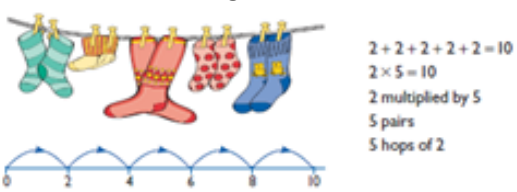
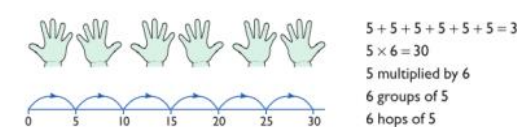
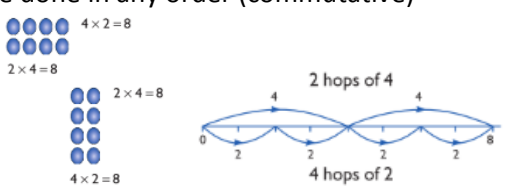
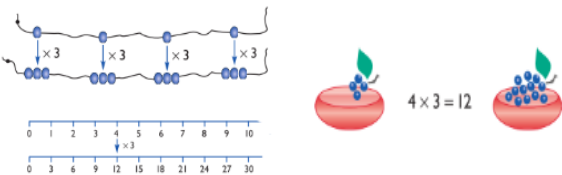
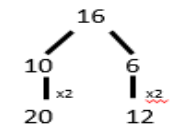
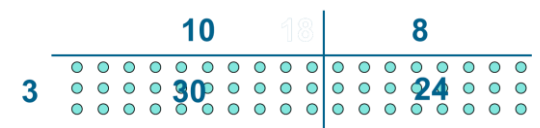



Thorntree Primary School Calculation Policy- Multiplication

Year 1	Year 2	Year 3
<p>Understand multiplication is related to doubling and combining groups of the same size (repeated addition)</p> <p>Washing line, and other practical resources for counting. Concrete objects. Numicon; bundles of straws, bead strings</p>  <p>$2 + 2 + 2 + 2 + 2 = 10$ $2 \times 5 = 10$ 2 multiplied by 5 5 pairs 5 hops of 2</p>  <p>$5 + 5 + 5 + 5 + 5 = 30$ $5 \times 6 = 30$ 5 multiplied by 6 6 groups of 5 6 hops of 5</p> <p>Problem solving with concrete objects (including money and measures)</p> <p>Use cuisenaire and bar method to develop the vocabulary relating to 'times' –</p> <p>Pick up five, 4 times</p> <p>Use arrays to understand multiplication can be done in any order (commutative)</p>  <p>$4 \times 2 = 8$ $2 \times 4 = 8$ $4 \times 2 = 8$</p> <p>2 hops of 4 4 hops of 2</p>	<p>Expressing multiplication as a number sentence using x</p> <p>Using understanding of the inverse and practical resources to solve missing number problems.</p> <p>$7 \times 2 = \square$ $\square = 2 \times 7$ $7 \times \square = 14$ $14 = \square \times 7$ $\square \times 2 = 14$ $14 = 2 \times \square$ $\square \times \bigcirc = 14$ $14 = \square \times \bigcirc$</p> <p>Develop understanding of multiplication using array and number lines (see Year 1). Include multiplications not in the 2, 5 or 10 times tables. Begin to develop understanding of multiplication as scaling (3 times bigger/taller)</p>  <p>$4 \times 3 = 12$</p> <p>Doubling numbers up to 10 + 10</p> <p>Link with understanding scaling</p> <p>Using known doubles to work out double 2d numbers (double 15 = double 10 + double 5)</p> <p>Towards written methods</p> <p>Use jottings to develop an understanding of doubling two digit numbers.</p>  <p>16 $\begin{array}{r} 10 \\ \times 2 \\ \hline 20 \end{array}$ $\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$</p>	<p>Missing number problems</p> <p>Continue with a range of equations as in Year 2 but with appropriate numbers.</p> <p>Mental methods</p> <p>Doubling 2 digit numbers using partitioning</p> <p>Demonstrating multiplication on a number line – jumping in larger groups of amounts</p> <p>$13 \times 4 = 10 \text{ groups } 4 = 3 \text{ groups of } 4$</p> <p>Written methods (progressing to 2d x 1d)</p> <p>Developing written methods using understanding of visual images</p>  <p>Develop onto the grid method</p>  <p>Give children opportunities for children to explore this and deepen understanding using Dienes apparatus and place value counters</p>

