St William's Catholic Academy:
Calculation Guidance For Multiplication and Division

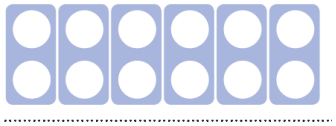
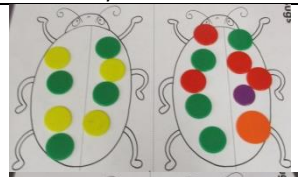
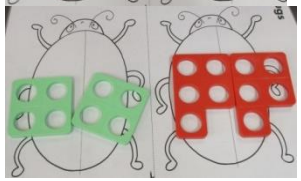
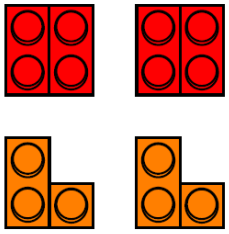
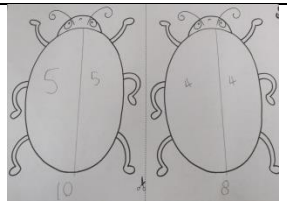
(Last Reviewed Spring Term 2023)

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
	Multiplication Recognise and make equal groups Doubling in a practical way.	Counting in multiples using concrete materials. Solve one step word problems using arrays and other concrete materials.	Show that multiplication can be done in any order (commutative) Solve problems using arrays and other concrete materials.	Write and calculate mathematical statements for multiplication using the times tables they know. Multiply 2 digit by 1 digit numbers using base 10 progressing to formal written methods.	Multiply two digits and three digit numbers by a one-digit number using a written formal method. Solve multiplication two-step problems in context choosing appropriate operations	Identify multiples and factors, including all factor pairs of a number. 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 numbers (*including decimals*) by 100, 100 and 1000.	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. Identify common multiples.
	Key language: double, times, multiplied by, the product of, groups of, lots of, equal groups.						
	Division Halving and sharing in a practical way. Division as grouping	Solve one step word problems using arrays and other concrete materials.	Show that with division the biggest number has to go first. Solve problems using arrays and other concrete materials.	Write and calculate mathematical statements for division using the times tables they know. Divide 2 digit by 1 digit numbers using base 10 or other concrete materials. Division with a remainder using concrete objects and number facts.	Divide numbers up to 3 digits by a one-digit number using the formal written method. Division with a remainder.	Divide numbers up to 4 digits by a one-digit number using the formal written method. Interpret remainders appropriately for the context. Divide numbers (*including decimals*) by 100, 100 and 1000.	Use short division to divide a 4-digit number by a 2-digit number. Use long division to divide a 4-digit number by a 2-digit number. Solve multi step problems involving division.
	Key language: share, group, divide, divided by, half						

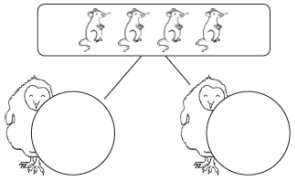
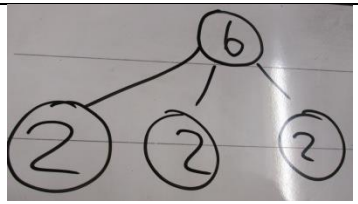
Progression In Multiplication Tables At St.William's (Whole School View)

Skill	Year Grp	Representations and Models Used
Recall and use multiplication and division facts for the 2x Table	2	Bar Model, Counters, Money/coins, Ten Frames, Bead Strings, Number Lines, Number Shapes and Everyday Objects.
Recall and use multiplication and division facts for the 5x Table	2	Bar Model, Counters, Money/coins, Ten Frames, Bead Strings, Number Lines, Number Shapes and Everyday Objects.
Recall and use multiplication and division facts for the 10x Table	2	Base 10, Counters, Money/coins, Ten Frames, Bead Strings, Number Lines, Number Shapes and 100 square.
Recall and use multiplication and division facts for the 3x Table	3	Counters, Everyday Objects, Bead Strings, Number Lines, Number Shapes and 100 square.
Recall and use multiplication and division facts for the 4x Table	3	Counters, Everyday Objects, Bead Strings, Number Lines, Number Shapes and 100 square.
Recall and use multiplication and division facts for the 8x Table	3	Everyday Objects, Bead Strings, Number Tracks, Number Shapes and 100 square.
Recall and use multiplication and division facts for the 6x Table	4	Everyday Objects, Bead Strings, Number Tracks, Number Shapes and 100 square.
Recall and use multiplication and division facts for the 7x Table	4	100 square, Number Shapes, Bead Strings and Number lines.
Recall and use multiplication and division facts for the 9x Table	4	100 square, Number Shapes, Bead Strings and Number lines.
Recall and use multiplication and division facts for the 11x Table	4	Base 10, 100 square, Place Value Counters and Number lines.
Recall and use multiplication and division facts for the 2x Table	4	Base 10, 100 square, Place Value Counters and Number lines.
To multiply and divide by 10, 100 and 1000	5	Place Value Counters and Base 10
To fluently use and apply multiplication and division facts up to 12 x 12	5/6	

