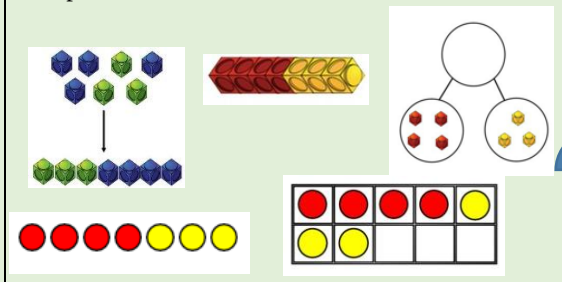
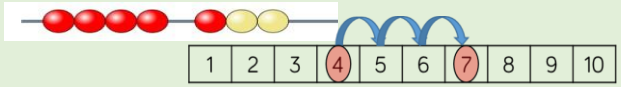
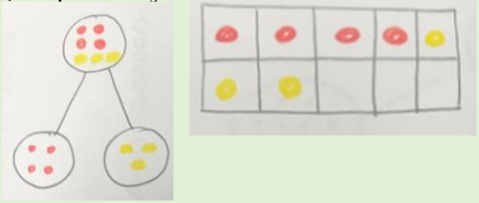
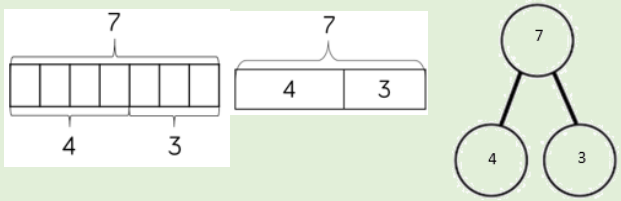
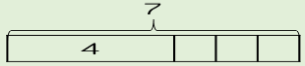
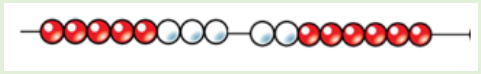
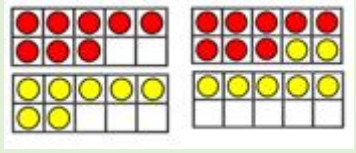
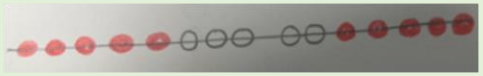
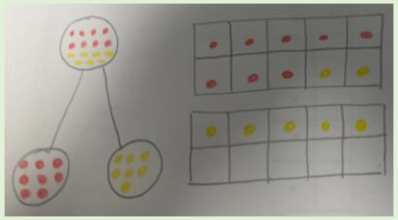
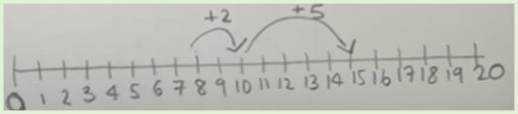
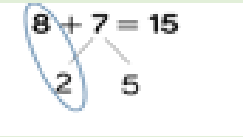
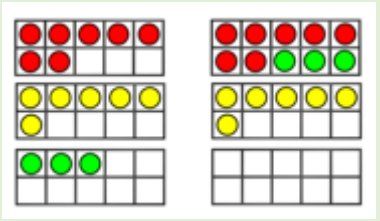
Calculation Policy: Addition (sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as')

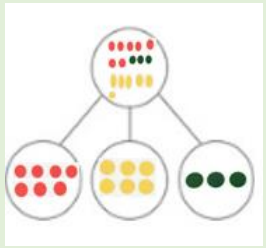
Skill	Concrete	Pictorial	Abstract
Add 1-digit numbers within 10 **e.g. 4+3**	**i) <u>Combing two parts to make a whole.</u>** The parts are 4 and 3. The whole is 7.  Use real life examples too e.g sort people and objects into parts and understand the relationship with the whole.  **ii) <u>Counting on</u>** 	Pupils can represent the cubes/ counters using dots or crosses. They could draw this onto a part-whole model or ten frame, respectively.  Pupils being able to use discrete and continuous bar models and understand what a part-whole model is representing.  Pupils can represent the beads by drawing circles/ dots on a line.  Pupils being able to use a combination bar model to support with counting on. 	**4 + 3 = 7**
Add 1 and 2-digit numbers to 20 **e.g.** **8 + 7 = 15**	**<u>Counting on</u>** using bead strings and ten frames. Continuing to use the ten frame to show the exchange taking place.  	Pupils can represent the beads using circles/ dots on a line.  They can also represent the counters using dots/ crosses and draw this onto a part-whole model or ten frame, respectively.  	**8 + 7= 15** Pupils use the learning from the ten frame/ and or number line to understand how to partition their jumps.  **8 + 2 = 10** **10 + 5= 15**

Add three 1-digit numbers

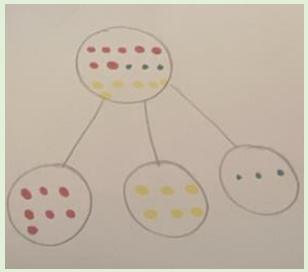
e.g.
7+ 6 + 3 = 16

Using ten frames/ whole part models to eventually allow pupils to look **for number bonds** to 10 or **doubles** to add the numbers more efficiently.





They can also represent the counters using dots/ crosses and draw this onto a part-whole model or ten frame respectively.



7 + 6 + 3 = 16

7 + 3= 10

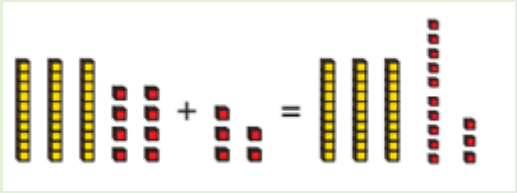
10 + 5= 15

Add 1-digit and 2-digit numbers to 100

***Year 3, pupils use the formal written method of column addition alongside concrete and pictorial representations so that they can see the link to the written method. Any exchanges should be shown at the bottom**

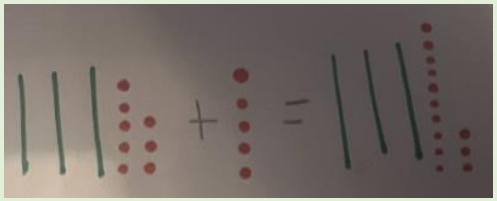
Using dienes (base ten), number lines and hundred sqaures to add, pupils should be encouraged to **count on** from the larger number and apply their knowledge of number bonds.

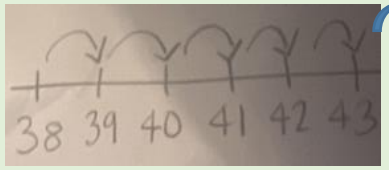
e.g. 38 + 5 = 43

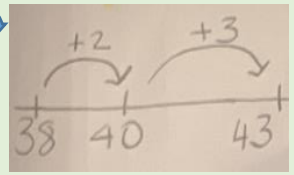


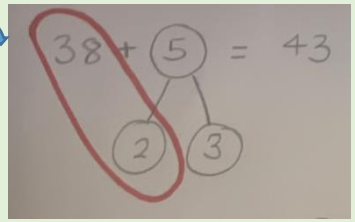
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

Pupils can represent the dienes using lines and dots.





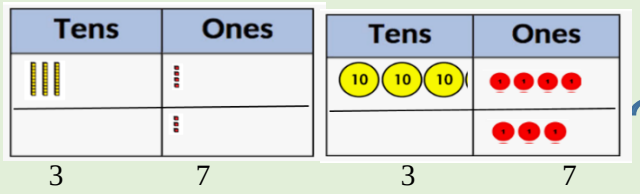
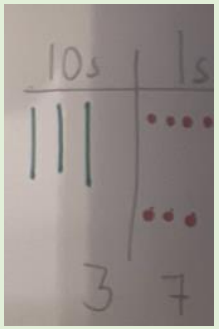
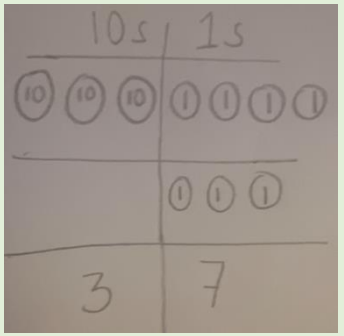
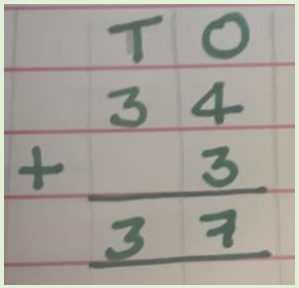
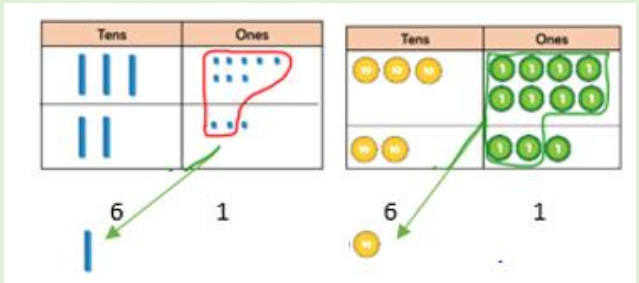
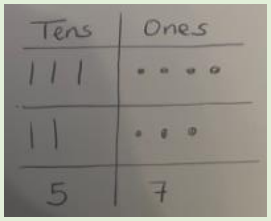
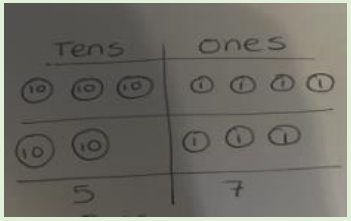
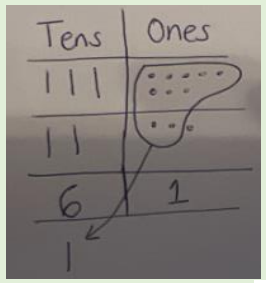
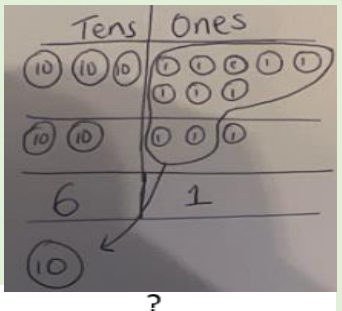
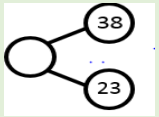
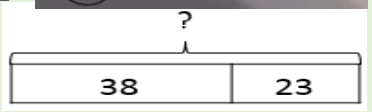
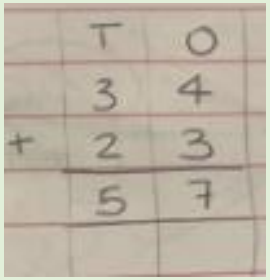
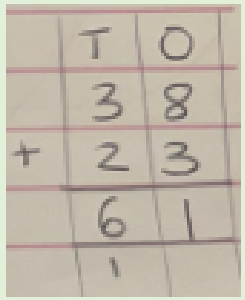




38 + 5 = 43

38 + 2 = 40

40 + 3= 43

	Pupils can place dienes/ place value counters onto a place value table to help support the progression into formal written methods. **e.g.** **34 + 3= 37**  	Pupils can represent the dienes using lines and dot and/ or draw out their place value counters.   	**34 + 3= 37** * 
Add two 2-digit numbers to 100; without exchange and with exchange ***Year 3, pupils use the <u>formal written method of column addition</u> alongside concrete and pictorial representations so that they can see the link to the written method. Any exchanges should be shown at the bottom**	Pupils use dienes and place value counters to support their understanding of the, first without exchange and then with exchanging (across a 10). **e.g 34 + 23= 57**  **e.g 38 +23 = 61**  	Pupils can represent the dienes using lines and dots and/ or draw out their place value counters. Once pupils have secured this skill, they should be able to use part-whole and bar models more efficiently.       	**34 + 33= 67** *  **38 +23 = 61** * 

Add numbers with up to 3 digits

Pupils continue to use dienes and/ or place value counters to support their understanding of the **formal written method of column addition,** first without exchange and then with exchanging (this will include across a 10 and 100). Ensure pupils write out their caclulations alongside concrete resources so that they can see the link to the written method. The exchange should be shown at the bottom.

