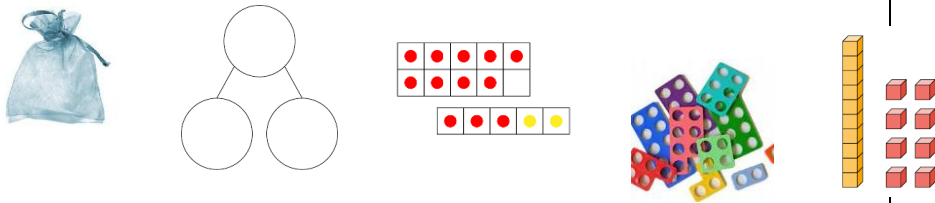
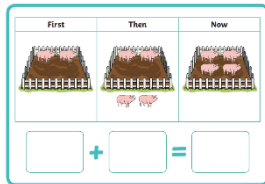
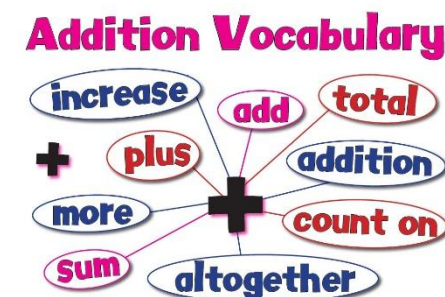


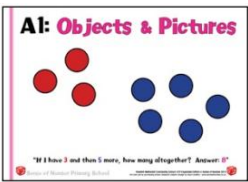
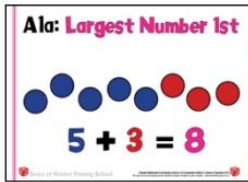
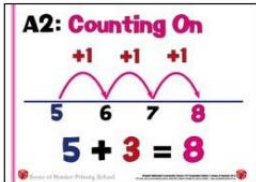
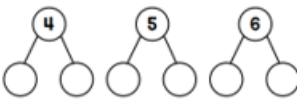
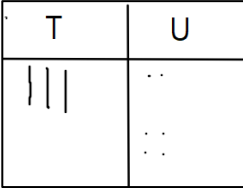
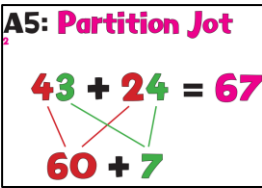
Calculation Policy

This document offers teachers at Barley Fields a summary of the agreed written calculation strategies that we have agreed will be taught progressively as children move through school. This document should also be considered alongside the progression ladders for Mathematics which outline progression in the wider Mathematics curriculum.

Addition

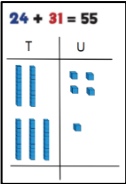
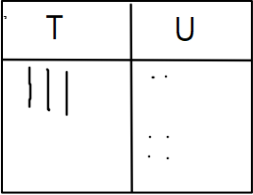
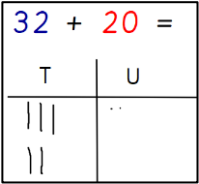
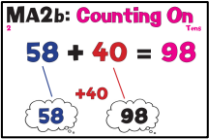
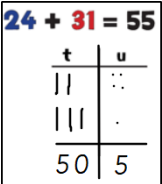
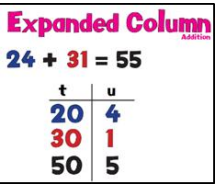
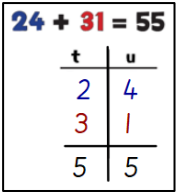
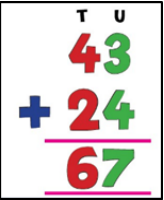
Reception Addition Calculation Methods	
	
Concrete and Pictorial Representations Counting Pouches, Five/Ten Frame, Coloured Counters, Part Whole Model, Base Ten and Ones	Reception Vocabulary - First, then, now.