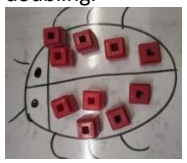
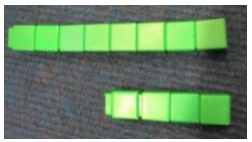
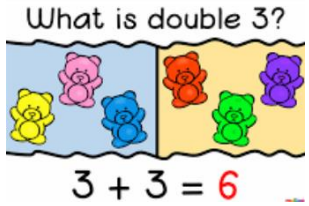
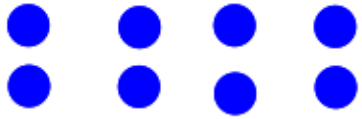
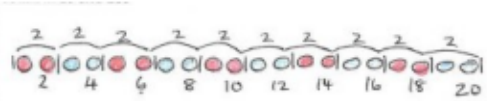
EYFS Multiplication

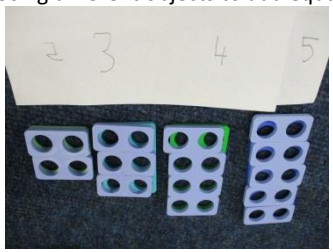
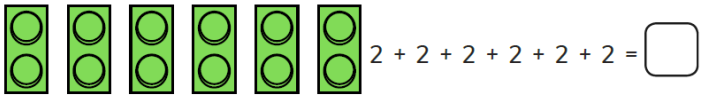
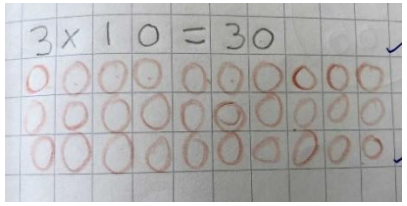
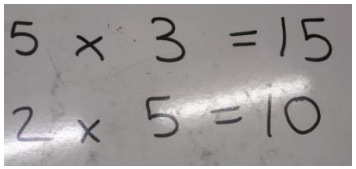
Objective & Strategy	Concrete	Pictorial	Abstract
Repeated addition	 Use numberframes (le.g. Numicon) to count in 2's. How many wellies needed for 3 children?	 Use pictures to count in 2's and 5's.	$2 + 2 + 2 = \square$ $3 + 3 + 3 = \square$
Doubling	  Use manipulatives to practically double.	 Use pictures double 4's and 2's.	 Writing doubles using a template.

EYFS Division.

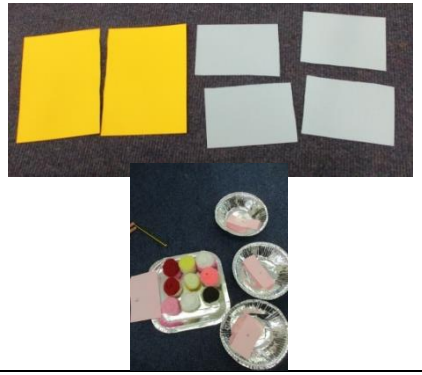
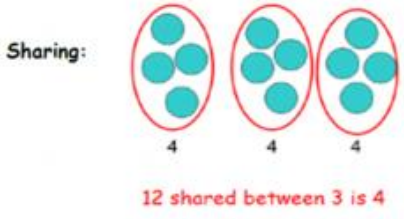
Objective & Strategy	Concrete	Pictorial	Abstract
Sharing	 Sharing the fruit equally into bowls.	 Use pictures to count in 2's and 5's.	 Sharing 6 into 3.

Y1 Multiplication

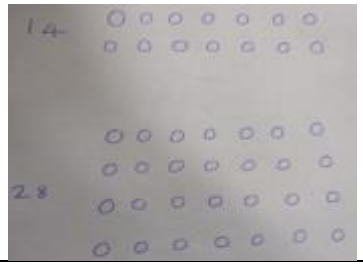
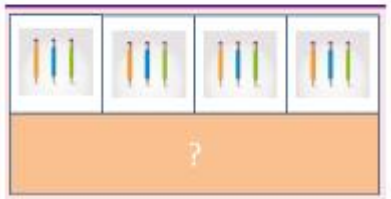
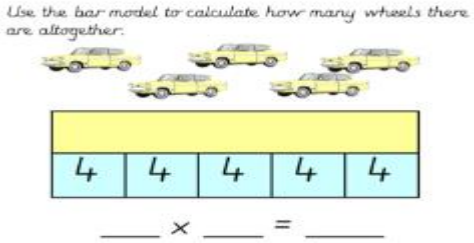
Objective & Strategy	Concrete	Pictorial	Abstract
Doubling	Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling.  	Draw pictures to show how to double numbers. 	Double 4 is 8. Double 5 = 10
Counting in multiples	Count the groups as children skip counting, children may use their fingers as they are skip counting. 	 Children make representations to show counting in multiples. 	Count in multiples of numbers aloud. Write sequences with multiples of numbers. 2,4,6,8,10… 5,10,15,20,25,30…..
Making equal groups and counting the total	Use manipulatives to create equal groups. 	Draw and make representations. 	3 x 2 = 6 2 x 3 = 6

