MULTIPLICATION Stage 1 : Mental multiplication using partitioning

At the start of every calculation the estimate step from estimate, calculate, check should be taken. Here applying knowledge of multiplying by 10 (see Place Value progression) will help make direct links between learning and model how to apply known facts.

In a similar layout to that adopted for addition of Tens and Units by partitioning the Tens are written over the Units.
Each calculation that results from the partitioning is recorded as a number sentence.

The written version is equivalent to the teacher explanation and modelling and explicitly shows that we are first finding the product of multiplying the Tens. Next we find the product by multiplying the Units. The total will be the sum of the two products, using mental addition with partitioning or column addition as preferred and most effective.

43 X 6 =

First step estimate:
Let's say this is close to 40 X 6
I know 4 X 6 = 24 so 40 X 6 = 240
My answer should be more than this but in this region

Second step: CALCULATE
Partition Tens and Units to multiply

Tens   40 x 6 =   240
Units   3 x 6 =   + 18
                                258

Or 240 + 18 = 258 using mental partitioning
Or both whilst learning to reinforce how final product is calculated.

Third step: CHECK
Look again at working, talk aloud to check.
Ask is this close to my estimate?

Do the next one!

MULTIPLICATION Stage 2 : The grid method for TU x U, HTU x U leading to expanded short multiplication

The grid method links directly to partitioning.
Place the number with the most digits along the top of the grid so that children are led towards expanded short multiplication.

At this stage they will probably add the partial products mentally using partitioning or can write them again as a sum if they prefer.

As children begin with this method they benefit from being given a grid to fill in so that they can concentrate on the calculation

Place Value work on multiplying numbers by 10/100 and shifting the digits to the left can be applied here and lots of chance to talk about zero as a placeholder.

Good fast recall of whole tables facts really helps too

Children who prefer to add mentally by partitioning may continue to prefer to add horizontally as in this model. There is no pressure to move to expanded short multiplication, or once tried nothing to stop a child returning to a preferred method

$38 \times 7 =$

First step estimate:
This is close to 40 x 7 it will be less
I know 4 x 7 = 28
So 40 x 7 = 280
The answer will be less than 280

Second step: CALCULATE
Partition 38 into 30 and 8 and put into grid.
Use the grid to fill in the product of

30 x 7 and then 8 x 7

x	30	8
7	210	56

Third step: CHECK
Look again at working, talk aloud to check.
Ask is this LESS THAN my estimate?

MULTIPLICATION Stage 3(i) : expanded short multiplication	

The next step is to represent the method of recording in a column format, but showing the working. Draw attention to the links with the grid method above.
 	
Children should describe what they do by referring to the actual values of the digits in the columns.
 	
For example, the first step in 38 × 7 is **'thirty multiplied by seven'**, not 'three times seven', although the relationship 3 × 7 should be stressed as in the estimate.
 	
Most children should be able to use this expanded method for TU × U by the end of Year 4
	38 x 7 =
	
	First step estimate:
	close to 40 x 7 it will be less
	I know 4 x 7 = 28
	So 40 x 7 = 280
	The answer will be less than 280
	
	Second step: CALCULATE
	
	   T U
	   3 8
	  X 7
	  2 1 0 30 x 7
	 + 5 6 8 x 7
	  2 6 6
	
	Third step: CHECK
	Look again at working,
	talk aloud to check.
	Ask is this LESS THAN my estimate?

The next two steps move children who are ready to the most compact method. There is no pressure to get to this stage. If children are more secure and find that recording their working or using the grid method is best for them, this is the best way to proceed. **Children who are anxious about maths or behind age appropriate expectations will benefit most from practising one method that they have mastered** and need not attempt to use other methods as they may confuse or cause further delay.

MULTIPLICATION Stage 3 (ii) : expanded short multiplication – no workings	MULTIPLICATION Stage 4 : short multiplication – with column addition of partial products carrying Tens as necessary
38 x 7 =	38 x 7
First step estimate: close to 40 x 7 it will be less I know 4 x 7 = 28 So 40 x 7 = 280 The answer will be less than 280	**First step estimate:** close to 40 x 7 it will be less I know 4 x 7 = 28 So 40 x 7 = 280 The answer will be less than 280
Second step: CALCULATE T U 3 8 X 7 2 1 0 + 5 6 2 6 6	**Second step: CALCULATE** T U 3 8 X 7 2 6 6 5
Third step: CHECK Look again at working, talk aloud to check. Ask is this LESS THAN my estimate? Do the next one!	**Third step: CHECK** Look again at working, talk aloud to check. Ask is this LESS THAN my estimate? This method is good for children who are confident with column addition and find this the best method.

MULTIPLICATION Stage 5(i) : Grid method TU X TU products

Extend the grid method to TU × TU

Remind children to estimate first using place value and tables facts knowledge.

Start to fill the grid with the products of each multiplication

The product can be found by addition.

The partial products in each row are added horizontally on the right.

Then the two sums at the end of each row are added to find the total product.

56 × 27 =

First step estimate:
 Close to 60 × 30
          6 x 3 = 18 and 18 x10x10 = 1800
The product will be less than the estimate

Second step: CALCULATE the product of each multiplication

×	20	7	
50	1000	350	1350
6	120	42	162
			1512
			1

Third step: CHECK each step and see if product is less than estimate

MULTIPLICATION Stage 5(ii) : Grid method HTU X TU products

Extend to HTU × TU

Estimate first.

Start with the grid method.

It is better to place the number with the most digits in the left-hand column of the grid so that it is easier to add the partial products.

Although it really makes little difference.
A second sum of the partial products can easily be written

286 x 29 =

First step estimate:
286 × 29 is approximately 300 × 30 = 9000
The product will be less than my estimate

Second Step : Calculate

×	20	9	
200	4000	1800	5800
80	1600	720	2320
6	120	54	174
			8294
			1

Third step: CHECK each step and see if product is less than estimate

MULTIPLICATION Stage 6 : long multiplication	
Children who are already secure with multiplication for TU × U and TU × TU should have little difficulty in using the same method for HTU × TU. Again, the carry digits in the partial products are usually carried mentally.	**286 x 29 =** **First step estimate:** 286 × 29 is approximately 300 × 30 = 9000 The product will be less than my estimate **Second step: CALCULATE** $$\begin{array}{r} 286 \\ \times\ \ 29 \\ \hline 5720 \\ 2574 \\ \hline 8294 \\ \hline 1 \end{array}$$ 286×20 286×9 **Third step: CHECK** **CHECK** each step and see if product is less than estimate