Brown Clee C.E. Primary School:

KS2 Calculation Policy

KS2 Calculation Policy

This document shows the way in which just the use of all four operations are **typically** taught across KS2 and generally focuses on written strategies. It is important to remember that often a mental strategy can be more suitable and efficient when solving a problem.

All four operations are separated into 3 different representations: *concrete*, *pictorial* and *abstract*.

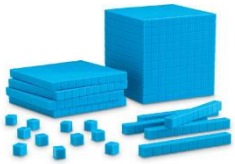
Concrete representations are where physical equipment (or "manipulatives") are used to help understand a mathematical concept. In KS2, this will usually be Dienes (base 10) and place value counters; however, other equipment may be used (some examples are included below). It is important that children experience a range of different representations when learning mathematical concepts.

Pictorial representations are where drawings/pictures are used to help understand a mathematical concept. These can be just picture of a concrete representations (e.g. a drawing of place value counters) or it could be strategies such as bar models and par-part-whole models. Again, it is important that children experience a range of different representations.

Abstract representations are where numbers (or letters) are used to represent a mathematical concept. This is the representation which is typical thought of as "maths" and is usually the most efficient; however, understanding just an abstract representation (and not pictorial and concrete versions) can suggest that the actual mathematical concept is not completely understood.

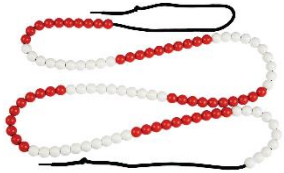
Place value counters

Dienes/ Base 10



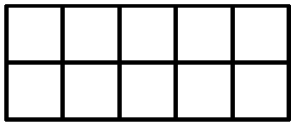
Multilink

100 bead string



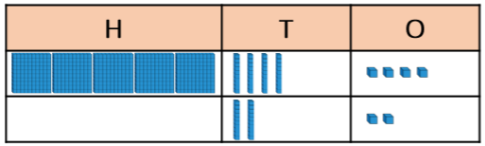
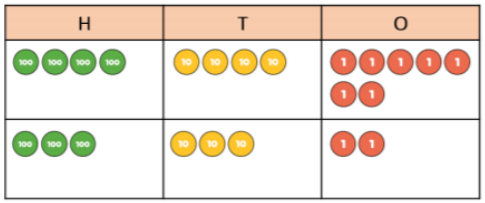
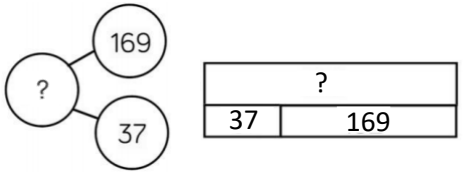
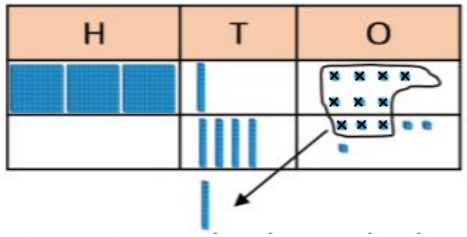
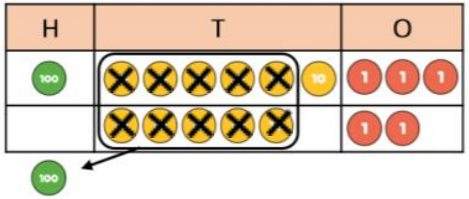
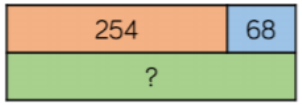
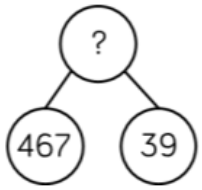
Numicon

Tens frame

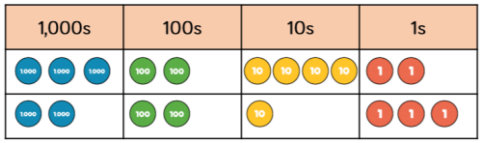
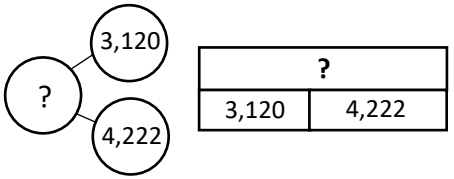
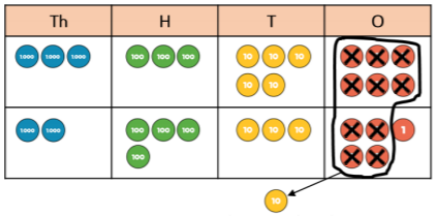
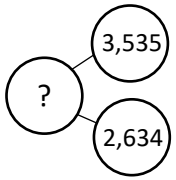


100 square

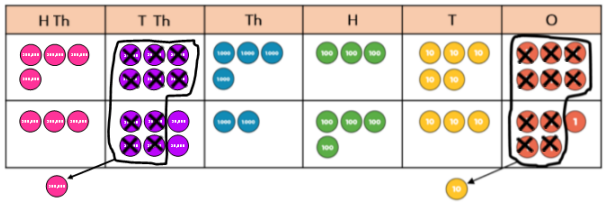
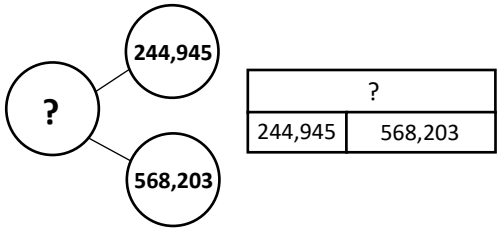
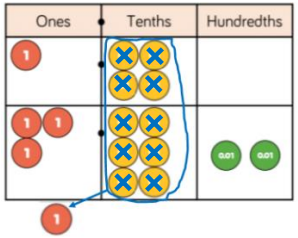
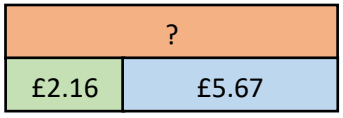
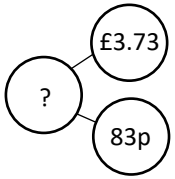
Calculation Policy – Addition – Year 3

