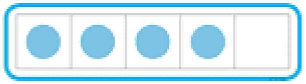
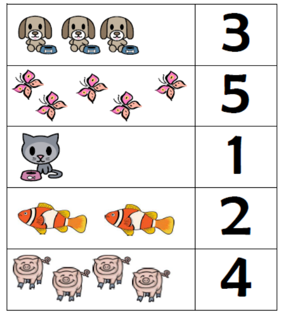
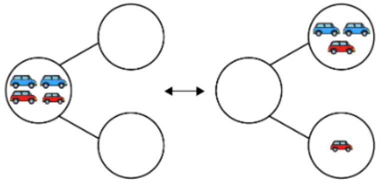
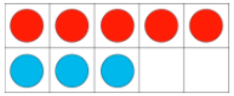
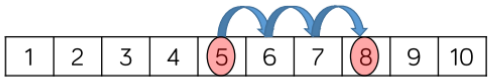
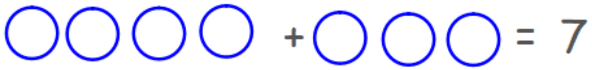
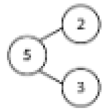
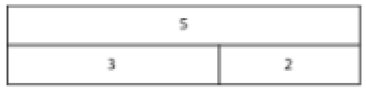
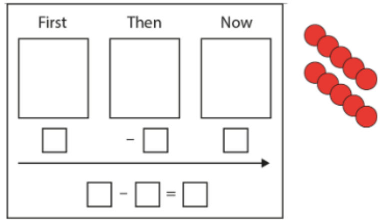
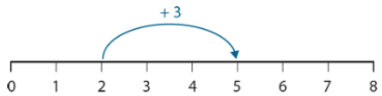
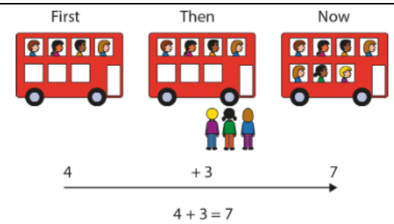
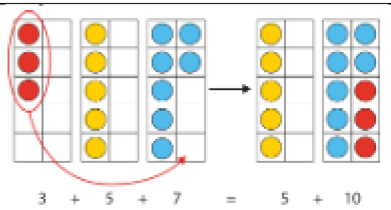
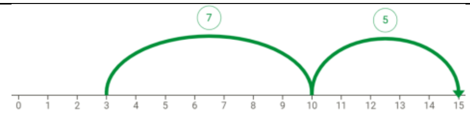
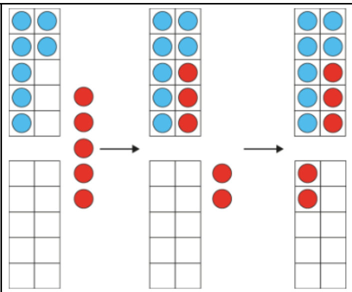
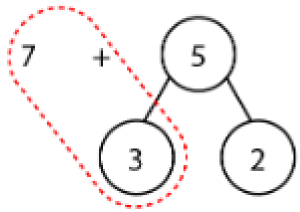
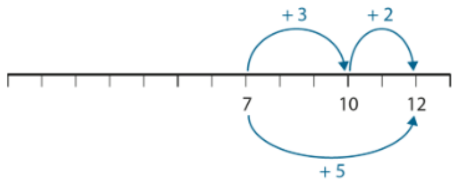
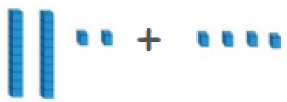
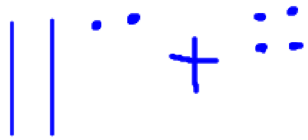
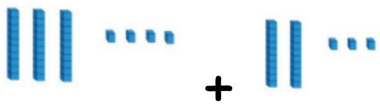
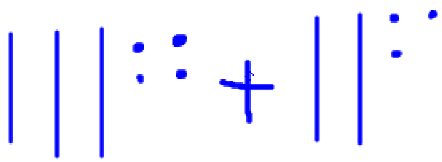
CALCULATION POLICY