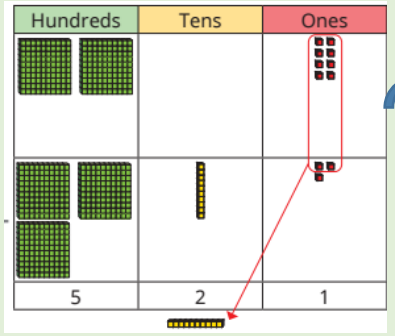
Pupils can represent the dienes using sqaures, lines and dots and/or draw out their place value counters. Once pupils have secured this skill, they should be able to use part-whole and bar models more efficiently.

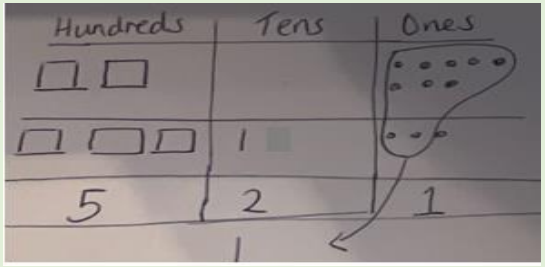
e.g. 345 + 432 =

345 + 432 =

	H	T	O
	3	4	5
+	4	3	2
	7	7	7

e.g. 208 + 313 =

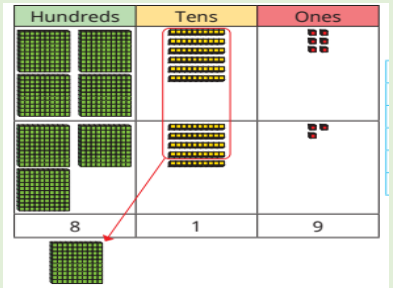


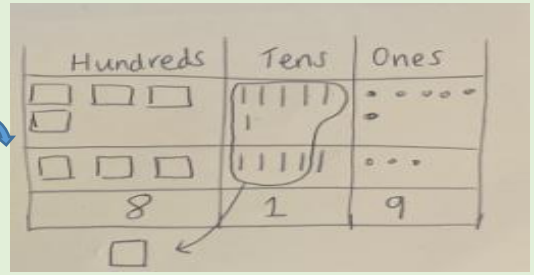


208 + 313 =

	H	T	O
	2	0	8
+	3	1	3
	5	2	1
		1	

e.g. 466 + 353 =

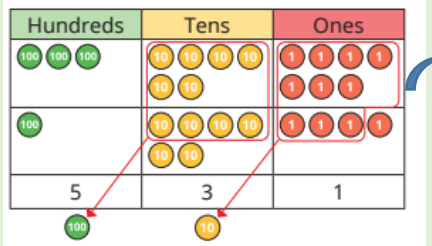


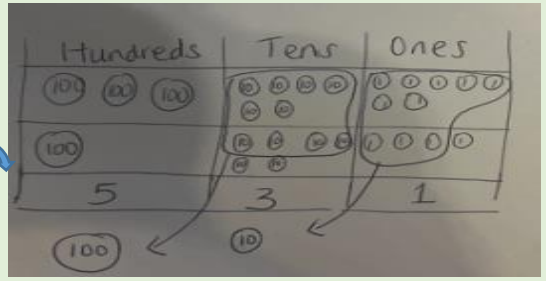


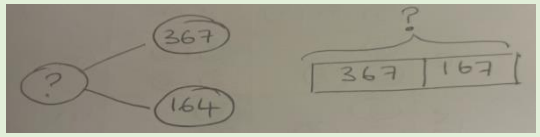
466 + 353 =

	H	T	O
	4	6	6
+	3	5	3
	8	1	9
	1		

e.g 367 + 164 =







367 + 164 =

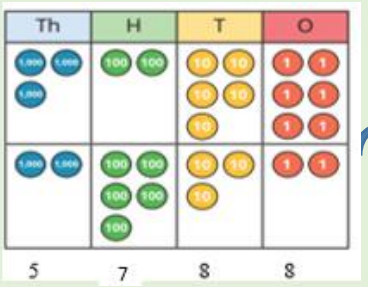
	H	T	O
	3	6	7
+	1	6	4
	5	3	1
	1	1	

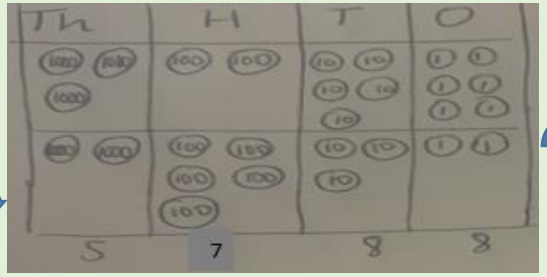
Add numbers with up to 4 digits

Pupils continue to use dienes and/ or place value counters to support their understanding of the **formal written method of column addition**, first without exchange and then with exchanging (this will include one exchange and more than one exchange). Ensure pupils write out their caclulations alongside concrete resources so that they can see the link to the written method. The exchange should be shown at the bottom.

Pupils can represent the dienes using cubes, sqaures, lines and dots and/or draw out their place value counters. Once pupils have secured this skill, they should be able to use part-whole and bar models more efficiently.

