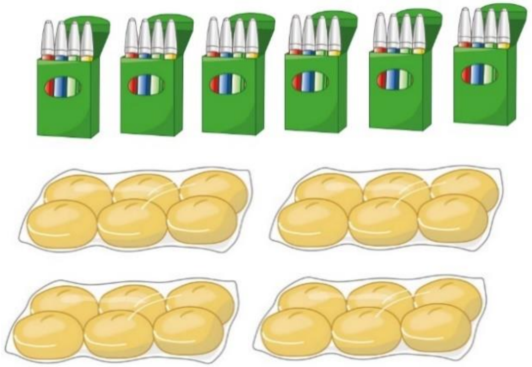
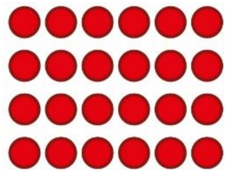
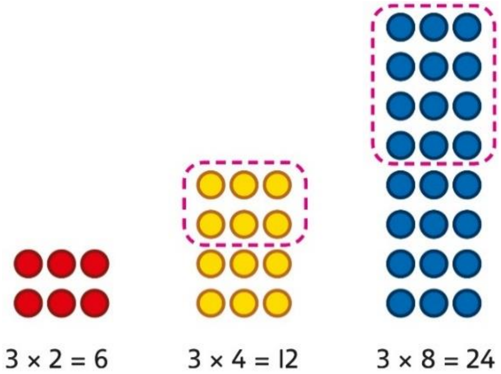
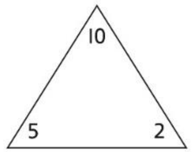
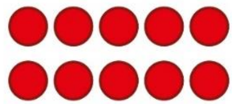
Using commutativity to support understanding of the times-tables	**Understand how to use times-tables facts flexibly.**  *There are 6 groups of 4 pens.* *There are 4 groups of 6 bread rolls.* *I can use 6 × 4 = 24 to work out both totals.*	**Understand how times-table facts relate to commutativity.**  *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.*
Understanding and using ×3, ×2, ×4 and ×8 tables.	**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.*	**Children understand how the ×2, ×4 and ×8 tables are related through repeated doubling.**  	**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*

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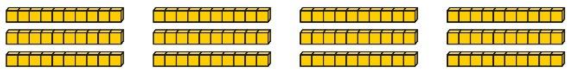
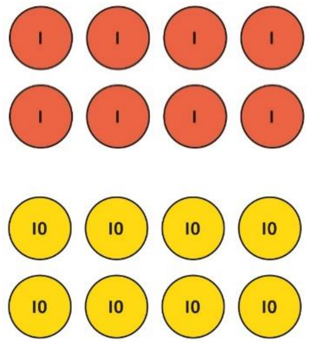
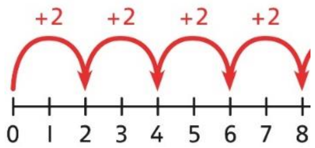
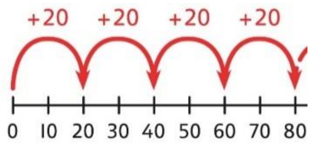
Using known facts to multiply 10s, for example 3 × 40	**Explore the relationship between known times-tables and multiples of 10 using place value equipment.** ***Make 4 groups of 3 ones.***  ***Make 4 groups of 3 tens.***  ***What is the same?*** ***What is different?***	**Understand how unitising 10s 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**