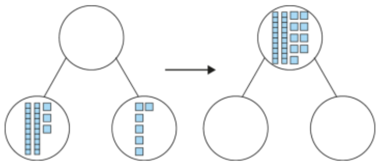
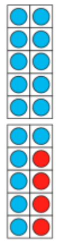
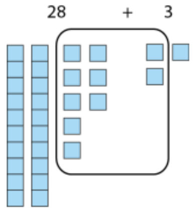
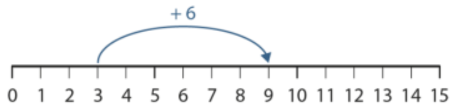
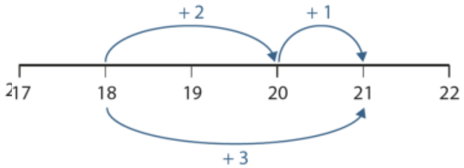
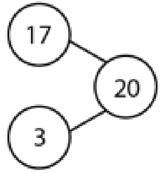
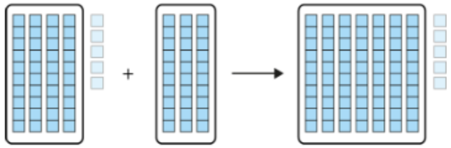
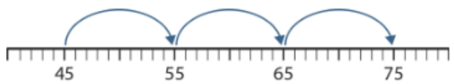
January 2023

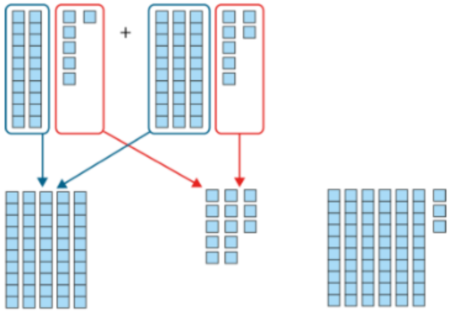
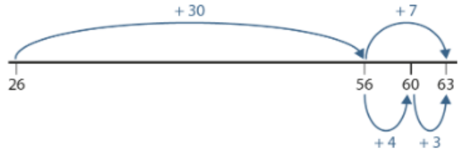
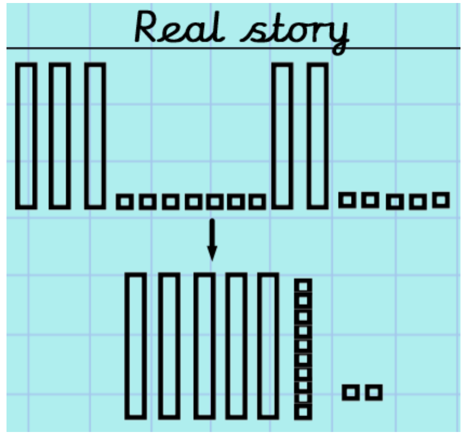
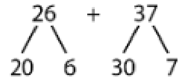
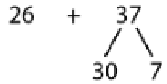
Addition

Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
Can you show me ___? ___ is ___ and one more. **EYFS**	  	  	 Children relate the number of objects to the numeral.
__ is the whole, __ is a part, __ is a part. __ = __ plus __ and __ plus __ = __ There are __ in total. **EYFS/1**	  	 3 + 2 = 5 2 + 3 = 5 5 = 3 + 2 5 = 2 + 3 5 + 3 = 8  	 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. **EYFS/1**	Role play getting 'on the bus' or use a toy bus. 	4 + 3 = 7 2 + 3 = 5	4 + 3 = 7
We can look for pairs of numbers which sum to 10. __ plus __ is equal to 10, then 10 plus __ is equal to __. **Year 1/2**			3 + 5 + 7 = 10 + 5 = 15

First I partition the __: __ plus __ is equal to __. Then __ plus __ is equal to ten … and ten plus __ is equal to __. **Year 1/2**	 7 + 5 = 7 + 3 = 10 10 + 2 = 12 	 	7 + 3 = 10 10 + 2 = 12 7 + 5 = 7 + 3 + 2 = 10 + 2 10 + 2 = 12
Year 1/2			22 + 4 = 26
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)			34 + 23 = 57

Year 1/2			
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 1/2**	  3 + 6 = 9 23 + 6 = 29 	 3 + 6 = 9 23 + 6 = 29 	 17 + 3 = 20 28 + 3 2 1
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**	 40 + 30 = 70 so 45 + 30 = 75	 45 + 30 = 75	4 + 3 =7 4 tens + 3 tens = 7 tens 40 + 30 = 70 So 45 + 30 = 75

