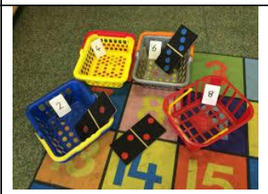
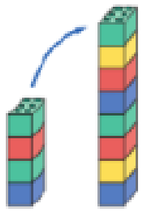
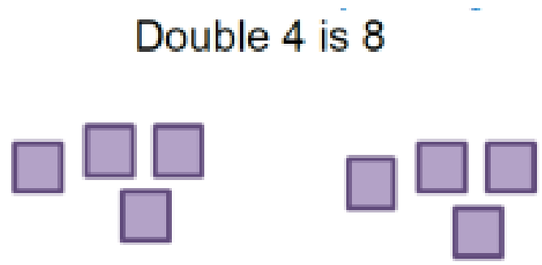
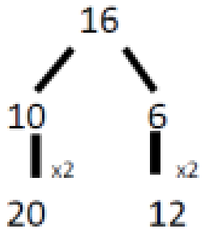
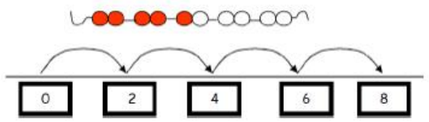
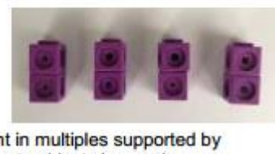
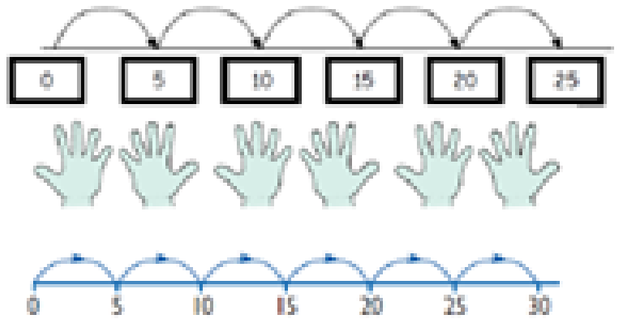
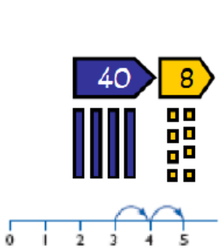
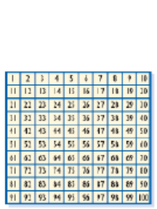
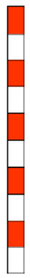
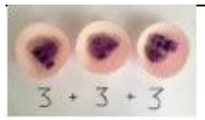
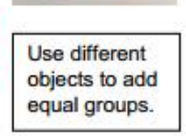
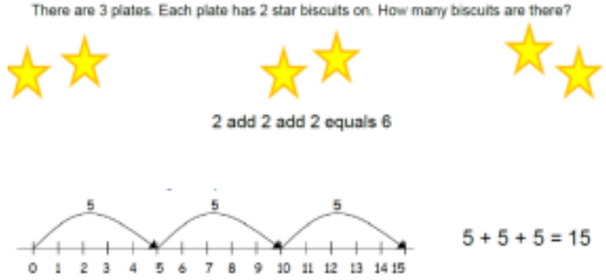
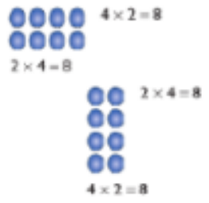
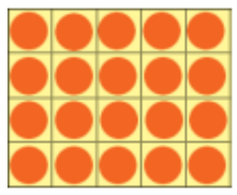
THE ASHBY FEDERATION

CALCULATION - MULTIPLICATION POLICY

Approved by:	Executive Head Teacher
Last reviewed on:	November 2021
Next review due by:	November 2023