Year 1 Addition Calculation Methods					
A1: Objects & Pictures 	A1a: Largest Number 1st 	A2: Counting On 			A5: Partition Jot 
Year 1	Year 1	Year 1	Year 1	Year 2	Year 2
Combining objects and pictures	Adding sets starting with the largest number	Adding by counting on	Part – Whole Models	representing Base 10 jottings and adding using place value	Partition Jottings

Year 2 Addition Calculation Methods

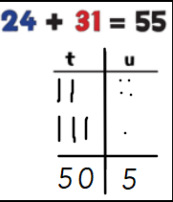
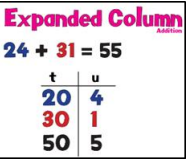
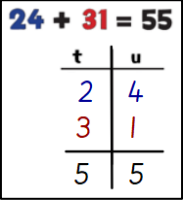
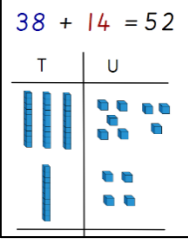
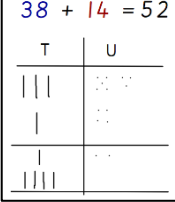
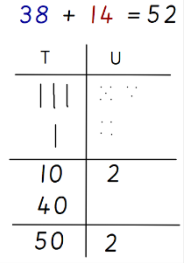
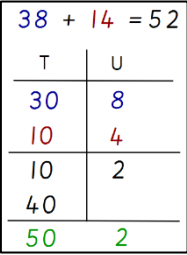
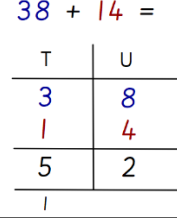
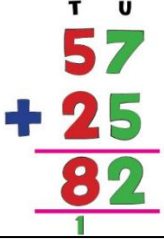
adding 2 digit and 2-digit numbers with no carrying

							
Year 2	Year 2	Year 2	Year 2	Year 2	Year 2/3	Year 3	Year 3
Step 1 Concrete Partitioning using base 10 equipment Adding 2 digit number and 10s Adding 2-digit and 2-digit numbers – no carrying	Step 2 Partition using jottings 2 digit and 1-digit Base 10 jottings	Step 3 partition jottings Adding a 2-digit number and 10s Base 10 jottings	Step 4 Partitioning Adding 2-digit and 10s	Step 5 Partition Jotting Adding 2-digit and 2 digit no carrying	Step 6 Expanded Column Method	Step 7 Column Method 2-digit add 2-digit no carrying	Step 8 Short Column Method 2-digit add 2-digit no carrying

Year 3 Addition Calculation Methods

adding 2 digit and 2-digit numbers with no carrying

adding 2 digit and 2-digit numbers with carrying

									
Year 2	Year 2/3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3/4
Step 5 Partition Jotting Adding 2-digit and 2 digit no carrying	Step 6 Expanded Column Method	Step 7 Column Method 2-digit add 2-digit no carrying	Step 8 Short Column Method 2-digit add 2-digit no carrying	Step 9 Concrete Partitioning using base 10 equipment with practical carrying/exchanging	Step 10 Pictorial Partitioning 2-digit add 2 digit numbers – crossing 10	Step 11 Pictorial Partitioning 2-digit add 2 digit numbers – crossing 10	Step 12 Expanded Partitioning with exchanging 2-digit add 2 digit numbers – crossing 10	Step 13 Column method with exchanges 2-digit add 2 digit numbers – crossing 10	Step 14 Formal Column Method with carrying

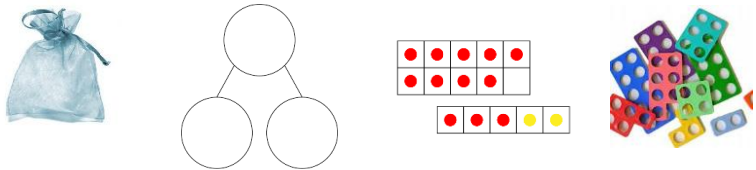
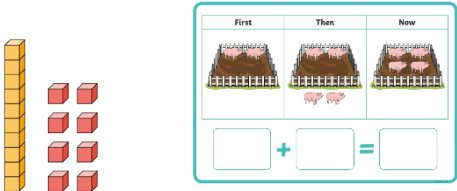
Key Stage 2 – Year 4, 5 and 6 Addition Methods

