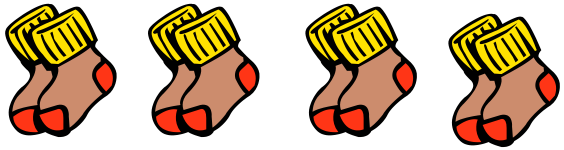
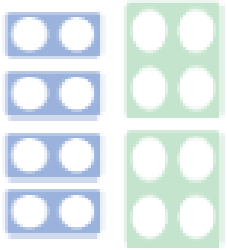
Multiplication

End of Year Expectations	Teacher modelling / Children's recording	Fluency
Year 1 U x U Solve single step practical problems involving multiplication Numbers up to 20 Use concrete objects, pictorial representations Double numbers and quantities Make connections between arrays, number patterns and counting in twos, fives and tens	. Practical only e.g. link to small world using concrete objects, pictorial representations and arrays with the support of an adult – take photographs/draw pictures – if using Numicon small icons could be stuck in    *four lots of two is eight* *two lots of four is eight*	Count in twos, fives and tens from different multiples e.g. 6, 8, 10, 12 etc Emphasise number patterns Double numbers and quantities

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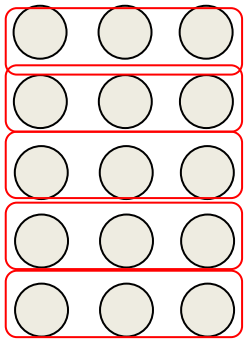
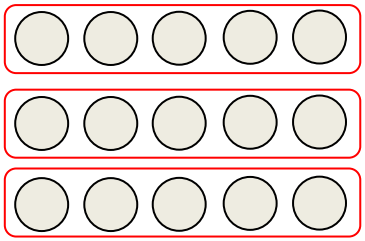
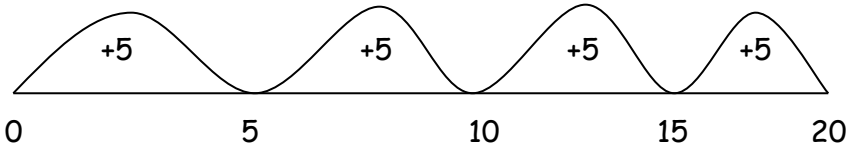
<u>Year 2</u> Understand multiplication as repeated addition Understand and solve problems involving arrays Calculate mathematical statements for multiplication within the tables and write them using symbols x = Ensure children understand that multiplication is commutative (can be done in any order) Understand that multiplication and division are inverse operations	Children should utilise multiplication as repeated addition - linked to arrays **(as this knowledge will support with the development of the grid method later on)**. They should also use jottings to support their calculation. These should be supported by the use of counters/cubes. e.g. 3 x 5 can be represented as an array in two forms (as it has commutativity):  3 + 3 + 3 + 3 + 3 = 15 5 x 3  5 + 5 + 5 = 15 3 x 5 **<u>Repeated addition</u>** 4 x 5 = 20 (When adding on a number line the jumps go on top of the line)  	Count in twos, threes, fives from zero and tens from any number e.g. 6, 8, 10, 12 etc Emphasise number patterns Introduction to Multiplication tables. Practise to become fluent in multiplication facts for 2, 5 and 10 Solve multiplication problems mentally