e.g. 3,256 + 2,532 =

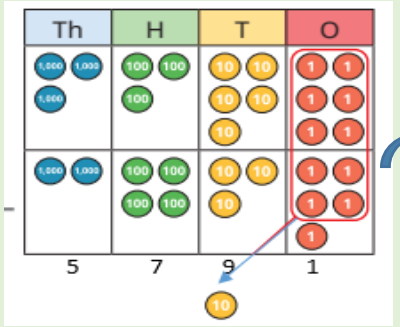


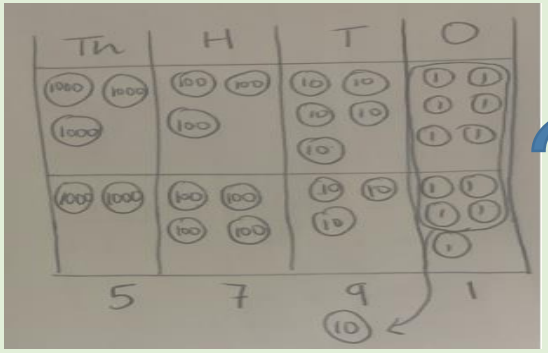


3,256 + 2,532 =

	Th	H	T	O
	3	2	5	6
+	2	5	3	2
	5	7	8	8

e.g. 3,356 + 2,435

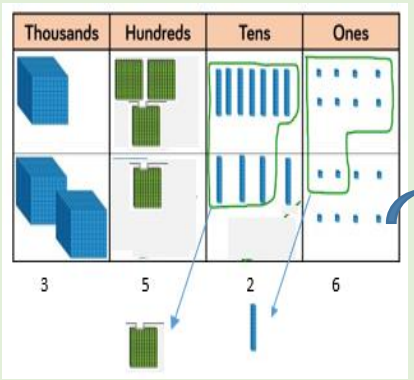


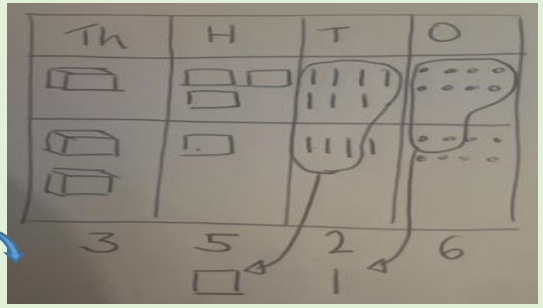


3,356 + 2,435=

	Th	H	T	O
	3	3	5	6
+	2	4	3	5
	5	7	9	1
			1	

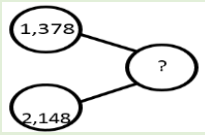
e.g. 1,378 + 2,148 =

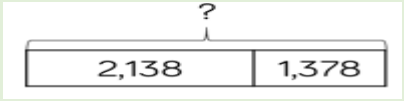


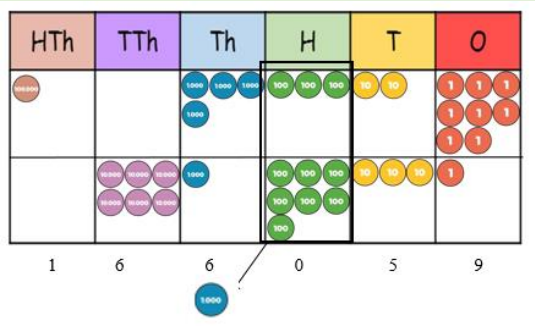
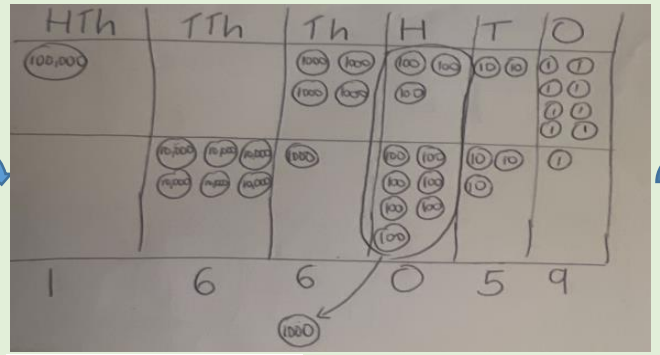
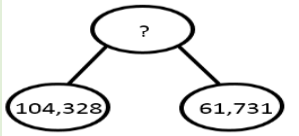
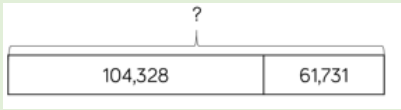
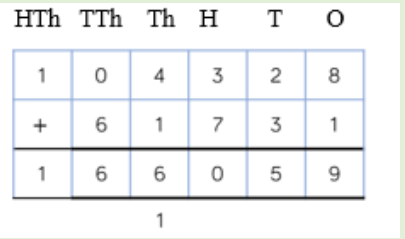
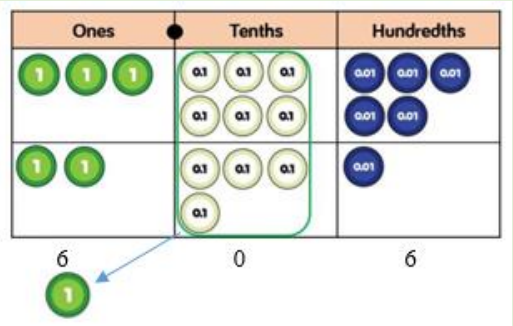
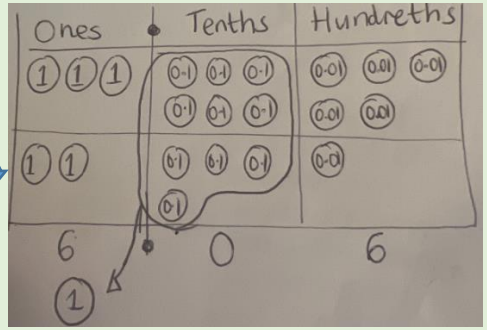
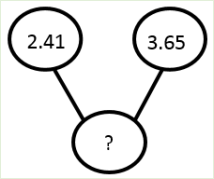
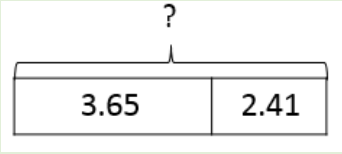
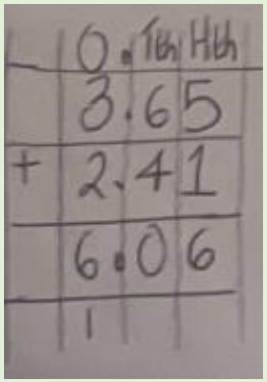


1,378 + 2,148 =

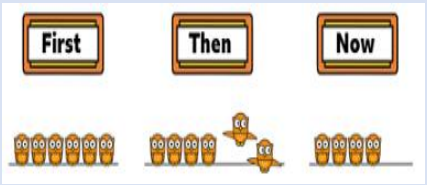
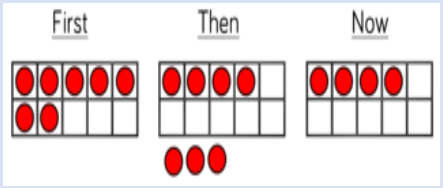
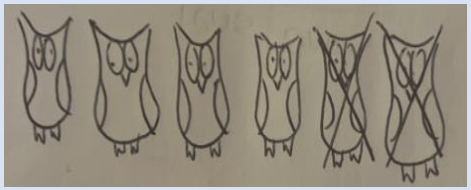
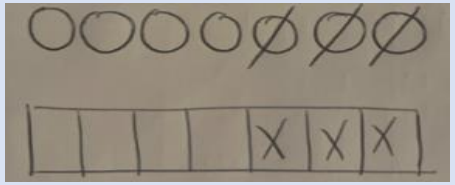
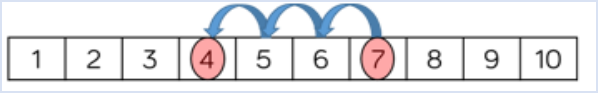
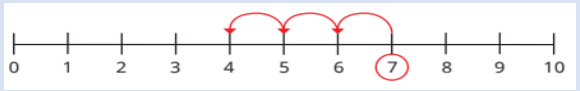
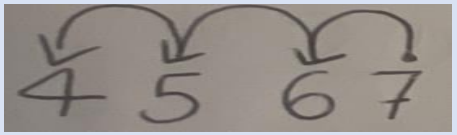
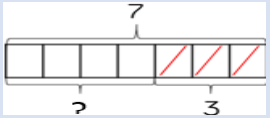
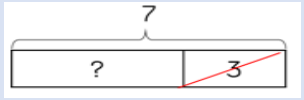
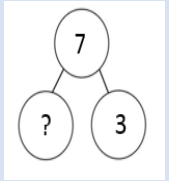
	Th	H	T	O
	1	3	7	8
+	2	1	4	8
	3	5	2	6
		1	1	

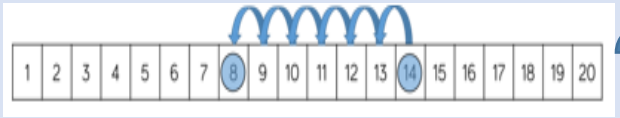
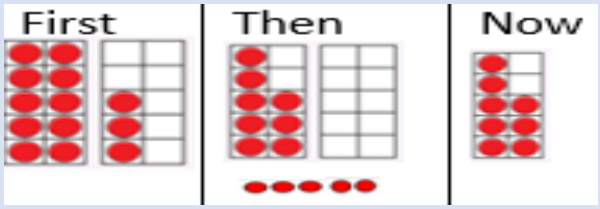
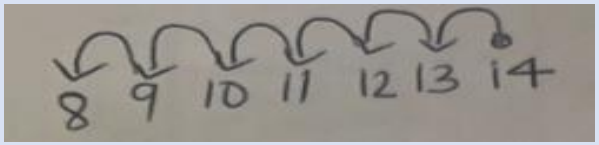
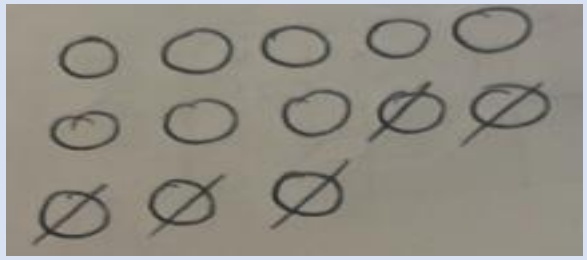
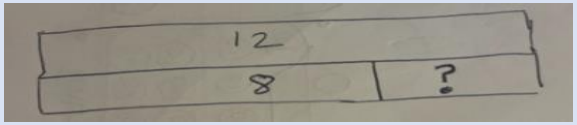
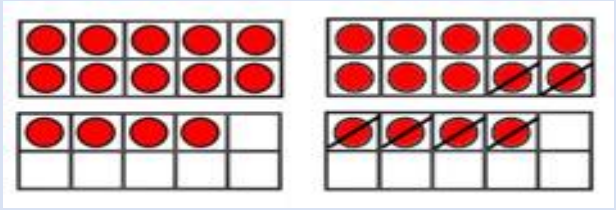
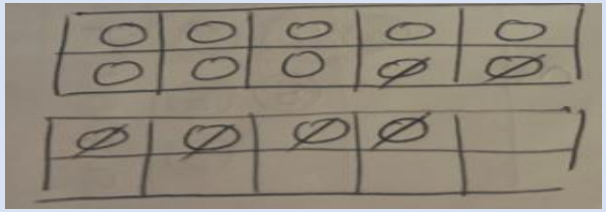
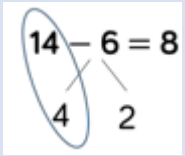




Add numbers with more than 4 digits	Place value counters are the most effective concrete resources when adding numbers with more than 4 digits, progressing from no exchange to then with exchanging. Ensure pupils write out their caclulations alongside concrete resources so that they can see the link to the written method. The exchange should be shown at the bottom. At this stage, children should be encouraged to work in the abstract, using the **column method** to add larger numbers efficiently. **e.g. 104,328 + 61,731 =** 	Pupils can draw out their place value counters. Once pupils have secured this skill, they should be able to use part-whole and bar models more efficiently.   	**104,328 + 61,731 =** 
Add with up to 3 decimal places ***Encourage pupils to "fill" empty columns with trailing zeros to promote an understanding of using the zero as a placeholder and making it easier to see how the numbers line up.**	Place value counters and plain counters on a place value grid are the most effective manipulatives when adding decimals with 1, 2 and then 3 decimal places using the **column method**. Ensure children have experience of adding decimals with the same and different number of decimal places***,** progressing from no exchange to then with exchanging. The exchange should be shown at the bottom. **e.g. 3.65 + 2.41=** 	Pupils can draw out their place value counters. Once pupils have secured this skill, they should be able to use part-whole and bar models more efficiently.   	**3.65 + 2.41=** 

Calculation Policy; Subtraction (takeaway, less than, the difference, subtract, minus, fewer, decrease)

Skill	Concrete	Pictorial	Abstract
Subtract 1-digit numbers within 10	**i) <u>Physically taking away and removing objects from a whole.</u>** Using real life examples first through story telling (e.g. bean bags, people, frogs etc.) before using mathematical representations. **e.g. 6 – 2 = 4**  **e.g. 7 – 3 = 4** 	Pupils can draw the concrete resources they are using (these can also be represented using dots/circles etc) **and cross out the correct amount.**  	**6 – 2 =** **7 – 3 =**
	ii) <u>Counting back</u> using a number track and/ or a number line.  	Pupils represent their calculation on a number track and/ or number line to show their jumps. 	
	iii) Encouraging the use of **<u>partitioning</u>**; 7 cubes representing the whole, removing 3 cubes (which is a part) leaves you with 4 cubes (which is the other part). Pupils explore this with bead strings too.  	The prior concrete exposure, should allow pupils to use discrete and continuous bar models and understand what a part-whole model is representing.   	

Subtract 1 and 2-digit numbers to 20 (including crossing 10)	**i) <u>Counting back</u>** by using a number track/ number line and physically removing the amount from the whole. **e.g 14 – 6 =**  **e.g 13 – 5 =**  	Pupils can draw the concrete resources they are using **and cross out the correct amount.**  	**14 – 6 =** **13 – 5 =**
	ii) <u>Finding the difference</u> (other real life examples can be used such as sticks, pebbles, girls and boys etc) **e.g. 12 – 8 =** 	Pupils can draw out the cubes; which in turn should support the use of discrete and continuous bar models.   	**12 – 8 =**
	iii) <u>Subtract ones by making 10</u> with the aid of ten frames. **e.g. 14 – 6 =** 	Pupils to represent the ten frame pictorially and discuss what they did to make 10. 	**14 – 6 =** Pupils to show how they can make 10 by partitioning the subtrahend.  14 – 4 = 10 10 – 2 = 8

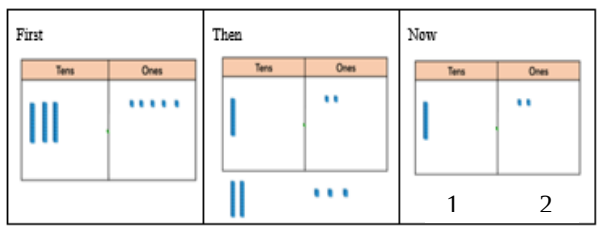
Subtract 1 and 2-digit numbers to 100

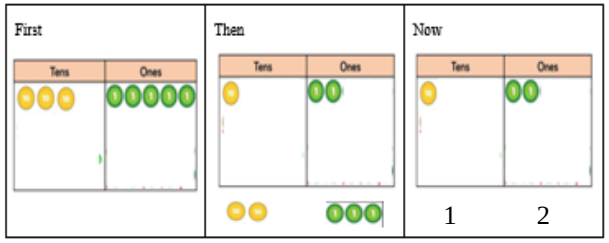
**

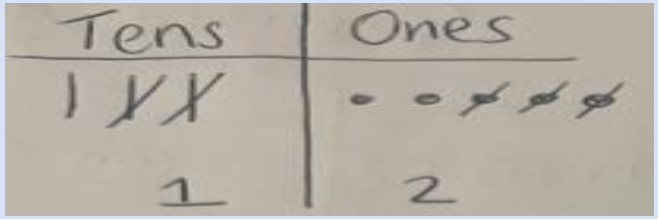
From Year 3, pupils use the formal written method of <u>column subtraction</u> alongside concrete and pictorial representations so that they can see the link to the written method. The exchange should be shown at the top.

