



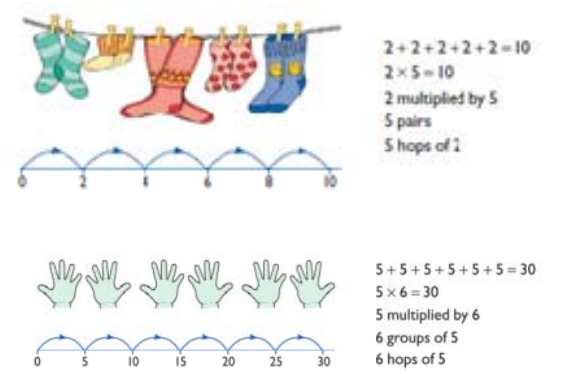
Calculation Policy

Multiplication – Years 1-3



Understand multiplication is related to doubling and combing groups of the same size (repeated addition)

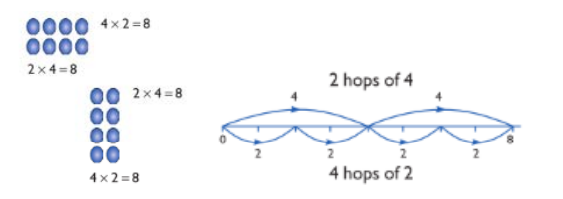
Washing line, and other practical resources for counting. Concrete objects. Numicon; bundles of straws, bead strings



Problem solving with concrete objects (including money and measures)

Use cuisenaire and bar method to develop the vocabulary relating to 'times' – Pick up five, 4 times

Use arrays to understand multiplication can be done in any order (commutative)

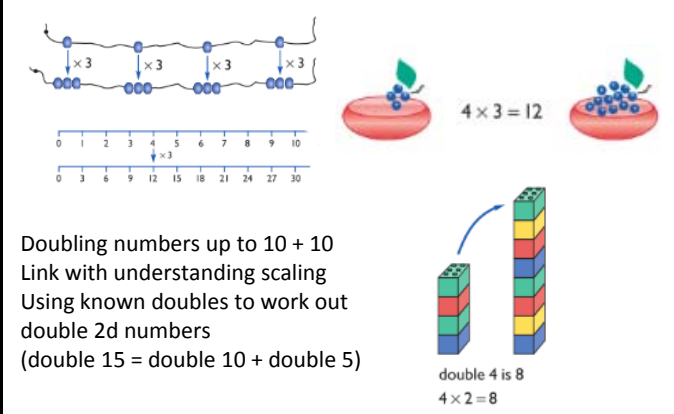


Expressing multiplication as a number sentence using x
Using understanding of the inverse and practical resources to solve missing number problems.

$7 \times 2 = \square$ $\square = 2 \times 7$
 $7 \times \square = 14$ $14 = \square \times 7$
 $\square \times 2 = 14$ $14 = 2 \times \square$
 $\square (\times) = 14$ $14 = \square (\times)$

Develop understanding of multiplication using array and number lines (see Year 1). Include multiplications not in the 2, 5 or 10 times tables.

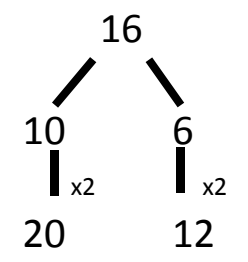
Begin to develop understanding of multiplication as scaling (3 times bigger/taller)



Doubling numbers up to 10 + 10
Link with understanding scaling
Using known doubles to work out double 2d numbers
(double 15 = double 10 + double 5)

Towards written methods

Use jottings to develop an understanding of doubling two digit numbers.



Missing number problems
Continue with a range of equations as in Year 2 but with appropriate numbers.