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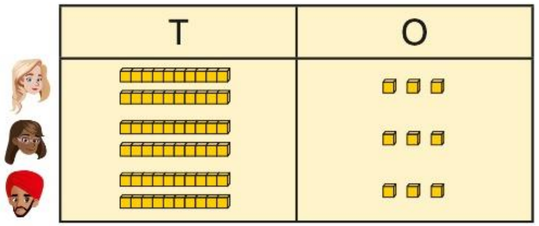
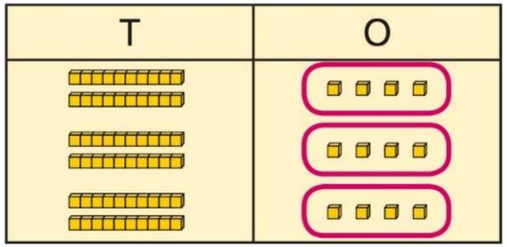
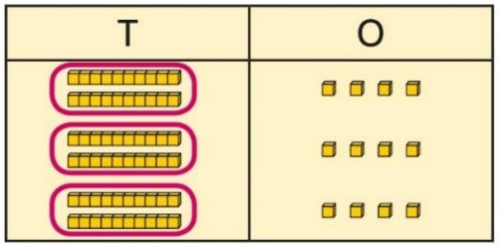
Multiplying a 2-digit number by a 1-digit number	**Understand how to link partitioning a 2-digit number with multiplying.** *Each person has 23 flowers.* *Each person has 2 tens and 3 ones.*  *There are 3 groups of 2 tens.* *There are 3 groups of 3 ones.* **Use place value equipment to model the multiplication context.**  *There are 3 groups of 3 ones.* *There are 3 groups of 2 tens.*	**Use place value to support how partitioning is linked with multiplying by a 2-digit number.** *3 × 24 = ?*  *3 × 4 = 12*  *3 × 20 = 60* *60 + 12 = 72* 3 × 24 = 72	**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*

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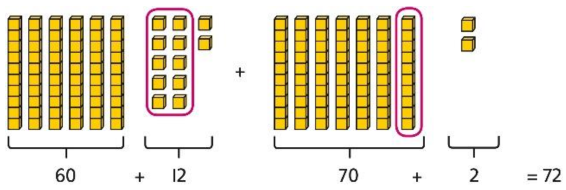
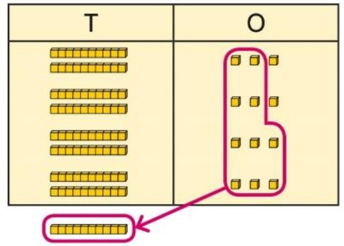
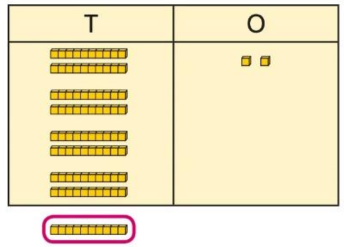
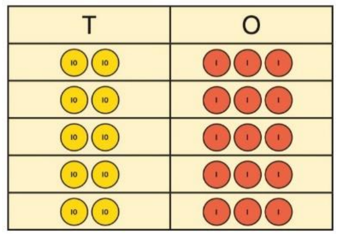
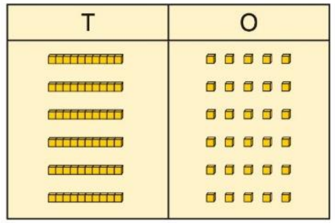
Multiplying a 2-digit number by a 1-digit number, expanded column method	**Use place value equipment to model how 10 ones are exchanged for a 10 in some multiplications.** ***3 × 24 = ?*** ***3 × 20 = 60*** ***3 × 4 = 12***  ***3 × 24 = 60 + 12*** ***3 × 24 = 70 + 2*** ***3 × 24 = 72***	**Understand that multiplications may require an exchange of 1s for 10s, and also 10s for 100s.** ***4 × 23 = ?***   ***4 × 23 = 92***  ***5 × 23 = ?*** ***5 × 3 = 15*** ***5 × 20 = 100*** ***5 × 23 = 115***	**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.**  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

Maths Mastery Policy

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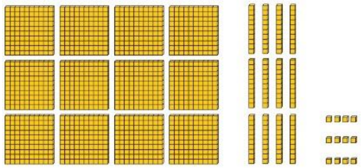
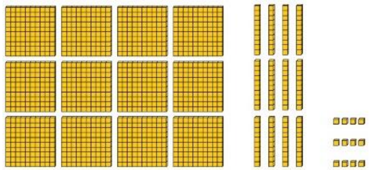
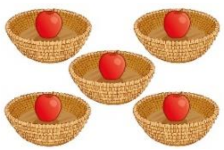
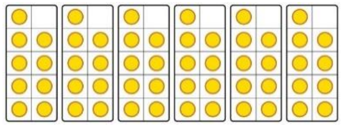
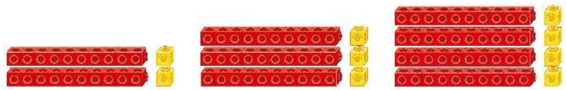
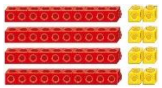
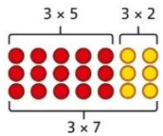
YEAR 4 MULTIPLICATION