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

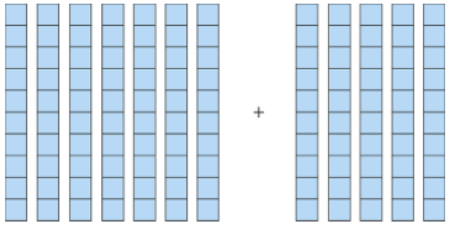
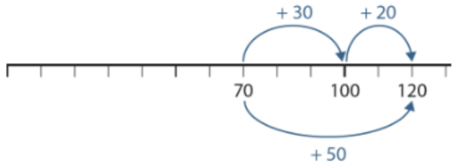
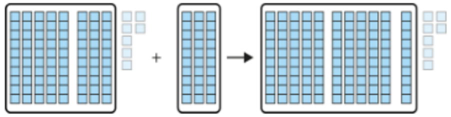
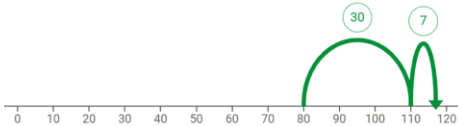
Addition Facts

Adding 1	Bonds to 10	Adding 10	Bridging/compensating
Adding 2	Adding 0	Doubles	Near doubles

Y1 facts

Y2 facts

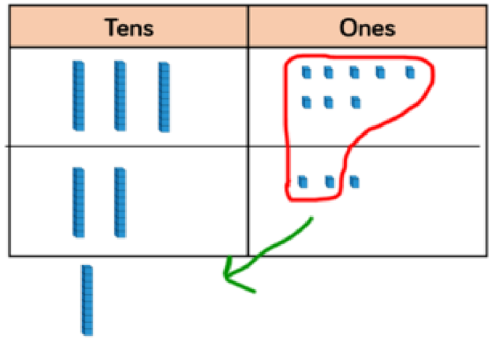
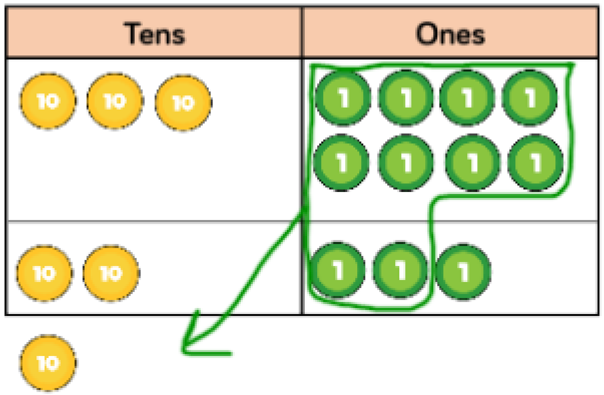
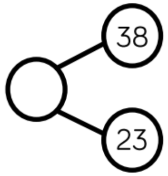
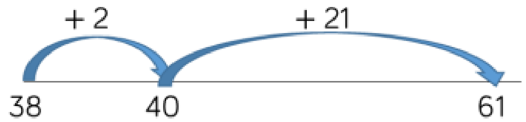
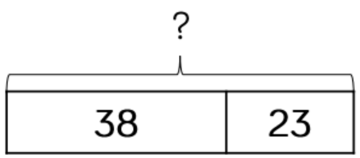
+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	1 + 10
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8	2 + 9	2 + 10
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7	3 + 8	3 + 9	3 + 10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

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 numbers) So __ tens plus __ tens is equal to __ tens. (multiple-of-ten numbers) __ plus __ is equal to one hundred and __. **Year 3**	 7 + 5 = 12 7 tens + 5 tens = 12 tens 70 + 50 = 120	 	70 + 50 = 120 30 20 100 70 + 50 = 70 + 30 + 20 = 100 + 20 = 120
I know that __ plus __ is equal to __. (single-digit numbers) So __ tens plus __ tens is equal to __ tens. (multiple-of-ten numbers) __ plus __ is equal to one hundred and __. **Year 3**	 87 + 30 = 110 + 7 = 117	 	87 + 30 = 117 7 80 110 87 + 30 = 80 + 7 + 30 = 110 + 7 = 117

<table>
<tr>
<td>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.