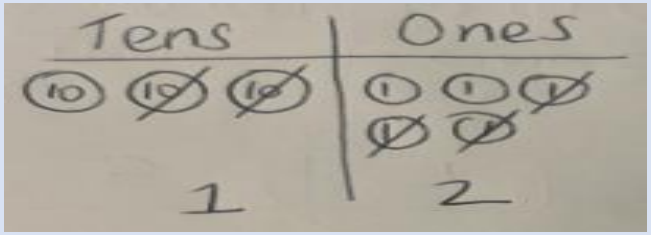
Pupils use dienes and place value counters to subtract 1 and 2-digit numbers to 100 by physically removing the manipulatives; first without exchange and then with exchanging. For subtraction, pupils only need to make the number being subtracted from.

e.g. 35 – 23 =



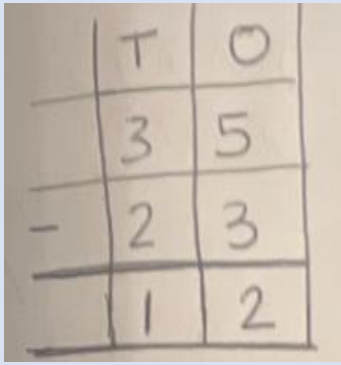




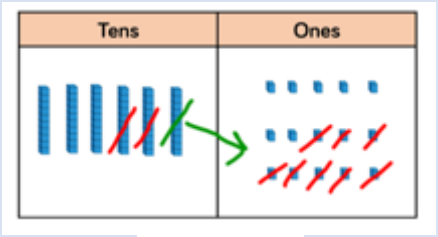


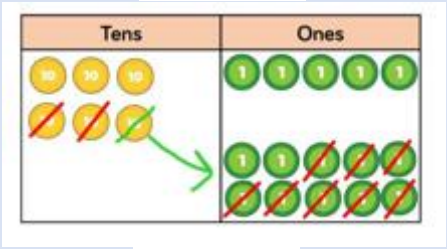
35 – 23 =

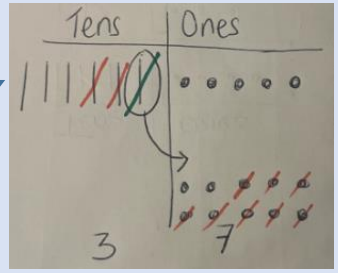
**

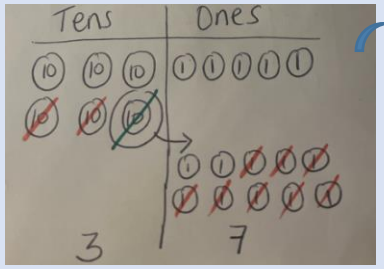


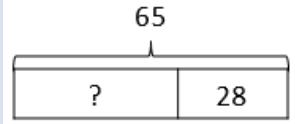
e.g. 65 – 28 =

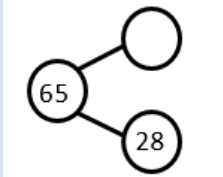






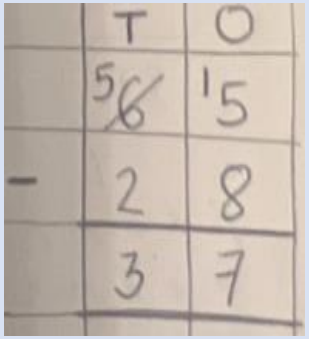






65 – 28 =

**

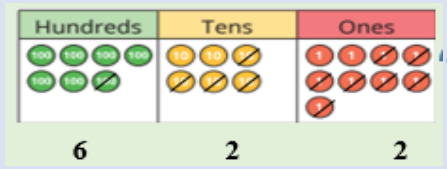


Subtract numbers with up to 3 digits

Pupils use dienes and/ or place value counters to support their understanding of the **formal written method of column subtraction,** first without exchange and then with exchanging (across a 10 and 100, respectively). Ensure pupils write out their caclulations alongside concrete resources so that they can see the link to the written method. The exchange should be shown at the top.

Pupils can represent the dienes using sqaures, lines and dots and/ or draw out their place value counters. Once pupils have secured this skill, they should be able to use part-whole and bar models more efficiently.

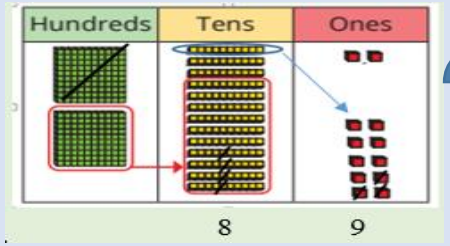
e.g. 769 – 147=

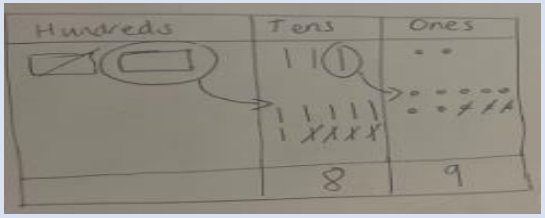


769 – 147=

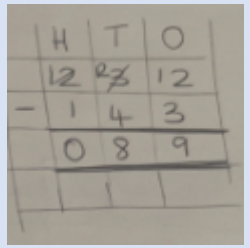
	H	T	O
	7	6	9
–	1	4	7
	6	2	2

e.g. 232 – 143 =

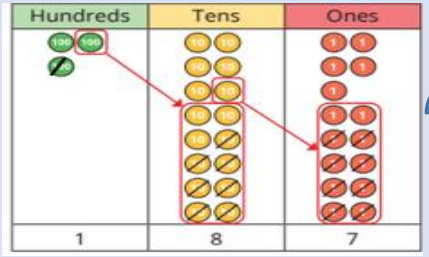


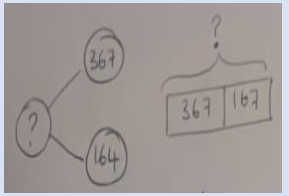


232 – 143 =



e.g. 365 - 178 =



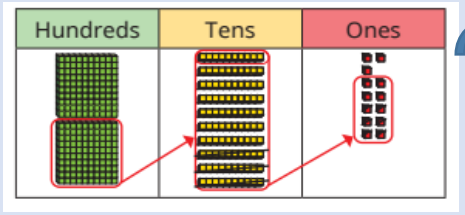


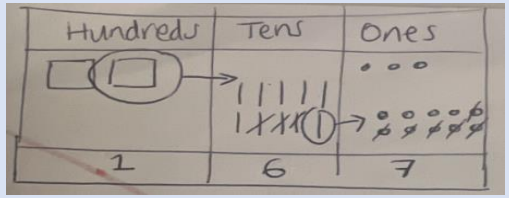
365 - 178 =

	H	T	O
	~~2~~ 3	~~15~~ 6	~~1~~ 5
–	1	7	8
	1	8	7

Pupils exchange from the hundreds column to the ones column in a two-part exchange because there are no tens in the original number. Make sure children exchange 1 hundred for 10 tens before exchanging one of those tens for 10 ones.

e.g. 203 – 36 =





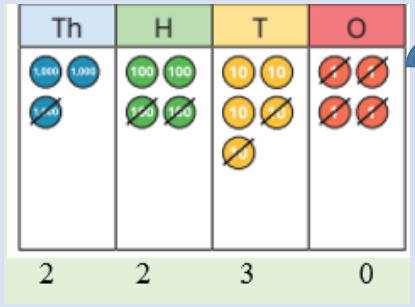
203 – 36 =

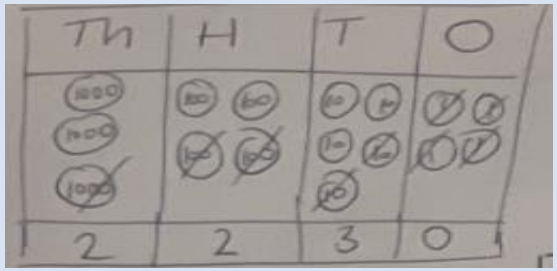
	H	T	O
	~~1~~ 2	~~0~~ 9	13
–		3	6
	1	6	7

Subtract numbers with up to 4 digits

Pupils continue to use dienes and/ or place value counters to support their understanding of the **formal written method of column subtraction,**, first without exchange and then with exchanging (this will include one exchange and more than one exchange, including two-part exchanges). Ensure pupils write out their caclulations alongside concrete resources so that they can see the link to the written method. The exchange should be shown at the top.