Objective	Concrete	Pictorial	Abstract
Year 3 – Adding (without exchanging) TO + TO HTO + TO HTO + HTO	**E.g. 544 + 22 = 566**  **E.g. 447 + 332 = 779**  Children look at each column (starting with the ones) and count how many counters/dienes are in each.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of addition – particularly to help visualise word problems.  	356 + 523 879 Abstract column addition is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 5 tens + 2 tens = 7 tens
Year 3 – Adding (with exchanging) TO + TO HTO + TO HTO + HTO	**E.g. 317 + 46 = 363**  **E.g. 163 + 52 = 215**  If there are more than 10 in a column, then 10 need to be exchanged for 1 in the column above (e.g. 10 tens = 1 hundred), and then added in that column.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of addition – particularly to help visualise word problems.   	538 + 91 629 1 Exchange using column addition is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. 3 tens + 9 tens = 12 tens 12 tens = 1 hundred + 2 tens

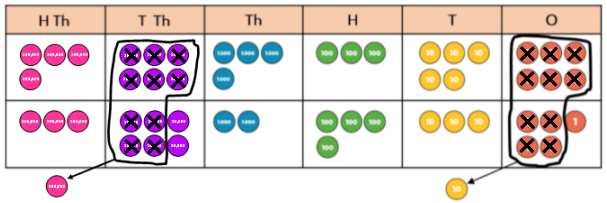
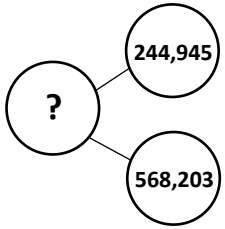
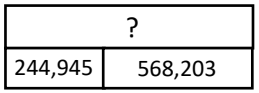
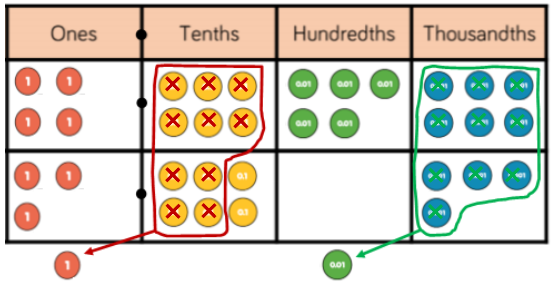
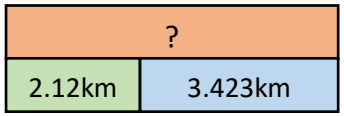
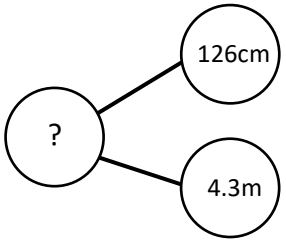
Calculation Policy – Addition – Year 4

Objective	Concrete	Pictorial	Abstract
Year 4 – Adding (without exchanging) up to ThHTO + ThHTO	**E.g. 3,242 + 2,213 = 5,455**  Children look at each column (starting with the ones) and count how many counters are in each. Dienes could still be used to help with understanding of place value	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of addition – particularly to help visualise word problems.  	3,538 5,251 + 8,789 Abstract column addition is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 5 hundreds + 2 hundreds = 7 hundreds
Year 4 – Adding (with exchanging) up to ThHTO + ThHTO	**E.g. 317 + 46 = 363**  If there are more than 10 in a column, then 10 need to be exchanged for 1 in the column above (e.g. 10 tens = 1 hundred), and then added in that column. Dienes could still be used to help with understanding of place value	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of addition – particularly to help visualise word problems.   	3,538 2,758 + 6,296 1 1 Exchange using column addition is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. 5 hundreds + 7 hundreds = 12 hundreds 12 hundreds = 1 thousand + 2 hundreds

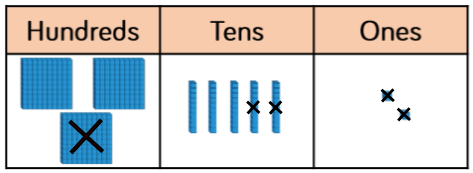
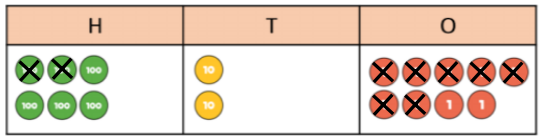
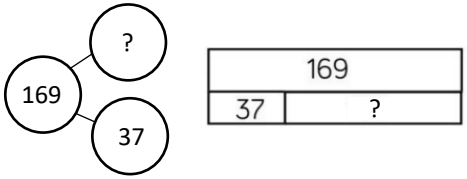
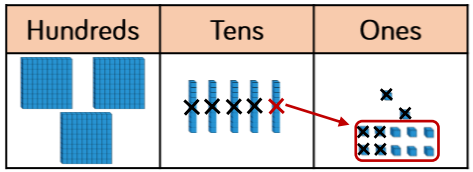
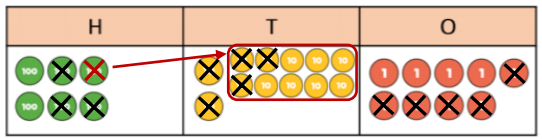
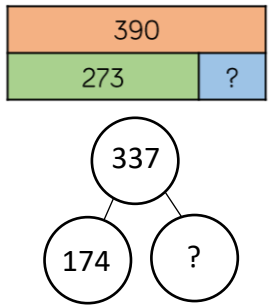
Calculation Policy – Addition – Year 5

Objective	Concrete	Pictorial	Abstract
Year 5 – Adding numbers up to 1 million	**E.g. 464,356 + 362,435 = 826,791**  Children look at each column (starting with the ones) and count how many counters are in each. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar model are also used to help understand the concept of addition – particularly to help visualise word problems.  	567,472 + 385,651 953,123 1 1 1 1 Abstract column addition is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 7 tens + 5 tens = 12 tens = 1 hundred + 2 tens
Year 5 – Adding decimals up to 2 places (including money)	**E.g. 1·4 + 3·62 = 5·02**  If there are more than 10 in a column, then 10 need to be exchanged for 1 in the column above (e.g. 10 tenths = 1 one), and then added in that column. Addition of decimals is linked to the idea of fractions (i.e. tenths = 1/10s and hundredths = 1/100s)	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar model are also used to help understand the concept of addition – particularly to help visualise word problems.   	5.53 + 6.9 12.43 1 Exchange using column addition is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. 5 tenths + 9 tenths = 14 tenths 14 tenths = 1 one + 4 tenths