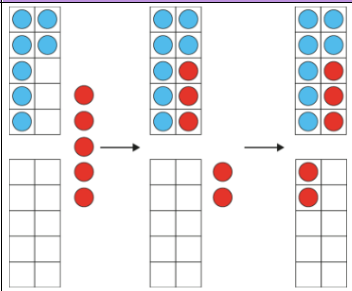
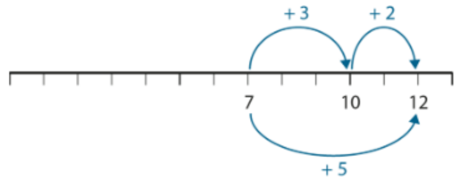
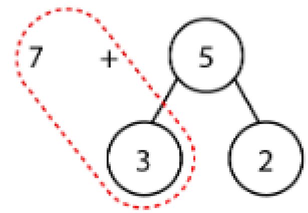
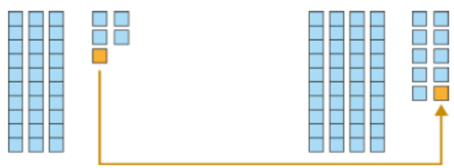
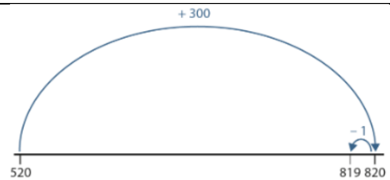
If the column sum is equal to ten or more, we must regroup.

Year 3</td>
<td>Start with two-digit numbers to exemplify lining up the columns.

</td>
<td>Children could draw place value counters or the diennes concrete materials.


</td>
<td>Start with two-digit numbers to exemplify lining up the columns.
$\boxed{38 + 23 = 61}$
$$\begin{array}{r} 38 \\ +\ 23 \\ \hline 61 \\ \hline {\scriptstyle 1}\ \end{array}$$</td>
</tr>
<tr>
<td>If the column sum is equal to ten or more, we must regroup.

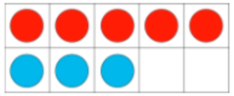
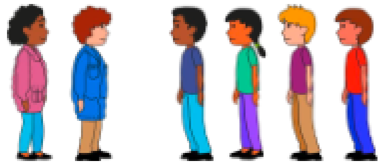
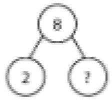
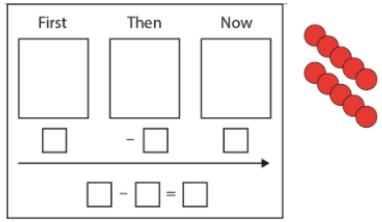
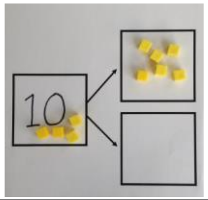
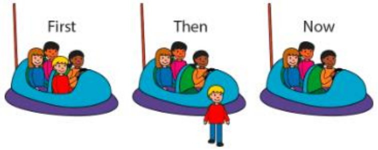
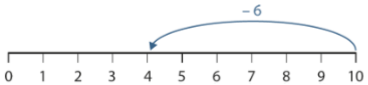
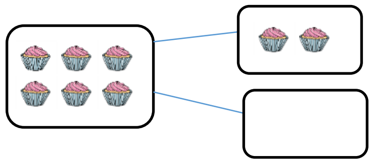
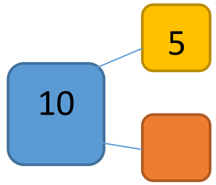
Year 4</td>
<td>See Year 3 examples</td>
<td>See Year 3 examples</td>
<td>$$\begin{array}{rrrrr} & 6, & 5 & 8 & 4 \\ + & 2, & 7 & 3 & 9 \\ \hline & 9, & 3 & 2 & 3 \\ \hline & {\scriptstyle 1} & {\scriptstyle 1} & {\scriptstyle 1} & \end{array}$$</td>
</tr>
</table>

