Stathern Primary School

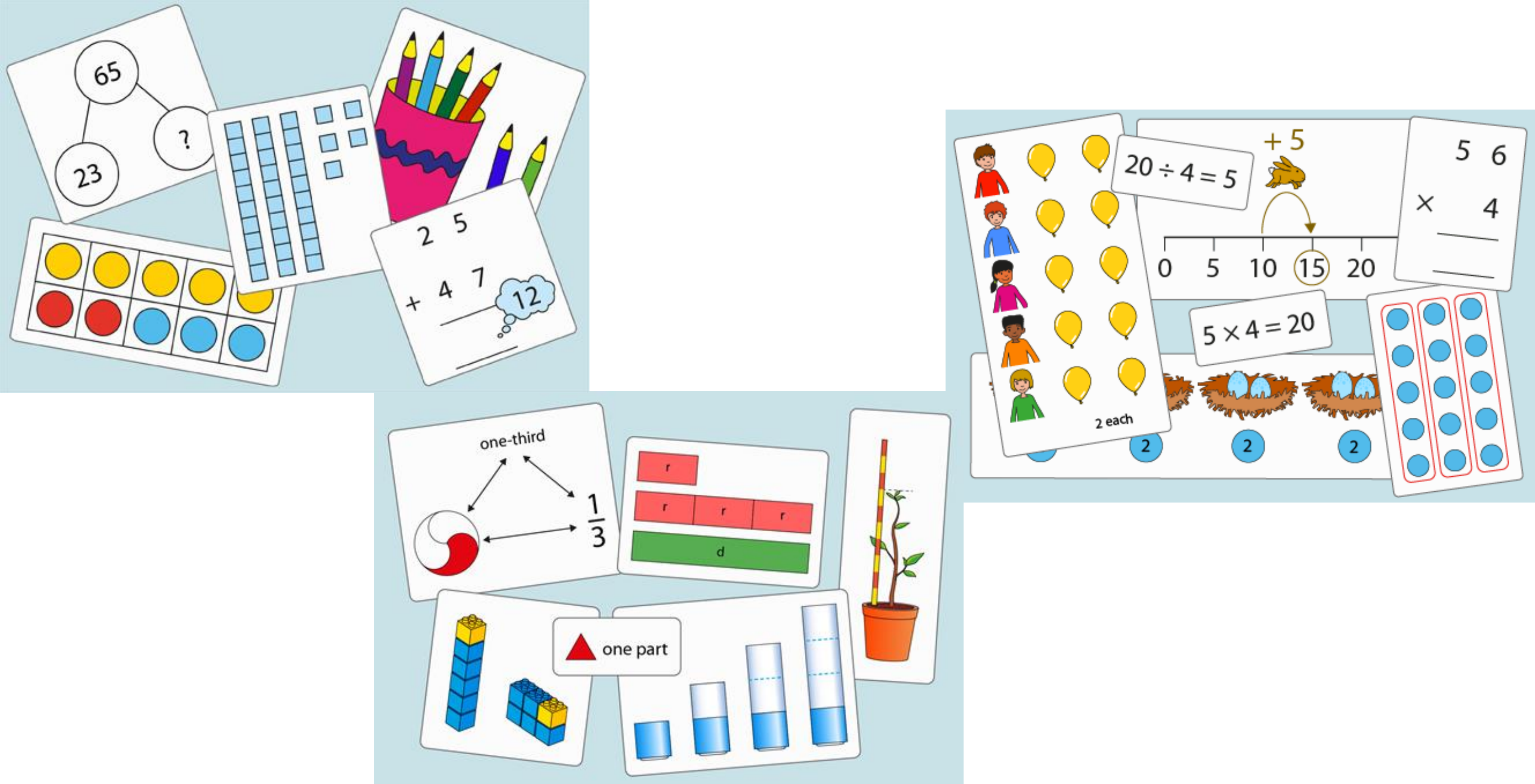
'Nurture, Inspire, Discover, Create'

Calculation Policy

2023-2025

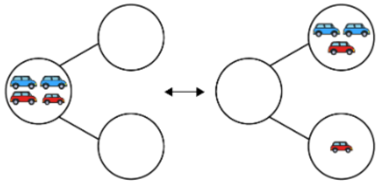
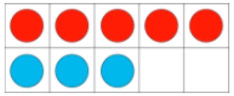
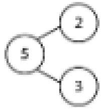
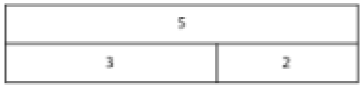
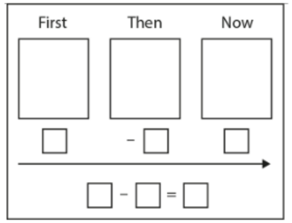
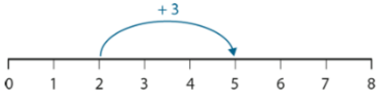
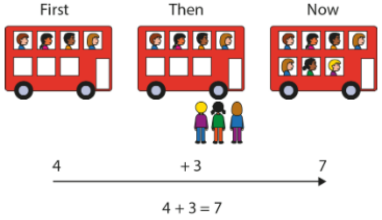
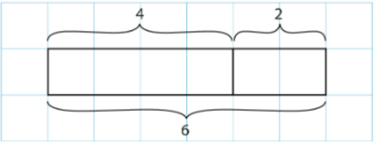
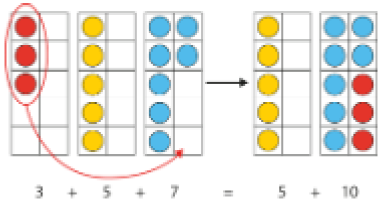
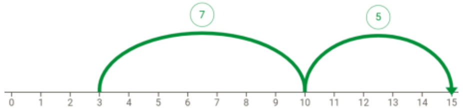
Reviewed by the Head teacher, Maths Subject Lead, teaching staff and the Maths Link Governor:

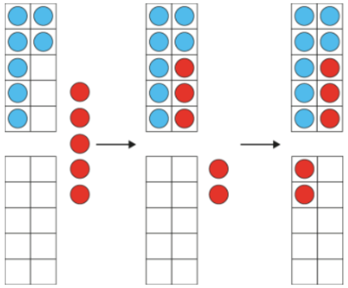
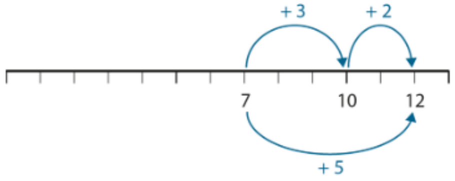
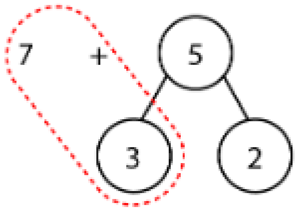
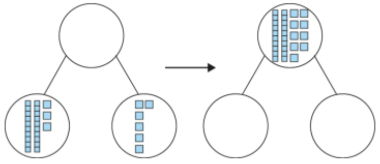
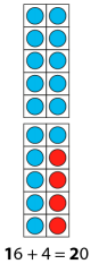
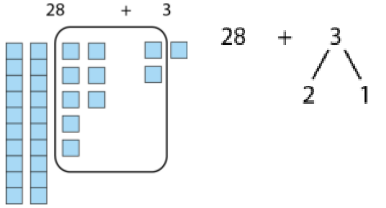
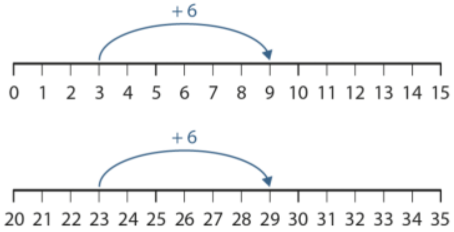
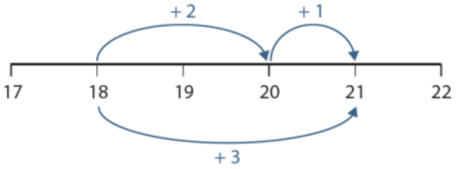
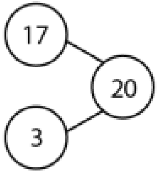
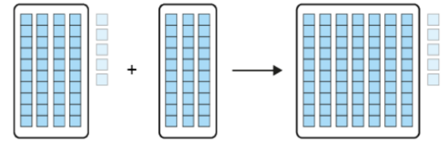
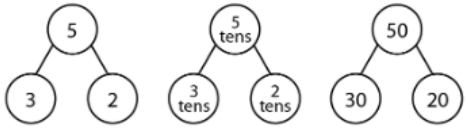
Signed:

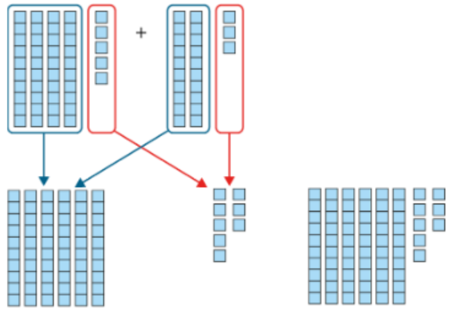
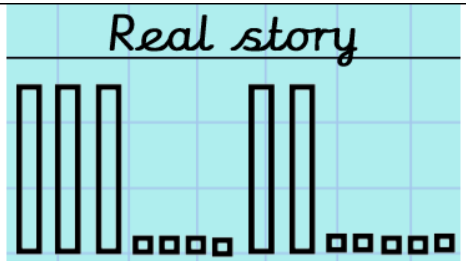
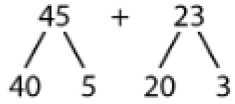
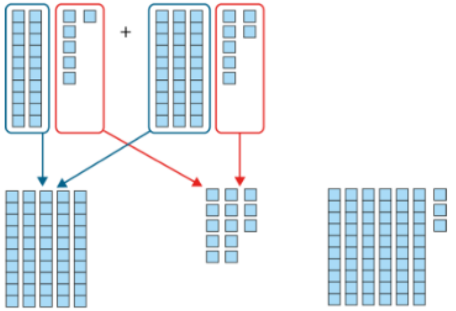
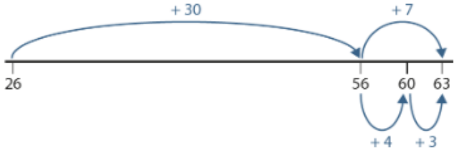
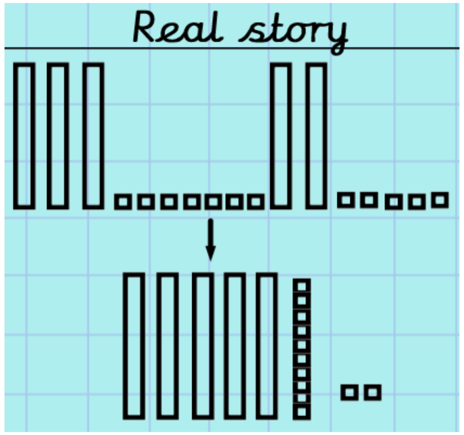
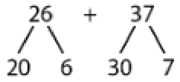
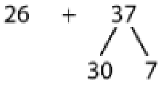


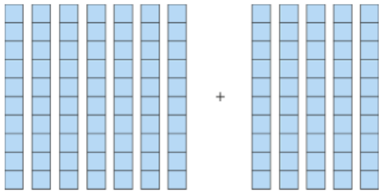
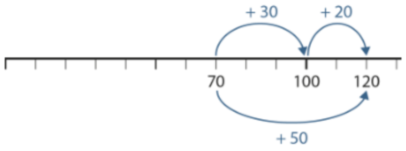
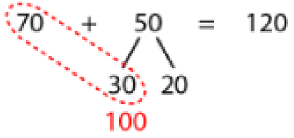
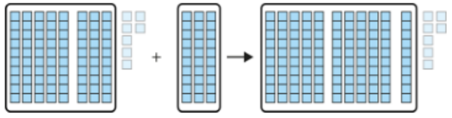
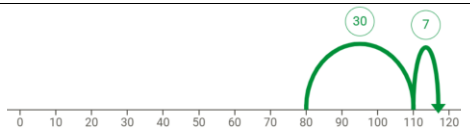
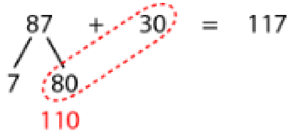
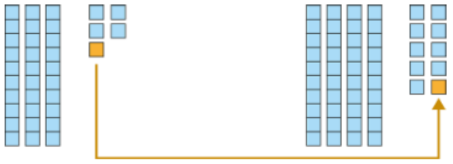
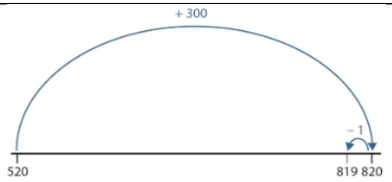
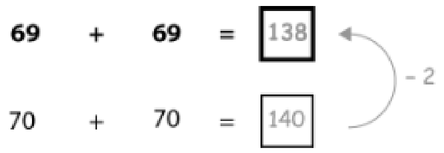
Our planning at Stathern is informed by the national curriculum, the DFE's non-statutory Ready to Progress guidance and the NCETM's prioritisation and professional development materials. This policy has been written using these documents to exemplify each of the 4 strands of calculation and summarise how this is to be taught through sentence stems, concrete, pictorial and abstract levels of understanding. Year groups have been added alongside as a guide. Ongoing assessment of pupils understanding informs our teaching. The steps in learning, challenges and approaches should always be adapted as necessary and based on pupils' security of understanding and readiness to progress to the next stage. At all stages of their learning children are encouraged to think deeply about the mathematical concepts introduced to them, apply these in a variety of ways and reflect on ways to be efficient and flexible in their calculation choices.