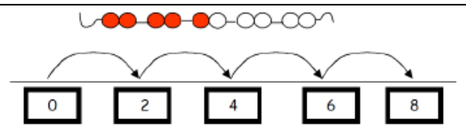
MULTIPLICATION STAGE 1			
Progression	**Concrete**	**Pictorial**	**Abstract**
Understand the language of doubling. Vocabulary: lots of, sets of, groups of, equal groups, double, doubling, pattern, twice as much/many as.	 Use objects to understand what doubling means – e.g. counting the spots on both sides of a ladybird...		
Doubles Year 1 – doubles to 10. Year 2 – doubles to 20. Vocabulary: row, column, multiply, multiplied by, multiplication, times.	Use practical activities to show how to double a number.  double 4 is 8 4 × 2 = 8 Before showing the multiplication sign use the word lots of, when cofident with doubling introduce the concept that doubling is the same as multiplying by 2.	Draw pictures to show how to double a number. 	 Partition a number and then double each part before recombining it back together.
Counting in multiples. (Count in repeated groups of the same size). Foundation Stage: 1s, 2s and 10s. Year 1: 1s, 2s, 5s, 10s and 3s. Year 2: 1s, 2s, 5s, 10s, 3s and 4s. Vocabulary: multiple of.	  Count in multiples supported by concrete objects in equal groups.	 Use a number line or pictures to continue support in counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers: 2,4,6,8,10 5,10,15,20,25,30

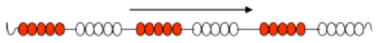
Underlying skills	**Active Learning Through Models and Images**
• Count objects accurately using one to one correspondence matching a number name to each object. • Number recognition 0-20. • Count up to 20. • Count in 2s, 5s and 10s as appropriate. • Place value – order numbers 0-20 in size. • Number bonds to 10.	  

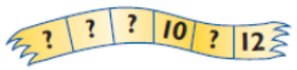
MULTIPLICATION STAGE 2			
Progression	**Concrete**	**Pictorial**	**Abstract**
The x sign as repeated addition and lots of. Vocabulary: repeated addition, 2/3/5… times as many/much as.	 		Write addition sentences to describe objects and pictures.
Arrays – showing commutative multiplication. Vocabulary: array, commutative law, calculation, equation, factor, multiple, product, inverse.	Create arrays using counters/ cubes to show multiplication sentences.	Draw arrays in different rotations to find **commutative** multiplication sentences.   Link arrays to area of rectangles.	Use an array to write multiplication sentences and reinforce repeated addition. 5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15
Underlying skills • Count forwards in steps of different single digit numbers	**Active Learning Through Models and Images**		

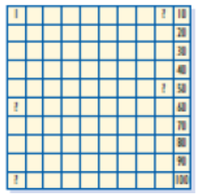
accurately.

- Understand multiplication as repeated addition.

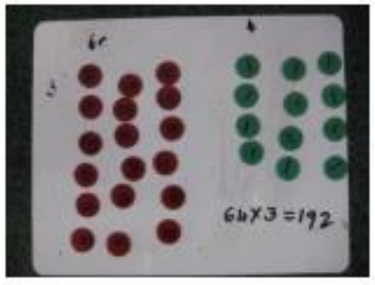
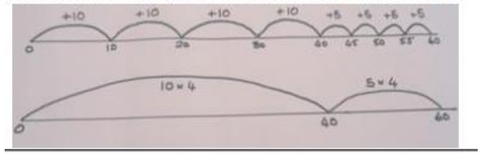
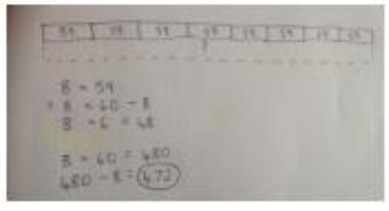
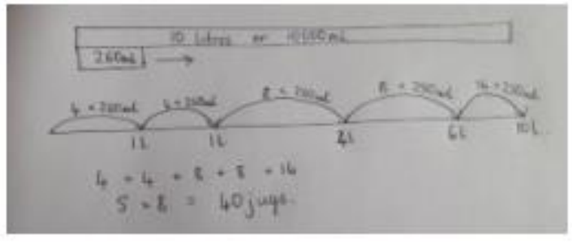