	CONCRETE	PICTORIAL	ABSTRACT
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.**  *3 groups of 4 ones is 12 ones.* *3 groups of 4 tens is 12 tens.* *3 groups of 4 hundreds is 12 hundreds.*	**Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.**  *3 × 4 = 12* *3 × 40 = 120* *3 × 400 = 1,200*	**Use known facts and understanding of place value and commutativity to multiply mentally.** *4 × 7 = 28* *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*

Maths Mastery Policy

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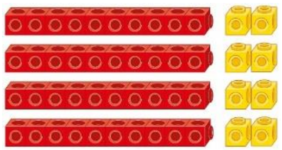
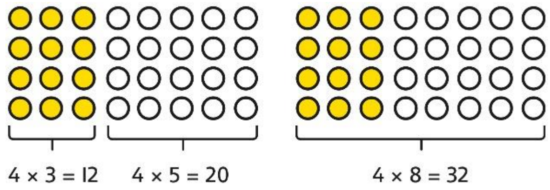
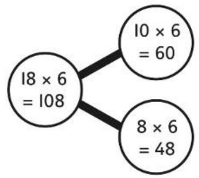
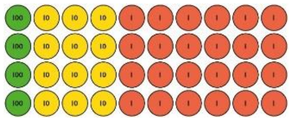
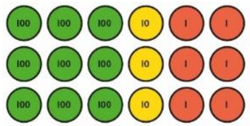
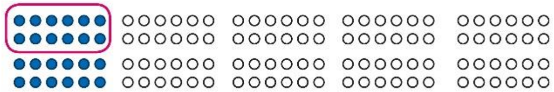
Partnership for Achievement

Understanding and using partitioning in multiplication	**Make multiplications by partitioning.** *4 × 12 is 4 groups of 10 and 4 groups of 2.*  *4 × 12 = 40 + 8*	**Understand how multiplication and partitioning are related through addition.**  *4 × 3 = 12* *4 × 5 = 20* *12 + 20 = 32* *4 × 8 = 32*	**Use partitioning to multiply 2-digit numbers by a single digit.** *18 × 6 = ?*  $18 \times 6 = \underbrace{10 \times 6}_{=60} + \underbrace{8 \times 6}_{48}$ = 108 *18 × 6 = 10 × 6 + 8 × 6* = 60 + 48 = 108
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.**  $\begin{array}{r} 3\ 1\ 2 \\ \times \quad\ \ 3 \\ \hline 9\ 3\ 6 \\ \hline \end{array}$	**Use the formal column method for up to 3-digit numbers multiplied by a single digit.** $\begin{array}{r} 3\ 1\ 2 \\ \times \quad\ \ 3 \\ \hline 9\ 3\ 6 \\ \hline \end{array}$ **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.** $\begin{array}{r} 2\ 3 \\ \times \quad 5 \\ \hline 1\ 5 \\ 1\ 0\ 0 \\ \hline 1\ 1\ 5 \\ \hline \end{array}$ $\begin{array}{r} 2\ 3 \\ \times \quad 5 \\ \hline 1\ 1\ 5 \\ \hline {}_{1}\ \ \end{array}$

Maths Mastery Policy

Multiplying more than two numbers	**Represent situations by multiplying three numbers together.**  *Each sheet has 2 × 5 stickers.* *There are 3 sheets.* *There are 5 × 2 × 3 stickers in total.* $\underbrace{5 \times 2}_{10} \times 3 = 30$ 10 × 3 = 30	**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* $12 \times \underbrace{2 \times 5}_{10} =$ 12 × 10 = 120 So, 24 × 5 = 120

