

## CALCULATION POLICY - MULTIPLICATION

	Year 3	Year 4	Year 5	Year 6
<b>Mental Calculations and Methods *</b>	<p>Review 2x, 5x and 10x multiplication facts. 4x, 8x, 3x, 6x multiplication facts (using doubling patterns). Double two digit numbers. Develop efficient mental methods using commutativity <math>5 \times 4 = 4 \times 5</math> and associativity <math>(2 \times 4) \times 3 = 2 \times (4 \times 3)</math>. Derive related multiplication and division facts. Calculate multiplication statements including 2 digit multiplied by 1 digit. Partitioning-multiply the tens first then the ones. <math>(39 \times 7 = 30 \times 7 + 9 \times 7)</math></p>	<p>Review 2x, 5x, 10x, 4x, 8x, 3x, and 6x multiplication facts. 10 times bigger. 7x, 9x, 11x, 12x multiplication facts. Double larger numbers and decimals. Recognise and use factor pairs and commutativity <math>(5 \times 4 = 4 \times 5)</math> in mental calculations. Multiply by 0 and 1. Multiplying together three numbers (using the associative law <math>(2 \times 4) \times 3 = 2 \times (4 \times 3)</math>). Practice mental methods and extend this to three-digit numbers to derive facts, (for example <math>3 \times 200 = 600</math> can be derived from <math>2 \times 3 = 6</math>)</p>	<p>Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers Establish whether a number up to 100 is prime. Recognise and use cube and square numbers. Multiplication facts up to <math>12 \times 12</math>. 10, 100, 1000 times bigger. Double larger numbers and decimals. Partition to multiply mentally. Multiply whole numbers and those involving decimals by 10, 100 and 1000.</p>	<p>Perform mental calculations, including with mixed operations and large numbers (increasingly large numbers &amp; more complex calculations). Use estimation to check answers to calculations. Know the square numbers up to <math>12 \times 12</math> &amp; derive the corresponding squares of multiples of 10 e.g. <math>80 \times 80 = 6400</math> Multiply numbers by 10, 100 and 1000 giving answers up to three decimal places. Review multiplication facts up to <math>12 \times 12</math>. Partition to multiply mentally larger numbers. Double larger numbers and decimals</p>
<b>Written Methods *</b>	<p>Continue to write and calculate mathematical statements for <math>\div</math> using the x tables they know progressing to formal written methods.</p>	<p>Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.</p> <p>Multiply four-digit numbers by a two-digit multiple of 10 (4A:14)</p>	$\begin{array}{r} 243 \\ \times 6 \\ \hline 1,458 \end{array}$	<p>Multiply numbers up to 4 digits and beyond by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers</p> <p>Multiply decimals by natural numbers (5B:124)</p> <p>Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.</p> <p>(When multiplying begin with units and carry below the calculation)</p> <p>Consolidation and extended problem solving.</p>

# CALCULATION POLICY - MULTIPLICATION

Developing Conceptual Understanding

Multiply four-digit numbers by a one or two digit number using a formal written method including long multiplication for two-digit numbers. (4A:47)

Encourage children to list times tables

Show multiplication using arrays: (3A:8)

Write an addition and a multiplication about the picture.



(3A:8)

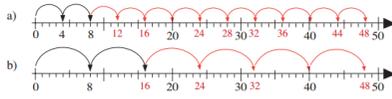
Colin had £48. He was given £15 for his birthday by each of his 3 aunts. How much money does he have now?

Calculation:  $48 + 15 + 15 + 15 = 48 + 3 \times 15 = 93$

Answer: ... Colin now has £93.

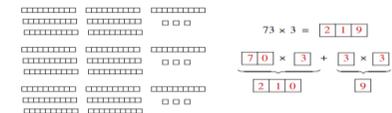
Show tables on a number line: (3A: 7)

Starting from 0, draw jumps of equal length along the number line. Write the numbers landed on below the number line.



(3B:137)

Think about what the diagram means. Fill in the missing numbers.