MULTIPLICATION STAGE 3

Progression	**Concrete**	**Pictorial**	**Abstract**
Use partitioning to multiply larger numbers.	Children can continue to be supported by place value counters at the stage of multiplication.  It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Use of a number line to solve 15 x 4: A number line can also be used  Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.  	64 x 3 = 60 x 3 = 180 4 x 3 = 12 180 +12 = 192

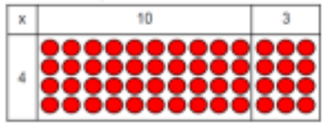
Underlying skills • Partition numbers	56 = 50 + 6

appropriately. • Recall appropriate multiplication facts. • Multiply numbers by 10, 100, 1000. • Multiply multiples of 10. • Add together 2, 3, or 4 digit numbers.	27 = 20 + 7 5 x 2 = 10 50 x 2 = 100 5 x 20 = 100 50 x 20 = 1000 6 x 1 = 6 6 x 10 = 60 6 x 100 = 600 6 x 1000 = 6000 6 x 1 = 6 6 x 10 = 60 6 x 100 = 600 6 x 2= 12 6 x 20 = 120 6 x 200 = 1200 6 x 3 = 18 6 x 30 = 180 6 x 300 = 1800 6 x 4 = 24 6 x 40 = 240 6 x 400 = 2400 1350 + 162 1000 + 300 + 50 = 1350 100 + 60 + 2 = 162 1000 + 400 + 110 + 2 = 1512

MULTIPLICATION STAGE 4			
Progression	**Concrete**	**Pictorial**	**Abstract**

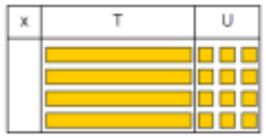
Use the grid method to multiply bigger numbers.

Show the link with arrays to first introduce the grid method.



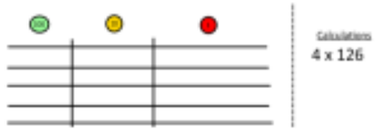
4 rows of 10
4 rows of 3

Move on to using Base 10 to move towards a more compact method.

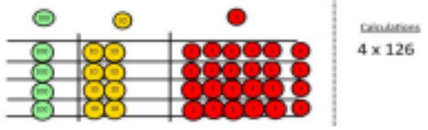


4 rows of 13

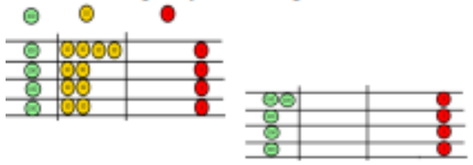
Move on to place value counters to show how we are finding groups of a number.We are multiplying by 4 so we need 4 rows.



Fill each row with 126.



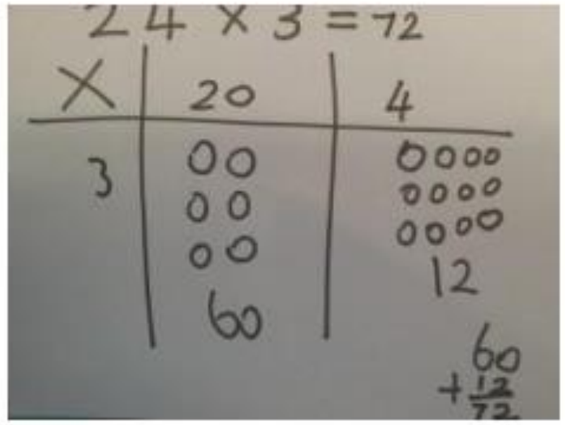
Add up each column, starting with the ones making any exchanges needed.



Then you have your answer.

Children can represent the work they have done with place value counters in a way that they understand.

They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.