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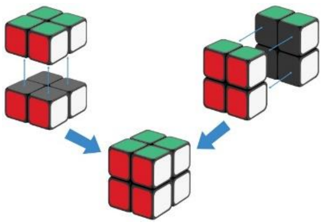
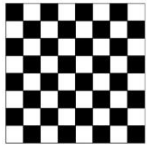
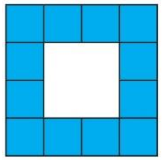
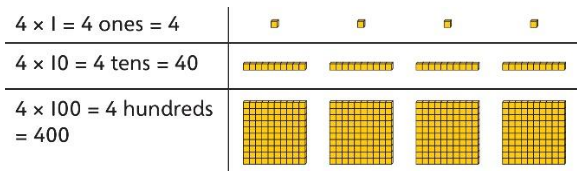
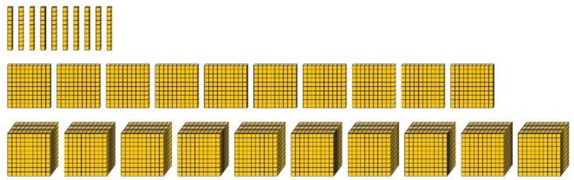
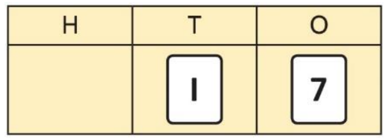
ELSTON HALL Learning Trust

YEAR 5 MULTIPLICATION

	CONCRETE	**PICTORIAL**	**ABSTRACT**
Understanding factors	Use cubes or counters to explore the meaning of 'square numbers'. *25 is a square number because it is made from 5 rows of 5.* Use cubes to explore cube numbers.  8 is a cube number.	Use images to explore examples and non-examples of square numbers.  *$8 \times 8 = 64$* *$8^2 = 64$*  *12 is not a square number, because you cannot multiply a whole number by itself to make 12.*	Understand the pattern of square numbers in the multiplication tables. Use a multiplication grid to circle each square number. Can children spot a pattern?
Multiplying by 10, 100 and 1,000	Use place value equipment to multiply by 10, 100 and 1,000 by unitising. 	Understand the effect of repeated multiplication by 10. 	Understand how exchange relates to the digits when multiplying by 10, 100 and 1,000.  *$17 \times 10 = 170$* *$17 \times 100 = 17 \times 10 \times 10 = 1{,}700$* $17 \times 1{,}000 = 17 \times 10 \times 10 \times 10 = 17{,}000$

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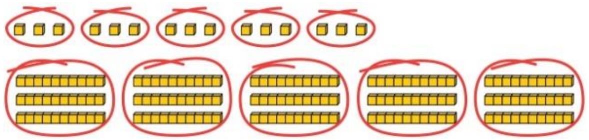
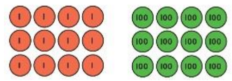
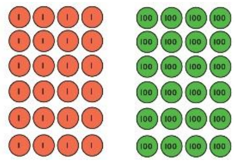
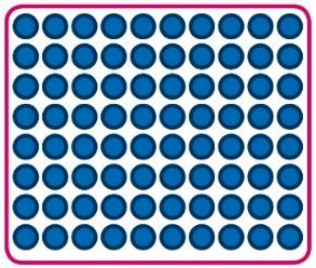
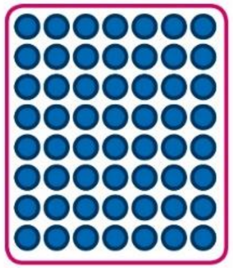
<table>
<tr>
<td>Multiplying by multiples of 10, 100 and 1,000</td>
<td>Use place value equipment to explore multiplying by unitising.

5 groups of 3 ones is 15 ones.
5 groups of 3 tens is 15 tens.

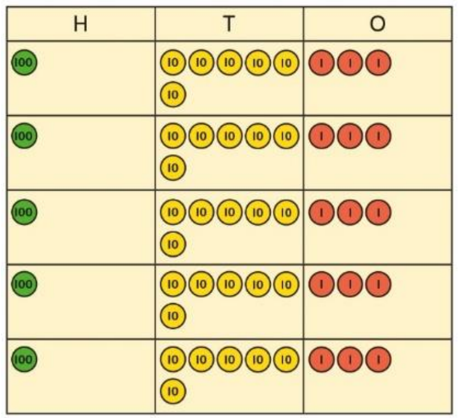
So, I know that 5 groups of 3 thousands would be 15 thousands.</td>
<td>Use place value equipment to represent how to multiply by multiples of 10, 100 and 1,000.

4 × 3 = 12
4 × 300 = 1,200

6 × 4 = 24
6 × 400 = 2,400</td>
<td>Use known facts and unitising to multiply.