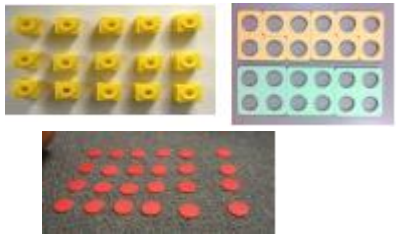
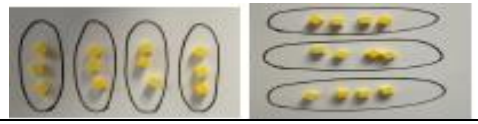
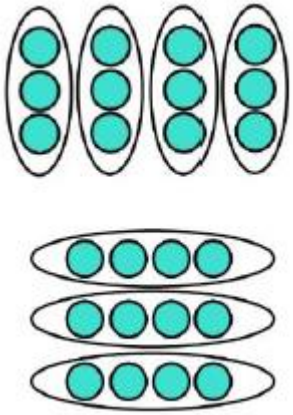
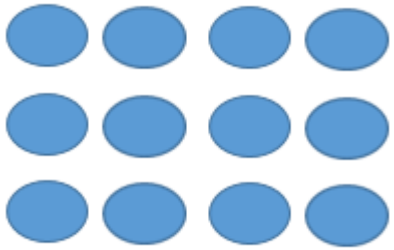
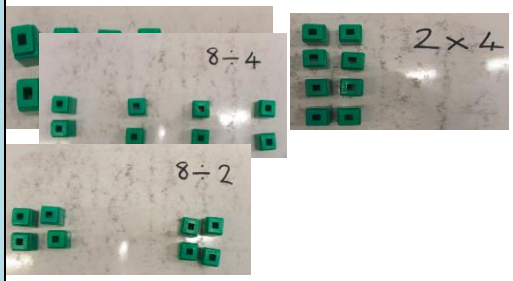
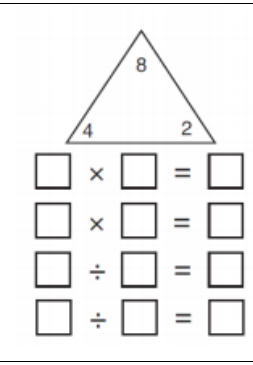
Repeated addition	Using different objects to add equal groups.  .	Use pictorial including numberlines to solve problems. 	2+2+2+2=8
Understanding arrays	Use objects laid out in arrays to find the answers to 2 lots of 5 3 lots of 2 etc. 	Draw representations of arrays to show understanding. 	3 X 2 = 6 2 X 5 = 10 

Y1 Division

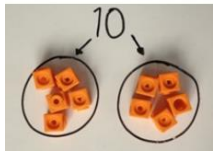
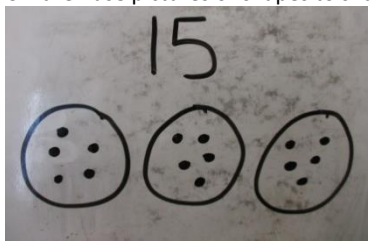
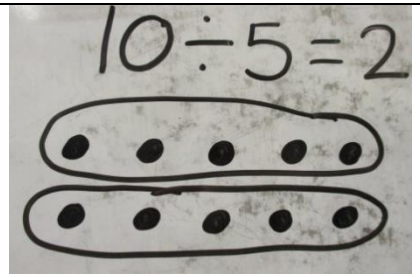
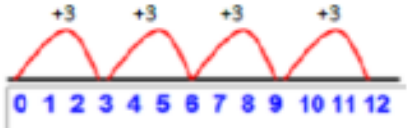
Objective & Strategy	Concrete	Pictorial	Abstract
Division as sharing	I have 10 cubes; can you share them equally in 2 groups? 	Children use pictures or shapes to share quantities 8 shared between 2 is 4. 	12 shared between 3 is 4

Y2 Multiplication

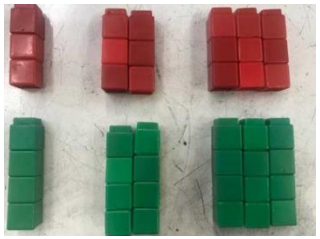
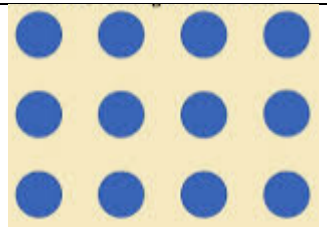
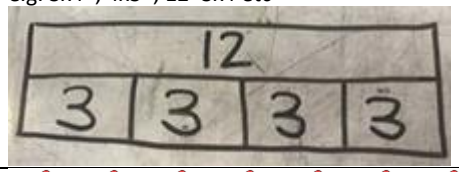
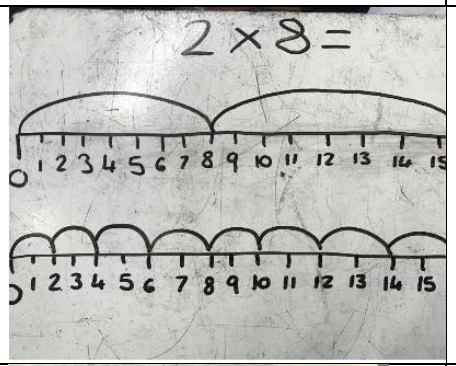
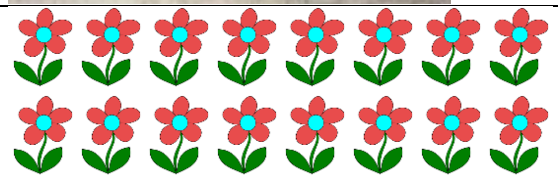
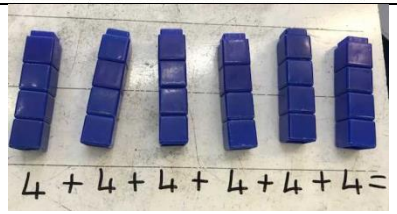
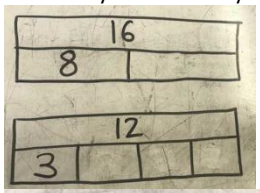
Objective & Strategy	Concrete	Pictorial	Abstract
Doubling	Model doubling using dienes and PV counters. 	Draw pictures and representations to show how to double numbers. 	Partition a number and then double each part before recombining it back together.
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models. 	Number lines, counting sticks and bar models should be used to show representation of counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers.