e.g. 3,454 – 1,224 =

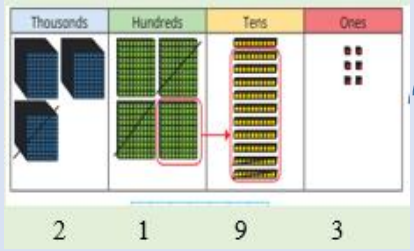


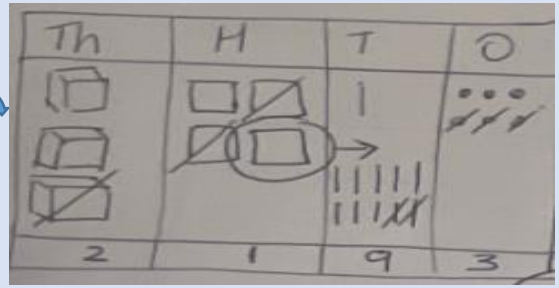


3,454 – 1,224 =

	Th	H	T	O
	3	4	5	4
-	1	2	2	4
	2	2	3	0

e.g. 3,416 – 1,223 =

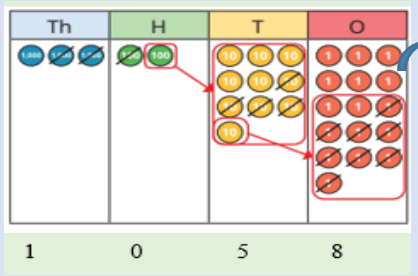


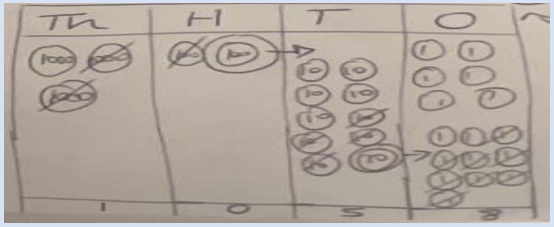


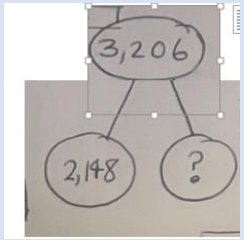
3,416 – 1,223 =

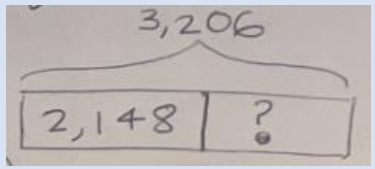
	Th	H	T	O
	3	3 4	1 1	6
-	1	2	2	3
	2	1	9	3

e.g. 3,206 – 2,148=



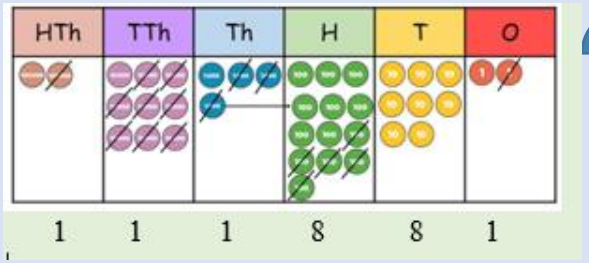
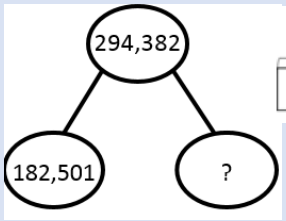
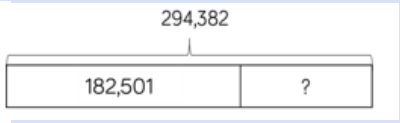
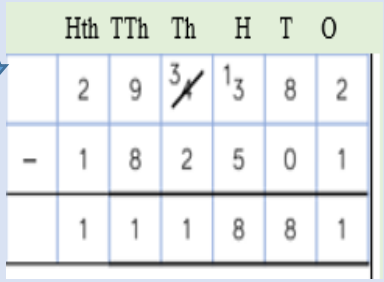
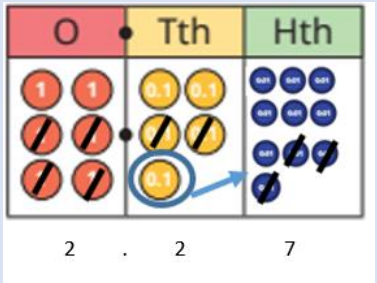
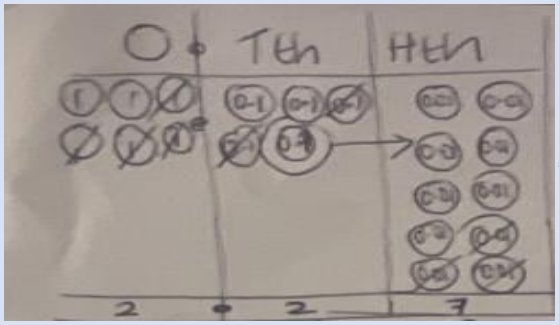
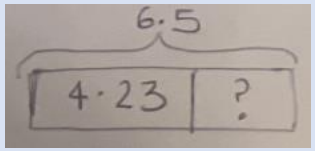
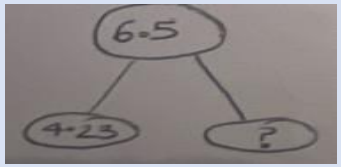
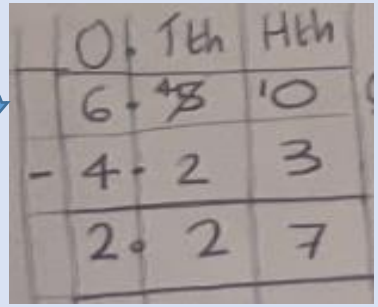




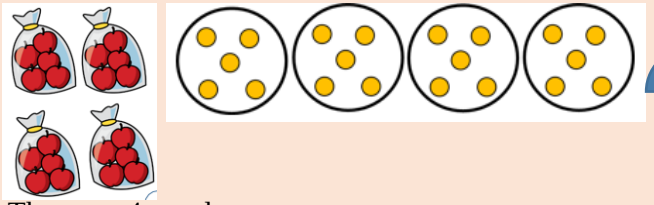
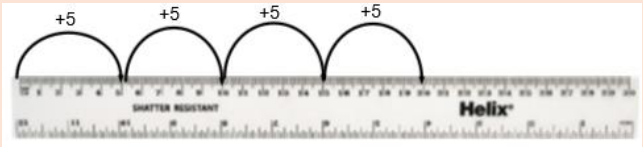
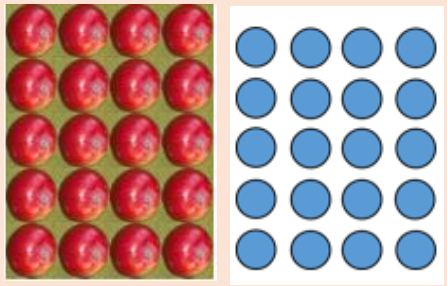
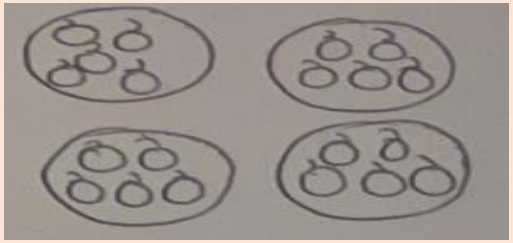
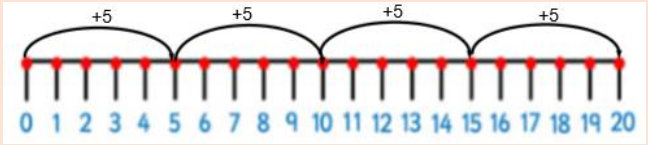


3,206 – 2,148=

	Th	H	T	O
	3	12 9	10	16
-	2	1	4	8
	1	0	5	8

Subtract numbers with more than 4 digits	Place value are the most effective concrete resources when subtracting numbers with more than 4 digits, progressing from no exchange to then with exchanging. Ensure pupils write out their caclulations alongside concrete resources so that they can see the link to the written method. The exchange should be shown at the top. At this stage, children should be encouraged to work in the abstract, using the **<u>column method</u>** to subtract larger numbers efficiently. **e.g. 294, 382 – 182, 501 =** 	Pupils can draw out their place value counters. Once pupils have secured this skill, they should be able to use part-whole and bar models more efficiently.   	**294, 382 – 182, 501 =** 
Subtract with up to 3 decimal places **Show Pupils how to "fill" empty columns with zeros, which will support them when exchanges are required. They need to be secure with the fact that, for example, 6 and 6.0 have the same numerical value, as do 6.5 and 6.50 and so on.**	Place value counters are the most effective manipulatives when subtracting decimals with 1, 2 and then 3 decimal places using the **<u>column method</u>**. Ensure children have experience of subtracting decimals with the same and different number of decimal places*****, progressing from no exchange to then with exchanging. The exchange should be shown at the top. **e.g. 6.5 – 4.23 =** 	Pupils can draw out their place value counters. Once pupils have secured this skill, they should be able to use part-whole and bar models more efficiently.   	**6.5 – 4.23 =** 

Calculation Policy: Multiplication (double, times, multiplied by, the product of, groups of, lots of, equal groups)

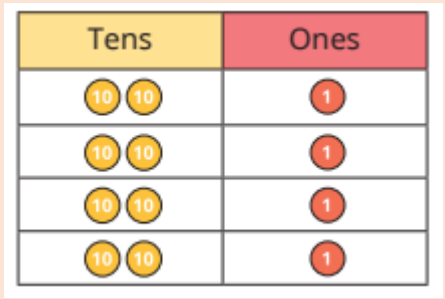
Skill	Concrete	Pictorial	Abstract
Solve 1- step problems using multiplication *** **In Year 2, pupils are introduced to the multiplication symbol** 5 x 4 = 20 Or 4 x 5 = 20	Where possible, use real life examples alongside counters, cubes, peg boards etc **e.g. One bag holds 5 apples. How many apples do 4 bags hold?** **i) Repeated addition**  There are 4 equal groups. There are 5 apples in each group. There are 20 apples altogether. 5 + 5 + 5 + 5 = 20 **ii) Number line to show the repeated groups**  **iii) Make arrays**  There are 5 apples in each column. There are 4 rows. There are 20 apples altogether. Or There are 4 apples in each row. There are 5 rows. There are 20 apples altogether.	Pupils can represent the practical resources using dots, crosses or even draw the picture.  Pupils to represent this pictorially alongside a number line.   Once pupils are able to understand the concept of the repeated addition/ multiplication, they should be able to use other representations (i.e. bar models) more efficiently.  	**One bag holds 5 apples. How many apples do 4 bags hold?** *** **4 x 5 =** **….= 4 x 5** **5 + 5 + 5 + 5 =**

Multiply 2-digit numbers by 1-digit numbers

i) Partition to multiply

Pupils use dienes and place value counters to support their understanding, first without exchange and then with exchanging. The 2-digit number is partitioned into tens and ones, both are multiplied by the 1-digit number and then the partial products are added to find the total product.

e.g. 21 x 4 =

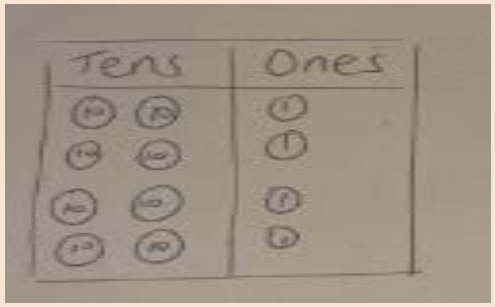


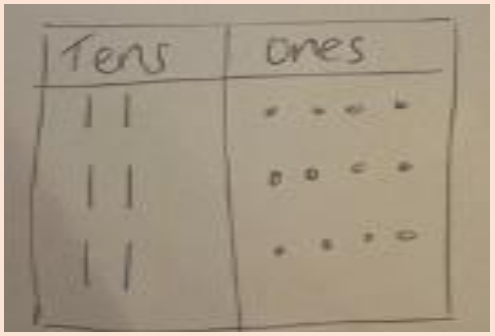
2 tens x 4 = 8 tens
1 one x 4 = 4 ones
80 + 4 = 84
21 x 4 = 84

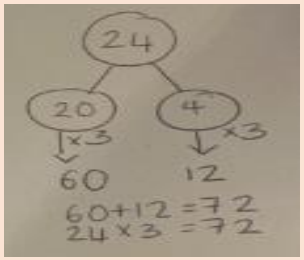
e.g. 24 x 3 =

2 tens x 3 = 6 tens
4 ones x 3 = 12 ones
60 + 12 = 72
24 x 3 = 72

Pupils can represent the dienes using lines and dots and/ or draw out their place value counters. Once pupils have secured this skill, they should be able to use other representations (e.g. part-whole models) more efficiently.