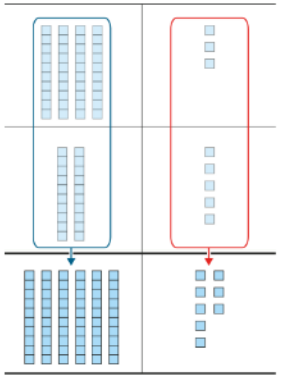
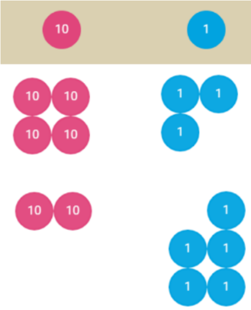
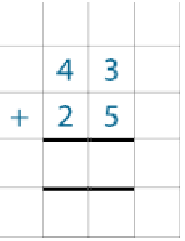
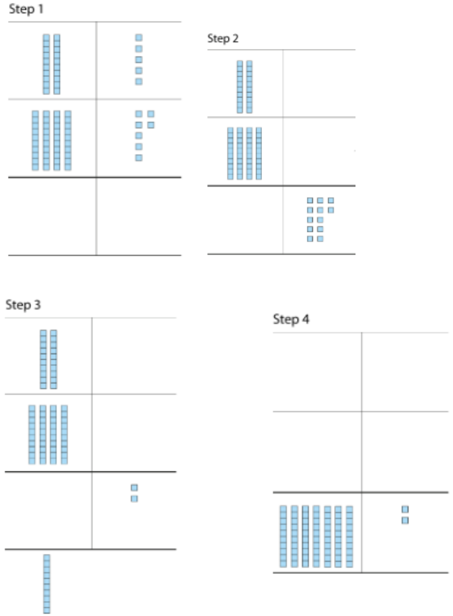
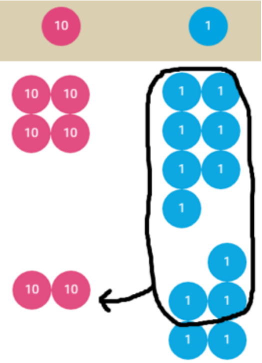
Addition

Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
__ is the whole, __ is a part, __ is a part. __ = __ plus __ and __ plus __ = __ There are __ in total. **Year 1**	  3 + 4 = 7 7 = 3 + 4 4 + 3 = 7 7 = 4 + 3  5 + 3 = 8 8 = 5 + 3 3 + 5 = 8 8 = 3 + 5	 3 + 2 = 5 2 + 3 = 5 5 = 3 + 2 5 = 2 + 3	 2 + 3 = 5 3 + 2 = 5 5 = 2 + 3 5 = 3 + 2 Bar model 
First… Then… Now… e.g. **First** there were 4 children on the bus, **then** 3 children got on. **Now** there are 7 children on the bus. **Year 1**	Role play getting 'on the bus' or use a toy bus.  	 4 + 3 = 7  2 + 3 = 5	  4 + 2 = 6
We can look for pairs of addends which sum to 10. __ plus __ is equal to 10, then 10 plus __ is equal to __. **Year 2**		Pictorial representations of the tens frames OR 	3 + 5 + 7 = 3 + 7 + 5 = 10 + 5 = 15

First I partition the __: __ plus __ is equal to __. Then __ plus __ is equal to ten ... and ten plus __ is equal to __. **Year 2**	 7 + 5 = 7 + 3 = 10 10 + 2 = 12	 7 + 5 = 7 + 3 = 10 10 + 2 = 12	 7 + 3 = 10 10 + 2 = 12
I know that __ plus __ is equal to __. (single-digit fact) So __ plus __ is equal to __. (related two-digit plus single digit fact) I know that __ plus __ is equal to ten so __ plus __ is equal to __. **Year 2**	 3 + 6 = 9 23 + 6 = 29  	Pictorial representations of the equipment used OR  3 + 6 = 9  23 + 6 = 29	 17 + 3 = 20
I know that __ plus __ is equal to __. So __ tens plus __ tens is equal to __ tens. __ tens and __ ones, plus __ tens is equal to __ tens and __ ones. **Year 2**	 4 + 3 = 7 so 40 + 30 = 70 45 + 30 = 75	Pictorial representations of the equipment used OR  45 + 30 = 75	 2 + 3 = 5 2 tens + 3 tens = 5 tens 20 + 30 = 50

First I partition the __ into __ and __, and the __ into __ and __. __ plus __ is equal to __... (addition of the tens) __ plus __ is equal to __... (addition of the ones) and __ plus __ is equal to __. (addition of the tens and ones) So __ plus __ is equal to __. (summary of the overall calculation) **Year 2**	 45 + 23 = 60 + 8 = 68	 34 + 25 =	 40 + 20 = 60 5 + 3 = 8 60 + 8 = 68
First I partition the __ into __ and __, and the __ into __ and __. __ plus __ is equal to __... (addition of the tens) __ plus __ is equal to __... (addition of the ones) and __ plus __ is equal to __. (addition of the tens and ones) So __ plus __ is equal to __. (summary of the overall calculation) **Year 2**	 26 + 37 = 50 + 13 = 63	 26 + 30 = 56 56 + 7 = 63  37 + 25 = 62	 or  20 + 30 = 50 6 + 7 = 13 50 + 13 = 63 26 + 30 = 56 56 + 7 = 63

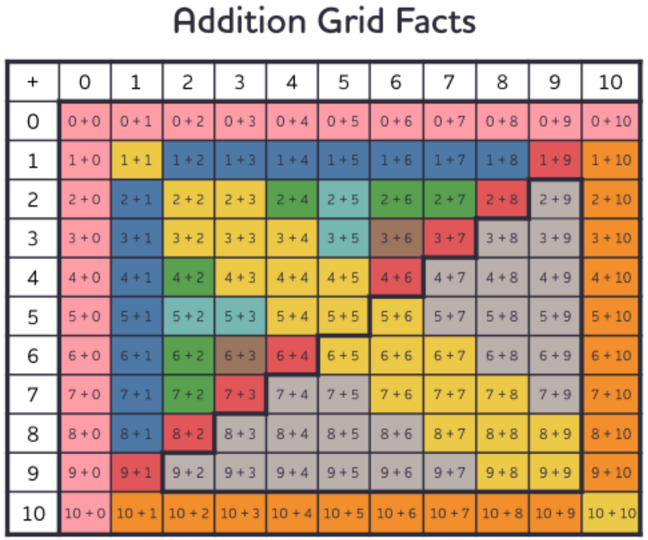
Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
I know that __ plus __ is equal to __. (single-digit addends) So __ tens plus __ tens is equal to __ tens. (multiple-of-ten addends) __ plus __ is equal to one hundred and __. **Year 3: Adding Multiples of 10 using scaled facts**	 7 + 5 = 12 7 tens + 5 tens = 12 tens 70 + 50 = 120 OR place value counters	Could include pictorial representations of equipment or:  70 + 50 = 70 + 30 = 100 100 + 20 = 120	 70 + 50 = 70 + 30 + 20 = 100 + 20 = 120
I know that __ plus __ is equal to __. (single-digit addends) So __ tens plus __ tens is equal to __ tens. (multiple-of-ten addends) __ plus __ is equal to one hundred and __. **Year 3: Adding 2 digit numbers mentally**	 87 + 30 = 110 + 7 = 117 OR place value counters	 87 + 30 = 80 + 30 + 7 = 110 + 7 = 117	 87 + 30 = 80 + 7 + 30 = 110 + 7 = 117
First we add: __ plus __ is equal to __ … … then we adjust: __ minus __ is equal to __. **Year 3: Adding through adjusting**	 35 + 49 = 34 + 50 = 84	 520 + 299 = 520 + 300 = 820 820 – 1 = 819	

Year 3: Written methods: Adding 2 or 3 digit numbers through column methods We line up the ones; __ ones plus __ ones. We line up the tens: __ tens plus __ tens. The __ is in the ones column – it represents __ ones. The __ is in the ones column – it represents __ ones. __ ones plus __ ones is equal to __ ones. The __ is in the tens column – it represents __ tens. The __ is in the tens column – it represents __ tens. __ tens plus __ tens is equal to __ tens. In column addition we start at the right-hand side.	Start with two-digit numbers to exemplify lining up the columns. 	Children could draw place value counters. 	Start with two-digit numbers to exemplify lining up the columns.  462 + 205 ___
If the column sum is equal to ten or more, we must regroup. ___ ones is the same as ____ ten **Year 3: As above with regrouping**	Start with two-digit numbers to exemplify the regrouping. 	Children could draw place value counters. 	Start with two-digit numbers to exemplify the regrouping. 2 5 + 4 7 2 1 2 5 + 4 7 7 2 1 567 +233 800 1 1

If the column sum is equal to ten or more, we must regroup. **Year 4, 5 and 6**	See Year 3 examples	See Year 3 examples	As in Year 4 but using numbers with more than 4 digits $\begin{array}{ccccc} & 6, & 5 & 8 & 4 \\ + & 2, & 7 & 3 & 9 \\ \hline & 9, & 3 & 2 & 3 \\ \hline & {\scriptstyle 1} & {\scriptstyle 1} & {\scriptstyle 1} & \end{array}$ $\begin{array}{ccccccc} & \pounds & 2 & 4 & . & 5 & 5 \\ + & \pounds & 1 & 7 & . & 8 & 2 \\ \hline & \pounds & 4 & 2 & . & 3 & 7 \\ \hline & & {\scriptstyle 1} & {\scriptstyle 1} & & & \end{array}$

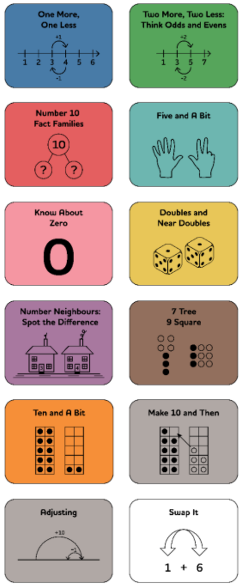
Addition – Known Number Facts

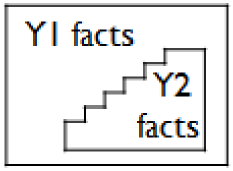
KS1



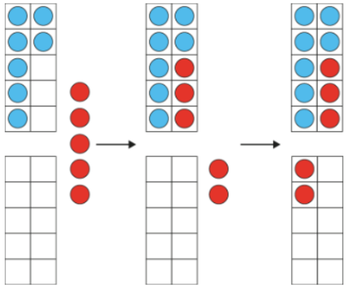
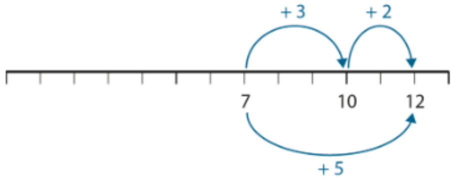
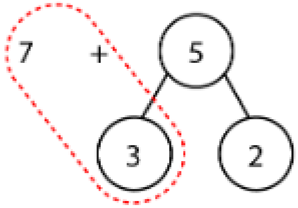
Addition Grid Facts