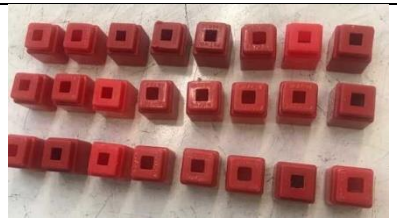
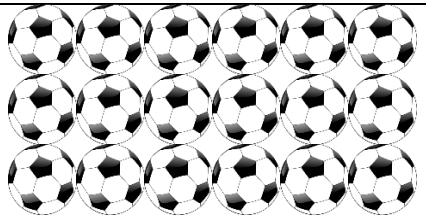
Multiplication is commutative	Create arrays using counters and cubes and Numicon.  Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer. 	Use representations of arrays to show different calculations and explore commutativity. 	12 = 3 × 4 12 = 4 × 3  4 + 4 + 4 = 12 3 + 3 + 3 +3 = 12 4 x 3 = 12 3 x 4 = 12
Using the Inverse (This should be taught alongside division, so pupils learn how they work alongside each other).	Use concrete apparatus to show number families. 		2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 8 = 2 x 4 8 = 4 x 2 2 = 8 ÷ 4 4 = 8÷ 2 Show all 8 related fact family sentences.

Year 2 Division

Division as sharing	 I have 10 cubes. can you share them equally in 2 groups?	Children use pictures or shapes to share quantities  15 shared between 3 is 5.	12 shared between 3 is 4
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. 	 Use number lines for grouping  Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

Year 3 Multiplication and Division

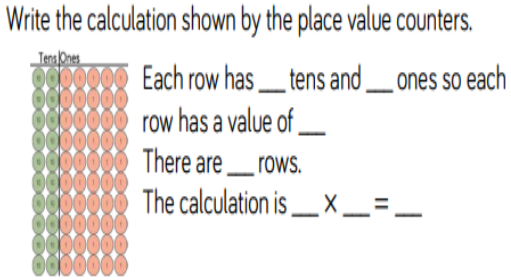
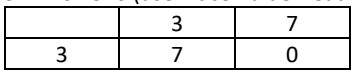
Objective & Strategy	Concrete	Pictorial	Abstract
Recall and use multiplication and division facts for the 3,4 and 8 multiplication tables.	 	 How many altogether? What would the calculation be? How many different calculations can you think of? e.g. 3x4=, 4x3=, 12=3x4 etc 	3 x 4 = 4 x 3 = 12 = 3 x 4 12 = 4 x 3 12 ÷ 3 = 4 12 ÷ 4 = 3 Mary has 3 friends. She has 12 sweets in total. If she shares them equally how many sweets will each child have?
Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs.		 What could the calculation be?	2 multiplied by 8 is equal to? How many eyes do 8 people have altogether? 2 x __ = 16 16 ÷ __ = 2
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context.		What would the addition calculation look like? Can you write this as a multiplication problem? How many different ways can you represent this?  	4+4+4+4 = 4 x 4 = 4 squared = A bar of chocolate is in the shape of a square? If there are 4 columns how many pieces of chocolate are there altogether? What would the next square bar look like? E.g. 5 x 5 =

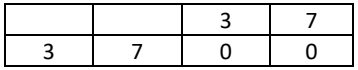
Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.		 __ x __ = __ x __ = __ = __ x __ __ = __ x __ __ ÷ __ = __ ÷ __ =	True or false? Anything multiplied by 6 will equal an even number?

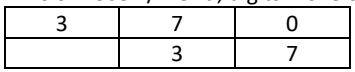
Year 4 Multiplication and Division.

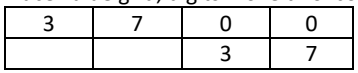
<table>
<tr><th>Objective and Strategy.</th><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>Multiplying by 10, 100 and 1000

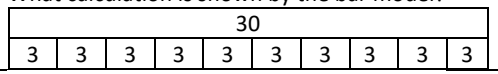
Dividing by 10, 100 and 1000</td>
<td>Place value counters

 
</td>
<td>Place Value Sliders / Place value grid; digits move one column to the left;
37 x 10 =370 (use Place Value Headings to support)
 

37 x 100 =3700
 

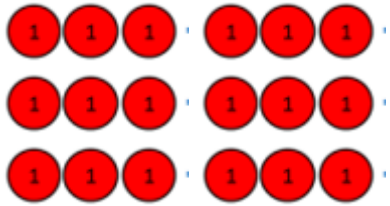
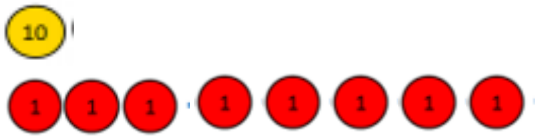
Division: Use P/V Grid; digits move one column to the right 370 ÷ 10 =37
 

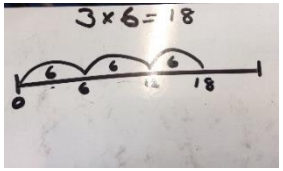
Place value grid; digits move two columns to the left;
 

3700 ÷ 100 =37
What calculation is shown by the bar model?
 