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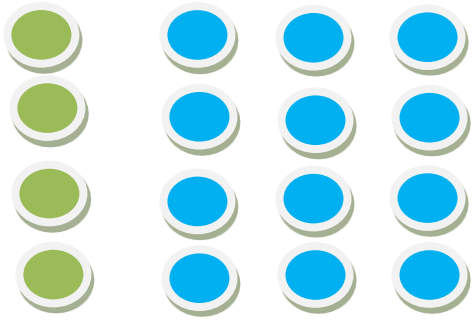
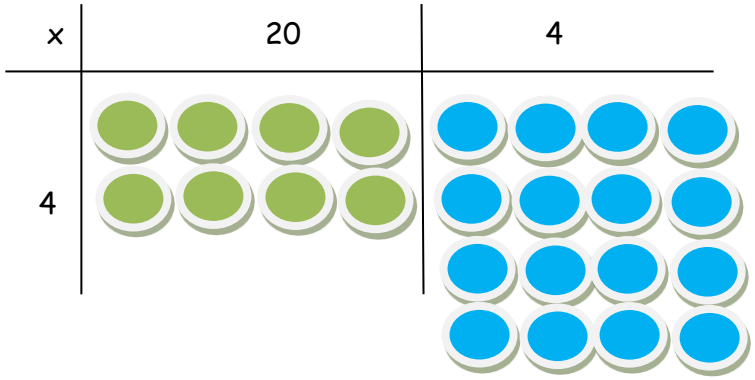
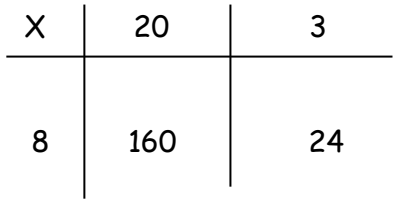
Year 3 TU x U Develop reliable written methods Understand and solve scaling problems Solve problems involving multiplication including correspondence (a close similarity, connection or equivalence)	Arrays using place value counters moving towards the grid method 13 x 4 = 52  24 x 4 = 96  23 X 8 =  160 + 24 = 184	Count from 0 in multiples of 4, 8, 50 and 100 Use multiples of 2, 3, 4, 5, 8, 10, 50 and 100 Practise mental recall of multiplication tables – 3, 4 and 8x times tables Connect the 2, 4 and 8 times tables using doubling Develop efficient mental methods using commutativity and multiplication facts to derive related facts e.g. 4 x 5 x 12 = 12 x 4 x 5 = 12 x 20 4 x 5 = 20 5 x 4 = 20 20 ÷ 5 = 4 20 ÷ 4 = 5

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<u>Year 4</u> TU x U HTU x U Multiplying three numbers 3 x 2 x 6 Solve two-step problems Multiplying by 0 and by 1 Develop fluency in short multiplication using formal written layout Solve problems involving multiplication including using the distributive law, integer scaling problems and harder correspondence problems	**Grid method moving on to short multiplication** **Grid Method** 236 X 6 = 1416 X | 200 | 30 | 6 6 | 1200 | 180 | 36 1200 180 + 36 1416 1 Short multiplication 24 x 6 becomes: 24 X 6 144 2 342 x 7 becomes: 342 x 7 2394 21	Count in multiples of 6, 7, 9, 25 and 1000 Recall and use multiplication facts up to 12 x 12 with increasing fluency Derive multiplication facts with up to three-digits Recognise and use factor pairs and commutativity Use the distributive law Combine knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g. 2 x 6 x 5 = 10 x 6