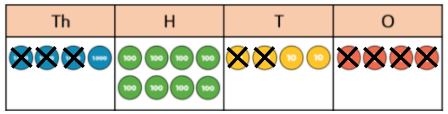
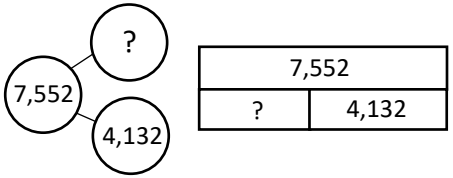
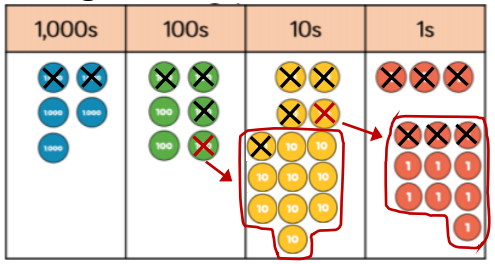
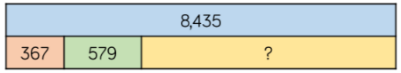
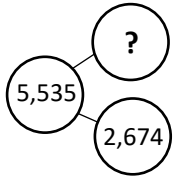
Calculation Policy – Addition – Year 6

Objective	Concrete	Pictorial	Abstract
Year 6 – Adding numbers up to 10 million	**E.g. 464,356 + 362,435 = 826,791**  Children look at each column (starting with the ones) and count how many counters are in each. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of addition – particularly to help visualise word problems.   	567,472 + 385,651 953,123 1 1 1 1 Abstract column addition is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 7 tens + 5 tens = 12 tens = 1 hundred + 2 tens
Year 6 – Adding decimals up to 3 places (including money)	**E.g. 4·656 + 3·604 = 8·26**  If there are more than 10 in a column, then 10 need to be exchanged for 1 in the column above (e.g. 10 tenths = 1 one), and then added in that column. Addition of decimals is linked to the idea of fractions (i.e. tenths = 1/10s and hundredths = 1/100s)	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of addition – particularly to help visualise word problems.   	5.508 + 6.78 12.288 1 Exchange using column addition is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. 5 tenths + 7 tenths = 12 tenths 12 tenths = 1 one + 2 tenths

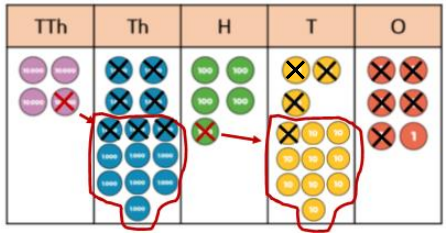
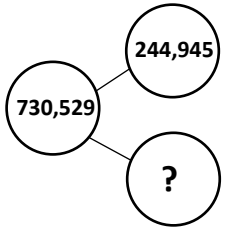
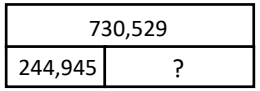
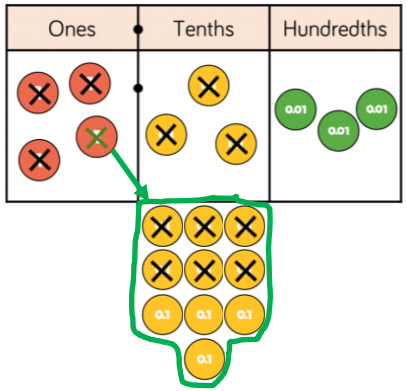
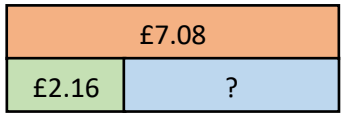
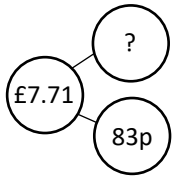
Calculation Policy – Subtraction – Year 3

Objective	Concrete	Pictorial	Abstract
Year 3 – Subtracting (without exchanging) TO - O TO - TO HTO - O HTO - TO HTO - HTO	**E.g. 352 - 122 = 230**  **E.g. 629 - 207 = 422**  Children look at each column (starting with the ones) and count how many counters/dienes are left in each.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of subtraction – particularly to help visualise word problems.  	568 - 51 517 Abstract column subtraction is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 6 tens - 5 tens = 1 ten
Year 3 – Subtracting (with exchanging) TO - O TO - TO HTO - O HTO - TO HTO - HTO	**E.g. 352 - 46 = 306**  **E.g. 629 - 355 = 274**  If we are subtracting more than we have from a column, then 1 from the column above needs to be exchanged for 10 (e.g. 1 ten = 10 ones), and then subtracted from.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of subtraction – particularly to help visualise word problems.  	4 11 ~~5~~38 - 291 247 Exchange using column subtraction is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. We exchange 1 hundred for 10 tens. Our 10 tens combine with our 3 tens to make 13 tens. We can then take 9 tens away from 13 tens to be left with 4 tens.

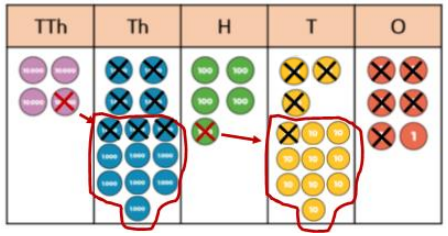
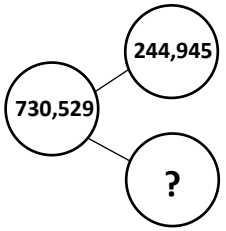
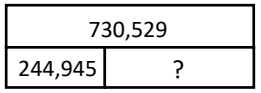
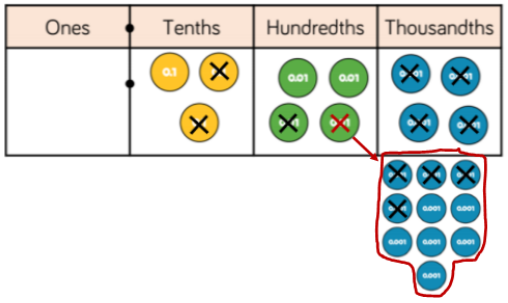
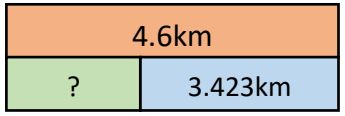
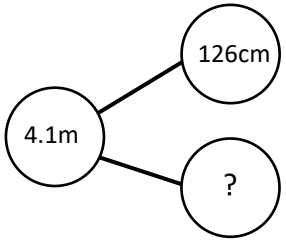
Calculation Policy – Subtraction – Year 4