</td>
<td>Begin to link facts:

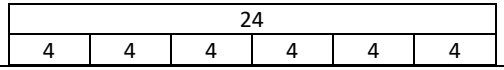
x x 100 = 3700

37 x 10 = 370

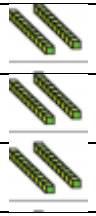
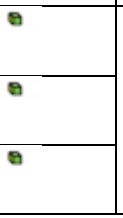
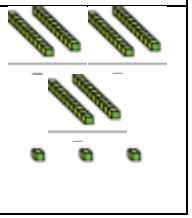
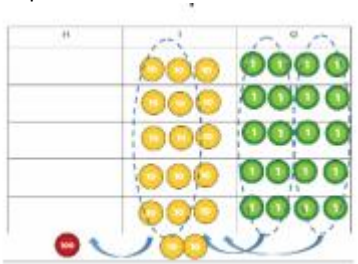
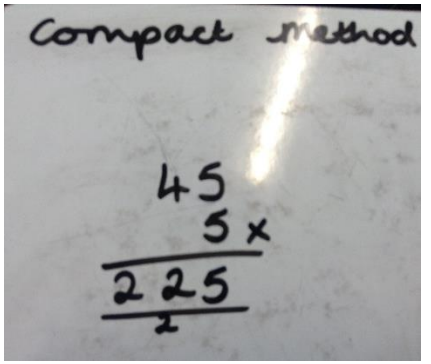
3.7 x 10 = x</td>
</tr>
<tr>
<td>Multiply two single digit numbers</td>
<td>3 x 6 (Using Place Value Counters and Exchange)
 
=
  </td>
<td>

Array
4 x 6 = 24
6 x 4 =24
O O O O O O
O O O O O O
O O O O O O
O O O O O O
 

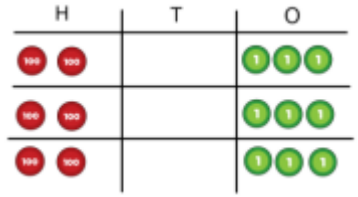
Number lines with repeated jumps

Bar models 4 x 6
 
</td>
<td>Horizontal recording of multiplication facts
4 x 3 =12
7 x 8 =56
_ = 4 x 5
6 x _ = 30
Multiplication grid

<table>
<tr><th>X</th><th>3</th><th>4</th><th>7</th><th>9</th></tr>
<tr><td>2</td><td>6</td><td>8</td><td>14</td><td>18</td></tr>
<tr><td>5</td><td>15</td><td>20</td><td>35</td><td>45</td></tr>
<tr><td>8</td><td>24</td><td>32</td><td>56</td><td>72</td></tr>
<tr><td>6</td><td>18</td><td>24</td><td>42</td><td>54</td></tr>
</table>
</td>
</tr>
</table>

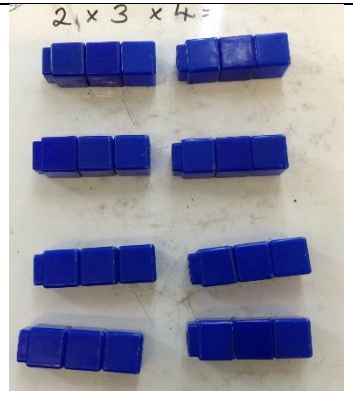
<table>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Multiply a two-digit number by a one-digit number</td><td>Using Diennes or Base 10 apparatus: 21 x 3
<table><tr><th>Tens</th><th>Ones</th><th>Product</th></tr><tr><td>  </td><td>  </td><td>  </td></tr></table>
Use place value counters
 
34 x 5 = 170</td><td>Bar model 21 x 3
<table><tr><td colspan="2">21</td><td colspan="2">21</td><td colspan="2">21</td></tr><tr><td>20</td><td>20</td><td>20</td><td>1</td><td>1</td><td>1</td></tr><tr><td colspan="6">60 + 3 = 63</td></tr></table></td><td>Written method,
Compact method
 

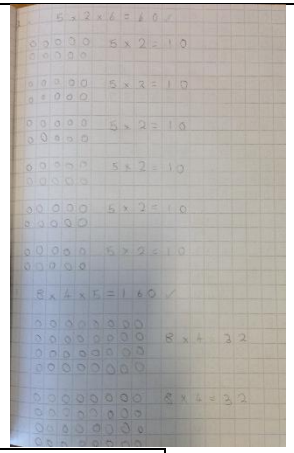
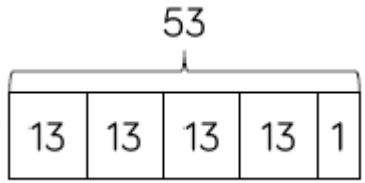
Expanded method
<table><tr><td></td><td>H</td><td>T</td><td>O</td><td></td><td></td></tr><tr><td></td><td></td><td>3</td><td>4</td><td></td><td></td></tr><tr><td>x</td><td></td><td></td><td>5</td><td></td><td></td></tr><tr><td></td><td></td><td>2</td><td>0</td><td>(5 x 4)</td><td></td></tr><tr><td>+</td><td>1</td><td>5</td><td>0</td><td>(5 x 30)</td><td></td></tr><tr><td></td><td>1</td><td>7</td><td>0</td><td></td><td></td></tr></table></td></tr>
<tr><td>Multiply a three-digit number by a one-digit number</td><td>When moving to 3-digit by 1 digit or beyond, encourage children to move to short multiplication method. Base 10 and PV can continue to be used to support understanding of written method. Limit the number of exchanges needed in questions to allow children to move away from concrete resources with larger numbers.