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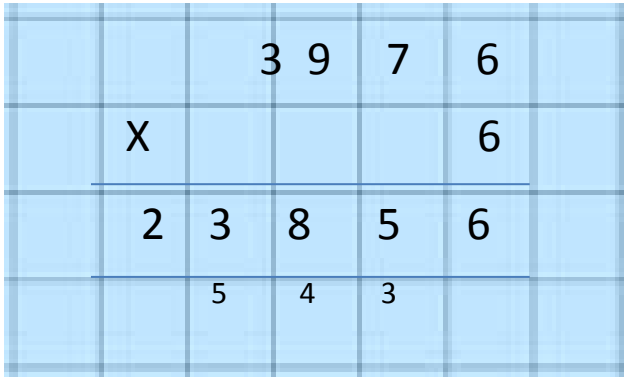
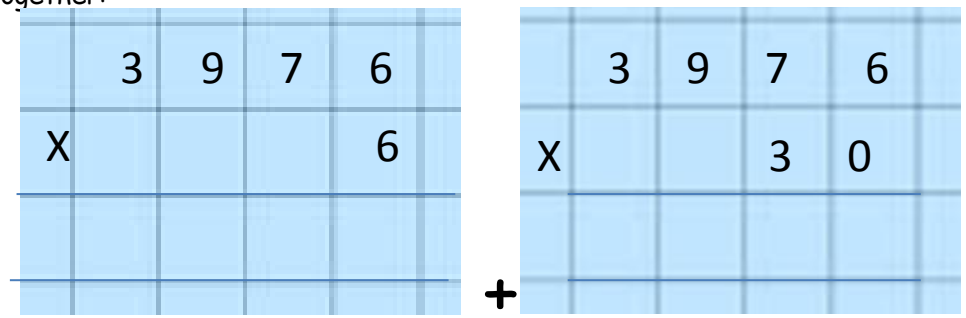
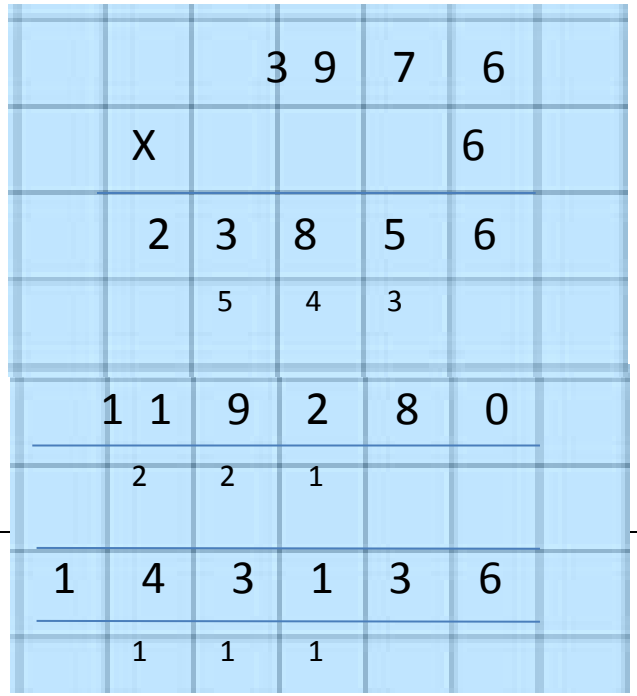
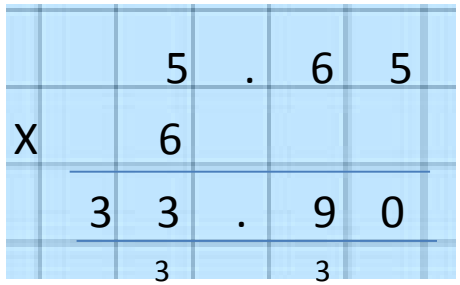
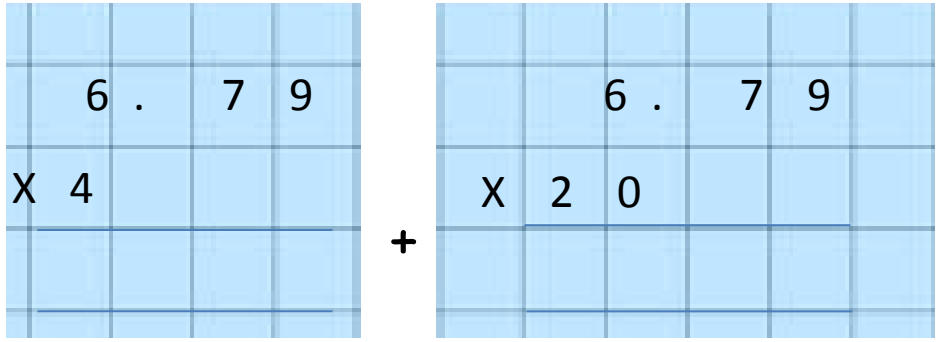
<u>Year 5</u> ThHTU x U ThHTU x TU Identify multiples and factors including finding all factor pairs of a number, and common factors of two numbers Solve problems involving all operations where larger numbers are used Multiply whole numbers and those involving decimals by 10, 100 & 1000 Understand and use multiplication and division as inverses including in problems involving missing numbers and balancing equations Solve problems involving multiplication and division including scaling by simple fractions Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) Recognise and square and cube numbers and associated notation	**Short multiplication moving on to long multiplication** Short multiplication 342 x 7 becomes: 342 x 7 2394 2 1 2741 x 6 becomes: 2741 x 6 16446 4 2 Long Multiplication 4 digit x 1 digit 	Count forwards in steps of powers of 10 from any given number up to 1 000 000 Practise and extend use of formal written method of short multiplication Apply all multiplication tables frequently. Commit them to memory and use them confidently to make larger calculations Multiply numbers mentally drawing upon known facts