Objective	Concrete	Pictorial	Abstract
Year 4 – Subtracting (without exchanging) up to ThHTO - ThHTO	**E.g. 4,844 - 3,024 = 1,820**  Children look at each column (starting with the ones) and count how many counters/dienes are left in each. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of subtraction – particularly to help visualise word problems. 	3,568 - 2,341 1,227 Abstract column subtraction is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 6 tens - 4 tens = 2 tens
Year 4 – Subtracting (with exchanging) up to ThHTO - ThHTO	**E.g. 5,643 - 2,346 = 3,297**  If we are subtracting more than we have from a column, then 1 from the column above needs to be exchanged for 10 (e.g. 1 ten = 10 ones), and then subtracted from.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of subtraction – particularly to help visualise word problems.  	$^{5}\not{6}\,^{1}\not{4}\,^{1}3\not{7}2$ - 3,591 2,981 Exchange using column subtraction is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. We exchange 1 hundred for 10 tens. Our 10 tens combine with our 7 tens to make 17 tens. We can then take 9 tens away from 17 tens to be left with 8 tens.

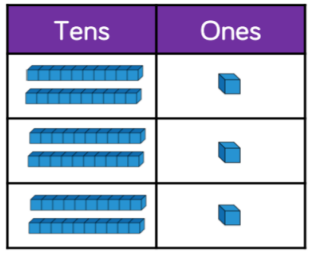
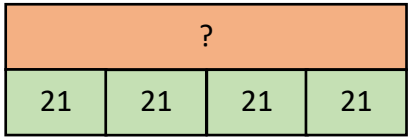
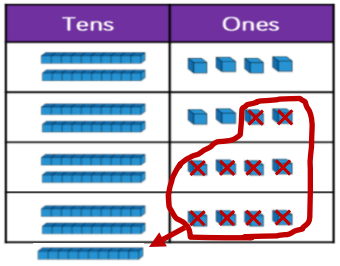
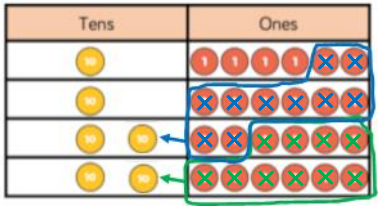
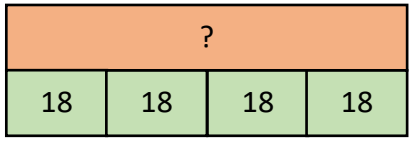
Calculation Policy – Subtraction – Year 5

Objective	Concrete	Pictorial	Abstract
Year 5 – Subtracting numbers up to 1 million	**E.g. 44,536 - 7,045 = 1,820**  Children look at each column (starting with the ones) and count how many counters/dienes are left in each. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of subtraction – particularly to help visualise word problems.   	5 14 11 8 6, 3 7 2 - 3 3,5 9 1 5 2,9 8 1 Abstract column subtraction is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 17 tens - 9 tens = 6 tens
Year 5 – Subtracting decimals up to 2 places (including money)	**E.g. 4·33 - 3·9 = 0·43**  If we are subtracting more than we have from a column, then 1 from the column above needs to be exchanged for 10 (e.g. 1 one = 10 tenths), and then subtracted from.	**Pictures of place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of subtraction – particularly to help visualise word problems.   	4 12 1 3 .2 9 - 2 .5 7 2 .7 2 Exchange using column subtraction is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. We exchange 1 one for 10 tenths. Our 10 tenths combine with our 2 tenths to make 12 tens. We can then take 5 tenths away from 12 tenths to be left with 7 tenths.

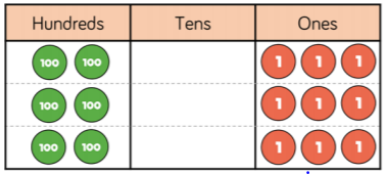
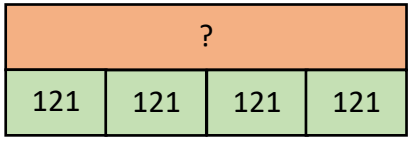
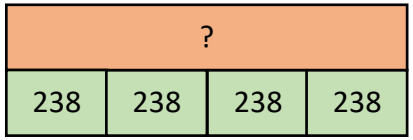
Calculation Policy – Subtraction – Year 6

Objective	Concrete	Pictorial	Abstract
Year 6 – Subtracting numbers up to 10 million	**E.g. 44,536 - 7,045 = 37,491**  Children look at each column (starting with the ones) and count how many counters/dienes are left in each. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of subtraction – particularly to help visualise word problems.  	5 1 9 1 8 6,0 7 2 - 3 3,5 9 1 5 2,4 8 1 Abstract column subtraction is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 17 tens - 9 tens = 6 tens
Year 6 – Subtracting decimals up to 3 places (including money)	**E.g. 0·344 – 0·218 = 0·126**  If we are subtracting more than we have from a column, then 1 from the column above needs to be exchanged for 10 (e.g. 1 hundredth = 10 thousandths), and then subtracted from.	**Pictures of place value counters used as opposed to physical equipment.** Part-part-whole and bar models are also used to help understand the concept of subtraction – particularly to help visualise word problems.  	2 1 1 1 3.2 0 5 - 2.5 7 2 0.6 3 3 Exchange using column subtraction is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. We exchange 1 one for 10 tenths. Our 10 tenths combine with our 1 tenth to make 11 tens. We can then take 5 tenths away from 11 tenths to be left with 6 tenths.