21 x 4 =

2 tens x 4 = 8 tens
1 one x 4 = 4 ones
80 + 4 = 84
21 x 4 = 84

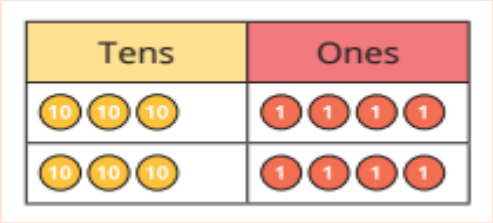
24 x 3 =

2 tens x 3 = 6 tens
4 ones x 3 = 12 ones
60 + 12 = 72
24 x 3 = 72

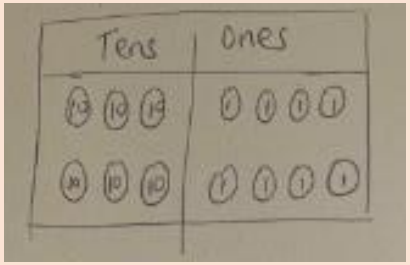
ii) Formal methods

In Year 3, pupils are introduced to the formal methods of multiplication. Place value counters/ dienes are used alongside the formal written method/ abstract calculations. Pupils progress from using the **expanded method** to the **short multiplication method**, completing calculations where there are no exchanges to those with exchanges (ensure the exchange is shown along the bottom).

e.g 34 x 2 =



Pupils can represent the dienes using lines and dots and/ or draw out their place value counters. .

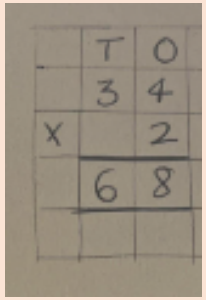


34 x 2 =

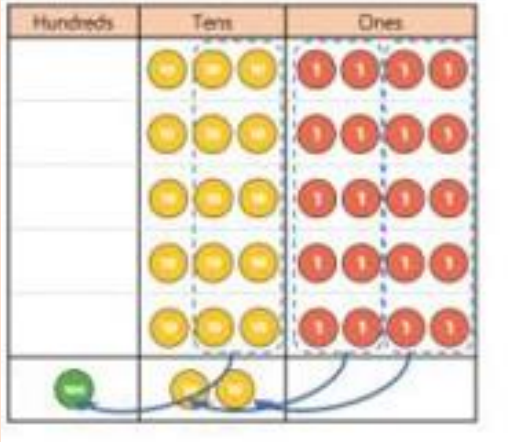
Expanded method

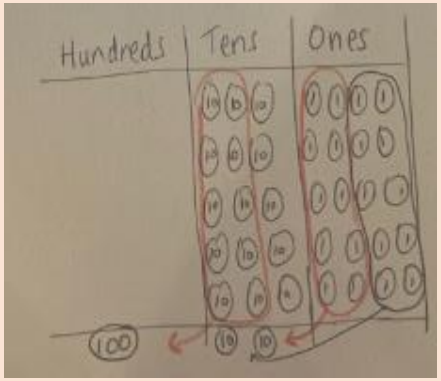
	T	O	
	3	4	
×		2	
		8	(2 x 4 = 8)
+	6	0	(2 x 30 = 60)
	6	8	

Short multiplication method



e.g. 34 x 5 =





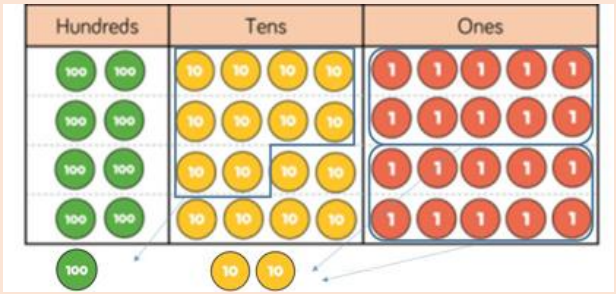
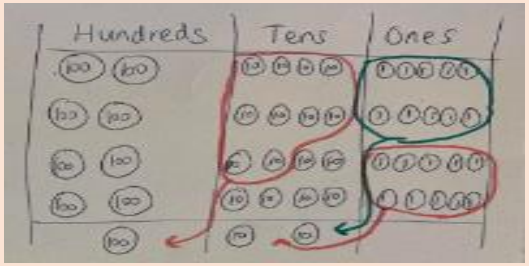
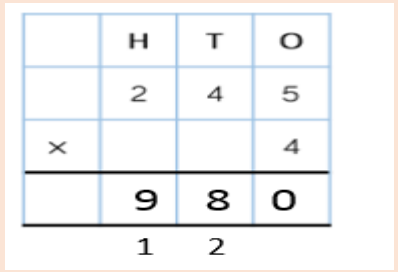
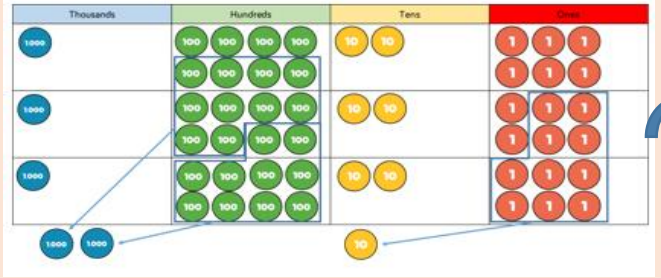
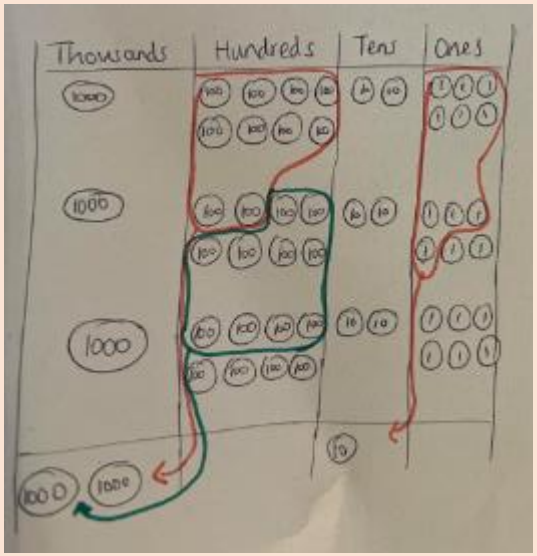
34 x 5 =

Expanded method

	H	T	O	
		3	4	
×			5	
		2	0	(5 × 4)
+	1	5	0	(5 × 30)
	1	7	0	

Short multiplication method

	H	T	O	
		3	4	
×			5	
	1	7	0	
	1	2		

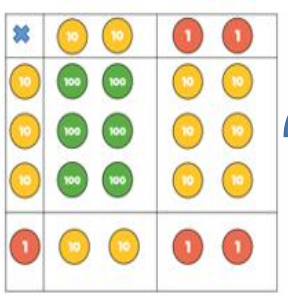
Multiply 3-digit numbers by 1-digit numbers	**<u>Short multiplication</u>** Place value counters/ dienes are used alongside the formal written method/ abstract calculations. Pupils use **<u>short multiplication method,</u>** completing calculations where there are no exchanges to those with exchanges (made for ones, tens and hundreds shown along the bottom). At this stage, pupils should be encouraged to work in the abstract, using the **<u>short multiplication method</u>**. **e.g. 245 x 4 =** 	Pupils can represent the dienes using lines and dots and/ or draw out their place value counters. 	**245 x 4 =** 
Multiply 4-digit numbers by 1-digit numbers	**Short multiplication** Place value counters are used alongside the formal written method/ abstract calculations. Pupils use the **<u>short multiplication method</u>**, completing calculations where there are no exchanges to those with exchanges (made for ones, tens, hundreds and thousands shown along the bottom). Pupils should be encouraged to work in the abstract, using the **<u>short written method.</u>** **e.g. 1,826 x 3 =** 	Pupils can draw out their place value counters. 	**1.826 x 3 =** 

Multiply 2-digit numbers by 2-digit numbers

*****
(Once pupils notice how the subtotals match the totals of parts in the grid method, pupil do not need to show a breakdown of their calculations on the side).

Formal methods
Place value counters/ dienes are used alongside the formal written method/ abstract calculations. Pupils progress from using the **grid method** to the **long multiplication method**, completing calculations with and without exchanges (shown along the bottom). Pupils must understand the importance of the zero as a placeholder.

e.g. 22 x 31 =



600 + 60 + 20 + 2 = 682

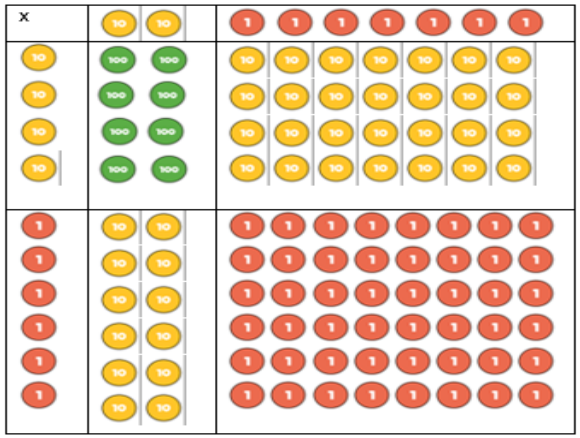
There are 6 hundreds

There are 8 tens.

There are 2 ones.

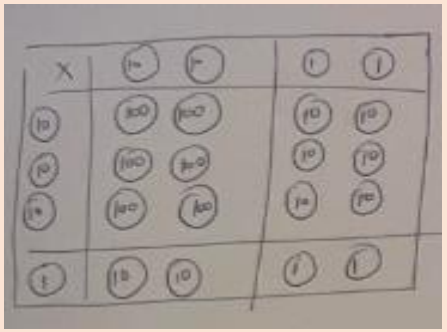
600 + 80 + 2 = 682

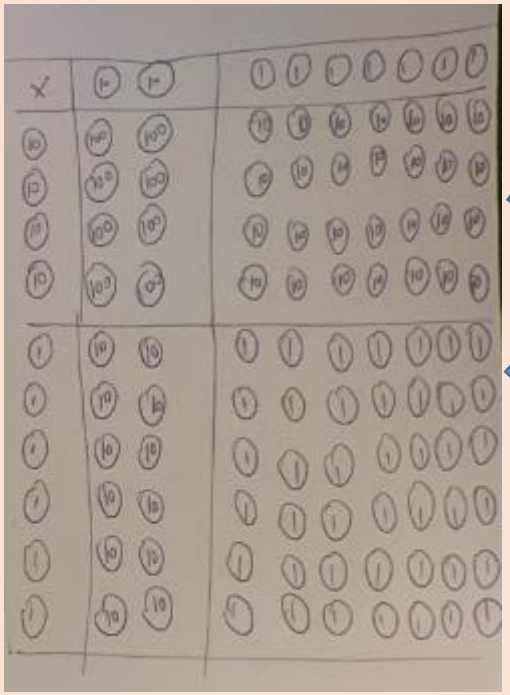
e.g. 27 x 46=



800 + 280 + 120 + 42 = 1,242

Pupils can represent the dienes using lines and dots and/ or draw out their place value counters.