Using place value counters;
203 x 3
 

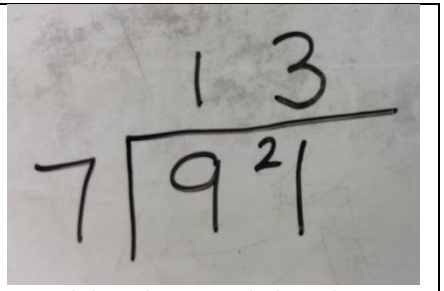
600 + 9 =609</td><td>Bar Model: 342 x 3
<table><tr><td colspan="3">342</td><td colspan="3">342</td><td colspan="3">342</td><td colspan="3">342</td></tr><tr><td>300</td><td>300</td><td>300</td><td>40</td><td>40</td><td>40</td><td>2</td><td>2</td><td>2</td></tr><tr><td colspan="9">900 + 120 + 6 =1026</td></tr></table>
Part whole method

342 x 3
(300 + 40+ 2) x 3
900 + 120 + 6 =1026</td><td><table><tr><td></td><td>H</td><td>T</td><td>O</td></tr><tr><td></td><td>2</td><td>4</td><td>5</td></tr><tr><td>x</td><td></td><td></td><td>4</td></tr><tr><td></td><td>9</td><td>8</td><td>0</td></tr><tr><td></td><td></td><td>1</td><td>2</td></tr></table></td></tr>
</table>

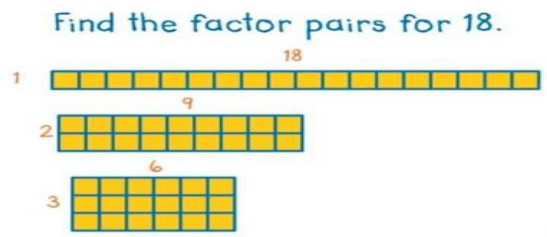
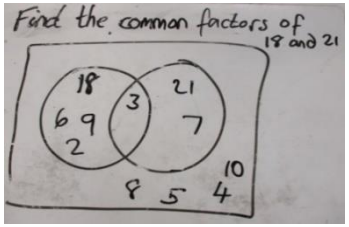
<table>
<tr>
<td>Multiply three single digit numbers</td>
<td> 
</td>
<td>Arrays

Bar Model
 
<table>
<tr><td colspan="4">2 x 3 x 4</td></tr>
<tr><td>2 x 3</td><td>2 x 3</td><td>2 x 3</td><td>2 x 3</td></tr>
<tr><td>6</td><td>6</td><td>6</td><td>6</td></tr>
<tr><td colspan="4">24</td></tr>
</table></td>
<td>2 x 3 x 4
(2 x 3) x 4
6 x 4 = 24
Or
2 x (3 X 4)
2 X 12 =24</td>
</tr>
<tr>
<td>Dividing with a remainder</td>
<td>
</td>
<td>ten divided by three
<table>
<tr><td colspan="4">10</td></tr>
<tr><td>3</td><td>3</td><td>3</td><td>1</td></tr>
</table>

</td>
<td>$53 \div 4 = 13\ r1$</td>
</tr>
<tr>
<td>Dividing 2 digits by 1 digit

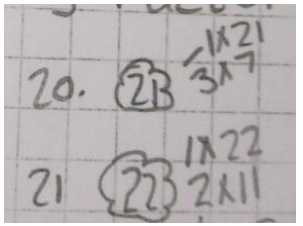
Dividing 3 digits by 1 digit</td>
<td>Place Value Counters</td>
<td><table>
<tr><td colspan="7">91</td></tr>
<tr><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td></tr>
</table></td>
<td>Formal short division with two digits</td>
</tr>
</table>

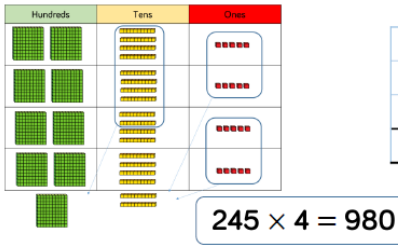
	$844 \div 4 = 122$ H T O 100 100 10 1 100 100 10 1 100 100 10 1 100 100 10 1 →	856 800 (÷ 4 = 200) 40 (÷ 4 = 10) 16 (÷ 4 = 4)	 Formal short division with three digits As above with 3 digits $844 \div 4 = 122$

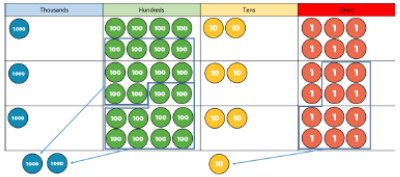
Y5 Multiplication and Division

<table>
<tr><th>Objective & Strategy</th><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr><td>Identify multiples and factors, including all factor pairs of a number.</td><td> 
</td><td> 

Venn Diagrams / Carroll Diagrams

Use to identify common factors of two or more numbers.</td><td> 

e.g.
Identification of common factors / factor pairs of a number</td></tr>
<tr><td>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</td><td> 

245 × 4 = 980
 
1,826 × 3 = 5,478</td><td>When moving to 3-digit by 1 digit or beyond, encourage children to move to short multiplication method. Base 10 and PV can continue to be used to support understanding of written method. Limit the number of exchanges needed in questions to allow children to move away from concrete resources with larger numbers).

