Ash Croft Primary Academy

Calculation & Fluency Policy – Progression in Multiplication

Last updated: 10th February 2022

This document outlines the progression in multiplication strategies throughout our academies. Teaching staff should consider using previously taught written methods as part of visually representing mental methods later in a child's school journey. For example, using the 'sorting into groups' method (taught as a written method in much of KS1) as a way to visually represent mental methods in Key Stage 2.

It has been carefully put together in line with the National Curriculum (2014), the Government's non-statutory guidance for teaching mathematics (June 2020) and our existing approach to teaching mathematics. This document has been organised respective of age-related expectations and learning should still be differentiated appropriately.

Progression in learnt multiplication facts
Written multiplication strategies are learnt formally in Key Stage 2, with 'long multiplication' being taught in Year 6. The Multiplication Tables Check (MTC) in Year 4 aims to ensure children are meeting the National Curriculum objective *"to recall multiplication and division facts for multiplication tables up to 12 × 12"*. Learning times tables by heart is fundamentally important to ensure children can access the full curriculum beyond Year 4. With this in mind, the diagram below shows our age-related expectations for learning times tables.

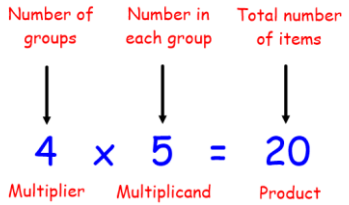
By the end of Year 2			By the end of Year 3			By the end of Year 4				
10x	**5x**	**2x**	**4x**	**8x**	**3x**	**6x**	**9x**	**7x**	**11x**	**12x**

Year 1

In Year 1, pupils should learn how to count in multiples of 2, 5 and 10 so that they are ready to progress to multiplication involving groups of 2, 5 and 10 in Year 2. As with counting in ones within 100, this is a key skill that will need to be practised throughout Year 1.

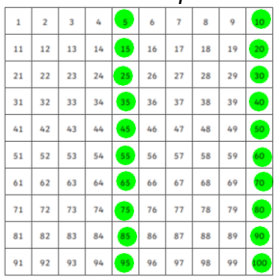
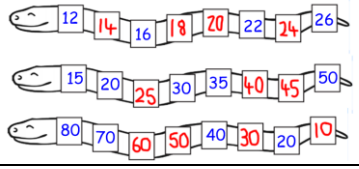
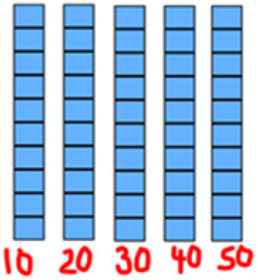
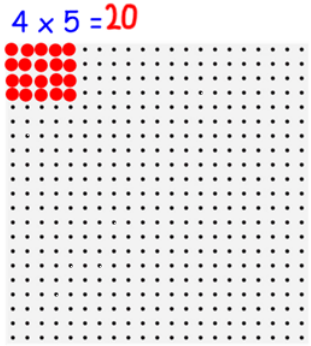
By the end of Year 1, pupils should be fluent in counting in these multiples, and our approach is to introduce the multiplication and division symbols (x and ÷) as a way of presenting written calculations during Year 1.

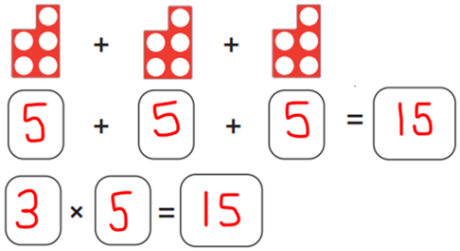
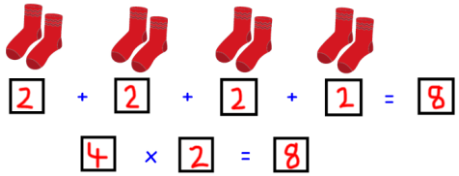
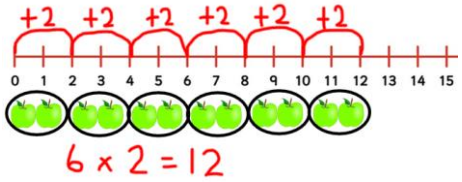
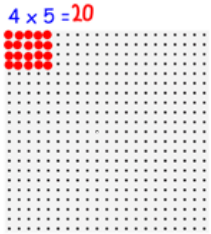
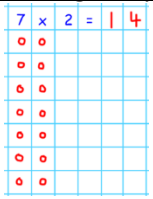
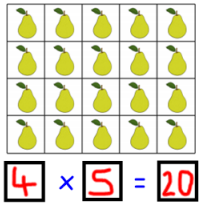
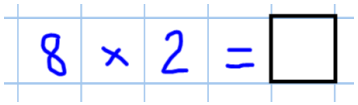
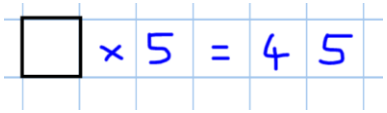
Children should be taught at this stage that the first number of a multiplication calculation is how many groups there are, and the second number is the number of items in each group. The final number is how many items there are altogether.