5 × 4 = 20
5 × 40 = 200
5 × 400 = 2,000
5 × 4,000 – 20,000

5,000 × 4 = 20,000</td>
</tr>
<tr>
<td>Multiplying up to 4-digit numbers by a single digit</td>
<td>Explore how to use partitioning to multiply efficiently.

8 × 17 = ?

8 × 10 = 80

8 × 7 = 56

80 + 56 = 136

So, 8 × 17 = 136</td>
<td>Represent multiplications using place value equipment and add the 1s, then 10s, then 100s, then 1,000s.
</td>
<td>Use an area model and then add the parts.
<table><tr><td></td><td>100</td><td>60</td><td>3</td></tr><tr><td>5</td><td>100 × 5 = 500</td><td>60 × 5 = 300</td><td>3 × 5 = 15</td></tr></table>
Use a column multiplication, including any required exchanges.
$$\begin{array}{r} 1\ 3\ 6 \\ \times \quad\ 6 \\ \hline 8\ 1\ 6 \\ \hline {\scriptstyle 2\ 3\ \ } \end{array}$$</td>
</tr>
</table>

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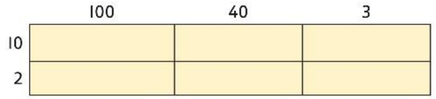
Multiplying 2-digit numbers by 2-digit numbers	**Partition one number into 10s and 1s, then add the parts.** ***23 × 15 = ?***  10 × 15 = 150 10 × 15 = 150  3 × 15 = 45 There are 345 bottles of milk in total. H T O 1 5 0 1 5 0 + 4 5 3 4 5 1 ***23 × 15 = 345***	**Use an area model and add the parts.** ***28 × 15 = ?*** | | 20 m | 8 m | | 10 m | 20 × 10 = 200 m^2 | 8 × 10 = 80 m^2 | | 5 m | 20 × 5 = 100 m^2 | 8 × 5 = 40 m^2 | H T O 2 0 0 1 0 0 8 0 + 4 0 4 2 0 1 ***28 × 15 = 420***	**Use column multiplication, ensuring understanding of place value at each stage.** 3 4 × 2 7 2 3_2 8 34 × 7 3 4 × 2 7 2 3_2 8 34 × 7 6 8 0 34 × 20 3 4 × 2 7 2 3_2 8 34 × 7 6 8 0 34 × 20 9 1 8 34 × 27 1

Multiplying up to 4-digits by 2-digits		**Use the area model then add the parts.**  Th H T O 1 0 0 0 4 0 0 2 0 0 8 0 3 0 + 6 1 7 1 6 143 × 12 = 1,716 There are 1,716 boxes of cereal in total. ***143 × 12 = 1,716***	**Use column multiplication, ensuring understanding of place value at each stage.** 1 4 3 × 1 2 2 8 6 143 × 2 1 4 3 0 143 × 10 1 7 1 6 143 × 12 **Progress to include examples that require multiple exchanges as understanding, confidence and fluency build.** ***1,274 × 32 = ?*** ***First multiply 1,274 by 2.*** 1 2 7 4 × 3 2 2 5 4 8 1,274 × 2 ***Then multiply 1,274 by 30.*** 1 2 7 4 × 3 2 2 5 4 8 1,274 × 2 3 8 2 2 0 1,274 × 30 ***Finally, find the total.*** 1 2 7 4 × 3 2 2 5 4 8 1,274 × 2 3 8 2 2 0 1,274 × 30 4 0 7 6 8 1,274 × 32 ***1,274 × 32 = 40,768***

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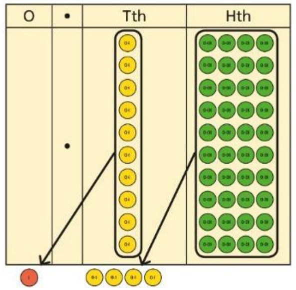
Multiplying decimals by 10, 100 and 1,000	**Use place value equipment to explore and understand the exchange of 10 tenths, 10 hundredths or 10 thousandths.**	**Represent multiplication by 10 as exchange on a place value grid.**  **0·14 × 10 = 1·4**	**Understand how this exchange is represented on a place value chart.**