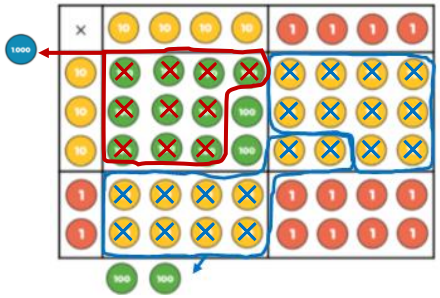
Calculation Policy – Multiplication – Year 3

Objective	Concrete	Pictorial	Abstract
Year 3 – Multiply (without exchanging) TO x O	**E.g. 21 x 3 = 63**  **E.g. 34 x 2 = 68**  After multiplying, children look at each column (starting with the ones) and count how many counters/dienes are in each.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Bar models are also used to help understand the concept of multiplication – particularly to help visualise word problems.  	32 x 3 96 Abstract column multiplication is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 3 tens x 3 = 9 tens
Year 3 – Multiply (with exchanging) TO x O	**E.g. 24 x 4 = 96**  **E.g. 16 x 4 = 64**  If there are more than 10 in a column, then each 10 needs to be exchanged for 1 in the column above (e.g. 10 ones = 1 ten), and then added in that column.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Bar models are also used to help understand the concept of multiplication – particularly to help visualise word problems.  	46 x 4 184 1 2 Exchange using column multiplication is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. 4 tens x 4 = 16 tens = 1 hundred + 6 tens Expanded column multiplication could be used if exchanging is confused. 46 x 4 24 (6x4) 160 (40x4) 184

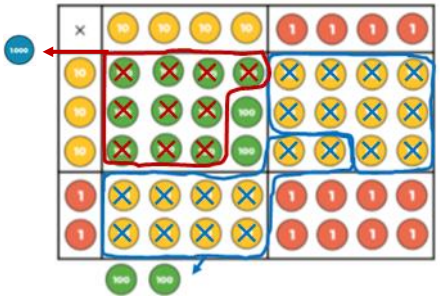
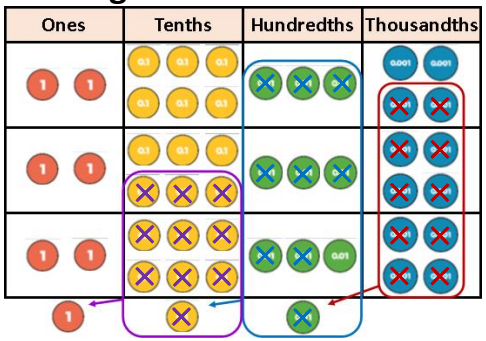
Calculation Policy – Multiplication – Year 4

Objective	Concrete	Pictorial	Abstract
Year 4 – Multiply (without exchanging) HTO x O	**E.g. 203 x 3 = 609**  After multiplying, children look at each column (starting with the ones) and count how many counters/dienes are in each. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Bar models are also used to help understand the concept of multiplication – particularly to help visualise word problems.  	302 x 3 906 Abstract column multiplication is taught alongside concrete and pictorial strategies to help link the concepts of column value - e.g. 3 tens x 3 = 9 tens
Year 4 – Multiply (with exchanging) HTO x O	**E.g. 245 x 4 = 980**  If there are more than 10 in a column, then each 10 needs to be exchanged for 1 in the column above (e.g. 20 ones = 2 tens), and then added in that column. Dienes could still be used to help with understanding of place value	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Bar models are also used to help understand the concept of multiplication – particularly to help visualise word problems.  	546 x 4 2184 2 1 2 Exchange using column multiplication is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. 4 tens x 4 (+ 2 tens) = 18 tens = 1 hundred + 8 tens

Calculation Policy – Multiplication – Year 5

Objective	Concrete	Pictorial	Abstract
Year 5 – Multiply by 1-digit number up to ThHTO x O	**E.g. 1,325 x 4 = 5,300**  After multiplying, children look at each column (starting with the ones) and count how many counters/dienes are in each. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** Bar models are also used to help understand the concept of multiplication – particularly to help visualise word problems. ? (121 + 121 + 121 + 121)	2,546 x 4 = 10,184 2 1 2 Exchange using column multiplication is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. 4 tens x 4 (+ 2 tens) = 18 tens = 1 hundred + 8 tens.
Year 5 – Multiply by 2-digit number ThHTO x TO	**E.g. 44 x 32 = 1,408**  If there are more than 10 of one counter, then each 10 needs to be exchanged for 1 counter from the column above (e.g. 20 tens = 2 hundreds), and then added in that column. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** |	40	4
---	---	---
30	1,200	120
2	80	8 | **44 x 32 = 1,408**	2,546 x 34 = 10,184 + 76,380 = 86,564 2 1 2 1 1 1 When multiplying by a 2-digit number, we first multiply our number by the ones and then multiply it by the tens. When we multiply our number by a ten, we place a 0 in the ones column. This means that when we place each number, they are actually 10 times bigger – e.g. 3 x 6 becomes 18 in the tens column to make 180 (30x6); 3 x 4 becomes 12 in the hundreds column to make 1200 (30 x 40).

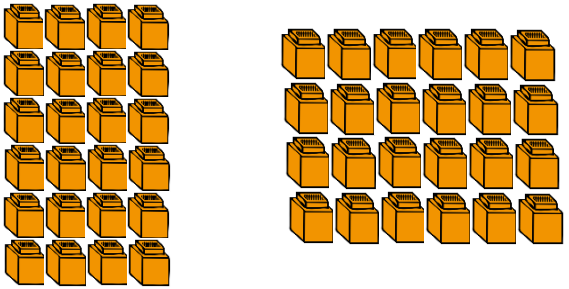
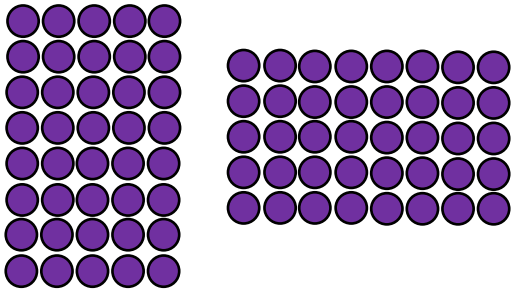
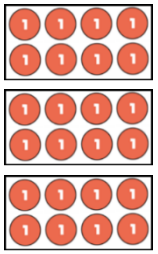
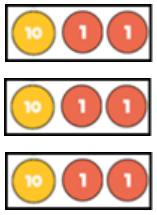
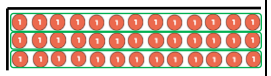
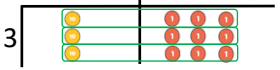
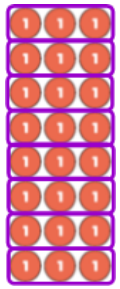
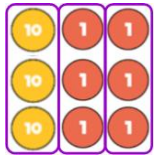
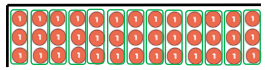
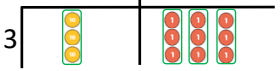
Calculation Policy – Multiplication – Year 6