Start with multiplying by one digit numbers and showing the clear addition alongside the grid:

×	30	5
7	210	35

210 + 35 = 245

Moving forward, multiply by a 2 digit number showing the different rows within the grid method:

X	20	7
50	1000	350
6	120	42

	1350
+	162
=	1512

X	300	70	2	
20	6000	1400	40	7440
5	1500	350	10	+ 1860
				= 9300

Underlying skills

- Partition numbers appropriately.
- Recall appropriate multiplication facts.
- Multiply numbers by 10, 100, 1000.

56 = 50 + 6
27 = 20 + 7

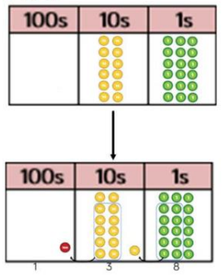
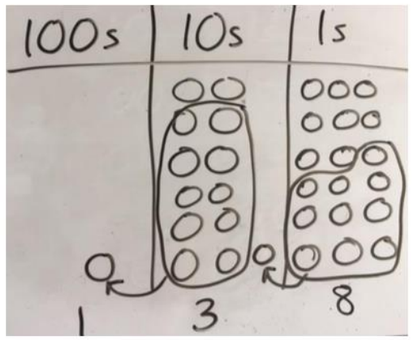
5 x 2 = 10
50 x 2 = 100
5 x 20 = 100
50 x 20 = 1000

6 x 1 = 6
6 x 10 = 60
6 x 100 = 600
6 x 1000 = 6000

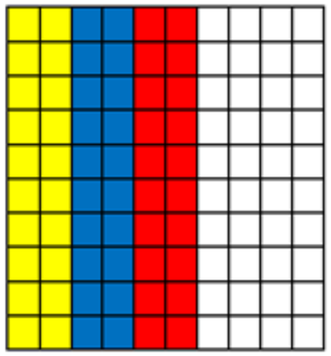
6 x 1 = 6 6 x 10 = 60 6 x 100 = 600

• Multiply multiples of 10. Add together 2, 3, or 4 digit numbers.	6 x 2= 12 6 x 20 = 120 6 x 200 = 1200 6 x 3 = 18 6 x 30 = 180 6 x 300 = 1800 6 x 4 = 24 6 x 40 = 240 6 x 400 = 2400 1350 + 162 1000 + 300 + 50 = 1350 100 + 60 + 2 = 162 1000 + 400 + 110 + 2 = 1512

MULTIPLICATION STAGE 5

Progression	**Concrete**	**Pictorial**	**Abstract**
Formal column multiplication for whole number times single digit number. Start with no exchanging before moving on to exchanging. Vocabulary: short multiplication, associative law, distributive law.	**Formal column method** with place value counters. 6 x 23  	Children to represent the counters/base 10, pictorially e.g. the image below.  	Children must be taught to line up columns. 23 x6 18 (3x6) 120 (20 x 6) 138 Move on to compact formal written method below: 6 x 23 = 23 × 6 138 1 1
	To move on to 3d and 4d x 1d they should be confident with the compact formal written method above. Introduce the associative law and distributive laws of multiplication – could be separate investigations.		
Formal column multiplication for decimals X single digit number. Start with no exchanging before moving on to exchanging.	Sam, Tara and Emily have £16.20 each. How much do they have altogether? Calculation = £16.20 x 3 £10 x 3 = £30 £5 x 3 = £15	Sam has 8 pieces of ribbon that measure 34.2cm each. How much ribbon does he have altogether?	16.2 x 3 16.2 x3 0.6 (0.2 x 3) 18.0 (6 x 3) 30.0 (10 x 3) 48.6 Moving on to compact formal written method below: 16.2 x3 48.6 1

<table>
<tr>
<td></td>
<td>£1 x 3 =£3
£0.20 x 3 = £0.60

£30 +£15+£3 +£0.60 = £48.60</td>
<td> 
Shaded in above is 3 groups of 0.2 (0.2 is the same as 20 out of 100)

0.6 of the whole is shaded (0.6 is the same as 60 out of 100)