Grid Method

x	20	2
30	600	60
1	20	2

600 + 60 + 20 + 2 = 682

22 x 31 = 682

***** **Long Multiplication Method**

	H	T	O	
		2	2	
x		3	1	
		2	2	(22 x 1)
+	6	6	0	(22 x 30)
	6	8	2	

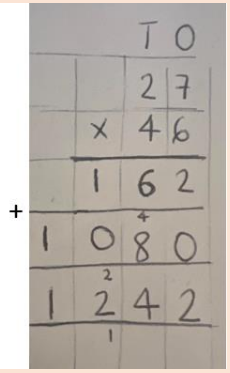
Grid Method

x	20	7
40	800	280
6	120	42

800 + 280 + 120 + 42 = 1,242

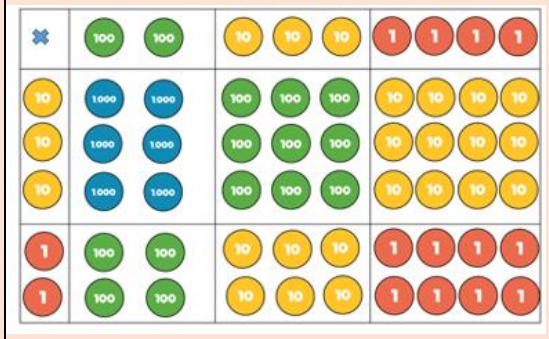
27 x 46 = 1,242

Long Multiplication Method



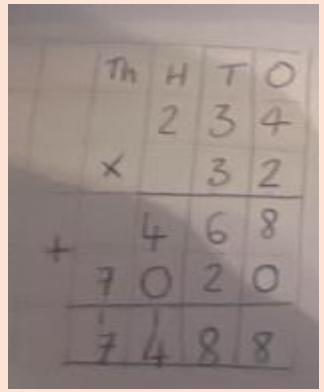
<table>
<tr>
<td>Multiply 3-digit numbers by 2-digit numbers</td>
<td>
<u>Long multiplication</u>

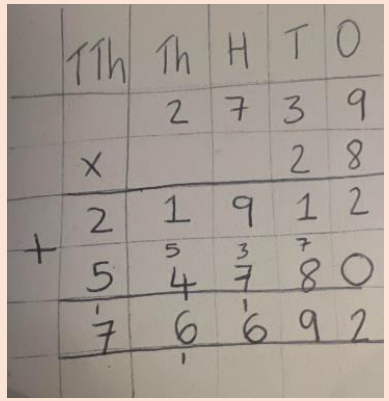
Place value counters are used alongside the formal written method/ abstract calculations. Pupils use the <u>long multiplication method</u> to complete calculations with and without exchanges (shown along the bottom). Pupils must understand the importance of the zero as a placeholder. Pupils must have a secure understanding of the previous methods and may need to refer back to the grid method if required.

e.g. 234 x 32 =

6000 + 900 + 120 + 400 + 60 + 8 = 7,488
</td>
<td>
Pupils can draw out their place value counters.

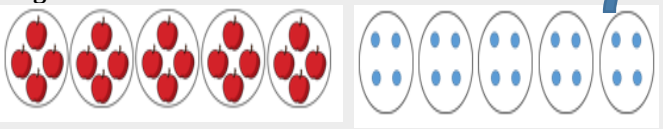
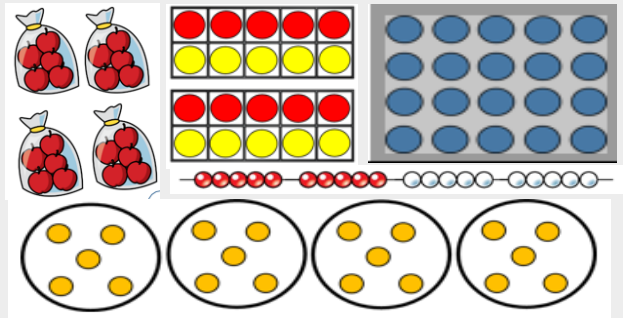
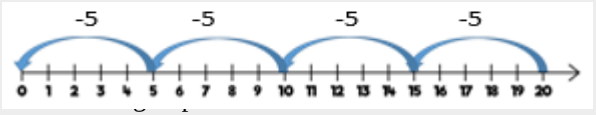
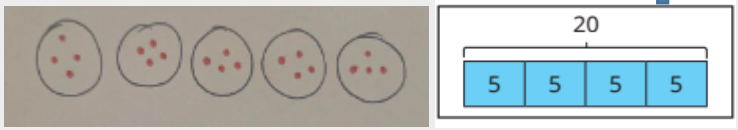
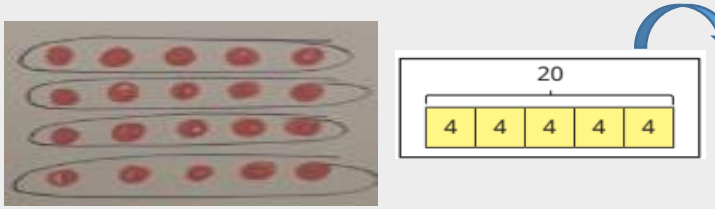
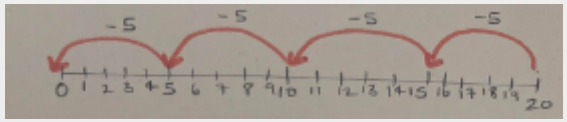

</td>
<td>
<u>Grid Method (if required)</u>
<table>
<tr><td>×</td><td>200</td><td>30</td><td>4</td></tr>
<tr><td>30</td><td>6,000</td><td>900</td><td>120</td></tr>
<tr><td>2</td><td>400</td><td>60</td><td>8</td></tr>
</table>
6000 + 900 + 120 + 400 + 60 + 8 = 7,488

234 x 32 = 7,488

<u>Long Multiplication Method</u>

</td>
</tr>
<tr>
<td>Multiply 4-digit numbers by 2-digit numbers</td>
<td>
<u>Long multiplication</u>

At this stage, pupils should be encouraged to work in the abstract, using the <u>long multiplication method</u> to complete calculations with and without exchanges (shown along the bottom). Pupils must understand the importance of the zero as a placeholder. Pupils must have a secure understanding of the previous methods and if required, may need to refer back to using place value counters and/ or the grid method.
</td>
<td></td>
<td>
2, 739 x 28=

</td>
</tr>
</table>

Calculation Policy: Division (share, group, divide, divided by, half, divisor, dividend, remainder)

Skill	Concrete	Pictorial	Abstract
Solve 1-step problems using division ****** **In Year 2, pupils are introduced to the division symbol** **20 ÷ 5 = 4** **20 ÷ 4 = 5**	Where possible, use real life examples alongside counters, cubes, bead strings, hoops for sorting groups etc e) **Sharing** Pupils solve problems by sharing amounts into equal groups. **e.g. There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?**  There are 20 apples. They are shared equally between 5 bags. There are 4 apples in each bag. **ii) Grouping** Pupils solve problems by grouping and counting the number of groups. **e.g. There are 20 apples altogether. They are put in groups of 5. How many groups are there?**  There are 20 apples altogether. They are put in groups of 5. There are 4 equal groups of 5 apples. **iii) Repeated subtraction** Grouping in the above step encourages pupils to count in multiples and links to repeated subtraction on a number line. 	Pupils can represent the practical resources using dots, crosses or even draw the picture. Once pupils have secured this skill, they should be able to use other representations (e.g. bar- models) more efficiently, when encountered.   	**There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?** ****** **20 ÷ 5 = 4** **There are 20 apples altogether. They are put in bags of 5. How many bags are there?** ****** **20 ÷ 4 = 5**

Divide 2-digit numbers by 1-digit numbers through sharing

([1] liaise with Mathematics team/ Team Leader for further clarification)

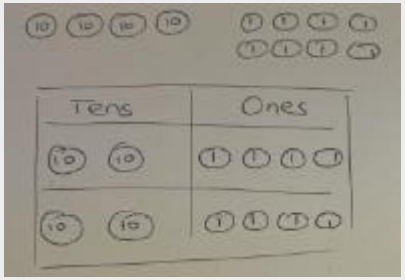
Pupils use dienes or place value counters to support their understanding of partitioning a number into tens and ones and sharing into equal groups. It is important that pupils divide the tens first and then the ones. Pupils should start with the equipment outside the place value grid before sharing the tens and ones equally between the rows. Pupils progress from completing calculations with no exchange, to exchanging and then those with remainders.
([1] It is important that pupils make sense of the place value counters and write or talk through calculations to show an understanding of the process).

i) <u>Sharing with no exchange</u>
e.g. 48 ÷ 2 = 24

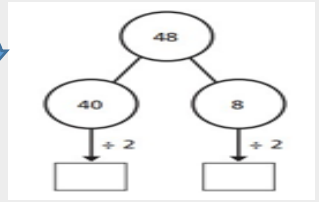
48 ÷ 2=
48 = 40 + 8
40 ÷ 2 = 20
8 ÷ 2 = 4

20 + 4 = 24

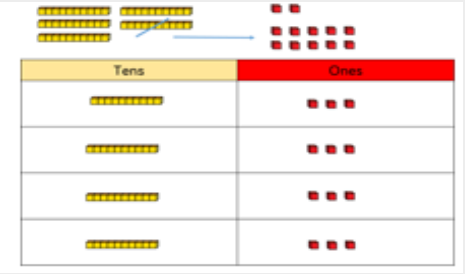
Pupils can represent the dienes using lines and dots and/ or draw out their place value counters.