adding 2 digits with and without carrying		adding 3 digits with and without carrying		adding 4 digits with and without carrying		adding 5 or more digits with and without carrying
Column Addition) $\begin{array}{r} \text{T} \quad \text{U} \\ 57 \\ + 25 \\ \hline 82 \\ \text{1} \end{array}$	Column Addition) $\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ 86 \\ + 48 \\ \hline 134 \\ \text{1} \quad \text{1} \end{array}$	Column Addition $\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ 687 \\ + 248 \\ \hline 935 \\ \text{1} \quad \text{1} \end{array}$		Column Addition $\begin{array}{r} 4873 \\ + 3762 \\ \hline 8635 \\ \text{1} \quad \text{1} \end{array}$		Column Addition $\begin{array}{r} 787567 \\ + 446278 \\ \hline 1233845 \\ \text{1} \quad \text{1} \quad \text{1} \quad \text{1} \end{array}$
Year 3/4	Year 4	Year 4	Year 4	Year 4/5	Year 5	Year 6
Step 14 Formal Column Method 2-digits to 2-digits with carrying	Step 15 Formal Column Method 2-digits to 2-digits with carrying	Step 16 add whole numbers with up to 4 digits using a formal written method - columnar addition – no carrying	Step 17 add whole numbers with up to 3 digits using a formal written method - columnar addition with carrying	Step 18 add whole numbers with up to 4 digits using a formal written method - columnar addition – no carrying	Step 19 add whole numbers with no more than 4 digits using a formal written method - columnar addition with carrying	Step 20 add whole numbers with more than 4 digits using a formal written method - columnar addition with and without carrying

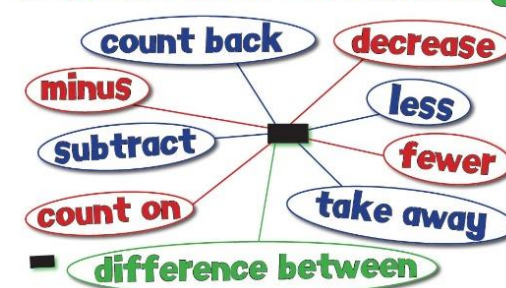
Key Stage 2 Year 5 and 6 Addition Methods - Decimals

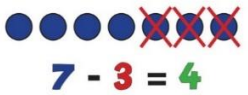
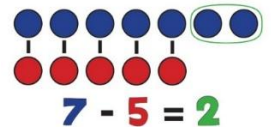
adding 2 digits with and without carrying		adding 3 digits with and without carrying	adding 4 digits with and without carrying	
Column Addition $\begin{array}{r} \text{U} \cdot \frac{1}{10} \\ 4.8 \\ + 3.8 \\ \hline 8.6 \\ \text{1} \end{array}$	Column Addition $\begin{array}{r} \text{U} \cdot \frac{1}{10} \quad \frac{1}{100} \\ 5.65 \\ + 3.29 \\ \hline 8.94 \\ \text{1} \end{array}$	Column Addition $\begin{array}{r} \text{T} \quad \text{U} \cdot \frac{1}{10} \\ 76.7 \\ + 58.5 \\ \hline 135.2 \\ \text{1} \quad \text{1} \quad \text{1} \end{array}$	Column Addition With Money $\begin{array}{r} \text{£}38.25 \\ + \text{£}27.46 \\ \hline \text{£}65.71 \\ \text{1} \quad \text{1} \end{array}$	$\begin{array}{r} \text{T} \quad \text{U} \cdot \frac{1}{10} \quad \frac{1}{100} \\ 73.4 \\ + 5.67 \\ \hline 79.07 \\ \text{1} \end{array}$
Year 5	Year 5	Year 5	Year 5	Year 5
adding decimals to one decimal place using column method	adding decimals to 2 decimal places using column method	Adding decimals	Adding money	adding decimals with mixed decimal places

Subtraction

Reception Subtraction Calculation Methods	
	
Concrete and Pictorial Representations Counting Pouches, Five/Ten Frame, Coloured Counters, Part Whole Model, Base Ten and Ones	Reception Vocabulary - First, then, now.