Picture examples

Lesson videos

Counting	*Practical approaches*	*Pictorial approaches*
To confidently count in multiples of 2, 5 and 10, forwards and backwards counting practice should include: • *reciting just the number names (for example, "ten, twenty, thirty…"), without the support of visual representations* Counting forwards and backwards in 2s, 5s and 10s  • *counting with the support of visual representations and gestural patterns. For example, pupils could point to numerals on a number line or a 100 square.*  • *starting the forwards counting sequence with numbers other than 2, 5 or 10*  	Base Ten Blocks  Peg boards  Sorting into groups  	Using pictorial approaches  Sorting into groups 
		

			Repeated addition	*Arrays*	*More formal contexts*
Year 2	**<u>In Year 2,</u>** pupils should recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables. Pupils who are sufficiently fluent in Year 2 multiplicative calculations are not reliant on drawing arrays or using number lines as tools to calculate. Pupils should have sufficient conceptual understanding to recognise these as models of multiplication and division. Skip counting should be common practice to help pupils learn the 10, 5 and 2x tables by heart. Pupils need to be able to represent 4 fives (or 5, 4 times) as both 4x5 and 5x4. They should be able to use commutativity to solve, for example, 2 sevens, using their knowledge of 7 twos. This is something that is likely to not have been introduced in Year 1 and so should be key learning.	*Picture examples*	<u>Concrete approaches</u>  <u>Pictorial approaches</u>  <u>Showing groups on a number line</u>  	<u>Practical</u> <u>(recapping peg boards from Y1)</u>  <u>Drawing arrays</u>  <u>Reading arrays</u>  	<u>Identifying products</u>  <u>Solving missing-factor problems</u>  <u>Semi-formal method</u> (always multiplying the tens first) 
	Lesson videos				

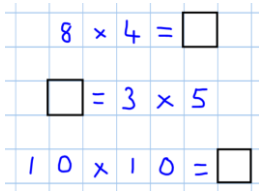
Year 3

In Year 3, pupils should be able to recall multiplication facts, and corresponding division facts, for times tables learned in Year 2 (10, 5 and 2 x tables). They should then progress to learning the 3, 4 and 8 x tables during Year 3. Pupils will recognise products in these multiplication tables as multiples of the corresponding number.

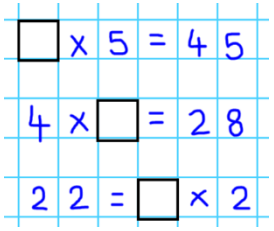
Pupils should also be fluent in interpreting contextual multiplication and division problems, identifying the appropriate calculation and solving it using automatic recall of the relevant fact. As pupils become fluent with multiplication facts, they should develop fluency in related calculations by scaling facts by 10. For example, if 3x4=12, then 30x4=120. And, if 12÷3=4, then 120÷4=30.

Picture examples

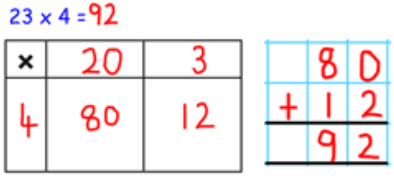
Identifying products



Solving missing-factor problems



Grid method



Lesson videos

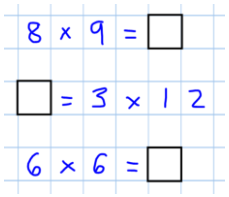
Year 4

In Year 4, the main multiplication calculation focus should be the ability to recall all multiplication table facts. Pupils who leave Year 4 fluent in these facts have the best chance of mastering short multiplication in Year 5. As they become fluent with times tables, pupils should begin to scale by powers of 10 using their knowledge of place value.