Using Grids for partitioning and multiplication facts if required

<table>
<tr><td>x</td><td>300</td><td>20</td><td>7</td></tr>
<tr><td>4</td><td>1200</td><td>80</td><td>28</td></tr>
</table>

Continue to use bar modelling to support problem solving</td><td>
<table>
<tr><td></td><td>H</td><td>T</td><td>O</td></tr>
<tr><td></td><td>2</td><td>4</td><td>5</td></tr>
<tr><td>x</td><td></td><td></td><td>4</td></tr>
<tr><td></td><td>9</td><td>8</td><td>0</td></tr>
<tr><td></td><td>1</td><td>2</td><td></td></tr>
</table>
To use formal written method

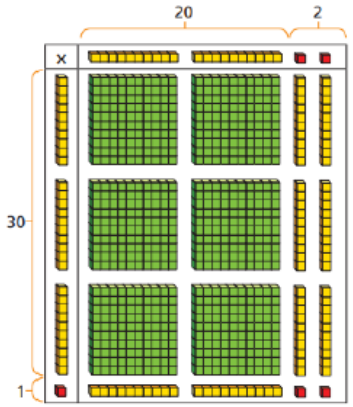
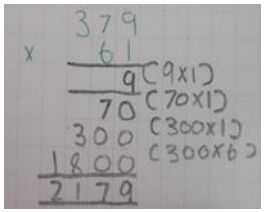
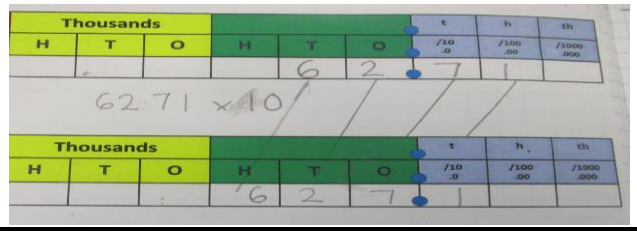
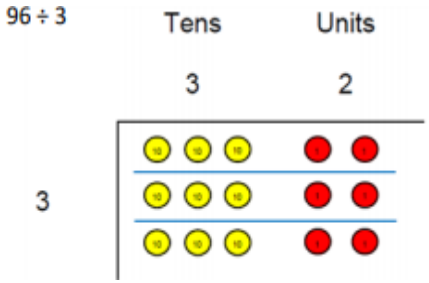
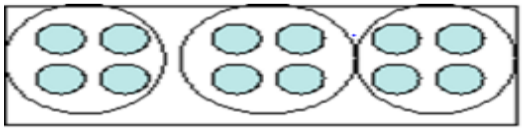
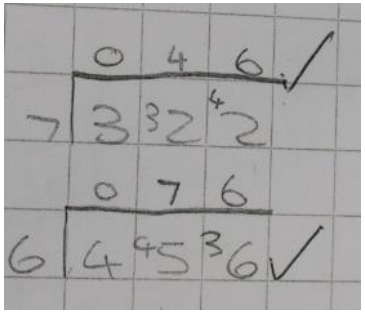
HTO x O

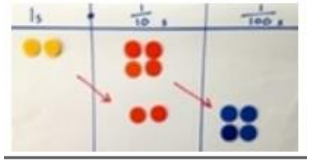
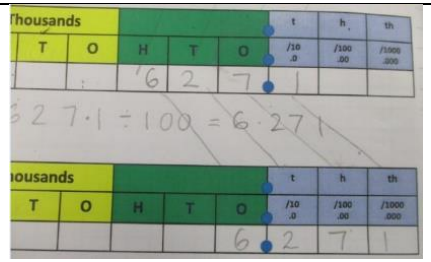
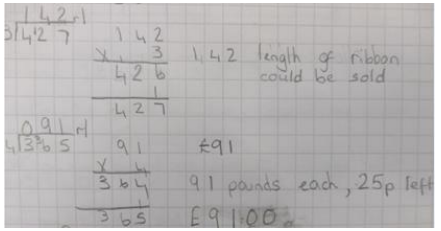
TO x TO</td></tr>
</table>

<table>
<tr>
<td>Multiply a 2-digit by a 2-digit</td>
<td>Use the area model to help children understand the size of the number:

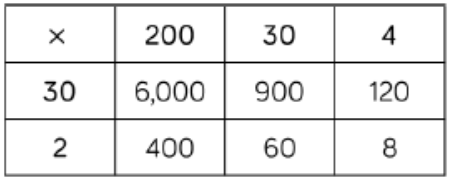
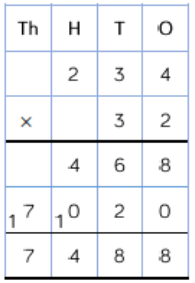
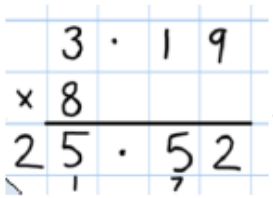
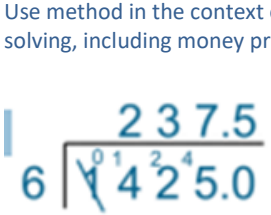
eg.22 x 31 = 682