Subtraction Vocabulary

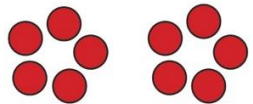
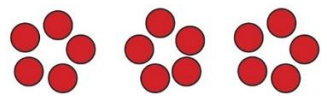
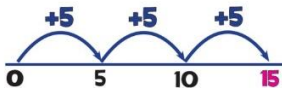
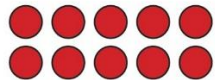


Key Stage 1 Year 1 and 2 Progression in Subtraction Calculation Methods			
Objects  "What do I get if I take 3 away from 7? Answer: 4"	What's the Difference?  "How many more is 7 than 5? What is the difference?"	Expanded Column) $\begin{array}{r} 87 - 23 = 64 \\ 80 \quad 7 \\ 20 \quad 3 \\ \hline 60 \quad 4 \end{array}$	Column Subtraction $\begin{array}{r} \text{T} \quad \text{U} \\ 87 \\ - 23 \\ \hline 64 \end{array}$
Year 1	Year 1	Year 2	Year 2
Crossing Out	Finding difference by matching	Step 1 Simple expanded column method no exchanging	Step 2 Simple Column Method 2-digits – 2-digits no exchanging

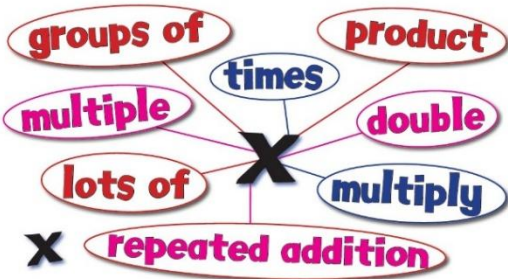
Key Stage 2 Year 3, 4, 5 and 6 Progression in Subtraction Calculation Methods					
Subtraction					
Column Subtraction $\begin{array}{r} \text{T} \quad \text{U} \\ 87 \\ - 23 \\ \hline 64 \end{array}$	Column Subtraction $\begin{array}{r} \text{T} \quad \text{U} \\ 75 \\ - 37 \\ \hline 38 \end{array}$	Column Subtraction $\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ 121 \\ - 45 \\ \hline 76 \end{array}$	Column Subtraction $\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ 723 \\ - 356 \\ \hline 367 \end{array}$	Column Subtraction $\begin{array}{r} 4 \quad 9 \quad 13 \quad 1 \\ 5042 \\ - 1776 \\ \hline 3266 \end{array}$	Column Subtraction $\begin{array}{r} 3 \quad 1 \quad 7 \quad 12 \quad 1 \\ 742831 \\ - 427358 \\ \hline 315473 \end{array}$
Year 2	Year 3	Year 3	Year 3/4	Year 4/5	Year 5
Step 2 Column Method 2-digits – 2-digits no exchanging	Step 3 Column subtraction 2-digits – 2-digits with exchanging	Step 4 Column subtraction 3-digits – 2-digits with exchanging	Step 5 Column subtraction 3-digits – 3-digits with exchanging	Step 6 Column subtraction 4 digits with exchanging	Step 7 Column subtraction more than 4 digits with exchanging

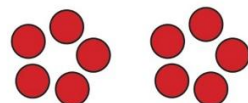
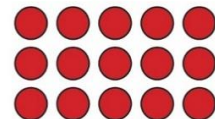
Key Stage 2 Progression in Subtraction Calculation Methods		
Subtraction with Decimals		
Column Subtraction	Column Subtraction	12.4 - 5.97 = 6.43
Year 5	Year 6	Year 6
Column Subtraction with decimals 1 – decimal place	Column Subtraction with decimals 2 – decimal places	Column Subtraction with decimals mixed decimal places

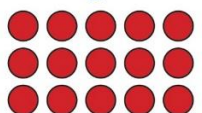
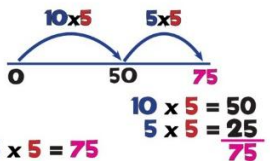
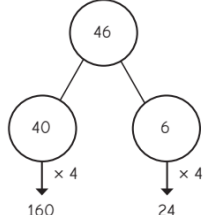
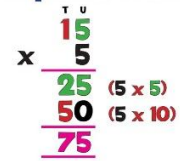
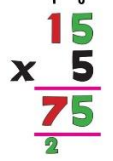
Multiplication