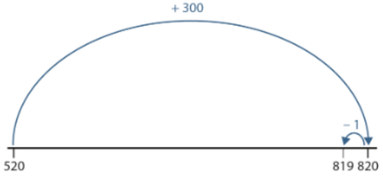
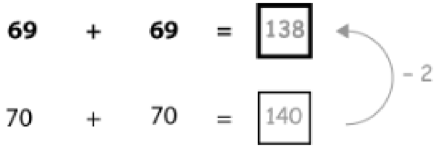
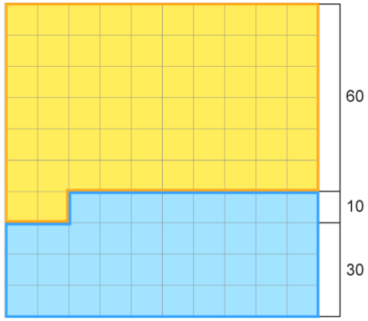
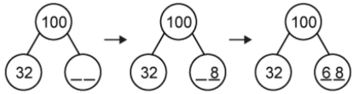
+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	1 + 10
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8	2 + 9	2 + 10
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7	3 + 8	3 + 9	3 + 10
4	4 + 0	4 + 1	4 + 2	4 + 3	4 + 4	4 + 5	4 + 6	4 + 7	4 + 8	4 + 9	4 + 10
5	5 + 0	5 + 1	5 + 2	5 + 3	5 + 4	5 + 5	5 + 6	5 + 7	5 + 8	5 + 9	5 + 10
6	6 + 0	6 + 1	6 + 2	6 + 3	6 + 4	6 + 5	6 + 6	6 + 7	6 + 8	6 + 9	6 + 10
7	7 + 0	7 + 1	7 + 2	7 + 3	7 + 4	7 + 5	7 + 6	7 + 7	7 + 8	7 + 9	7 + 10
8	8 + 0	8 + 1	8 + 2	8 + 3	8 + 4	8 + 5	8 + 6	8 + 7	8 + 8	8 + 9	8 + 10
9	9 + 0	9 + 1	9 + 2	9 + 3	9 + 4	9 + 5	9 + 6	9 + 7	9 + 8	9 + 9	9 + 10
10	10 + 0	10 + 1	10 + 2	10 + 3	10 + 4	10 + 5	10 + 6	10 + 7	10 + 8	10 + 9	10 + 10



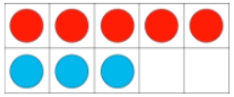
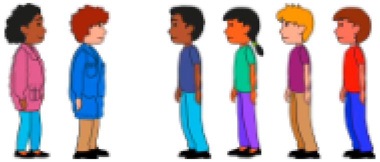
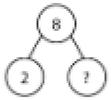
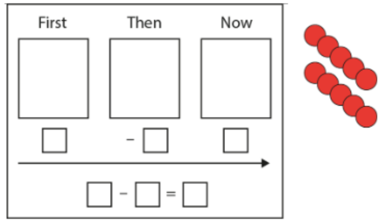
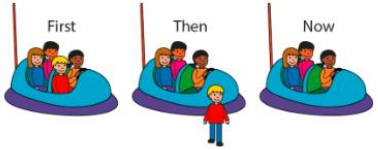
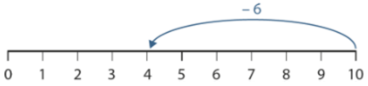
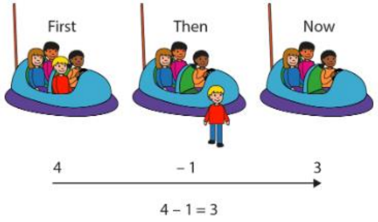
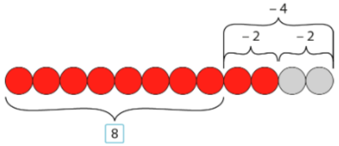
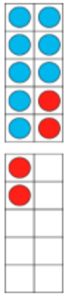
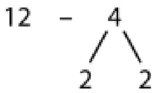
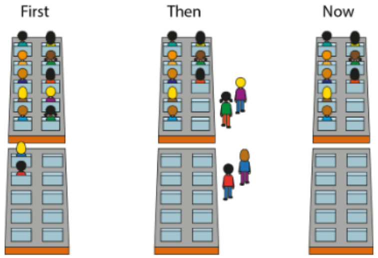
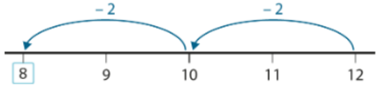
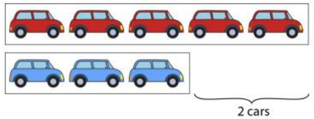
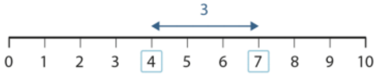
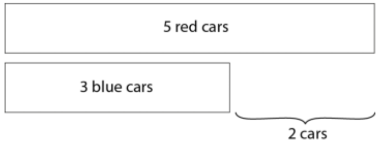


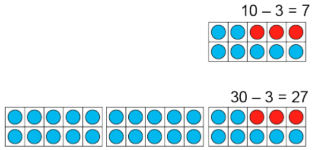
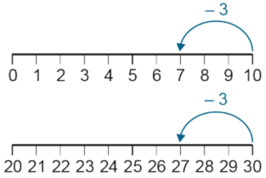
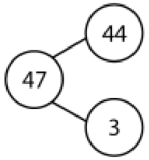
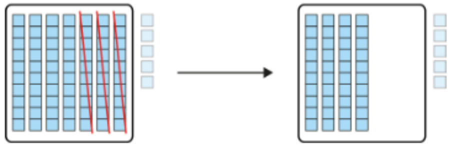
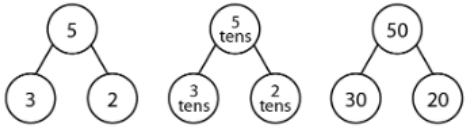
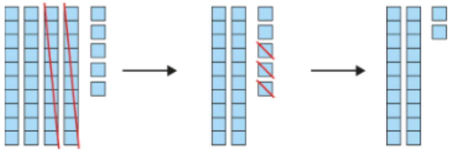
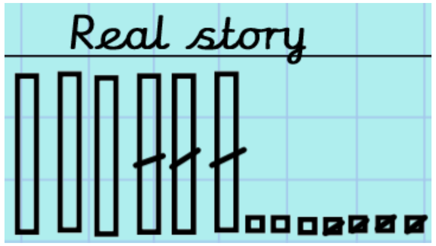
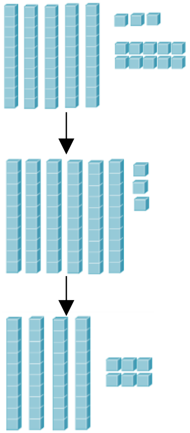
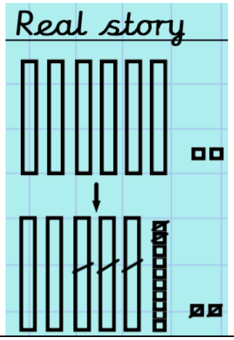
KS2

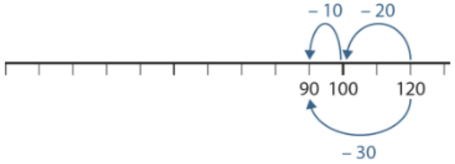
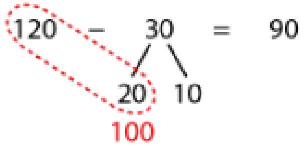
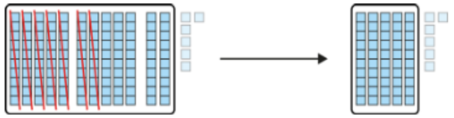
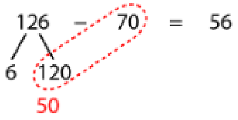
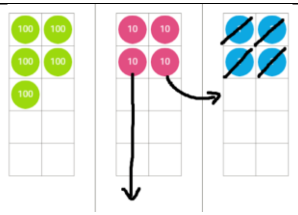
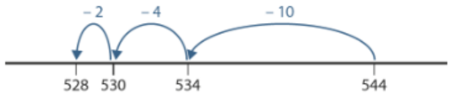
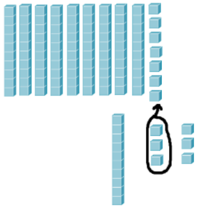
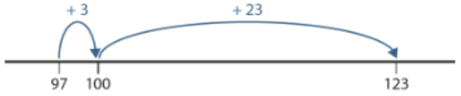
Strategy	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
Bridging through a multiple of 10, 100, etc **Years 3, 4, 5 and 6**	 7 + 5 = 7 + 3 = 10 10 + 2 = 12	 7 + 5 = 7 + 3 = 10 10 + 2 = 12	 7 + 3 = 10 10 + 2 = 12

Compensating – rounding to the nearest multiple 10, 100, etc and adjusting **Years 3, 4, 5 and 6**	 35 + 49 = 34 + 50 = 84	 520 + 299 = 520 + 300 = 820 820 – 1 = 819	
Year 3 **Derive quickly: Compliments to 100** First we make 10 ones. The ones digits add up to 1 ten, so we need 9 more tens.	Working using Dienes or place value counters, adding ones then tens.		

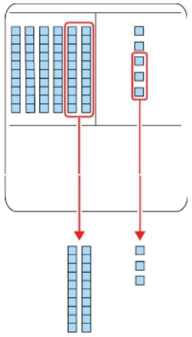
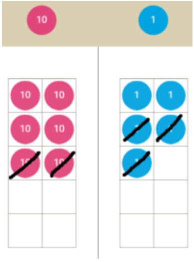
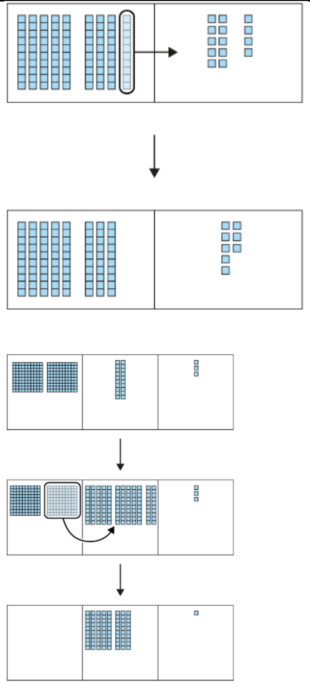
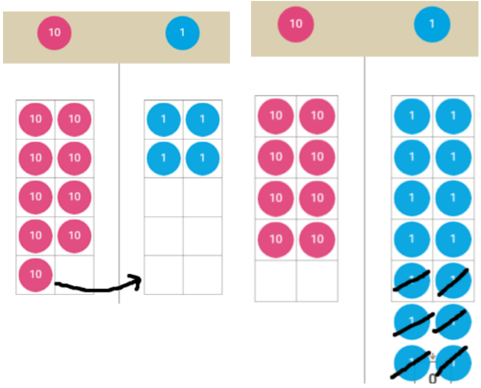
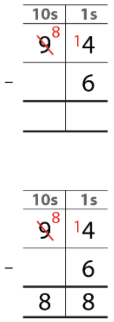
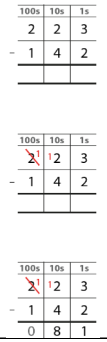
Subtraction

Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
__ is the whole, __ is a part, __ is a part. __ = __ minus __ and __ minus __ = __ **Year 1**	I have 8 counters. 5 counters are red. How many are blue? 	There are 6 children. 2 have their coat on. How many do not have their coat on? 	There are 8 flowers. 2 are red and the rest are yellow. How many are yellow?   8 – 2 = 6
First… Then… Now… e.g. **First** there were 4 children in the car, **then** 1 child got out. **Now** there are 3 children in the car. **Year 1**	Role play 'getting out of a car'.  	 4 - 1 = 3 3 = 4 – 1  10 – 6 = 4	
We partition the __ into __ and __. First we subtract the __ from __ to get to 10. Then we subtract the remaining __ from 10. We know 10 minus __ is equal to __. **Year 2**	 12 – 4 = 12 – 2 = 10 10 – 2 = 8   	First there were 12 children on the ride. Then 4 got off. Now there are 8 children on the ride.  	 12 – 4 = 12 – 2 = 10 10 – 2 = 4
There are more __ than __. There are fewer __ than __. The difference between __ and __ is __. **Year 2**	 The difference between 2 and 5 is 3. The difference between 5 and 2 is 3.	 The difference between 4 and 7 is 3. The difference between 7 and 4 is 3.	 5 – 3 = 2

I know that __ minus __ is equal to __. (single-digit fact) So __ minus __ is equal to __. (related two-digit minus single digit fact) I know that ten minus __ is equal to __ so __ minus __ is equal to __. **Year 2**	 30- 3 = 27		47 – 3 = 44 
I know that __ minus __ is equal to __. So __ tens minus __ tens is equal to __ tens. **Year 2**	 70 – 30 = 40 so 75 – 30 = 45	 75 – 30 = 45	 5 – 3 = 2 5 tens – 3 tens = 2 tens 50 – 30 = 20
First I subtract the tens, then I subtract the ones. **Year 2**	 45 – 23 = 45 – 20 = 25 25 – 3 = 22	67 – 34 = 33 	• 45 – 20 – 3 = 25 – 3 = 22 • 45 – 23 = 45 – 20 – 3 = 25 – 3 = 22
First I subtract the tens, then I subtract the ones. **Year 2: Bridging**		62 – 34 = 28 	63 – 17 = 46 63 – 10 = 53 53 – 7 = 53 – 3 – 4 = 46