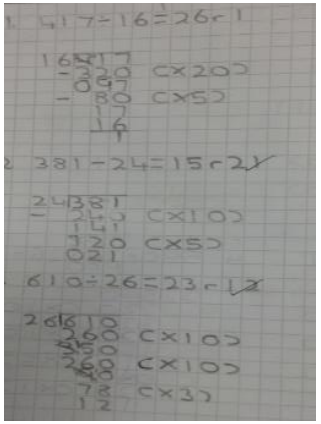
Place Value counters may also be used

 
</td>
<td><table>
<tr><td>×</td><td>20</td><td>2</td></tr>
<tr><td>30</td><td>600</td><td>60</td></tr>
<tr><td>1</td><td>20</td><td>2</td></tr>
</table>
Using Grids for partitioning and multiplication facts if required</td>
<td><table>
<tr><td></td><td>H</td><td>T</td><td>O</td></tr>
<tr><td></td><td></td><td>2</td><td>2</td></tr>
<tr><td>×</td><td></td><td>3</td><td>1</td></tr>
<tr><td></td><td></td><td>2</td><td>2</td></tr>
<tr><td></td><td>6</td><td>6</td><td>0</td></tr>
<tr><td></td><td>6</td><td>8</td><td>2</td></tr>
</table>
HTO x TO
 
</td>
</tr>
<tr>
<td>Multiply numbers (including decimals) by 10, 100 and 1000.</td>
<td>See Y4 Guidance</td>
<td>To use grids with column headings
(e.g. Th, H, T U . t h) and model moving columns to the LEFT as appropriate.
 
</td>
<td></td>
</tr>
<tr>
<td>Divide numbers up to 4 digits by a one digit number using the formal written method</td>
<td>For concrete, use of Place Value or similar manipulatives as appropriate
 
</td>
<td>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.
 
Encourage them to move towards counting in multiples to divide more efficiently.</td>
<td>Divide numbers up to 4 digits by a one digit number using ‘bus stop’ method
 
</td>
</tr>
<tr>
<td>Interpret remainders appropriately for the context.</td>
<td>Use of place value counters as above using the formal method for short division and showing extra counters as remainders.</td>
<td>As above, if required, highlighting incomplete leaps as remainders.</td>
<td></td>
</tr>
</table>

Divide numbers (including decimals) by 10, 100 and 1000	To continue to use Base 10, Dienes and Numicon where appropriate **If I know 4 x 6 then 0.4 x 6 is ten times smaller.** 	To use grids with column headings (e.g. Th, H, T o . t h) Model moving columns to the RIGHT as appropriate. 	 What could I do with the remaining 3? How could I share this between 6 as well? To use remainders in context – rounding up and down as appropriate e.g. The farmer has 39 eggs. How many boxes carrying 6 eggs will he need to sell them?
Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Recall prime numbers up to 100 To continue to draw division and multiplication facts rapidly (continuation fron Year 4) To solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates (e.g. converting measures).			

Year 6 Multiplication/Division (Continue to consolidate Y5 and develop strategies further)

Objective & Strategy	Concrete	Pictorial	Abstract
Multiply multi-digit number up to 4 digits by a 2-digit number using the formal method of long multiplication. *Use of inverse operations as a tool for checking answers.	As in previous years, children will use concrete and pictorial methods in order to close the gap but should be encouraged towards the formal method – making links to the grid method in previous years. Refer back to AREA model (Y5) to help develop understanding of number.	 × | 200 | 30 | 4 30 | 6,000 | 900 | 120 2 | 400 | 60 | 8	 Th H T O 2 3 4 × 3 2 4 6 8 1 7 1 0 2 0 7 4 8 8 Use method in the context of problem solving, including word problems.
Short multiplication and division involving decimals			 3 · 1 9 × 8 2 5 · 5 2  2 3 7.5 6) 1 4 2 5.0 Use method in the context of problem solving, including money problems

Divide multi digits by a 2 digit number using the formal written method. Divide numbers up to 4 digits by a 2-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.	Children can write out multiples to support their calculations – especially with larger remainders. $12 \times 1 = 12$ $12 \times 2 = 24$ $12 \times 3 = 36$ $12 \times 4 = 48$ $12 \times 5 = 60$ $12 \times 6 = 72$ $12 \times 7 = 84$ $12 \times 8 = 96$ $12 \times 7 = 108$ $12 \times 10 = 120$ 0 3 6 1 2 | 4 3 2 (×30) – 3 6 0 7 2 – 7 2 (×6) 0 $372 \div 15 = 24\frac{4}{5}$ $372 \div 15 = 24\ r12$		 Children should be able to record their remainder and be taught to display it as a fraction (depending on the context of the question). Children can also answer questions where the quotient needs to be rounded up or down – depending on the context. 2 4 $\frac{4}{5}$ 1 5 | 3 7 2 – 3 0 0 7 2 – 6 0 1 2