Objective	Concrete	Pictorial	Abstract
Year 6 – Multiply by 2-digit number ThHTO x TO	**E.g. 245 x 4 = 980**  If there are more than 10 of one counter, then each 10 needs to be exchanged for 1 counter from the column above (e.g. 20 tens = 2 hundreds), and then added in that column. Dienes could still be used to help with understanding of place value.	**Pictures of Dienes and place value counters used as opposed to physical equipment.** **44 x 32 = 1,408**	2,546 x 34 2 1 2 10,184 76,380 1 1 86,564 1 When multiplying by a 2-digit number, we first multiply our number by the ones and then multiply it by the tens. When we multiply our number by a ten, we place a 0 in the ones column. This means that when we place each number, they are actually 10 times bigger – e.g. 3 x 6 becomes 18 in the tens column to make 180 (30x6); 3 x 4 becomes 12 in the hundreds column to make 1200 (30 x 40).
Year 6 – Multiply decimals (up to 3 places) by 1-digit numbers (including money)	**E.g. 2.634 x 3 = 7.902**  If there are more than 10 in a column, then each 10 needs to be exchanged for 1 from the column above (e.g. 10 hundredths = 1 tenth), and then added in that column	**Pictures of place value counters used as opposed to physical equipment.** Bar models are also used to help understand the concept of multiplication – particularly to help visualise word problems.	5.406 x 4 2 1 2 21.624 Exchange using column multiplication is taught alongside concrete and pictorial strategies, and continual reminders of digit value is asserted - e.g. 6 thousandths x 4 = 24 thousandths = 2 hundredths + 4 thousandths

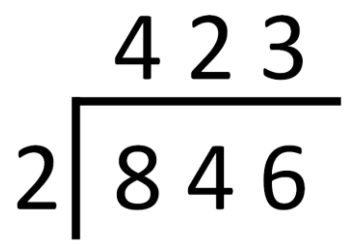
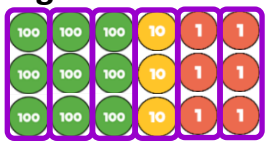
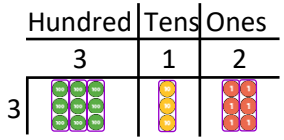
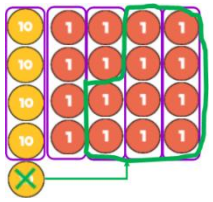
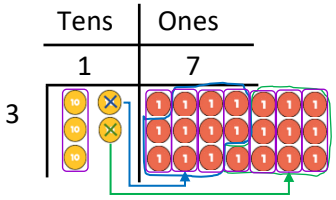
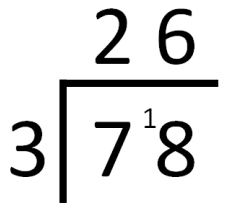
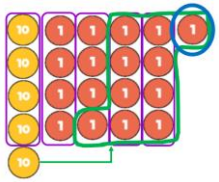
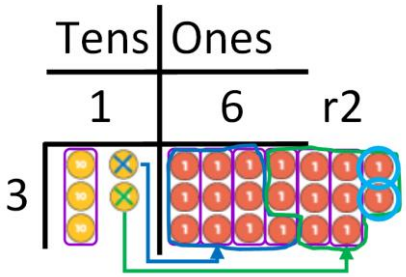
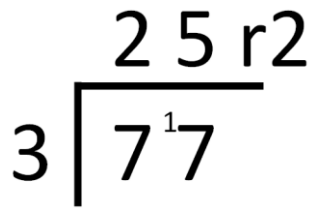
	40	4
30	1,200	120
2	80	8

?			
£2.38	£2.38	£2.38	£2.38

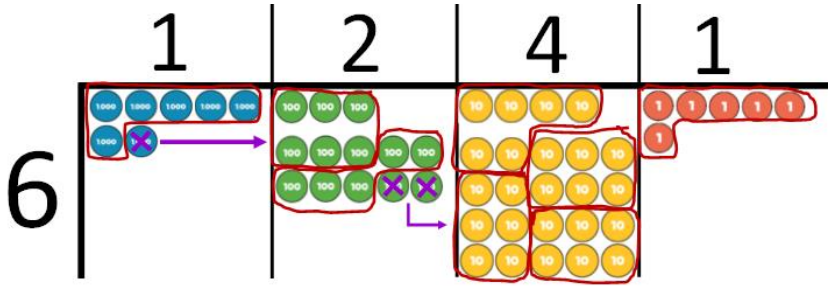
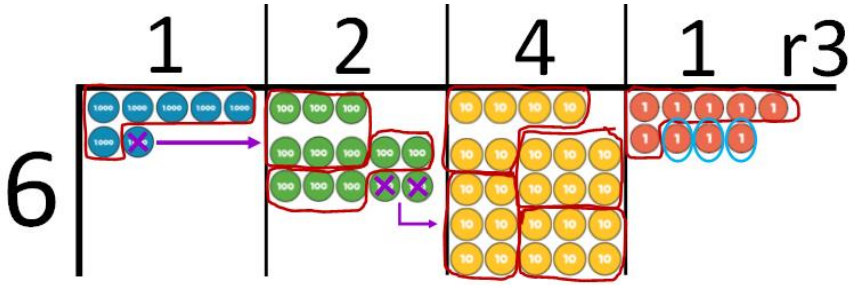
Calculation Policy – Division – Year 3