I know that __ minus __ is equal to __. (bridging ten) So __ tens minus __ tens is equal to __ tens. (bridging ten tens) One hundred and __ minus __ is equal to __. **Year 3**	See Year 2 (bridging)	 120 – 30 = 120 – 20 = 100 100 – 10 = 90	 120 – 30 = 120 – 20 = 100 100 – 10 = 90
I know that __ minus __ is equal to __. (bridging ten) So __ tens minus __ tens is equal to __ tens. (bridging ten tens) One hundred and __ minus __ is equal to __. **Year 3**	 126 – 70 = 56		 126 – 70 = 120 – 70 + 6 = 50 + 6 = 56
We partition the __ into __ and __. First we subtract the __ from __ to get to a multiple of 10. Then we subtract the remaining __ from the multiple of 10. We know 10 minus __ is equal to __ so __ minus __ is equal to __. **Year 3**	 Physically regrouping the one ten as ten ones.	544 – 16 	544 – 16 = 544 – 10 = 534 534 – 4 – 2 = 528
We partition the __ into __ and __. First we add the __ to __ to get to 100. Then we add the remaining __ to 100. We know 100 plus __ is equal to __. **Year 3**		 123 – 97 = 26	As counting up 97 + 3 + 20 + 3 = 123

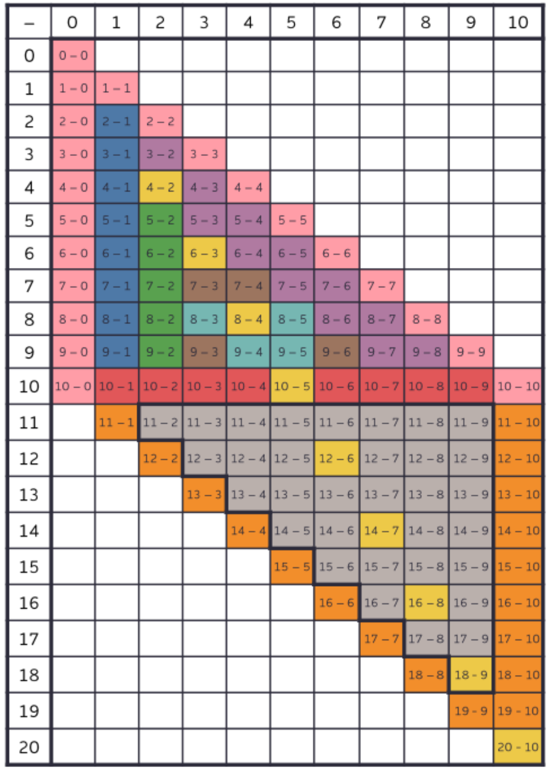
Subtraction: Written Methods

Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
We line up the ones; __ ones plus __ ones. We line up the tens: __ tens plus __ tens. The __ is in the ones column – it represents __ ones. __ ones minus __ ones is equal to __ ones. The __ is in the tens column – it represents __ tens. __ tens minus __ tens is equal to __ tens. In column subtraction we start at the right-hand side. **Year 3: Column subtraction of 2 and 3 digit amounts**		Children could draw place value counters. 	6 5 − 2 3 4 2 4 6 2 − 2 5 1
If there is an insufficient number to subtract from in a given column, we must exchange from the column to the left. **Year 3: Column Subtraction: Including regrouping digits**		Children could draw place value counters. 	10s 1s $\cancel{9}^{8}$ $^{1}4$ − 6 10s 1s $\cancel{9}^{8}$ $^{1}4$ − 6 8 8 100s 10s 1s 2 2 3 − 1 4 2 100s 10s 1s $\cancel{2}^{1}$ $^{1}2$ 3 − 1 4 2 100s 10s 1s $\cancel{2}^{1}$ $^{1}2$ 3 − 1 4 2 0 8 1

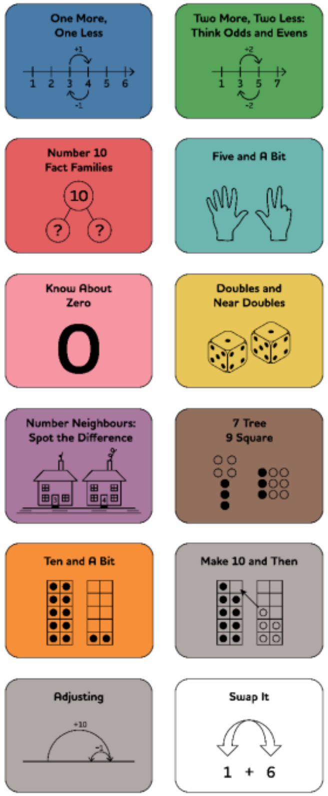
If there is an insufficient number to subtract from in a given column, we must exchange from the column to the left. **Year 4, 5 and 6**	See Year 3 examples	See Year 3 examples	$\begin{array}{r} \overset{5}{\cancel{6}},\overset{14}{\cancel{5}}\overset{12}{\cancel{3}}{}^{1}8 \\ -\ 2,7\ 8\ 9 \\ \hline 3,7\ 4\ 9 \\ \hline \end{array}$ $\begin{array}{r} \pounds\ 2\ \overset{8}{\cancel{9}}.\overset{14}{\cancel{5}}{}^{1}0 \\ -\ \pounds\ 1\ 8.9\ 4 \\ \hline \pounds\ 1\ 0.5\ 6 \\ \hline \end{array}$

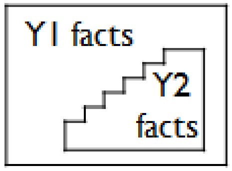
Subtraction Known Number Facts

KS1

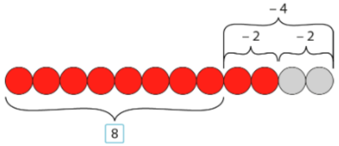
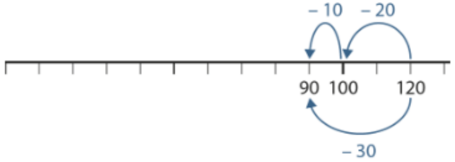
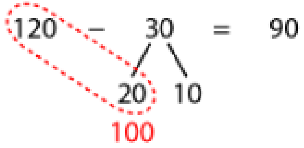


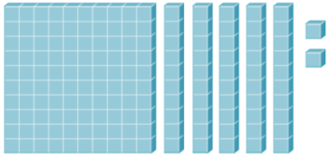
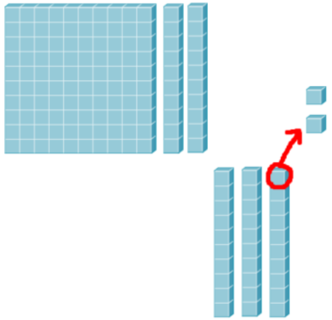
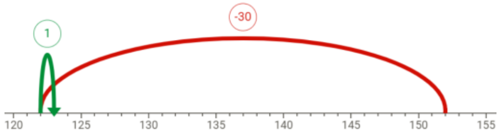
–	0	1	2	3	4	5	6	7	8	9	10
0	0 – 0										
1	1 – 0	1 – 1									
2	2 – 0	2 – 1	2 – 2								
3	3 – 0	3 – 1	3 – 2	3 – 3							
4	4 – 0	4 – 1	4 – 2	4 – 3	4 – 4						
5	5 – 0	5 – 1	5 – 2	5 – 3	5 – 4	5 – 5					
6	6 – 0	6 – 1	6 – 2	6 – 3	6 – 4	6 – 5	6 – 6				
7	7 – 0	7 – 1	7 – 2	7 – 3	7 – 4	7 – 5	7 – 6	7 – 7			
8	8 – 0	8 – 1	8 – 2	8 – 3	8 – 4	8 – 5	8 – 6	8 – 7	8 – 8		
9	9 – 0	9 – 1	9 – 2	9 – 3	9 – 4	9 – 5	9 – 6	9 – 7	9 – 8	9 – 9	
10	10 – 0	10 – 1	10 – 2	10 – 3	10 – 4	10 – 5	10 – 6	10 – 7	10 – 8	10 – 9	10 – 10
11		11 – 1	11 – 2	11 – 3	11 – 4	11 – 5	11 – 6	11 – 7	11 – 8	11 – 9	11 – 10
12			12 – 2	12 – 3	12 – 4	12 – 5	12 – 6	12 – 7	12 – 8	12 – 9	12 – 10
13				13 – 3	13 – 4	13 – 5	13 – 6	13 – 7	13 – 8	13 – 9	13 – 10
14					14 – 4	14 – 5	14 – 6	14 – 7	14 – 8	14 – 9	14 – 10
15						15 – 5	15 – 6	15 – 7	15 – 8	15 – 9	15 – 10
16							16 – 6	16 – 7	16 – 8	16 – 9	16 – 10
17								17 – 7	17 – 8	17 – 9	17 – 10
18									18 – 8	18 - 9	18 – 10
19										19 - 9	19 - 10
20											20 - 10



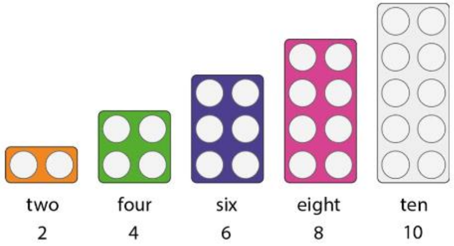
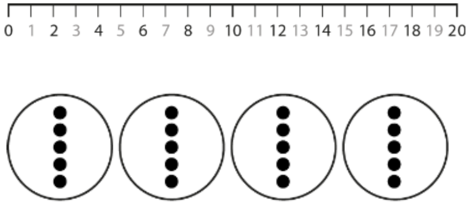
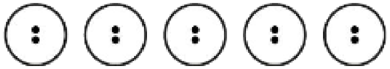
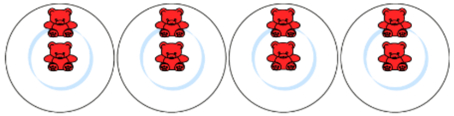
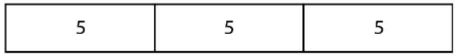
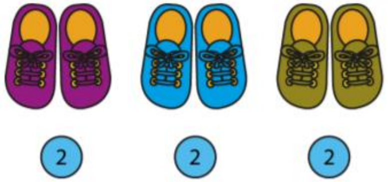
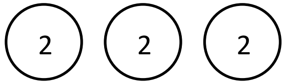
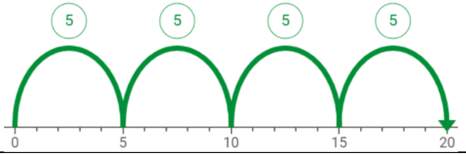


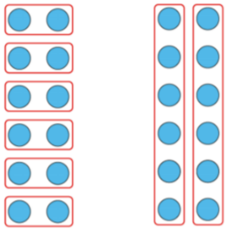
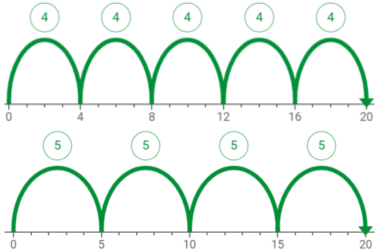
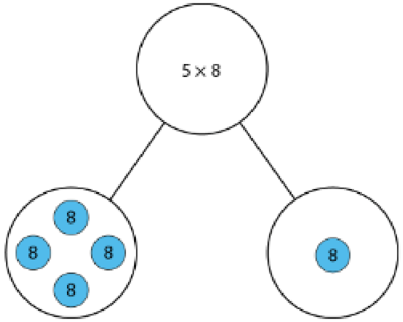
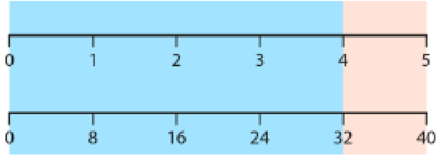
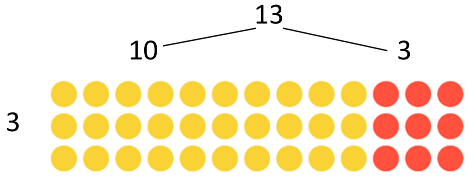
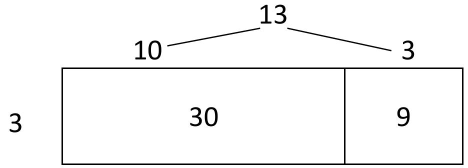
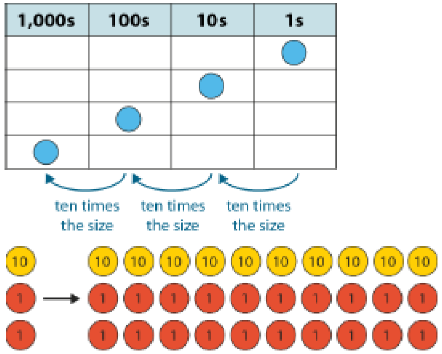
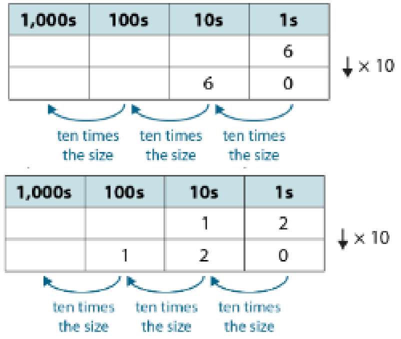
KS2