Year 1 Multiplication Calculation Methods			
Groups)  "2 groups of 5 counters makes 10 counters altogether"	Repeated Addition (Groups)  $5 \times 3 = 5 + 5 + 5 = 15$ "5 multiplied by 3" means "5, 3 times", which gives "3 lots of 5"	Repeated Addition (Number Line)  $5 \times 3 = 5 + 5 + 5 = 15$ "5 times 3" means "5, 3 times"	Arrays)  "2 groups of 5 counters" or "5 groups of 2 counters" - "10 counters altogether"
Year 1	Year 1	Year 2	Year 2
Partitioning groups and counting in multiples of 2, 5 and 10	understanding multiplication as repeated addition	repeated addition using a number line	Using pictorial Arrays

Multiplication Vocabulary



Year 2 Multiplication Calculation Methods				
Groups)  "2 groups of 5 counters makes 10 counters altogether"	Repeated Addition (Groups)  $5 \times 3 = 5 + 5 + 5 = 15$ "5 multiplied by 3" means "5, 3 times", which gives "3 lots of 5"	Repeated Addition (Number Line)  $5 \times 3 = 5 + 5 + 5 = 15$ "5 times 3" means "5, 3 times"	Arrays)  "2 groups of 5 counters" or "5 groups of 2 counters" - "10 counters altogether"	Arrays  $3 \times 5 = 15$ or $5 \times 3 = 15$
Year 1	Year 1	Year 2	Year 2	Year 3
Partitioning groups and counting in multiples of 2, 5 and 10	understanding multiplication as repeated addition	repeated addition using a number line	Using pictorial Arrays	Using arrays to illustrate associative law

Year 3 Multiplication Calculation Methods					
Arrays  $3 \times 5 = 15$ or $5 \times 3 = 15$	Multi Boing!  $15 \times 5 = 75$ $10 \times 5 = 50$ $5 \times 5 = 25$ $50 + 25 = 75$	Part whole model  $46 \times 4 = 160 + 24 = 184$	Partitioning $15 \times 5 = 75$ $10 \times 5 = 50$ $5 \times 5 = 25$ $50 + 25 = 75$	Expanded Column)  $15 \times 5 = 75$	Column Multiplication  $15 \times 5 = 75$
Year 2 and 3	Year 3	Year 3	Year 3	Year 3	Year 3
Arrays	Multi Boing!	Part whole model	Partitioning	Expanded Colum	Simple formal method – 2-digit x 1-digit

Year 4 Multiplication Calculation Methods

Expanded Column) $\begin{array}{r} \text{T U} \\ 15 \\ \times 5 \\ \hline 25 \text{ (5} \times \text{5)} \\ 50 \text{ (5} \times \text{10)} \\ \hline 75 \end{array}$	Column Multiplication $\begin{array}{r} \text{T U} \\ 15 \\ \times 5 \\ \hline 75 \\ 2 \end{array}$	Column Multiplication $\begin{array}{r} \text{H T U} \\ 43 \\ \times 6 \\ \hline 258 \\ 1 \end{array}$	Column Multiplication $\begin{array}{r} \text{H T U} \\ 147 \\ \times 4 \\ \hline 588 \\ 1 \ 2 \end{array}$	Column Multiplication $\begin{array}{r} 3647 \\ \times 4 \\ \hline 14588 \\ 2 \ 1 \ 2 \end{array}$
Year 3	Year 3	Year 4	Year 4	Year 5
Expanded Column	Simple formal method 2-digit x 1-digit	Formal method 2-digit x 1-digit	Formal Method 3-digits x 1 digits	Formal Method 4 digits x 1 digit

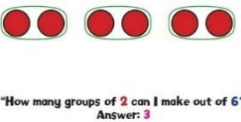
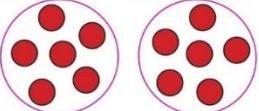
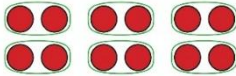
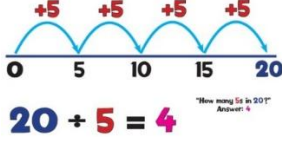
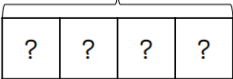
Year 5 Multiplication Calculation Methods