(3B:134)

Fill in the missing numbers.

a) 

Th	H	T	U
3	2	5	1

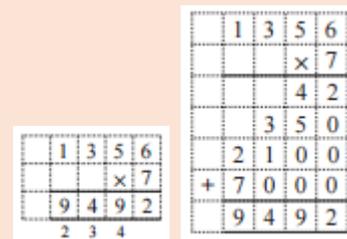
 $3 \times 1U = 3U$   
 $3 \times 2T = 6T$   
 $3 \times 5H = 15H = 1H + 5T$   
 $3 \times 1U = 3U$   
 $3 \times 2T = 6T$   
 $3 \times 5H = 15H = 1H + 5T$

b) 

Th	H	T	U
1	7	5	6

 $4 \times 6U = 24U = 2T + 4U$   
 $4 \times 5T = 20T = 2H + 2T$   
 $4 \times 7H = 28H = 3H + 3Th + 0H$   
 $4 \times 1Th = 4Th = 4Th$

(4A:42)



(4A:64)

Encourage children to list times tables

Manipulatives and additional support.

Grid method:

x	40	3
6	240	18

Represent using Place Value counters:

a) 

H	T	U
8	6	0

 $\leftarrow 43 \times 20$   
 $+ 129 \leftarrow 43 \times 3$   
 $989 \leftarrow 43 \times 23$

b) 

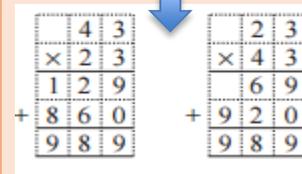
H	T	U
4	3	

 $\times 23$   
 $9 \leftarrow 3 \times 3$   
 $129 \leftarrow 40 \times 3$   
 $60 \leftarrow 3 \times 20$   
 $989 \leftarrow 40 \times 20$

c) 

H	T	U
4	3	

 $\times 23$   
 $9 \leftarrow 3 \times 3$   
 $860 \leftarrow 43 \times 3$   
 $989 \leftarrow 43 \times 20$



(5A:13)

a) 

2	7	4
2	3	

  
 $822$   
 $5480$   
 $63102$

b) 

4	7
2	6

  
 $282$   
 $840$   
 $1122$

c) 

6	1	2
1	0	7

  
 $4284$   
 $61200$   
 $65484$

d) 

4	6	7
2	0	5

  
 $2335$   
 $93400$   
 $95735$

(5A:60)

Encourage children to list times tables

Manipulatives and additional support.

Represent using Place value counters:



Encourage children to list times tables

a) 

5	2	9	1

 $\times 21$   
 $5291$   
 $105820$   
 $1111111$

b) 

5	2	9	1

 $\times 42$   
 $10582$   
 $211640$   
 $2222222$

c) 

5	2	9	1

 $\times 105$   
 $264555$   
 $5291000$   
 $5555555$

d) 

5	2	9	1

 $\times 189$   
 $47619$   
 $423280$   
 $5291000$   
 $9999999$

e) 

1	2	3	4	5	6	7	8	9
1	1	1	1	1	1	1	1	1

 $\times 9$   
 $2345678$

# CALCULATION POLICY - MULTIPLICATION

Estimate first, then calculate using addition and multiplication.

a)  $\begin{array}{r} 202 \\ 202 \\ 202 \\ +202 \\ \hline 808 \end{array}$   $R: \begin{array}{r} 810 \\ 810 \\ 810 \\ +810 \\ \hline 3240 \end{array}$  b)  $\begin{array}{r} 302 \\ 302 \\ +302 \\ \hline 906 \end{array}$   $R: \begin{array}{r} 900 \\ 900 \\ 900 \\ +900 \\ \hline 3600 \end{array}$

c)  $\begin{array}{r} 423 \\ +423 \\ \hline 846 \end{array}$   $R: \begin{array}{r} 810 \\ 810 \\ 810 \\ +810 \\ \hline 3240 \end{array}$  d)  $\begin{array}{r} 201 \\ 201 \\ 201 \\ +201 \\ \hline 804 \end{array}$   $R: \begin{array}{r} 1005 \\ 1005 \\ 1005 \\ +1005 \\ \hline 4020 \end{array}$

(3B:136)

a) Each flower on an apple tree has 5 petals. How many petals are on a branch with 243 flowers?  
 Answer: There are 1215 flowers on the branch.

