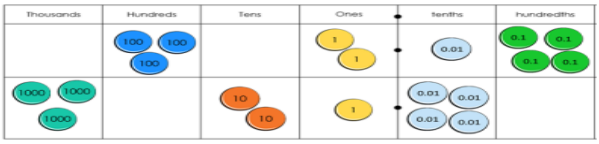
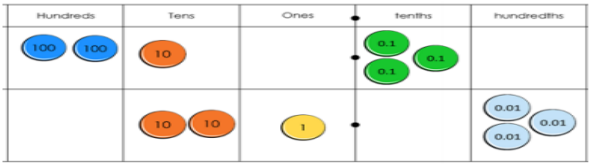
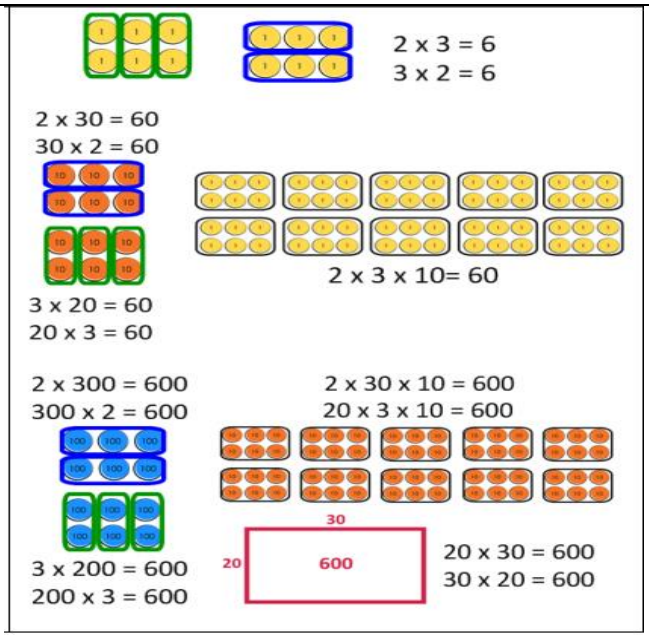
Year 5 & Year 6 Multiplication

Strategy and Guidance	CPA
<u>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</u> Avoid saying that you "add a zero" when multiplying by ten and instead use the language of place holder. Use place value counters and charts to visualise and then notice what happens to the digits.	When you multiply by ten, each part is ten times greater. The ones become tens, the tens become hundreds, etc. When multiplying whole numbers, a zero holds a place so that each digit has a value that is ten times greater. 102.14 x 10 = 1021.4  When you divide by ten, each part is ten times smaller. The hundreds become tens and the tens become ones. Each digit is in a place that gives it a value that is ten times smaller. When dividing multiples of ten, a place holder is no longer needed so that each digit has a value that is ten times smaller. E.g. 210 ÷ 10 = 21 210.3 ÷ 10 = 21.03 
<u>Using known facts and place value to derive multiplication facts</u> Emphasis is placed on understanding the relationship (10 times or 100 times greater) between a known number fact and one to be derived, allowing far larger 'fact families' to be derived from a single known number fact. Knowledge of commutativity is further extended and applied to find a range of related facts. Pupils should work with decimals with up to two decimal places. These derived facts should be used to estimate and check answers to calculations.	

These are the multiplication facts pupils should be able to derive from a known fact

2 100 000		700 000 x 3	70 000 x 30	7000 x 300	700 x 3000	70 x 30 000	7 x 300 000
210 000		70 000 x 3	7000 x 30	700 x 300	70 x 3000	7 x 30 000	
21 000		7000 x 3	700 x 30	70 x 300	7 x 3000		
2100		700 x 3	70 x 30	7 x 300			
210		70 x 3	7 x 30				
21	=	**7 x 3**					
2.1		0.7 x 3	7 x 0.3				
0.21		0.07 x 3	0.7 x 0.3	7 x 0.03			
0.021		0.007 x 3	0.07 x 0.3	0.7 x 0.03	7 x 0.003		

Year 5 & Year 6 Multiplication

Doubling and halving

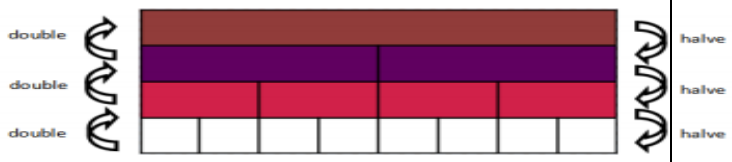
Pupils should experience doubling and halving larger and smaller numbers as they expand their understanding of the number system. Doubling and halving can then be used in larger calculations.