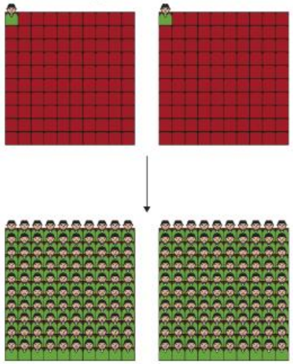
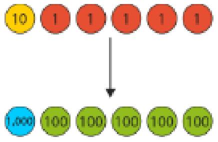
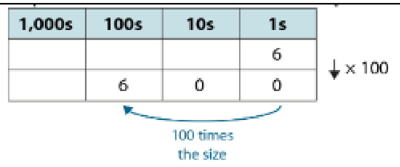
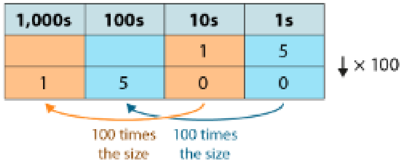
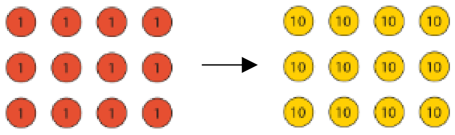
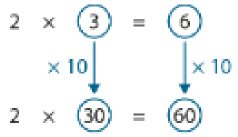
Strategy	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
Bridging through a multiple of 10, 100, etc **Years 3, 4, 5 and 6**	 12 – 4 = 12 – 2 = 10 10 – 2 = 8 12 – 4 2 2	 120 – 30 = 120 – 20 = 100 100 – 10 = 90	 120 – 30 = 120 – 20 = 100 100 – 10 = 90

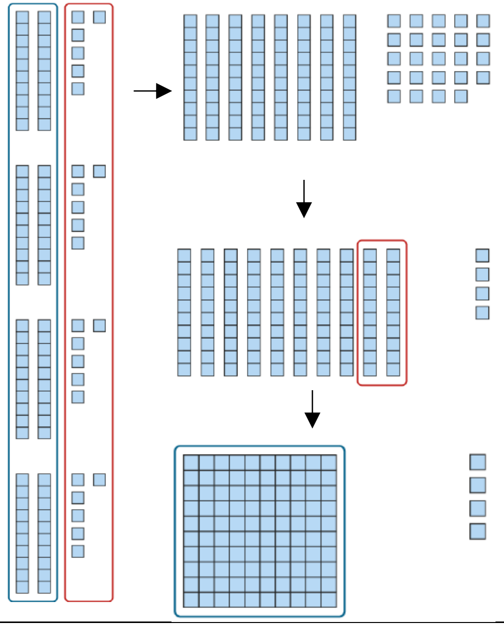
Compensating – rounding to the nearest multiple 10, 100, etc and adjusting **Years 3, 4, 5 and 6**	 152 – 29 		152 – 30 = 122 122 + 1 = 123

Multiplication

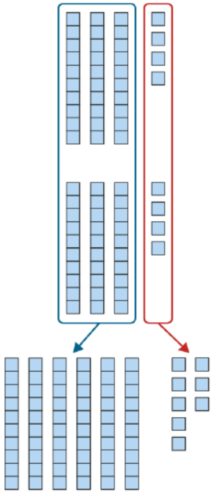
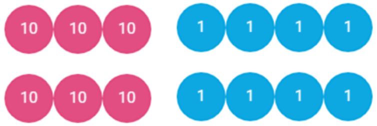
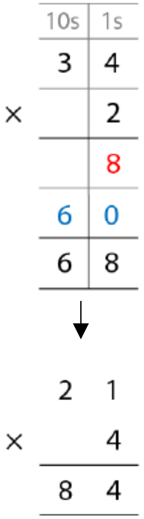
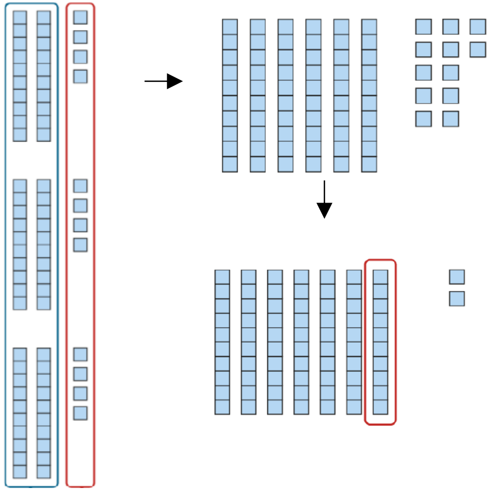
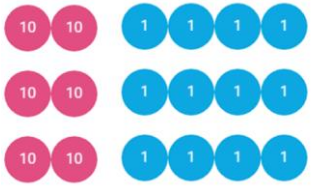
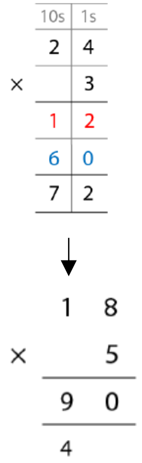
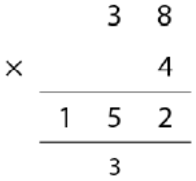
Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
One group of two, two groups of two, three groups of 2, … Ten, twenty, thirty, … One five, two fives, three fives, … **Year 1**			10, 20, 30, …
There are __ coins. Each coin has a value of __p. This is __p. **Year 1**	 Representing each group by one object		Five 2p coins = 10p
There are ____ equal groups There are ____ in each group **Year 2**			5 + 5 + 5
There are __ in each group. There are __ groups. There are __ in a group and __ groups. **Year 2**	 		2 + 2 + 2 + 2 = 8 2 x 4 = 8 5 + 5 + 5 = 15 5 x 3 = 15
Factor times factor is equal to the product. The product is equal to factor times factor. **Year 2**	 Unitising equal groups – representing each group by one object	 	2 x 3 = 6 6 = 2 x 3

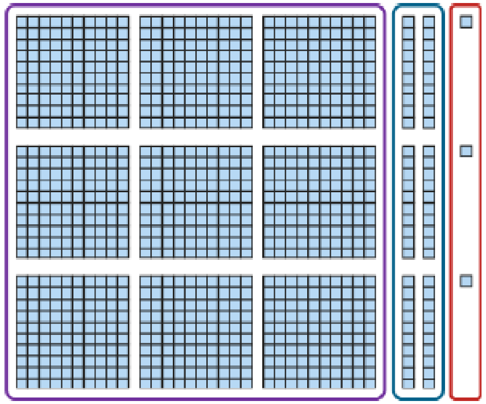
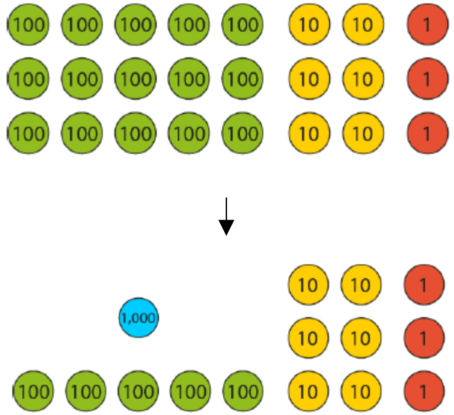
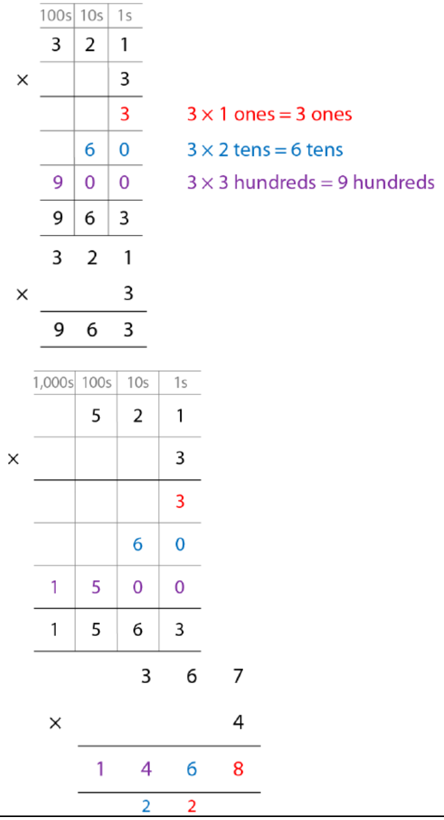
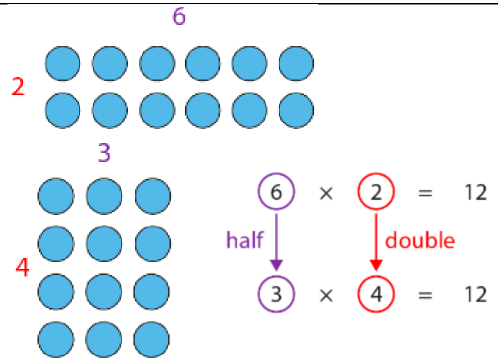
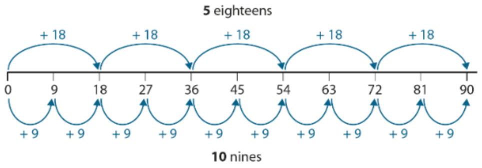
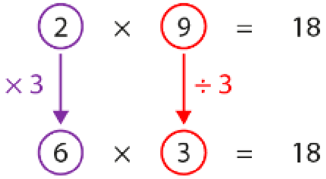
__ times __ can represent __ in a group and __ groups. It can also represent __ groups of __. Multiplication is commutative. **Year 2**			2 x 5 = 5 x 2
__ is equal to __ plus __, so __ times __ is equal to __ times __ plus __ times __. __ is equal to __ minus __, so __ times __ is equal to __ times __ minus __ times __. Multiplication is distributive. **Year 3**			5 = 4 + 1 5 x 8 = 4 x 8 + 1 x 8 = 32 + 8 = 40 4 = 5 – 1 4 x 8 = 5 x 8 – 1 x 8 = 40 – 8 = 32
__ is equal to __ plus __, so __ times __ is equal to __ times __ plus __ times __. __ is equal to __ minus __, so __ times __ is equal to __ times __ minus __ times __. Multiplication is distributive. **Year 3**			3 x 13 = 3 x 10 + 3 x 3 = 30 + 9 = 39
To multiply a whole number by 10, the digits move one place to the left and add a zero place holder. **Year 3**			6 x 10 = 60 12 x 10 = 120

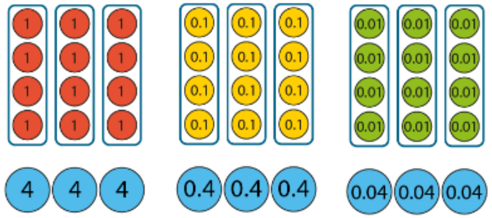
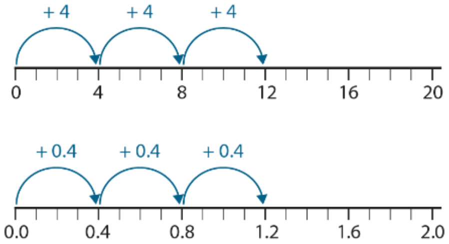
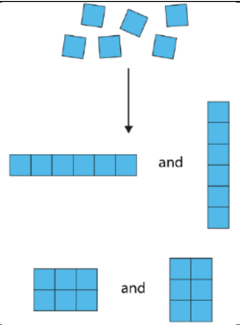
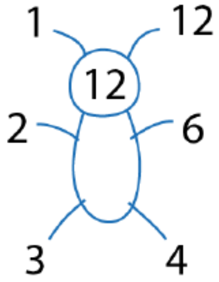
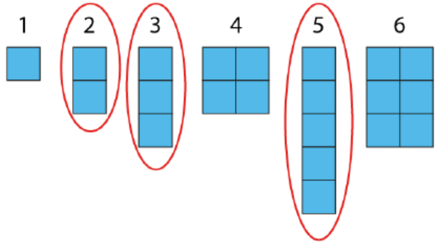
All multiples of 100 have both a tens and ones digit of 0. When a number is multiplied by 100, the product is a multiple of 100. **Year 3**	 	 	2 x 100 = 200 There are 100 times as many people as before. 15 x 100 = 1500
If one factor is made ten times the size, the product will be ten times the size. 3 times 5 is equal to 15.” “3 times 5 tens is equal to 15 tens.” “15 tens is equal to 150.” **Year 3**			4 x 3 = 12 so 4 x 30 = 120

