

**CALCULATION POLICY: MULTIPLICATION**

The policy gives an outline of the small steps of progression matched to the expectations for each year group according to the new 2014 National Curriculum. Some examples are included and further ones can be added to your document.

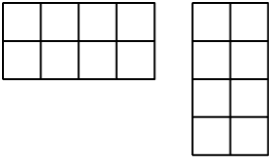
Concrete objects as models, such as cubes, counters, Dienes blocks, Cuisenaire rods and Numicon need to be used to help children gain conceptual understanding, supported by images such as number lines and 100 squares to develop mental pictures as a step from counting to calculation. Fluency in mental strategies and quick recall of facts need to be established before using a formal written method, but informal jottings and a recorded mental method can help bridge the mental and written methods so that each stage of the chosen written method is understood.

**Year 1**

Multiplication steps	Example
Group objects in twos and count groups	<i>Group these counters in twos. How many groups are there? How many counters are there altogether?</i>
Count in steps of 1, 2 and 10	<i>How far can you count in twos? 20, 30, 40... Count on to 50.</i>
Recall the doubles of numbers to 10	<i>Roll this die and double your number. What score do you get? Look at these domino doubles. How many spots are there altogether?</i>
Count groups of objects to multiply – repeated addition	<i>How many 2p coins make 20p? How many socks are there altogether in these eight pairs? How many fingers are there altogether on six hands?</i>
Count in twos, fives and tens and derive the multiples	<i>My sequence has these numbers in it: 10, 15, 20, 25... What numbers come next in the</i>

of these numbers	sequence? Show me the multiples of 2 on this number grid.
------------------	---

**Year 2**

Multiplication steps	Example
Double numbers to 20	Roll these two dice and add the numbers together. Now double your number. What score do you get?
Use arrays to represent multiplication	Here are 20 counters. How could you arrange them in equal rows? How could you use a number sentence to show your arrangement?
Understand the x sign as 'multiplied by': $4+4+4 = 4 \times 3$	$4 + 4 + 4 + 4 + 4 = 20$ Write this addition fact as a multiplication fact. $\square \times \square = \square$
Understand the commutative law for multiplication, $4 \times 5 = 5 \times 4$	Look at these diagrams:  Is $2 \times 4$ the same as $4 \times 2$ ? How do you know?
Develop quick recall of multiplication facts for 2, 5 and 10	Write a list of the tables facts you can say quickly. Can you use any of these to help you learn others?

Recognise multiples of 2, 5 and 10 to the tenth multiple	<i>Which are the multiples of 2 in this list? 13, 4, 12, 8, 19, 16</i>
Calculate the value of a missing number in a number sentence, such as $3 \times \_ = 30$	<i>What are the missing numbers? <math>\square \times 2 = 16</math> <math>10 \times \square = 40</math> <math>\square \times \diamond = 20</math> How do you know?</i>
Recognise multiples of 2, 5 and 10 beyond the tenth multiple	<i>Draw rings around all the multiples of 5. 55, 60, 54, 67, 80 How do you know they are multiples of 5?</i>

### Year 3

Multiplication steps	Example
Develop quick recall of multiplication facts for 3 and 4	<i>Write the missing numbers in the boxes. <math>6 \times 4 = 12 \times \square</math> <math>\square \times 3 = 6 \times 5</math></i>
Recognise multiples of 3 and 4 beyond the tenth multiple	<i>Is 82 a multiple of 4? How do you know?</i>
Use practical and informal methods to multiply 2-digit	<i>Rulers are 30 cm long. If you place six of them end to end, how long a line will they make?</i>

numbers by 2, 3, 4, 5	<i>Explain how you solved this problem. Did you write anything down?</i>
Understand the effect of multiplying by 0 and by 1	<i>What do you notice when you multiply any number by 1? Is it always, sometimes or never true that when you multiply a number by zero, the answer is zero?</i>
Use a written method for TUxU	<p><i>How would partitioning help you to calculate <math>27 \times 6</math>?</i></p> <p><i>What is <math>46 \times 5</math>?</i></p> <p style="text-align: center;"><math>6 \times 5 = 30</math>      <math>40 \times 5 = 200</math>      <math>200 + 30 = 230</math></p> $\begin{array}{r} 46 \\ \times 5 \\ \hline 230 \end{array}$
Develop quick recall of multiplication facts for 6 and 8	<i>What is <math>8 \times 4</math>? Did you know or did you work thorough one of the times tables? Which table did you use?</i>

## Year 4

Multiplication steps	Example
Recognise multiples of 6, 8 and 9 beyond the tenth multiple	<i>Use a venn diagram to show multiples of 6 and multiples 9. Choose 12 numbers between 80 and 120.</i>
Multiply together three single-digit numbers	<i>What is <math>3 \times 8 \times 4</math>? How did you work it out?</i>
Develop quick recall of multiplication facts for 11 and 12	<i>If you know that <math>10 \times 8 = 80</math>, how can you use this to help learn <math>12 \times 8</math>? What patterns are there in the 11x table?</i>
Know all multiplication facts to 12x12	<i>Which tables facts up to <math>12 \times 12</math> do you still need to learn? What strategies could you use to learn them?</i>
Multiply by multiples of 10 mentally	<i>If <math>4 \times 6 = 24</math>, what is <math>40 \times 6</math> and <math>400 \times 6</math>? How could you quickly work out the answer to <math>3 \times 80</math>?</i>
Use known facts to find unknown facts	<i>How could you calculate <math>15 \times 20</math>? What about <math>14 \times 12</math>?</i>
Use a written method for HTUxU	$\begin{array}{r} 53284 \\ \times 6 \\ \hline \end{array}$

	<u>2304</u>
--	-------------

## Year 5

Multiplication steps	Example
Use a written method for TUxTU	<p><i>There are 12 pencils in a box. A school buys 24 boxes. How many pencils does the school buy?</i></p> $\begin{array}{r} 24 \\ \times 12 \\ \hline 48 \quad (24 \times 2) \\ 240 \quad (24 \times 10) \\ \hline 288 \end{array}$
Use a written method for HTUxTU	<p><i>What is <math>584 \times 46</math>?                      Estimate: <math>\approx 600 \times 50 \approx 30\,000</math></i></p> $\begin{array}{r} 584 \\ \times 46 \\ \hline 3\,504 \quad (584 \times 6) \\ 23\,360 \quad (584 \times 40) \\ \hline 26\,864 \end{array}$
Solve scaling problems, including those involving rates	<p><i>How many times bigger is 2400 than 6? How do you know?</i></p> <p><i>A model car is <math>\frac{1}{50}</math> of real size. If the model is 47cm long, what is the length of the real car?</i></p>
Multiply proper fractions and mixed numbers by whole numbers	<p><i>Show me how you would work out 12 multiplied by <math>1\frac{1}{2}</math></i></p>

## Year 6

Multiplication steps	Example
Factorise large numbers to help multiply	<i>How can you use factors to multiply 17 by 12?</i>
Use a written method for ThHTU x TU	<i>Show the method you would use to multiply 4835 by 38.</i>
Know the order of operations to calculate with brackets	<i>Answer these:</i> $(17 \times 4) + (121 \div 11) =$ $(8+3) \times (7+9) =$
Use a written method to multiply numbers with up to two decimal places	<i>Multiply 0.07 by 0.6.</i>
Use diagrams to help multiply pairs of proper fractions	<i>Show me how you could answer <math>\frac{3}{4} \times \frac{1}{2}</math></i>