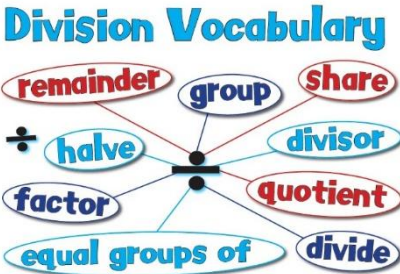
Column Multiplication $\begin{array}{r} \text{H T U} \\ 147 \\ \times 4 \\ \hline 588 \\ 1 \ 2 \end{array}$	Column Multiplication $\begin{array}{r} 3647 \\ \times 4 \\ \hline 14588 \\ 2 \ 1 \ 2 \end{array}$	Long Multiplication $\begin{array}{r} 43 \\ \times 65 \\ \hline 215 \text{ (5} \times \text{43)} \\ + 2580 \text{ (60} \times \text{43)} \\ \hline 2795 \end{array}$	Long Multiplication $\begin{array}{r} 243 \\ \times 68 \\ \hline 1944 \text{ (8} \times \text{243)} \\ + 14580 \text{ (60} \times \text{243)} \\ \hline 16524 \end{array}$	Jump! $\begin{array}{r} \times 1000 \ 63400 \\ \times 100 \ 6340 \\ \times 10 \ 634 \\ +10 \ 63.4 \\ +100 \ 6.34 \\ +1000 \ 0.634 \\ \hline 0.0634 \end{array}$
Year 4	Year 5	Year 5	Year 5	Year 5
Year 4 Formal Method 3-digits x 1 digits	Formal Method 4 digits x 1 digit	Long Multiplication 2-digits x 2-digits	Long Multiplication 3-digits x 2 digits	Multiplying by 10, 100 and 1000

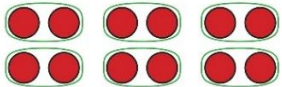
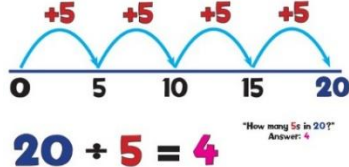
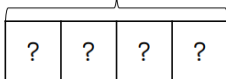
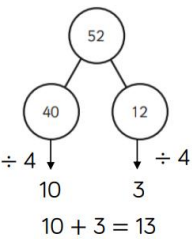
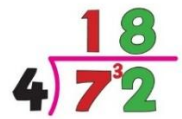
Year 6 Multiplication Calculation Methods

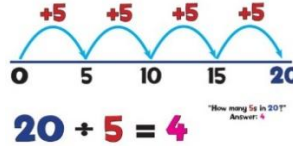
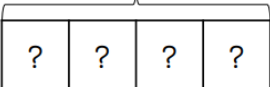
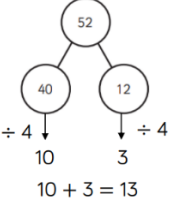
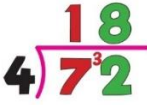
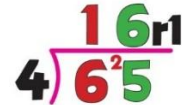
Column Multiplication $\begin{array}{r} 3647 \\ \times 4 \\ \hline 14588 \\ 2 \ 1 \ 2 \end{array}$	Long Multiplication $\begin{array}{r} 43 \\ \times 65 \\ \hline 215 \text{ (5} \times \text{43)} \\ + 2580 \text{ (60} \times \text{43)} \\ \hline 2795 \end{array}$	Long Multiplication $\begin{array}{r} 243 \\ \times 68 \\ \hline 1944 \text{ (8} \times \text{243)} \\ + 14580 \text{ (60} \times \text{243)} \\ \hline 16524 \end{array}$	Jump! $\begin{array}{r} \times 1000 \ 63400 \\ \times 100 \ 6340 \\ \times 10 \ 634 \\ +10 \ 63.4 \\ +100 \ 6.34 \\ +1000 \ 0.634 \\ \hline 0.0634 \end{array}$	Long Multiplication $\begin{array}{r} 3786 \\ \times 48 \\ \hline 30288 \text{ (8} \times \text{3786)} \\ + 151440 \text{ (40} \times \text{3786)} \\ \hline 181728 \end{array}$	Column Multiplication $\begin{array}{r} \text{T U} = \frac{1}{10} \\ 3.6 \\ \times 4 \\ \hline 14.4 \\ 2 \end{array}$
Year 5	Year 5	Year 5	Year 5	Year 6	Year 6
Formal Method 4 digits x 1 digit	Long Multiplication 2-digits x 2-digits	Long Multiplication 3-digits x 2 digits	Multiplying by 10, 100 and 1000	Long Multiplication 4 digits x 2 digits	Multiplying Decimals