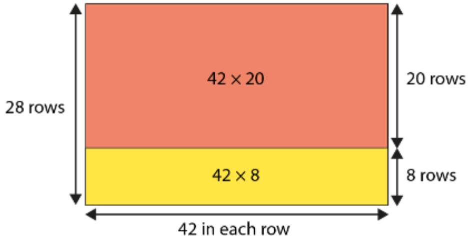
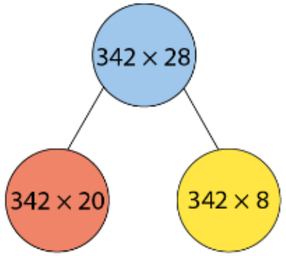
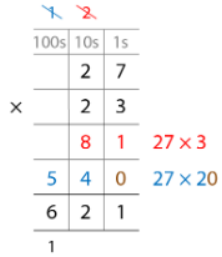
If there are ten or more ones, we must regroup the ones into tens and ones. If there are ten or more tens, we must regroup the tens into hundreds and tens. Multiplication is distributive. Informal multiplication of 2 or 3 digit amounts **Year 4**		84 × 6 = 504 80 4 80 × 6 = 480 4 × 6 = 24 480 + 24 = 504	84 x 6 = 80 x 6 + 4 x 6 = 480 + 24 = 504

Multiplication: Formal Written Methods

Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
We work from the least significant digit, on the right, to the most significant digit, on the left. Multiplication is distributive. **Year 5**		 34 x 2 = 60 + 8 = 68	 2 × 4 ones = 8 ones 2 × 3 tens = 6 tens
If there are ten or more ones, we must regroup the ones into tens and ones. If there are ten or more tens, we must regroup the tens into hundreds and tens. Multiplication is distributive. **Year 5**		 24 x 3 = 60 + 12 = 72 ↓	 3 × 4 ones = 12 ones = 1 ten + 2 ones 3 × 2 tens = 6 tens 

If there are ten or more ones, we must regroup the ones into tens and ones. If there are ten or more tens, we must regroup the tens into hundreds and tens. If there are ten or more hundreds, we must regroup the hundreds into thousands and hundred. Multiplication is distributive. **Year 5**	 321 x 3 = 963	 521 x 3 = 1000 + 500 + 60 + 3 = 1563	
If there is a multiplicative increase in one factor and a multiplicative decrease in the other, the product remains the same. If I multiply one factor by __, I must divide the other factor by __ for the product to remain the same. **Year 5 and 6**			

If one factor is made one tenth of the size, the product will be one tenth of the size. If one factor is made one hundredth of the size, the product will be one hundredth of the size. I move the digits of the number I am multiplying __ places to the left until I get a whole number; then I multiply; then I move the digits of the product __ places to the right. **Year 5**	 4 x 3 = 12 0.4 x 3 = 1.2 0.04 x 3 = 0.12		$\begin{array}{ccccc} & & 4 & 5 & 6 \\ \times & & & & 4 \\ \hline & 1 & 8 & 2 & 4 \\ \hline & & 2 & 2 & \end{array}$ $\begin{array}{ccccc} & & 4 . & 5 & 6 \\ \times & & & & 4 \\ \hline & 1 & 8 . & 2 & 4 \\ \hline & & 2 & 2 & \end{array}$
Numbers that have more than two factors are composite numbers. **Year 5**	 Factors of 6 are 1, 2, 3 and 6.	 Factor bugs	Factors of 6 are 1, 2, 3 and 6.
Numbers that have only two factors are prime numbers. **Year 5**			17 is a prime number because its only factors are 1 and 17.

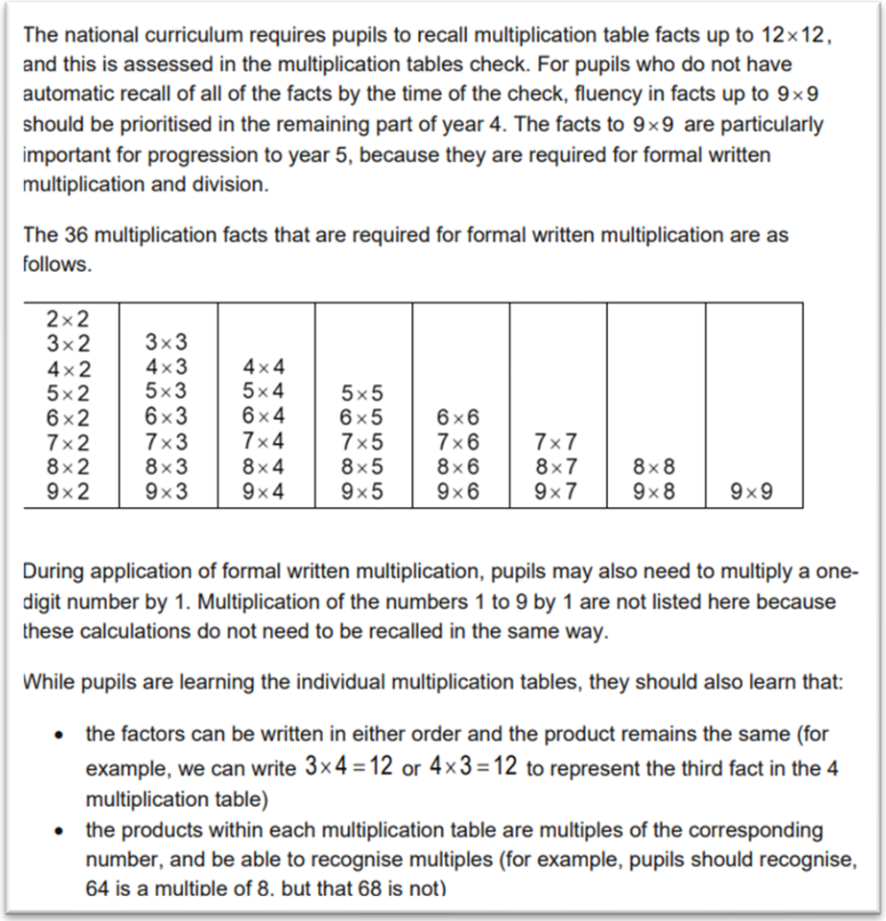
To multiply two two-digit numbers, first multiply by the ones, then multiply by the tens, then add them together. To multiply a three-digit number by a two-digit number, first multiply by the ones, then multiply by the tens, then add them together. **Year 6**			 

Multiplication – Key mental strategies for Key Stage 2

Children are taught automatic recall of the times table facts through a variety of methods. This includes 'rolling numbers' beginning with 2, 5 and 10 in Year 1 and 2
And 3, 4, 5, 6, 7, 8 and 9 from Year 3 onwards.

Quick recall of times table facts upto 12 x 12 is practised daily through discrete activities. Alongside this the maths lesson should be used to gain clear conceptual knowledge as detailed above.

In Year 3, children will practice their automatic recall of facts in the 2, 5, 10, 3 and 4 times table. In Year 4 this will be extended to the 6, 7, 8, 9, 11 and 12 times table. Strategies to quickly derive the 11 and 12 times table will also be explored.



The national curriculum requires pupils to recall multiplication table facts up to 12×12, and this is assessed in the multiplication tables check. For pupils who do not have automatic recall of all of the facts by the time of the check, fluency in facts up to 9×9 should be prioritised in the remaining part of year 4. The facts to 9×9 are particularly important for progression to year 5, because they are required for formal written multiplication and division.

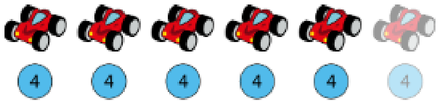
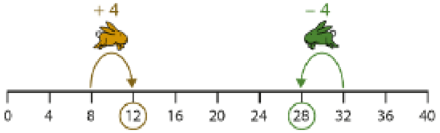
The 36 multiplication facts that are required for formal written multiplication are as follows.

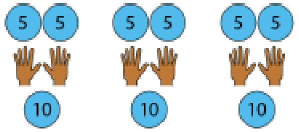
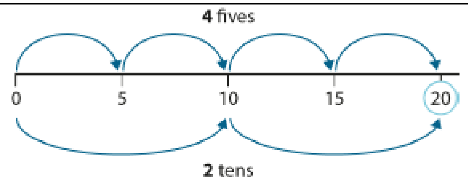
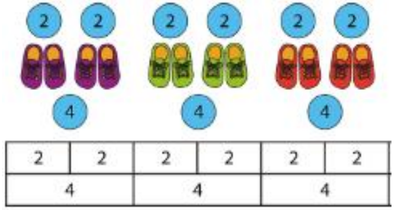
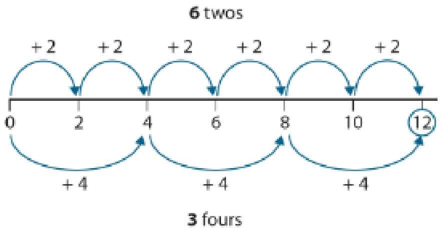
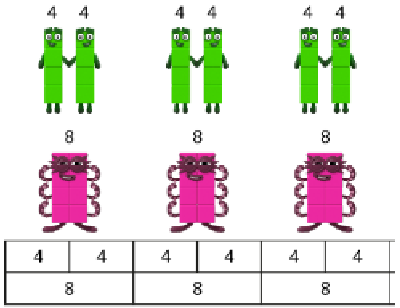
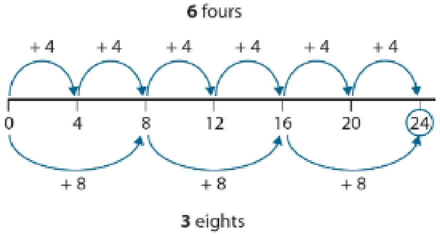
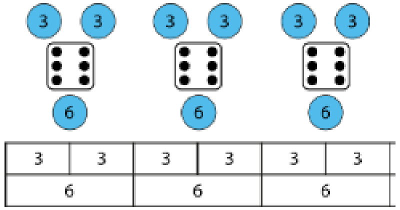
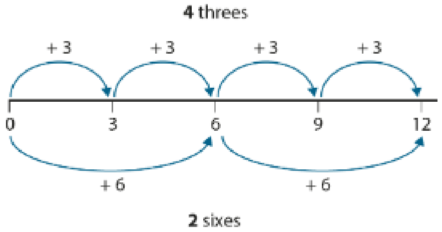
2×2							
3×2	3×3						
4×2	4×3	4×4					
5×2	5×3	5×4	5×5				
6×2	6×3	6×4	6×5	6×6			
7×2	7×3	7×4	7×5	7×6	7×7		
8×2	8×3	8×4	8×5	8×6	8×7	8×8	
9×2	9×3	9×4	9×5	9×6	9×7	9×8	9×9

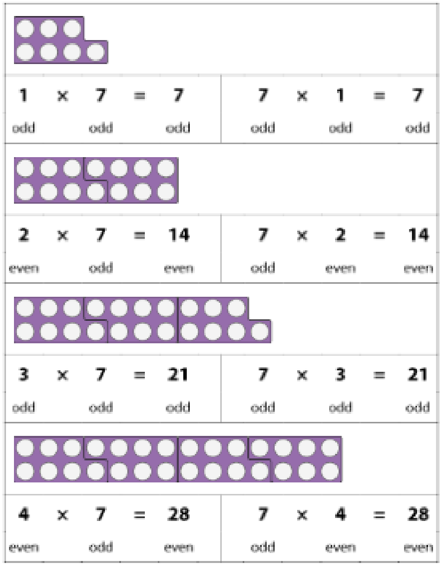
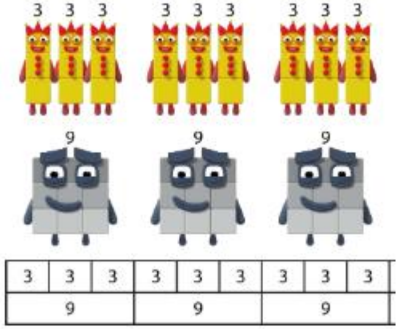
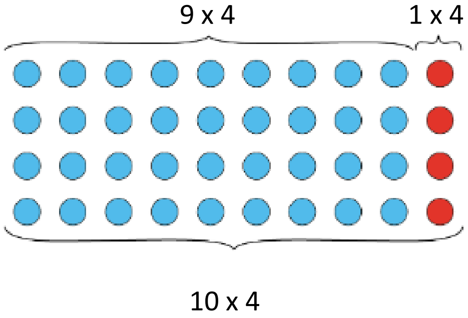
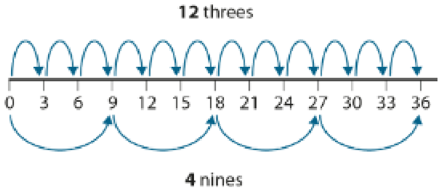
During application of formal written multiplication, pupils may also need to multiply a one-digit number by 1. Multiplication of the numbers 1 to 9 by 1 are not listed here because these calculations do not need to be recalled in the same way.