Objective	Concrete		Pictorial		Abstract
Arrays	Arrays are a useful way to illustrate the relationship between multiplication and division. 		**Pictures/drawings of arrays** 		**7 x 4 = 28** **4 x 7 = 28** **28 ÷ 4 = 7** **28 ÷ 7 = 4**
Year 3 - Dividing by sharing TO ÷ O	**E.g.** **24 ÷ 3 = 8** 24 ones are shared between 3 groups 	**E.g.** **36 ÷ 3 = 12** 3 tens and 6 ones are shared between 3 groups 	**E.g. 39 ÷ 3 = 13** 13  39 shared between 3 groups	**E.g. 39 ÷ 3 = 13** Tens | Ones 1 | 3  3 tens and 9 ones shared between 3 groups	$$\begin{array}{r} 3\,2 \\ 3\overline{)\,9\,6} \end{array}$$ Formal written method of division is taught alongside concrete and pictorial representations. Division can be thought of as 'sharing' (i.e. if I share 9 tens between 3 groups, how many would be in each group?) or 'grouping' (i.e. how many groups of three can I take out of 9?)
Year 3 – Dividing by grouping TO ÷ O	**E.g.** **24 ÷ 3 = 8** How many 3s can be taken from 24 ones? 	**E.g. 36 ÷ 3 = 12** How many 3s can be taken from 3 tens? How many 3s can be taken from 6 ones? 	**E.g. 39 ÷ 3 = 13** 13  How many groups of 3 can you take from 39?	**E.g. 39 ÷ 3 = 13** Tens | Ones 1 | 3  How many groups of 3 can you take from 3 tens? How many groups of 3 can you take from 9 ones?	

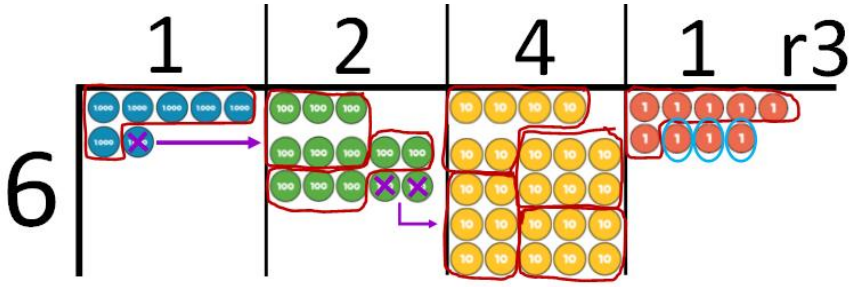
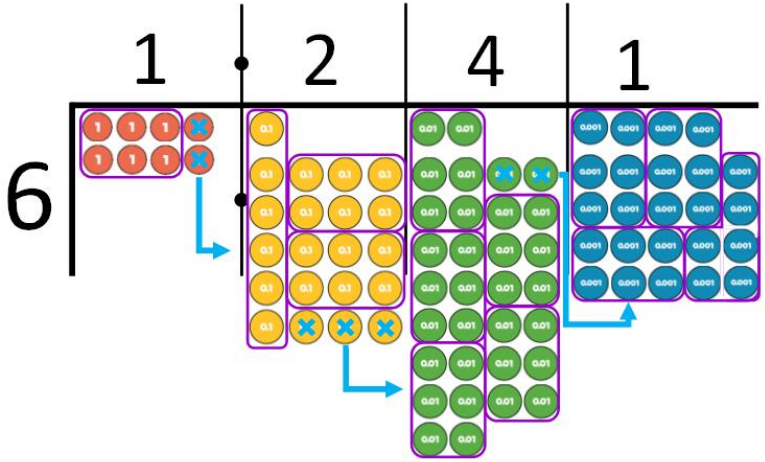
Calculation Policy – Division – Year 4

Objective	Concrete	Pictorial	Abstract
Year 4 - Dividing by sharing HTO ÷ O	**E.g. 936 ÷ 3 = 312** 9 hundreds, 3 tens and 6 ones are shared between 3 groups 	**E.g. 936 ÷ 3 = 312**  9 hundreds, 3 tens and 6 ones shared between 3 groups	 Formal written method of division is taught alongside concrete and pictorial representations. Division can be thought of as 'sharing' (i.e. if I share 9 tens between 3 groups, how many would be in each group?) or 'grouping' (i.e. how many groups of three can I take out of 9?)
Year 4 - Dividing by grouping HTO ÷ O	**E.g. 36 ÷ 3 = 12**  How many 3s can be taken from 9 hundreds? How many 3s can be taken from 3 tens? How many 3s can be taken from 6 ones?	**E.g. 39 ÷ 3 = 13**  How many groups of 3 can you take from 9 hundreds, 3 tens and 6 ones?	
Year 4 - Dividing including exchanging	**E.g. 56 ÷ 4 = 14**  We can take 1 group of 4 from 5 tens – with 1 ten left over. This ten is exchanged for 10 ones to make 16 ones. We can take 4 groups of 4 from 16 ones.	**E.g. 51 ÷ 3 = 17**  We can take one group of 3 from 5 tens – with 2 tens left over. These tens are exchanged for 20 ones to make 21 ones. We can take 7 groups of 3 from 21.	 We can take 2 groups of 3 from 7 tens – with 1 ten left over. This ten is exchanged for 10 ones to make 18 ones. We can take 6 groups of 3 from 18.
Year 4 - Dividing including remainders	**E.g. 57 ÷ 4 = 14r1**  After grouping our tens and ones into 4s and exchanging, we have 1 one left over. This, we call a remainder.	**E.g. 50 ÷ 3 = 16r2**  After grouping our tens and ones into 3s and exchanging, we have 2 ones left over.	 After dividing our tens by 3, exchanging, and dividing our ones by 3, we can see that 3 goes into 77 25 times with 2 left over.