Thorntree Primary School Calculation Policy- Multiplication

Year 4	Year 5	Year 6															
<p>Continue with a range of equations as in Year 2 but with appropriate numbers. Also include equations with missing digits</p> <p>□2 x 5 = 160</p> <p>Mental methods</p> <p>Counting in multiples of 6, 7, 9, 25 and 1000, and steps of 1/100.</p> <p>Solving practical problems where children need to scale up. Relate to known number facts. (e.g. how tall would a 25cm sunflower be if it grew 6 times taller?)</p> <p>Written methods (progressing to 3d x 2d)</p> <p>Children to embed and deepen their understanding of the grid method to multiply up 2d x 2d. Ensure this is still linked back to their understanding of arrays and place value counters.</p> <div style="text-align: center;"> </div> <div style="text-align: center; margin-top: 20px;"> </div>	<p>Continue with a range of equations as in Year 2 but with appropriate numbers. Also include equations with missing digits</p> <p>Mental methods</p> <p>X by 10, 100, 1000 using moving digits ITP</p> <p>Use practical resources and jottings to explore equivalent statements (e.g. $4 \times 35 = 2 \times 2 \times 35$)</p> <p>Recall of prime numbers up to 19 and identify prime numbers up to 100 (with reasoning)</p> <p>Solving practical problems where children need to scale up. Relate to known number facts.</p> <p>Identify factor pairs for numbers</p> <p>Written methods (progressing to 4d x 2d)</p> <p>Long multiplication using place value counters</p> <p>Children to explore how the grid method supports an understanding of long multiplication (for 2d x 2d)</p> <div style="text-align: center;"> </div> <div style="text-align: center; margin-top: 20px;"> </div>	<p>Continue with a range of equations as in Year 2 but with appropriate numbers. Also include equations with missing digits</p> <p>Mental methods</p> <p>Identifying common factors and multiples of given numbers</p> <p>Solving practical problems where children need to scale up. Relate to known number facts.</p> <p>Written methods</p> <p>Continue to refine and deepen understanding of written methods including fluency for using long multiplication</p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 5px;">X</td> <td style="padding: 5px;">1000</td> <td style="padding: 5px;">300</td> <td style="padding: 5px;">40</td> <td style="padding: 5px;">2</td> </tr> <tr> <td style="padding: 5px;">10</td> <td style="padding: 5px;">10000</td> <td style="padding: 5px;">3000</td> <td style="padding: 5px;">400</td> <td style="padding: 5px;">20</td> </tr> <tr> <td style="padding: 5px;">8</td> <td style="padding: 5px;">8000</td> <td style="padding: 5px;">2400</td> <td style="padding: 5px;">320</td> <td style="padding: 5px;">16</td> </tr> </table> <div style="text-align: center; margin-top: 20px;"> </div>	X	1000	300	40	2	10	10000	3000	400	20	8	8000	2400	320	16
X	1000	300	40	2													
10	10000	3000	400	20													
8	8000	2400	320	16													

Thorntree Primary School Calculation Policy- Multiplication

Y1

Statutory requirements

Pupils should be taught to:

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Y2

Statutory requirements

Pupils should be taught to:

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Y3

Statutory requirements

Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Y4

Statutory requirements

Pupils should be taught to:

- recall multiplication and division facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Thorntree Primary School Calculation Policy- Multiplication

Y5

Statutory requirements

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Statutory requirements

- recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

Thorntree Primary School Calculation Policy- Multiplication

Y6

Statutory requirements

Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

135

Mathematics

Statutory requirements

- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.