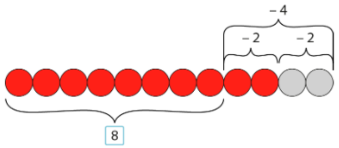
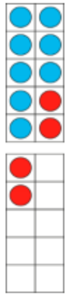
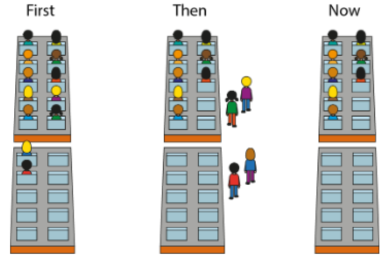
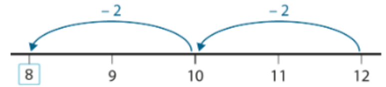
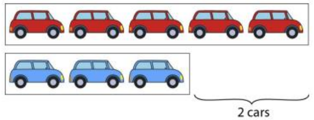
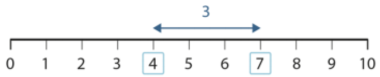
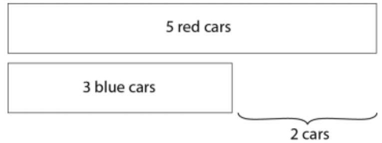
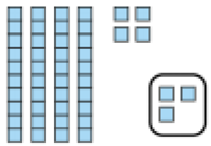
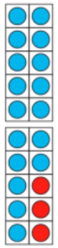
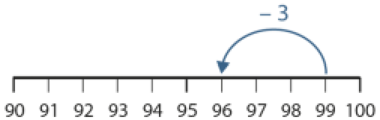
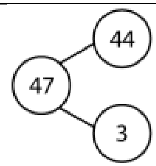
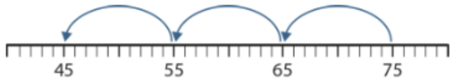
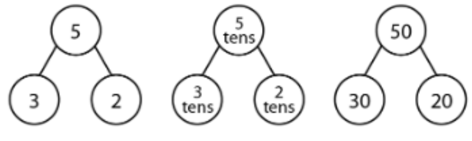
			£ 2 4 . 5 5 + £ 1 7 . 8 2 £ 4 2 . 3 7 1 1
If the column sum is equal to ten or more, we must regroup. **Years 5 and 6**	See Year 3 examples	See Year 3 examples	As in Year 4 but using numbers with more than 4 digits

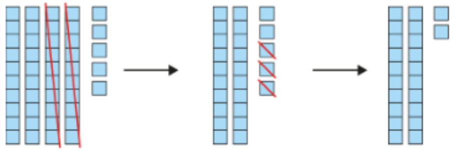
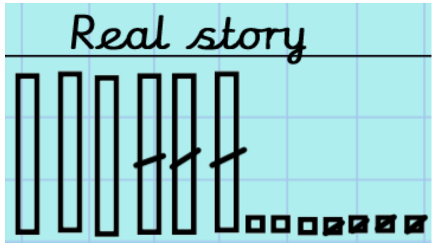
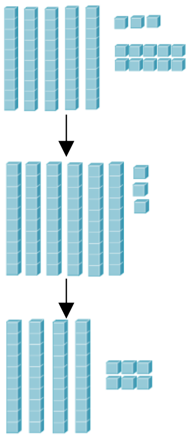
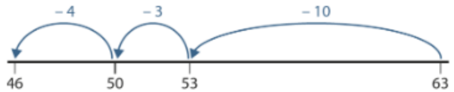
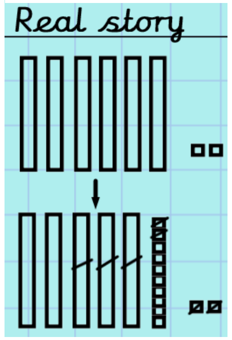
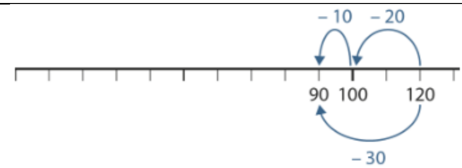
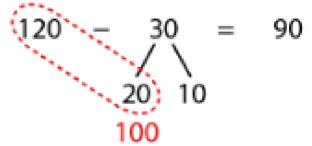
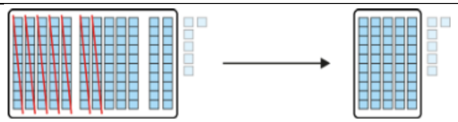
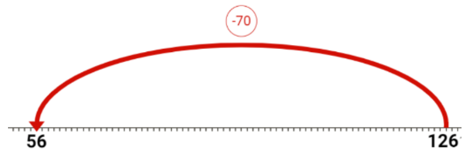
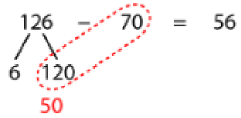
Addition – Key mental strategies for Key Stage 2