Multiply by 4 by doubling and doubling again

e.g. 16 × 4 = 32 × 2 = 64

Divide by 4 by halving and halving again

e.g. 104 ÷ 4 = 52 ÷ 2 = 26



Multiply by 8 by doubling three times

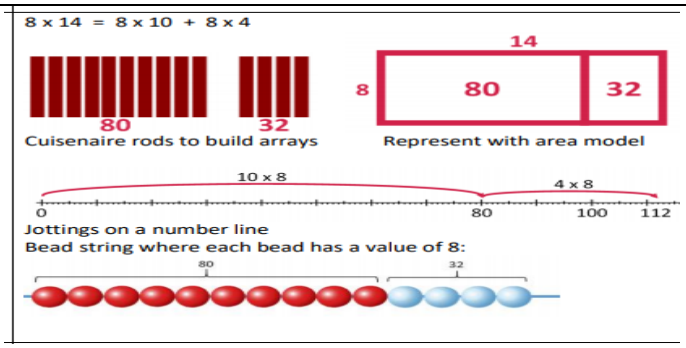
e.g. 12 × 8 = 24 × 4 = 48 × 2 = 96

Divide by 8 by halving three times

e.g. 104 ÷ 8 = 52 ÷ 4 = 26 ÷ 2 = 13

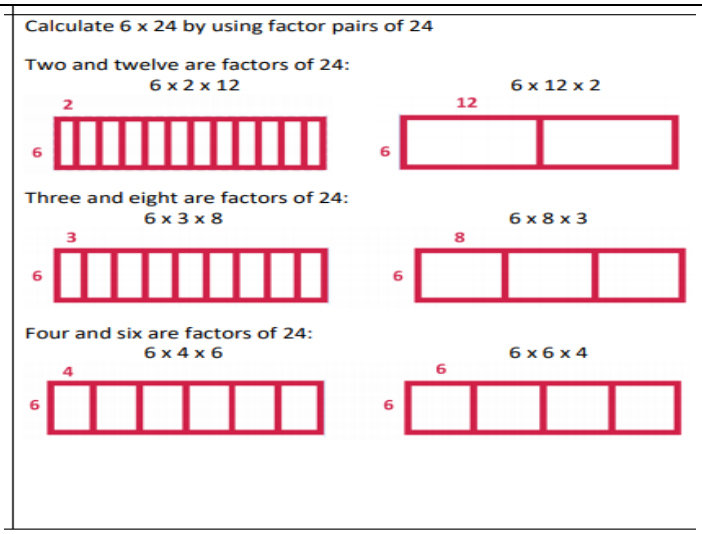
Multiply by partitioning one number and multiplying each part Distributive law a x (b + c) = a x b + a x c

Build on pupils' understanding of arrays of counters to represent multiplication to see that area models can be a useful representation:



Using knowledge of factors

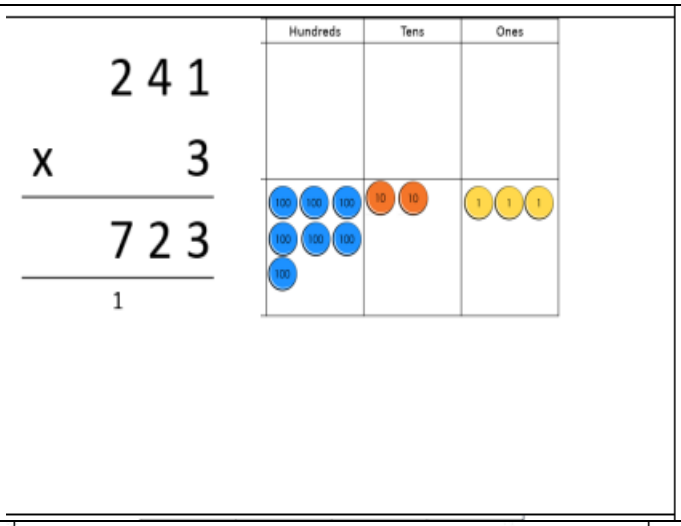
In Year 5 pupils are expected to be able to identify factor pairs and this knowledge can be used to calculate. Pupils will be using the commutative and associative laws of multiplication. Commutative law a x b = b x a Associative law a x b x c = (a x b) x c = a x (b x c) They should explore and compare the different options and choose the most efficient order to complete calculations.



Year 5 & Year 6 Multiplication

Formal written method of short multiplication

Conceptual understanding is supported by the use of place value counters, both during teacher demonstrations and during their own practice. Exemplification of this method and the language to use are best understood through viewing the tutorial videos found here on the toolkit.



Multiplying by a 2-digit number

Formal written method of long multiplication In Year 6 pupils are extended from multiplication by a 1- digit number to multiplication by a 2-digit number. Extend the place value chart model used in Year 4, using an additional row on the place value chart. Extend understanding of the distributive law to develop conceptual understanding of the two rows of the formal written method. Dienes blocks can be used to construct area models to represent this.