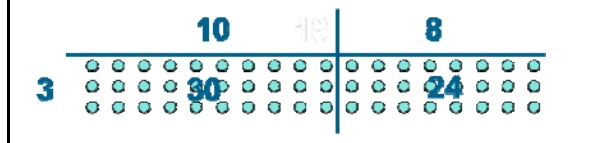
Mental methods
Doubling 2 digit numbers using partitioning

Demonstrating multiplication on a number line – jumping in larger groups of amounts

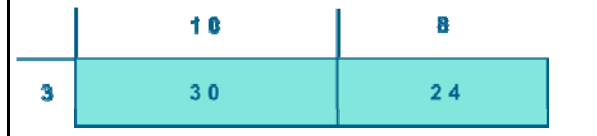
$13 \times 4 = 10 \text{ groups } 4 = 3 \text{ groups of } 4$

Written methods (progressing to 2d x 1d)

Developing written methods using understanding of visual images



Develop onto the grid method



Give children opportunities for children to explore this and deepen understanding using Dienes apparatus and place value counters

Year 1 objectives

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.



Year 1 guidance

Notes and guidance (non-statutory)

Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.

They make connections between arrays, number patterns, and counting in twos, fives and tens.



Year 2 objectives

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.



Year 2 guidance

Notes and guidance (non-statutory)

Pupils use a variety of language to describe multiplication and division.

Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.

Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).



Year 3 objectives

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.



Year 3 guidance

Notes and guidance (non-statutory)

Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.


Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example, $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).

Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.

Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).



Multiplication

Year 1	Year 2	Year 3
<p><u>Mental Strategies</u> Children should experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10. Children should memorise and reason with numbers in 2, 5 and 10 times tables They should see ways to represent odd and even numbers. This will help them to understand the pattern in numbers.</p>  <p>Children should begin to understand multiplication as scaling in terms of double and half. (e.g. that tower of cubes is double the height of the other tower)</p> <p><u>Vocabulary</u> Ones, groups, lots of, doubling repeated addition groups of, lots of, times, columns, rows longer, bigger, higher etc times as (big, long, wide ...etc)</p> <p><u>Generalisations</u> Understand 6 counters can be arranged as 3+3 or 2+2+2</p> <p>Understand that when counting in twos, the numbers are always even.</p> <p><u>Some Key Questions</u> Why is an even number an even number? What do you notice? What's the same? What's different? Can you convince me? How do you know?</p>	<p><u>Mental Strategies</u> Children should count regularly, on and back, in steps of 2, 3, 5 and 10. Number lines should continue to be an important image to support thinking, for example</p> <p>Children should practise times table facts $2 \times 1 =$ $2 \times 2 =$ $2 \times 3 =$</p> <p>Use a clock face to support understanding of counting in 5s. Use money to support counting in 2s, 5s, 10s, 20s, 50s</p> <p><u>Vocabulary</u> multiple, multiplication array, multiplication tables / facts groups of, lots of, times, columns, rows</p> <p><u>Generalisation</u> Commutative law shown on array (video)</p> <p>Repeated addition can be shown mentally on a number line</p> <p>Inverse relationship between multiplication and division. Use an array to explore how numbers can be organised into groups.</p> <p><u>Some Key Questions</u> What do you notice? What's the same? What's different? Can you convince me? How do you know?</p>	<p><u>Mental Strategies</u> Children should continue to count regularly, on and back, now including multiples of 4, 8, 50, and 100, and steps of 1/10. The number line should continue to be used as an important image to support thinking, and the use of informal jottings and drawings to solve problems should be encouraged.</p> <p>Children should practise times table facts $3 \times 1 =$ $3 \times 2 =$ $3 \times 3 =$</p> <p><u>Vocabulary</u> partition grid method inverse</p> <p><u>Generalisations</u> Connecting x2, x4 and x8 through multiplication facts</p> <p>Comparing times tables with the same times tables which is ten times bigger. If $4 \times 3 = 12$, then we know $4 \times 30 = 120$. Use place value counters to demonstrate this.</p> <p>When they know multiplication facts up to x12, do they know what x13 is? (i.e. can they use 4×12 to work out 4×13 and 4×14 and beyond?)</p> <p><u>Some Key Questions</u> What do you notice? What's the same? What's different? Can you convince me? How do you know?</p>