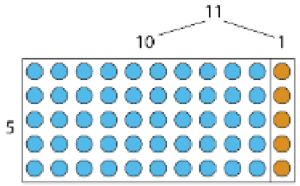
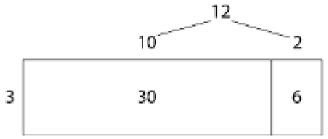
While pupils are learning the individual multiplication tables, they should also learn that:

- the factors can be written in either order and the product remains the same (for example, we can write $3\times4=12$ or $4\times3=12$ to represent the third fact in the 4 multiplication table)
- the products within each multiplication table are multiples of the corresponding number, and be able to recognise multiples (for example, pupils should recognise, 64 is a multiple of 8, but that 68 is not)

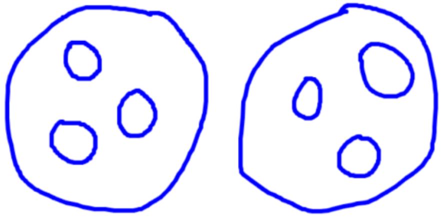
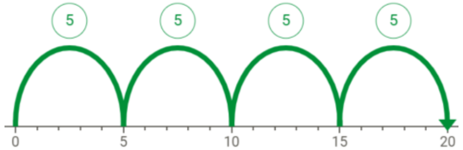
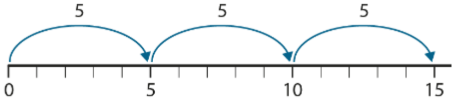
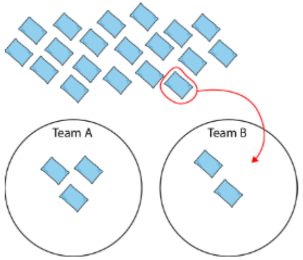
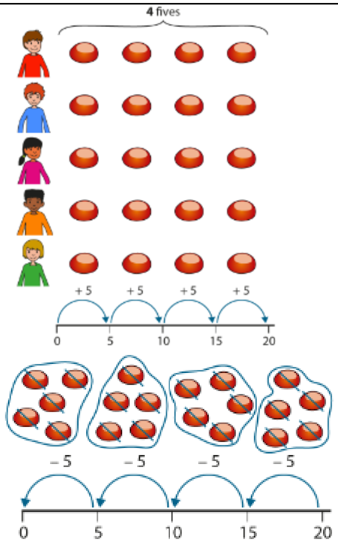
Strategy	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
Adjacent multiples of __ have a difference of __. **Year 3 onwards**			4 x 6 = 4 x 5 + 4 4 x 9 = 4 x 10 - 4

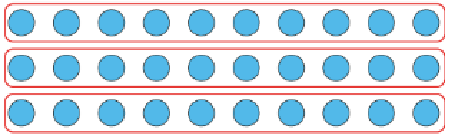
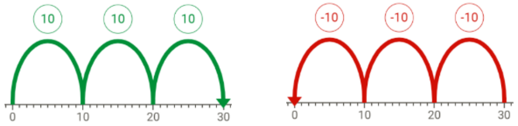
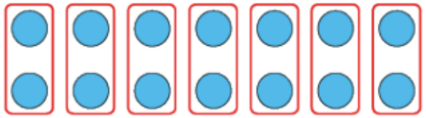
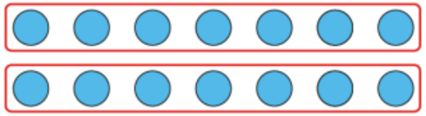
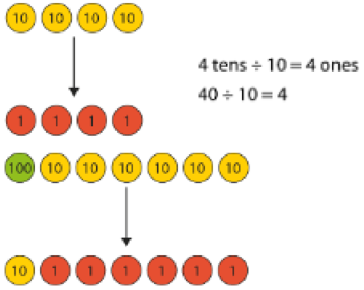
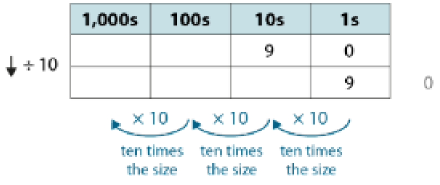
Products in the 10 times table are double the products in the 5 times table. Products in the 5 times table are half of the products in the 10 times table. (NCETM Year 2 unit 2.5) **Year 2 onwards**			5 x 4 = 10 x 2
Products in the 4 times table are double the products in the 2 times table. Products in the 2 times table are half of the products in the 4 times table. **Year 3 onwards**			2 x 6 = 4 x 3
Products in the 8 times table are double the products in the 4 times table. Products in the 4 times table are half of the products in the 8 times table. **Year 3 onwards**			4 x 6 = 8 x 3
Products in the 6 times table are double the products in the 3 times table. Products in the 3 times table are half of the products in the 6 times table. **Year 3 onwards**			3 x 4 = 6 x 2

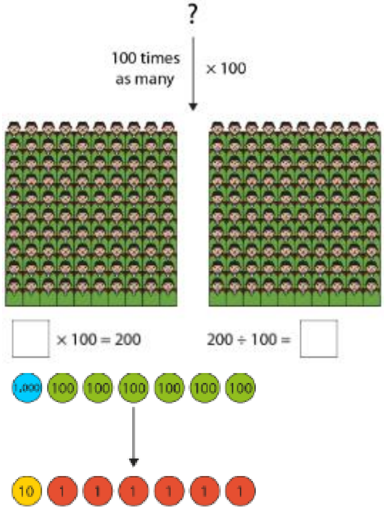
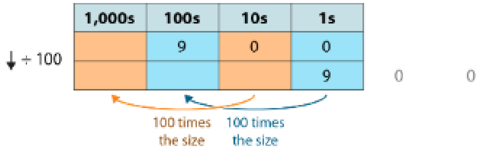
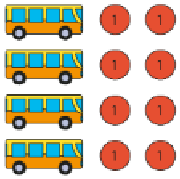
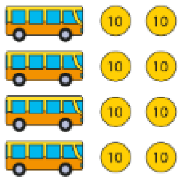
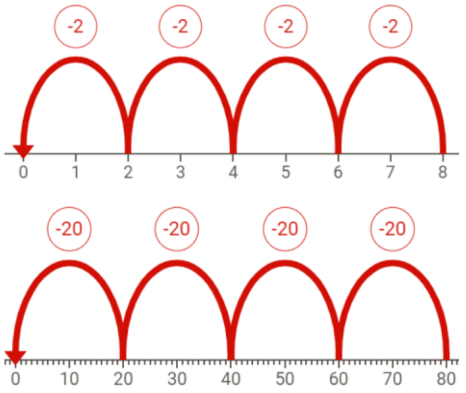
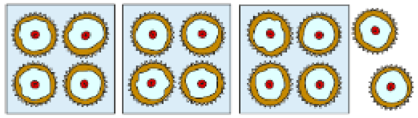
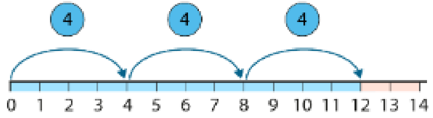
When both factors are odd, the product is odd. When one factor is odd and the other factor is even, the product is even. **Year 4 onwards**			odd x odd = odd odd x even = even even x odd = even even x even = even
Products in the 9 times table are triple the products in the 3 times table. Products in the 10 times table can be used to find products in the 9 times table. **Year 3 onwards**	 		3 x 12 = 9 x 4 9 x 4 = 10 x 4 – 1 x 4

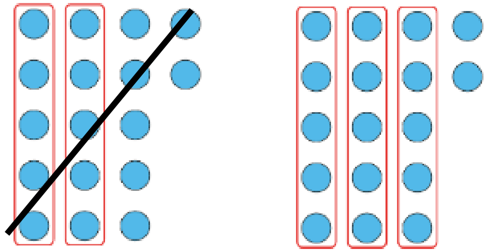
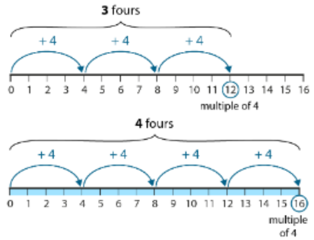
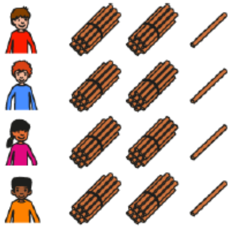
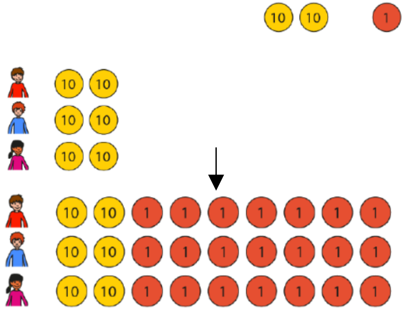
Products in the 10 times table can be used to find products in the 11 times table and 12 times table. **Year 4 onwards**			12 x 3 = 10 x 3 + 2 x 3 = 30 + 6 = 36

Division

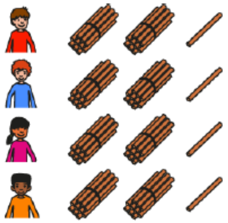
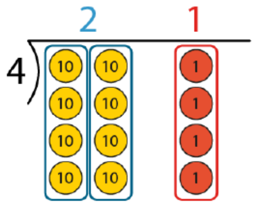
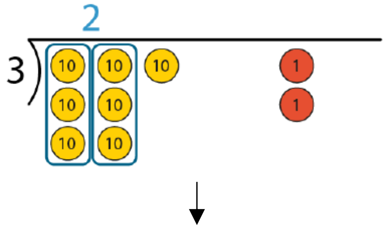
Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
One group of two, two groups of two, three groups of 2, … Ten, twenty, thirty, … One five, two fives, three fives, … **Year 1**			6 biscuits shared between 2 children gives 3 biscuits each.
The _____ costs __p. Each coin has a value of __p. So I need __ coins. **Year 1**			Five 2p coins = 10p
__ is divided into groups of __. There are __ groups. We can skip count using the divisor to find the quotient. **Year 2**			5 + 5 + 5 = 15 15 ÷ 5 = 3
__ divided between __ is equal to __ each. We can skip count using the divisor to find the quotient. **Year 2**			One 5 is 1 each. That's 5. Two 5s is 2 each. That's 10. 10 ÷ 5 = 2