Th	H	T	U
2	4	3	5
1	2	1	5

b) Workmen laid 106 m of pavement a day from Monday to Friday. How many metres did they lay in a week?  
 Answer: They laid 530 m in a week.

Th	H	T	U
1	0	6	5
5	3	0	

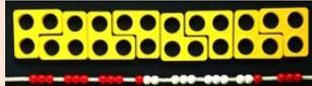
## Manipulatives and additional support.

Show multiplication using arrays:

$13 \times 4 = (10 \times 4) + (3 \times 4)$



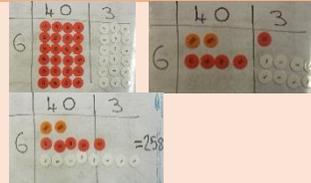
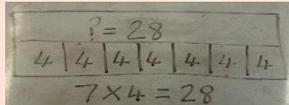
Represent multiplication facts using Numicon and bead strings:  $8 \times 3 = 24$



Represent using Diennes:



Bar Model:



Partition and multiply- exchange- regroup.  
 $43 \times 6$  by partitioning

$43 \times 6$   
 $40 \times 6 + 3 \times 6$

$40 \times 6 = 240$

$3 \times 6 = 18$

$43 \times 6 = 258$

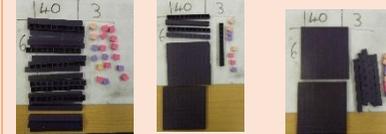
If I know  $4 \times 6 = 24$  then  $40 \times 6$  is ten times bigger.

Build multiplication facts on counting stick:

$12 \times 7 = 84$

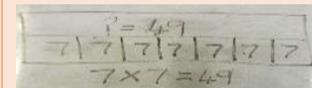


Represent using Diennes:



Partition and multiply- exchange- regroup

Bar Model:



Partition and multiply- exchange- regroup

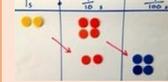
Grid method linked to formal written method:

x	200	40	3
30	6000	1200	90
6	1200	240	18

7290
1458
8748

If I know  $4 \times 6$  then  $0.4 \times 6$  is ten times smaller

$0.4 \times 0.6$  is ten times smaller again



Multiply  $1,432 \times 6$

( $6 \times 2$ ,  $6 \times 30$ ,  $6 \times 400$ ,  $6 \times 1000$ )

Carried numbers are recorded above 1,432.

$$\begin{array}{r} 2 \text{ ---} \\ 1,432 \\ \times 36 \\ \hline 8,592 \end{array}$$

Then multiply  $1,432 \times 30$

( $30 \times 2$ ,  $30 \times 30$ ,  $30 \times 400$ ,  $30 \times 1000$ )

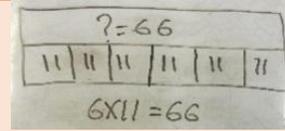
$$\begin{array}{r} 1 \text{ ---} \\ 2 \text{ ---} \\ 1,432 \\ \times 36 \\ \hline 8,592 \\ \hline 42,960 \end{array}$$

Then use column addition to find the total of the products.

$$\begin{array}{r} 1 \text{ ---} \\ 2 \text{ ---} \\ 1,432 \\ \times 36 \\ \hline 8,592 \\ \hline 42,960 \\ \hline 51,552 \end{array}$$

Bar Model:

## CALCULATION POLICY - MULTIPLICATION



\* please refer to Non-negotiables document

**MAYFLOWER COMMUNITY ACADEMY MULTIPLICATION SUPPORT VIDEOS CAN BE FOUND AT:**

YEAR FOUR: <https://www.youtube.com/watch?v=Ks2Tz940N7U>

YEAR FIVE: <https://www.youtube.com/watch?v=3tLXBSszBGo>

YEAR SIX: <https://www.youtube.com/watch?v=ya7n6eRlVwk&t=211s>