4 digit x 2 digit
3976 x 36
Partition the 2 digit number and create 2 calculations then add answers together:



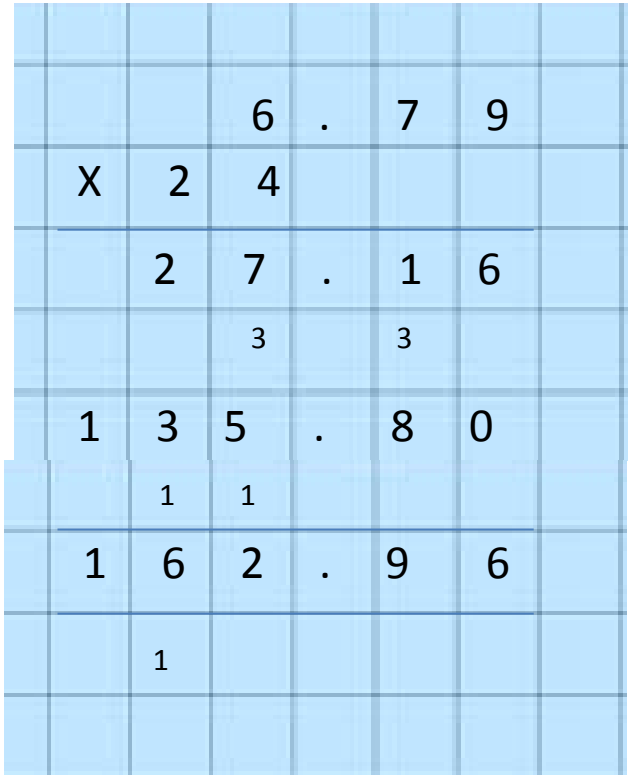
4 digit x 2 digit
3976 x 36
Complete one calculation underneath the other and add up



End of Year Expectations	Teacher modelling / Children's recording	Fluency
<u>Year 6</u> Multiply multi-digit numbers up to four-digits by a two-digit whole number Multiply single –digit numbers with up to two-decimal places by whole numbers Identify common factors, common multiples and prime numbers Solve problems including multiplication	**Short and long multiplication involving decimal numbers** Decimal x 1 digit 5.65 x 6  Decimal x 2 digit 6.79 x 24 Partition the 2 digit number and create 2 calculations then add answers together:  	Undertake mental calculations with increasingly large numbers Continue to use all multiplication tables to calculate mathematical statements in order to maintain fluency

Decimal x 2 digit

Complete both parts of the calculation (x4 and then x20) and add them together in the column



By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.
Children should not be made to go onto the next stage if:

- they are not ready.
- they are not confident.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.
The decision making process of which method to use in order to answer a question most effectively:
1 – Can I do it in my head?
2 – Do I need to use a jotting?
3 – Do I need to use a written method?