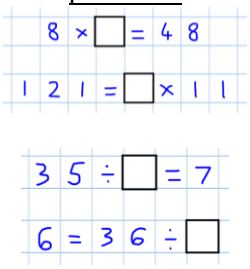
Pupils should also be fluent in interpreting contextual multiplication and division problems, identifying the appropriate calculation and solving it using automatic recall of the relevant fact. As pupils become fluent with multiplication facts, they should develop fluency in related calculations by scaling facts by 100. For example, if 3x4=12, then 300x4=1,200. And, if 12÷3=4, then 1,200÷4=300.

Picture examples

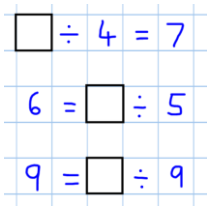
Identifying products



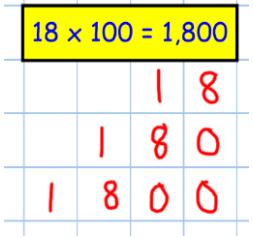
Solving missing-factor and divisor problems



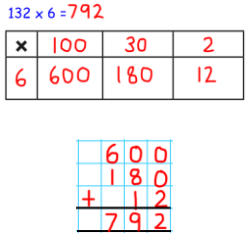
Using the inverse to solve missing dividend problems



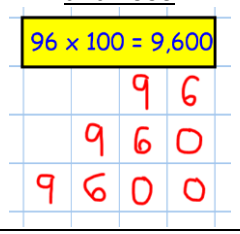
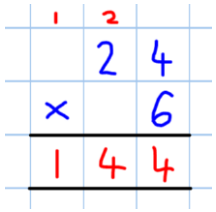
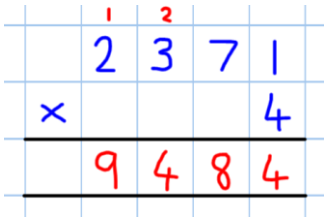
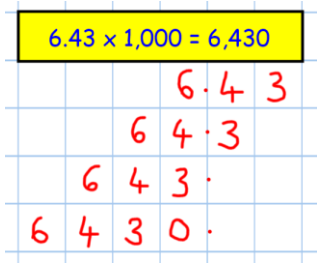
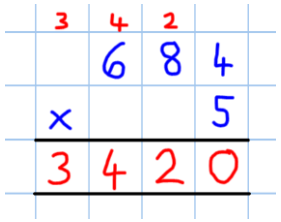
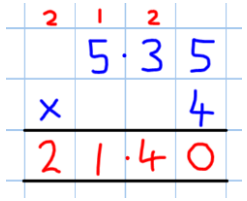
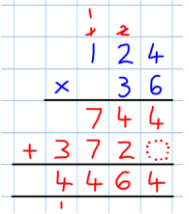
Multiplying by 10, 100 and 1000



Grid method



Lesson videos

Year 5	**<u>In Year 5,</u>** pupils should be able to multiply whole numbers with up to 4 digits by any 1-digit number using the short multiplication method. In addition, they should be able to multiply by powers of 10 using their knowledge of place value. *Pupils should be fluent in interpreting contextual problems to decide when multiplication is the appropriate operation to use, including as part of multi-step problems. Pupils should use short multiplication as appropriate to solve these calculations.*	*Picture examples*	<u>Multiplying by 10, 100 and 1000</u> 	<u>Short multiplication (2x1)</u> 	<u>Short multiplication (3x1)</u> 	<u>Short multiplication (4x1)</u> 
		Lesson videos				
Year 6	**<u>In Year 6,</u>** pupils should continue to practise multiplying a 4-digit whole number by any 1-digit number using short multiplication. Pupils should now also use this method to multiply decimals by 1-digit numbers as well as using long multiplication to multiply a 2-digit number by a 2 or 3-digit number. In addition, they should be able to multiply by powers of 10 using their knowledge of place value. *Pupils should be fluent in interpreting contextual problems to decide when multiplication is the appropriate operation to use, including as part of multi-step problems. Pupils should use short or long multiplication as appropriate to solve these calculations.* *Pupils should also learn to check their short and long multiplication calculations with a calculator so that they know how to use one. This will help pupils when they progress to Key Stage 3.*	*Picture examples*	<u>Multiplying by 10, 100 and 1000</u> 	<u>Short multiplication</u> 	<u>Short multiplication with decimal numbers</u> 	<u>Long multiplication (2x2 and 3x2)</u> 
		Lesson videos				