Division

Year 1/ 2 Division Calculation Methods				
Grouping (Concept) 	Division as Sharing $12 \div 2 = 6$ "If I share 12 into 2 equal amounts, how many in each group?" Answer: 6 	Division as Grouping $12 \div 2 = 6$ "How many groups of 2 can I fit into 12?" Answer: 6 	Grouping on a Number Line  $20 \div 5 = 4$	52 
Year 1	Year 2	Year 2 / 3	Year 2 / 3	Year 3
Grouping	Division as grouping	Division as grouping	Grouping on a numberline	Bar Models



Year 3 Division Calculation Methods				
Division as Grouping $12 \div 2 = 6$ "How many groups of 2 can I fit into 12?" Answer: 6 	Grouping on a Number Line  $20 \div 5 = 4$	52 		Short Division) $72 \div 4 = 18$ 
Year 2 / 3	Year 2 / 3	Year 3	Year 3	Year 4
Division as grouping	Grouping on a numberline	Bar Models	Part whole Models	Formal method Simple Short Division (Bus Stop)

Year 4 Division Calculation Methods				
Grouping on a Number Line  $20 \div 5 = 4$	52 		Short Division) $72 \div 4 = 18$ 	Short Division) $65 \div 4 = 16r1$ 
Year 2 / 3	Year 3	Year 3	Year 4	Year 4
Grouping on a numberline	Bar Models	Part whole Models	Step 1 Formal method Simple Short Division (Bus Stop)	Step 2 Formal method Simple Short Division with remainders (Bus Stop)

Year 5 Division Calculation Methods

Short Division) $72 \div 4 = 18$	Short Division) $65 \div 4 = 16r1$	Short Division $136 \div 4 = 34$	Short Division $394 \div 6 = 65r4$	Chunking Long Division $15 \overline{) 480}$ $- 150 \text{ (15 x 10)}$ 330 $- 150 \text{ (15 x 10)}$ 180 $- 150 \text{ (15 x 10)}$ 30 $- 30 \text{ (15 x 2)}$ 0 $480 \div 15 = 32$
Year 4	Year 4	Year 4/5	Year 5	Year 6
Step 1 Formal method Simple Short Division (Bus Stop)	Step 2 Formal method Simple Short Division with remainders (Bus Stop)	Step 3 Formal Method Short Division with larger numbers	Step 4 Formal Method Short Division with larger numbers and remainders	Step 5 Formal Method Introduction to chunking

Year 6 Division Calculation Methods

Short Division $136 \div 4 = 34$	Short Division $394 \div 6 = 65r4$	Chunking Long Division $15 \overline{) 480}$ $- 150 \text{ (15 x 10)}$ 330 $- 150 \text{ (15 x 10)}$ 180 $- 150 \text{ (15 x 10)}$ 30 $- 30 \text{ (15 x 2)}$ 0 $480 \div 15 = 32$	Chunking Long Division $15 \overline{) 480}$ $- 450 \text{ (15 x 30)}$ 30 $- 30 \text{ (15 x 2)}$ 0 $480 \div 15 = 32$	Long Division Chunking Method $37 \overline{) 983}$ $- 740 \text{ (37 x 20)}$ 243 $- 222 \text{ (37 x 6)}$ 21 $983 \div 37 = 26r21$	D10i: Short Division $87.5 \div 7 = 12.5$
Year 5	Year 5	Year 6	Year 6	Year 6	Year 6
Step 3 Formal Method Short Division with larger numbers	Step 4 Formal Method Short Division with larger numbers and remainders	Step 5 Formal Method Introduction to chunking	Step 6 Formal Method Introduction to chunking	Step 7 Formal Method Introduction to chunking with remainders	Formal Method Short Division using Decimals