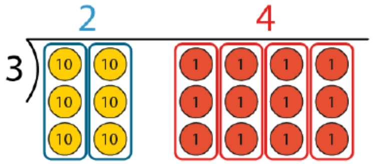
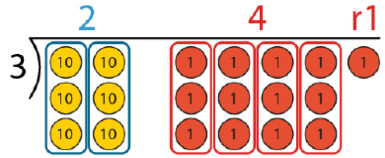
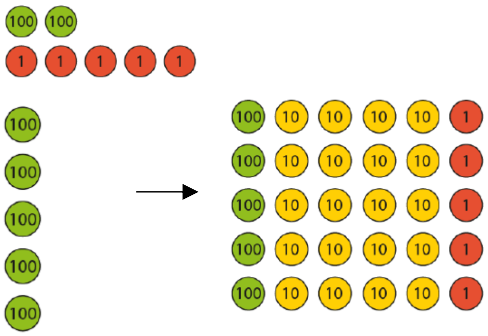
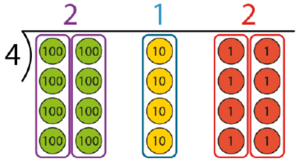
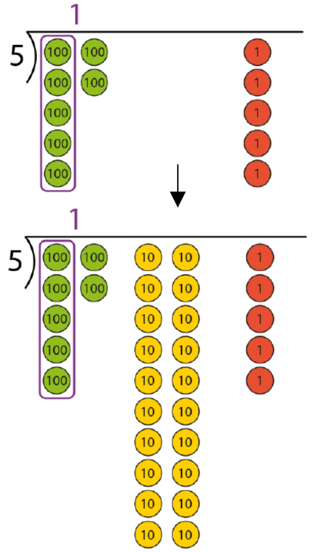
Ten times __ is equal to __ so __ divided into groups of ten is __. **Year 2**	 30 represents the total number of counters. 10 represents the number in each group. 3 represents the number of groups.		10 x 3 = 30 3 x 10 = 30 30 ÷ 10 = 3 Answers can be derived by skip counting
_____ twos are 14. 7 twos are 14. ____ times ___ is 14, so 14 divided by 2 is ___.” “14 divided into groups of 2 is equal to ____.” If the divisor is __, we can use the __ times table to find the quotient. **Year 3**	I need 14 ping-pong balls. There are 2 ping-pong balls in a pack. How many packs do I need?  14 ÷ 2 = 7	14 2 2 2 2 2 2 2	14 ÷2 = 7 Answers should be derived using known multiplication facts
_____ twos are 14. 7 twos are 14. ____ times ___ is 14, so 14 divided by 2 is ___.” “£14 shared between 2 is equal to £7 each. If the divisor is __, we can use the __ times table to find the quotient.	£14 is shared between 2 children. How much money does each child get? 	14 7 7	14 ÷2 = 7 Answers should be derived using known multiplication facts
To divide a multiple of ten by 10, remove the zero from the ones place. **Year 3**	 4 tens ÷ 10 = 4 ones 40 ÷ 10 = 4		90 ÷ 10 = 9 150 ÷ 10 = 15

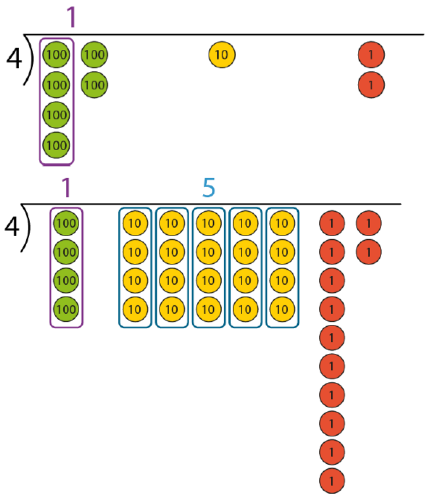
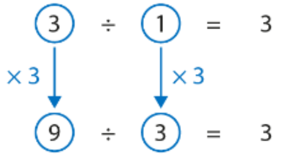
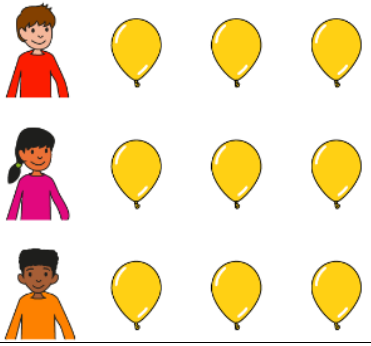
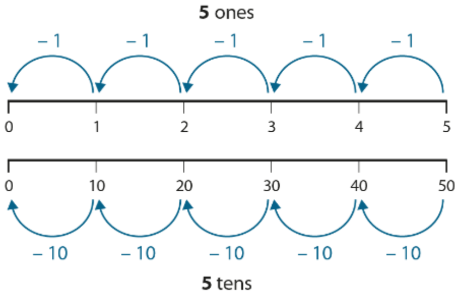
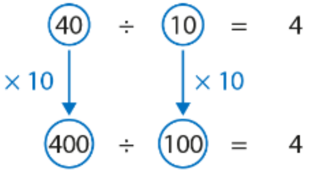
To divide a multiple of 100 by 100, remove two zeros (from the tens and ones places). **Year 3**	 	 	900 ÷ 100 = 9 1500 ÷ 100 = 15
If the dividend is made ten times the size, the quotient will be ten times the size. **Year 3**	8 ÷ 4 = 2  80 ÷ 4 = 20  	 	$\begin{tikzcd} 12 \div 3 = 4 \arrow[d, "\times 10"'] & & 4 \arrow[d, "\times 10"] \\ 120 \div 3 = & & \boxed{40} \end{tikzcd}$
__ is divided into groups of __. There are __ groups and a remainder of __. **Year 4**		 	14 = 4 x 3 + 2 14 ÷ 4 = 3 r 2

__ is a multiple of __ so when it is divided into groups of __, there is no remainder. The remainder is always less than the divisor. **Year 4**			17 ÷ 5 = 2 r 7 is incorrect because 7 is greater than 5. 17 ÷ 5 = 3 r 2
If dividing the tens gives a remainder of one or more tens, we must exchange the remaining tens for ones. **Year 4**	 84 ÷ 4 = 21		8 tens ÷ 4 = 2 tens 4 ones ÷ 4 = 1 one 84 ÷ 4 = 21 6 tens ÷ 3 = 2 tens 21 ones ÷ 3 = 7 ones 81 ÷ 3 = 27

Division: Written Methods

Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
If dividing the tens gives a remainder of one or more tens, we must exchange the remaining tens for ones. **Year 5**		 72 ÷ 3 = 24 	10s 1s $\begin{array}{r} 2\ \ 1 \\ 4\overline{)\,8\ \ 4} \end{array}$ 8 tens ÷ 4 = 2 tens 4 ones ÷ 4 = 1 one $\begin{array}{r} 2\ \ 1 \\ 4\overline{)\,8\ \ 4} \end{array}$ $\begin{array}{r} 2\ \ 4 \\ 3\overline{)\,7\ \ {}^{1}2} \end{array}$

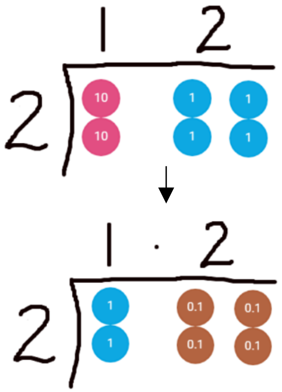
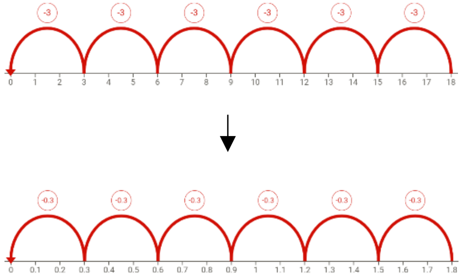
		 73 ÷ 3 = 24 r 1 	$\begin{array}{l} \quad 2\ \ 4\,r\,1 \\ 3\overline{)\ 7\ \ {}^{1}3} \end{array}$
If dividing the hundreds gives a remainder of one or more hundreds, we must exchange the remaining hundreds for tens. **Year 5**		 	$\begin{array}{l} \quad 2\ \ 1\ \ 2 \\ 4\overline{)\ 8\ \ 4\ \ 8} \end{array}$ $\begin{array}{l} \quad 1\ \ 4\ \ 1 \\ 5\overline{)\ 7\ \ {}^{2}0\ \ 5} \end{array}$ $\begin{array}{l} \quad 1\ \ \ 5\ \ \ 3 \\ 4\overline{)\ 6\ \ {}^{2}1\ \ {}^{1}2} \end{array}$

		612 ÷ 4 = 153 	
If there is a multiplicative change to the dividend factor and a corresponding change to the divisor, the quotient remains the same. If I multiply the dividend by __, I must multiply the divisor by __ for the quotient to remain the same. **Year 5 and 6**	 		

<table>
<tr>
<td>If the dividend is made one tenth of the size, the quotient will be one tenth of the size.

If the dividend is made one hundredth of the size, the quotient will be one hundredth of the size.

I move the digits of the dividend __ places to the left until I get a whole number; then I divide; then I move the digits of the quotient __ places to the right.

Year 5 onwards</td>
<td>
</td>
<td>
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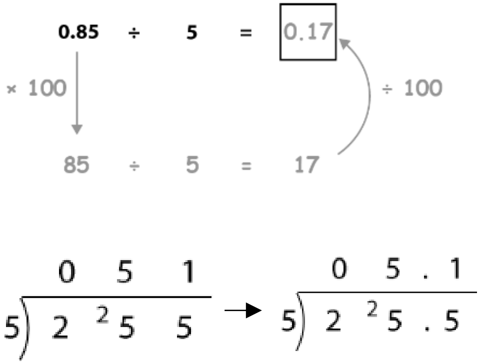
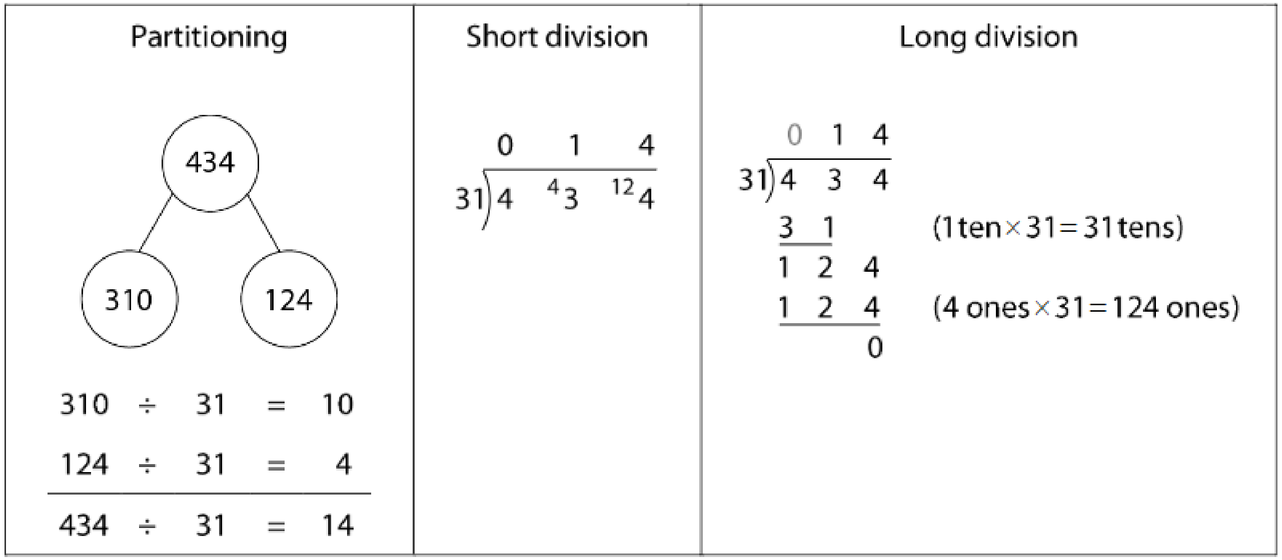
<td>
</td>
</tr>
<tr>
<td>Any two-, three- or four-digit dividend can be divided by a two-digit divisor using skip-counting in multiples of the divisor, or by short division or long division.

Year 6</td>
<td colspan="3">
</td>
</tr>
</table>

Where there is a remainder, the result can be expressed as a whole-number quotient with a whole-number remainder, a whole-number quotient with a proper-fraction remainder, or as a decimal-fraction quotient.

Year 6

354 ÷ 15 = ?

$\begin{array}{r} 23\text{ r}9 \\ 15\overline{)354} \\ \underline{30} \\ 54 \\ \underline{45} \\ 9 \end{array}$	$\begin{array}{r} 23\frac{9}{15} \\ 15\overline{)354}\phantom{\frac{9}{15}} \\ \underline{30}\phantom{\frac{9}{15}} \\ 54\phantom{\frac{9}{15}} \\ \underline{45}\phantom{\frac{9}{15}} \\ 9\phantom{\frac{9}{15}} \end{array}$	$\begin{array}{r} 23.6 \\ 15\overline{)354.0} \\ \underline{30} \\ 54 \\ \underline{45} \\ 90 \\ \underline{90} \\ 0 \end{array}$
	$\frac{9}{15} = \frac{3}{5}$	
So, 354 ÷ 15 = 23 r 9	So, $354 \div 15 = 23\frac{3}{5}$	So, 354 ÷ 15 = 23.6

This policy should be reviewed every two years, or as necessary.

Log of changes and updates to the document:

Date	Page	Change	Approver
5/11/2020	All	Policy created by Maths Leader – EM and reviewed with HT	KL
11/11/2020	All	Reviewed at staff meeting	
	All	Reviewed by governors	SDC
10/12/2021	All	None	KL SDC
February 2023	1 All	Update logo and dates Update and add to policy, reflecting the current practise, with specific examples in Year groups Update to HT, Maths SL and Link Governor	KL and EH MH