48 ÷ 2 = 24

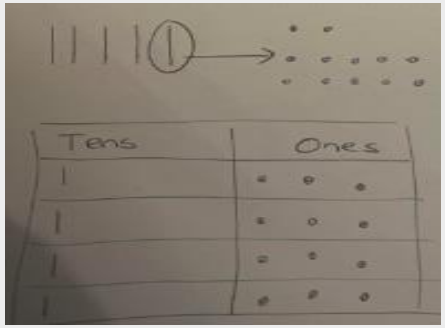


ii) <u>Sharing with exchange</u>
e.g. 52 ÷ 4 = 13

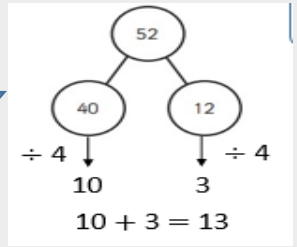


52 ÷ 4=
52 = 40 + 12
40 ÷ 4 = 10
12 ÷ 4 = 3

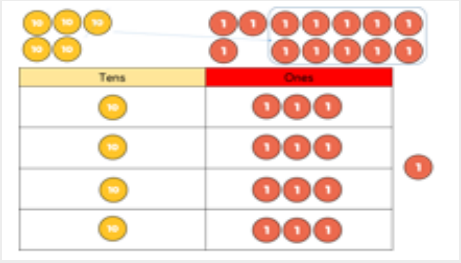
10 + 3 = 13



52 ÷ 4 = 13

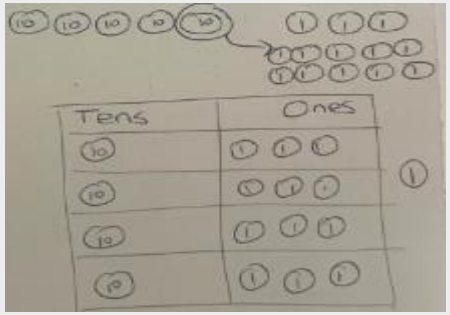


iii) <u>Sharing with remainders</u>
e.g. 53 ÷ 4 = 13 r 1

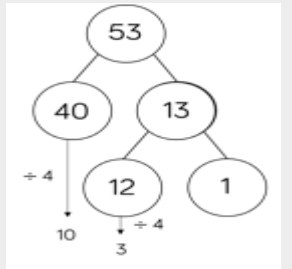


53 ÷ 4=
53 = 40 + 13
40 ÷ 4 = 10
12 ÷ 4 = 3
1 remainder

10 + 3= 13 13 r1



53 ÷ 4 = 13 r 1



[1] For those pupils who have secured this skill, their understanding **<u>can</u>** be further developed through the use of other representations (part-whole models).

Divide up to 4-digit numbers by 1-digit numbers using the formal written method of short division

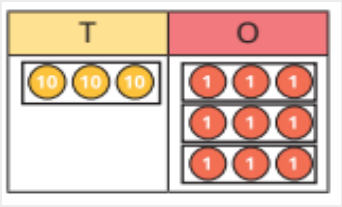
[2] **Pupils may need to be reminded of the transition between sharing and grouping. If so, use the above method (with numbers according to year group expectations).**

Once pupils have a secure conceptual understanding of this method, pupils should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges.

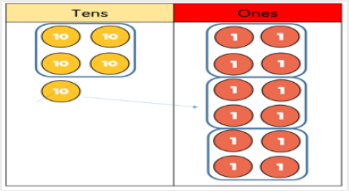
[2] **Pupils in Year 3 are introduced to** the **formal written method of short division**. Place value counters/ dienes are used alongside the formal written method/ abstract calculations. When using the short division method, **pupils use grouping**- starting with the largest place value, they group by the divisor **(using divisors according to the year group expectation for times table).** Remainders can also be seen as they are left ungrouped.

First, pupils use short division to divide a 2-digit number by a 1-digit number, initially without an exchange, then with an exchange and those which leave remainders. They then explore the same set of skills with 3- digit and 4- digit numbers **(depending on the year group expectations for size/ place value of numbers).**

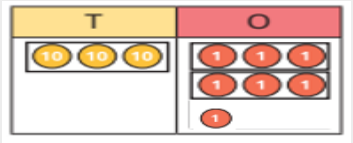
e.g. 39 ÷ 3 = 13



e.g. 52 ÷ 4 = 13



e.g. 37 ÷ 3 = 12 r 1



Pupils can represent the dienes using lines and dots and/ or draw out their place value counters. [1] For those pupils who have secured this skill, their understanding **can** be further developed through the use of other representations (e.g. part-whole models- refer to the above examples).

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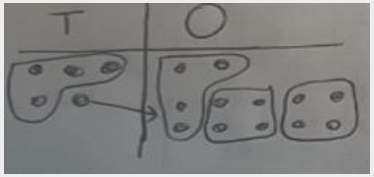
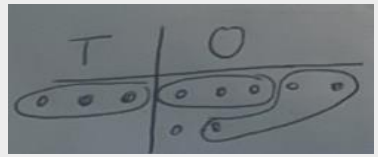




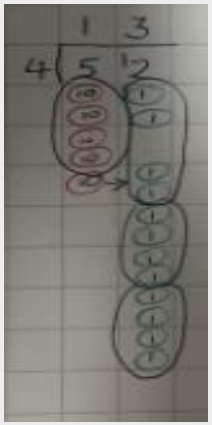
If required, pupils **can** draw place value counters under the dividend to support them with the transition from the concrete/ pictorial to the abstract.

39 ÷ 3 = 13

	1	3
3	3	9

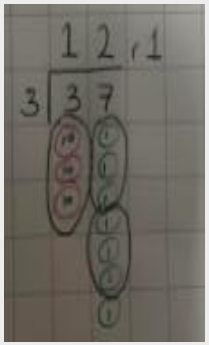
52 ÷ 4 = 13

	1	3
4	5	1 2

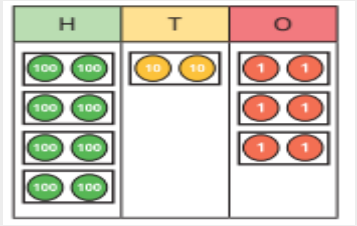


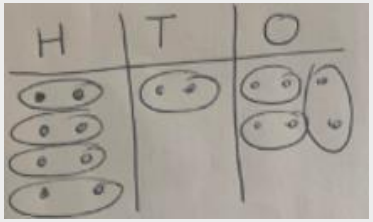
37 ÷ 3 = 12 r 1

	1	2	r1
3	3	7	



e.g. 826 ÷ 2 = 413

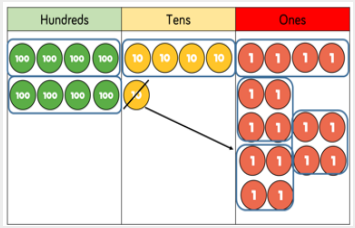


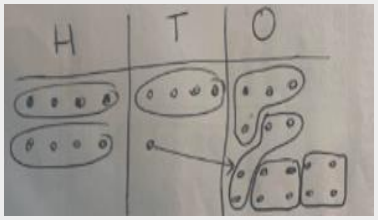


826 ÷ 2 = 413

	4	1	3
2	8	2	6

e.g. 856 ÷ 4 = 214

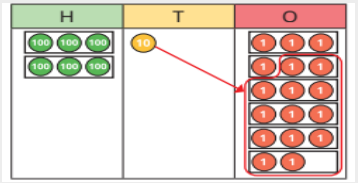


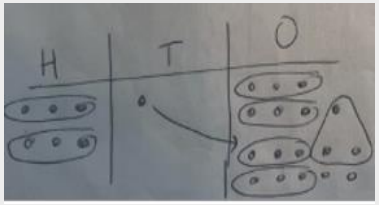


856 ÷ 4 = 214

	2	1	4
4	8	5	$^{1}6$

e.g. 617 ÷ 3 = 205 r2

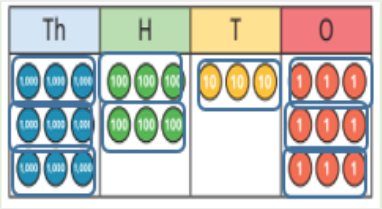


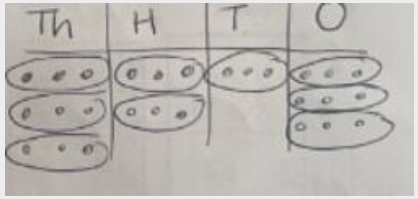


617 ÷ 3 = 205 r2

	2	0	5	r2
3	6	1	$^{1}7$	

e.g. 9,639 ÷ 3 = 3213

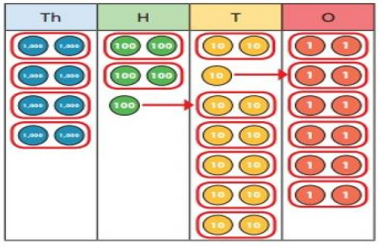


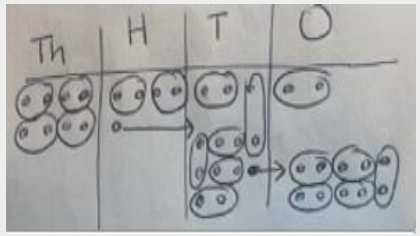


9,639 ÷ 3 = 3213

	3	2	1	3
3	9	6	3	9

e.g. 8,532 ÷ 2 = 4266

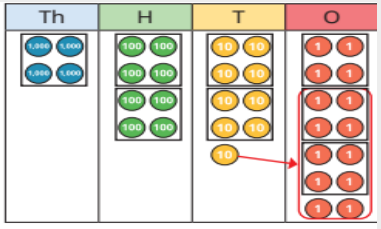


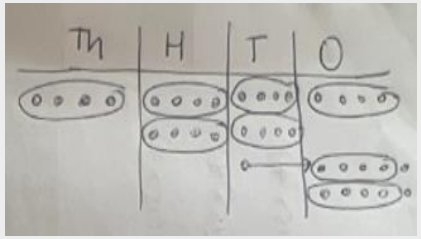


8,532 ÷ 2 = 4266

	4	2	6	6
2	8	5	$^{1}3$	$^{1}2$

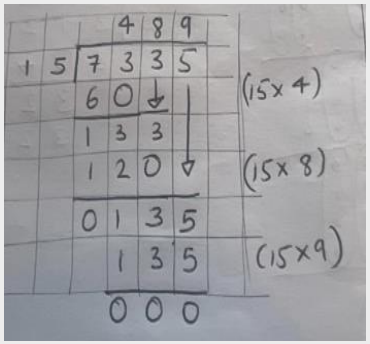
e.g. 4,894 ÷ 4 = 1223 r2





4,894 ÷ 4 = 1223 r2

	1	2	2	3	r2
4	4	8	9	$^{1}4$	

Divide up to 4-digit numbers by 2-digit numbers using the formal written method of <u>long division</u> [3] Pupils should also be shown how short division can be used to calculate the above, interpreting remainders according to the context, but long division is preferred as we may not be strong with our multiples for all 2 digit numbers. (Liaise with Mathematics team/ Team Leader for further clarification)	[3]**Pupils in Year 6** are taught the **<u>formal written methods of long division</u>** when dividing up to 4- digit numbers by 2-digit numbers. Pupils complete calculations without remainders and then with remainders using the **<u>pulling down method.</u>** Remainders can be interpreted as whole numbers, fractions or by rounding, as appropriate foe the context. Some pupils may find it helpful to list the multiples of the divisor before attempting the calculation (up to x12). At this stage, pupils should be encouraged to work in the abstract. .		**e.g. 7,335 ÷ 15 = 489**  **e.g. 372 ÷ 15 = 24 r 12 ($24\frac{4}{5}$)**