Calculation Policy – Division – Year 5

Objective	Concrete	Pictorial	Abstract
Year 5 - Dividing including exchanging ThHTO ÷ O	**E.g. 7,346 ÷ 6 = 1,241**  We can take 1 group of 6 in 7 thousands with 1 thousand left over. The one thousand is exchanged for 10 hundreds to create 13 hundreds. We can take 2 groups of 6 out 13 hundreds with 2 hundreds left over. The 2 thousands are exchanged for 20 tens to make 24 tens. We can take 4 groups of 6 from 24 tens and 1 group of 6 from 6.	**Pictures of place value counters used as opposed to physical equipment.**	$$\begin{array}{r} 0\,7\,5\,4 \\ 7\overline{)\,5^{5}2^{3}7^{2}8} \end{array}$$ We start with the column with the highest value (in this example - the thousands). Any remaining values are exchanged for 10 of the next column (e.g. 0 sevens can be taken from 5 thousands; therefore, 5 are left and exchanged for 50 hundreds).
Year 5 - Dividing including remainders ThHTO ÷ O	**E.g. 7349 ÷ 6 = 1,241 r3**  We can take 1 group of 6 in 7 thousands with 1 thousand left over. The one thousand is exchanged for 10 hundreds to create 13 hundreds. We can take 2 groups of 6 out 13 hundreds with 2 hundreds left over. The 2 thousands are exchanged for 20 tens to make 24 tens. We can take 4 groups of 6 from 24 tens and 1 group of from 9 with 9 left over.	**Pictures of place value counters used as opposed to physical equipment.**	$$\begin{array}{r} 0\,7\,5\,3\ r6 \\ 7\overline{)\,5^{5}2^{3}7^{2}7} \end{array}$$ With this example, there is a remainder of 6 ones left over. In year 5, this remainder can be thought of as a fraction. As we are dividing by 7 and have a remainder of 6, $5{,}277 \div 7 = 753\frac{6}{7}$

Calculation Policy – Division – Year 6

Objective	Concrete	Pictorial	Abstract
Year 5 - Dividing including remainders ThHTO ÷ O	**E.g. 7349 ÷ 6 = 1,241 r3**  We can take 1 group of 6 in 7 thousands with 1 thousand left over. The one thousand is exchanged for 10 hundreds to create 13 hundreds. We can take 2 groups of 6 out 13 hundreds with 2 hundreds left over. The 2 thousands are exchanged for 20 tens to make 24 tens. We can take 4 groups of 6 from 24 tens and 1 group of from 9 with 9 left over.	**Pictures of place value counters used as opposed to physical equipment.**	$$\begin{array}{r} 0\,7\,5\,3\ r6 \\ 7\overline{)\,5^{5}2^{3}7^{2}7} \end{array}$$ With this example, there is a remainder of 6 ones left over. In year 5, this remainder can be thought of as a fraction. As we are dividing by 7 and have a remainder of 6, $5{,}277 \div 7 = 753\frac{6}{7}$
Year 5 - Dividing decimals (up to 3 places) by 1-digit numbers	 Dividing decimals by 1-digit number is the same process as dividing whole numbers. Exchanging is linked to understanding of place value of tenths, hundredths and thousandths.	**Pictures of place value counters used as opposed to physical equipment.**	$$\begin{array}{r} 0{\cdot}4\,1\,2 \\ 8\overline{)\,3^{3}{\cdot}2\,9^{1}6} \end{array}$$ By using zeros as place holders, we can use formal written division to express remainders as decimals (instead of fractions). $$\begin{array}{r} 0\,8{\cdot}2\,5 \\ 4\overline{)\,3^{3}3{\cdot}^{1}0^{2}0} \end{array}$$

Calculation Policy – Division – Year 6

Dividing by a 2-digit number

Children should know their times tables up to 12x12; however, when dividing by large 2-digit number, it is useful to write the multiples out before starting division.

A useful way of doing this is to partition the 2-digit number into the 10s and 1s and multiplying each (up to 9) and then adding both products together.

E.g. 27 x 7 would be (20 x 7) + (7 x 7) = 140 + 49 = 189

27

20 + 7 = 27 (1 x 27)
40 + 14 = 54 (2 x 27)
60 + 21 = 81 (3 x 27)
80 + 28 = 108 (4 x 27)
100 + 35 = 135 (5 x 27)
120 + 42 = 162 (6 x 27)
140 + 49 = 189 (7 x 27)
160 + 56 = 216 (8 x 27)
180 + 63 = 243 (9 x 27)

Dividing using short division

1.) There are **0** 27s in 9 with 9 left over.	0 27 | 9 9 3 6	2.) The **9** thousands are exchanged for 90 hundreds to make 99 hundreds.	0 27 | 9 ^{9}9 3 6
3.) There are **3** 27s in 99 with 18 left over.	0 3 27 | 9 ^{9}9 3 6	4.) The **18** hundreds are exchanged for 180 tens to make 183 tens.	0 3 27 | 9 ^{9}9 ^{18}3 6
5.) There are **6** 27s in 183 with 21 left over.	0 3 6 27 | 9 ^{9}9 ^{18}3 6	6.) The **21** tens are exchanged for 210 ones to make 216 ones.	0 3 6 27 | 9 ^{9}9 ^{18}3 ^{21}6
7.) There are **8** 27s in 216 with 0 left over.	0 3 6 8 27 | 9 ^{9}9 ^{18}3 ^{21}6	To work out the differences (e.g. 99 – 81 = 18), column subtractions could be used alongside short division.	

Dividing using long division

1.) There are **0** 27s in 9.	0 27 | 9 9 3 6	2.) There are 3 27s in 99. 3 x 27 = 81	0 3 27 | 9 9 3 6
3.) 99 – 81 = 18 left over	0 3 27 | 9 9 3 6 8 1 1 8	4.) 18 hundreds joins with 3 tens to make 183 tens.	0 3 27 | 9 9 3 6 8 1↓ 1 8 3
5.) There are **6** 27s in 183. 6 x 27 = 162	0 3 6 27 | 9 9 3 6 8 1↓ 1 8 3	6.) 183 – 162 = 21 left over	0 3 6 27 | 9 9 3 6 8 1↓ 1 8 3 1 6 2 0 2 1
7.) The **21** tens are exchanged for 210 ones to make 216 ones.	0 3 6 27 | 9 9 3 6 8 1↓ 1 8 3 1 6 2↓ 0 2 1 6	5.) There are **8** 27s in 216. with 0 left over	0 3 6 8 27 | 9 9 3 6 8 1↓ 1 8 3 1 6 2↓ 0 2 1 6