<table>
<tr><th>X</th><th>30</th><th>4</th><th>0.2</th></tr>
<tr><td>8</td><td>240</td><td>32</td><td>1.6</td></tr>
</table>

240 + 32 + 1.6 = 273.6</td>
<td></td>
</tr>
<tr>
<td><u>Underlying Skills</u>

• partition numbers appropriately

• recall appropriate multiplication facts up to and including 12 x 12

• multiply numbers by 10,100 and 1000

• multiply multiples of 10,100 and 1000

• add together 2, 3 or 4 digit numbers

• Multiply decimals understanding place value.</td>
<td>56 = 50 + 6
27 = 20 + 7

6 x 1 = 6
6 x 10 = 60
6 x 100 = 600
6 x 1000 = 6000

6 x 1 = 6 6 x 10 = 60 6 x 100 = 600
6 x 2= 12 6 x 20 = 120 6 x 200 = 1200
6 x 3 = 18 6 x 30 = 180 6 x 300 = 1800
6 x 4 = 24 6 x 40 = 240 6 x 400 = 2400

1350 + 162

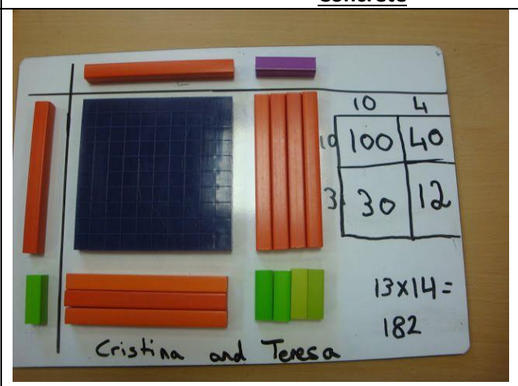
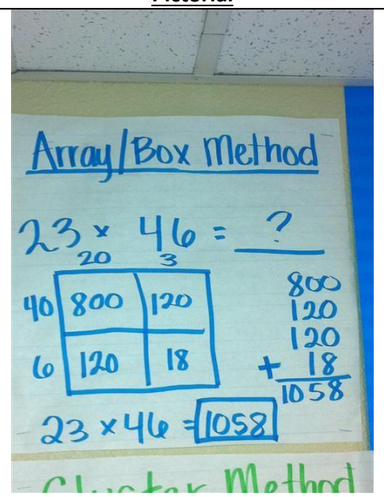
1000 + 300 + 50 = 1350
100 + 60 + 2 = 162
1000 + 400 + 110 + 2 = 1512

0.8 x 0.3 = 0.24

8 x 0.3 = 2.4

0.8 x 3 = 2.4</td>
<td colspan="2"></td>
</tr>
</table>

MULTIPLICATION STAGE 6

Progression	Concrete	Pictorial	Abstract
Formal column method for long multiplication up to 4d x 2d Start with no exchanging and multiplying by a teen number before moving on to exchanging and then larger 2 digit numbers. Vocabulary: long multiplication.			Start with the long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer. 32 x24 8 (2 x 4) 120 (30 x 4) 40 (2 x 20) 600 (30 x 20) 768 This moves to the more compact method: 1342 x 18 10736 ~~2 3 1~~ (Ensure they cross as they add the digit on) 13420 24156 1 When multiplying by a 2 digit number that is not a teen number e.g. x 28, for the second line the children can split the 20 into 2 x 10 and do a jotting on the side. 1342 x 28 10736 ~~2 3 1~~ (Ensure they cross as they add the digit on) 26840 37576 1 1342 x 20 = 1342 x 2 x 10 1342 x 2 = 2684 x 10 = 26840

Underlying Skills	
• Use facts up to 12x12 to derive facts involving multiples 10/100.	8 x 3 = 24 80 x 3 = 240 8 x 30 = 240

• Recall appropriate multiplication facts. • Multiply numbers by 10,100,100. • Multiply and divide multiples of 10. • Add together 2, 3 or 4 digit numbers.	80 x 30 =2400