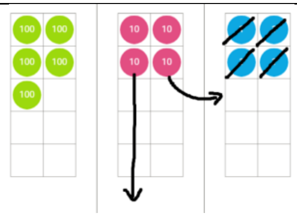
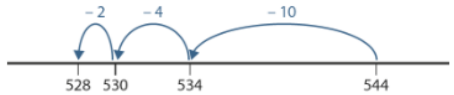
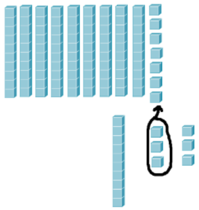
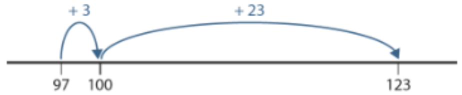
Strategy	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
Bridging through a multiple of 10, 100, etc **Years 3, 4, 5 and 6**	 7 + 5 = 7 + 3 = 10 10 + 2 = 12	 7 + 5 = 7 + 3 = 10 10 + 2 = 12	 7 + 3 = 10 10 + 2 = 12
Compensating – rounding to the nearest multiple 10, 100, etc and adjusting **Years 3, 4, 5 and 6**	 35 + 49 = 34 + 50 = 84	 520 + 299 = 520 + 300 = 820 820 – 1 = 819	**69** + **69** = $\boxed{138}$ - 2 70 + 70 = $\boxed{140}$

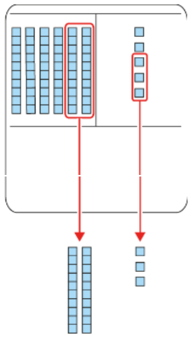
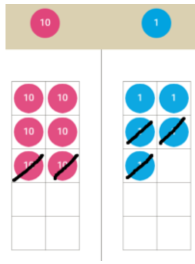
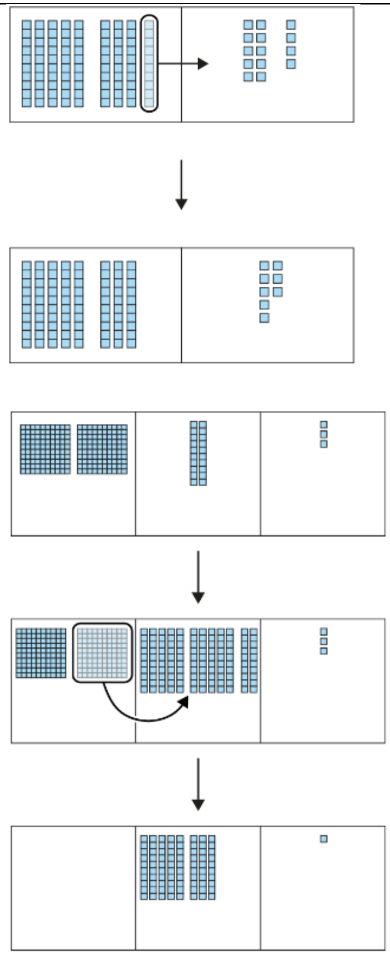
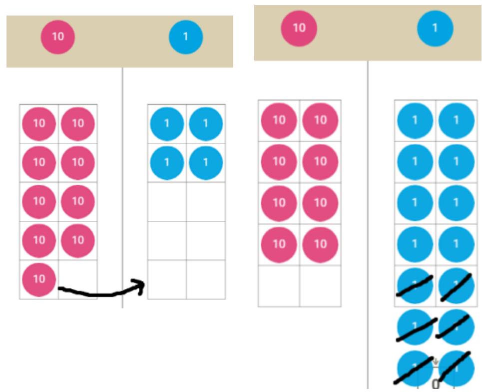
Subtraction

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 R/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 R/1**	Role play 'getting out of a car'.  Link to addition – use the part whole model to help explain the inverse between addition and subtraction. If 10 is the whole and 6 is the part. What is the other part? 	 4 - 1 = 3 3 = 4 – 1  Start with the whole and count back the part showing the jumps on the number line 10 – 6 = 4 Use a pictorial representation of objects to show the part whole model. 	If you know that 5 + 5 = 10 Then you also know that 10 – 5 = 5 Move to using numbers within the part whole model. 

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 12 – 4 2 2  	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**	 7 – 3 = 4 47 – 3 = 44  20 – 3 =17	 9 – 3 = 6 99 – 3 = 96	 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

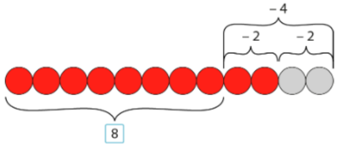
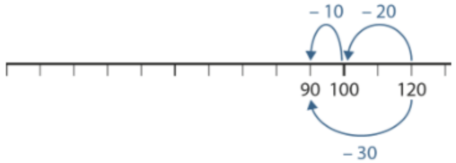
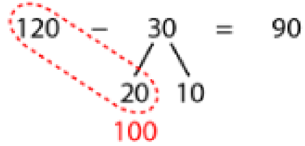
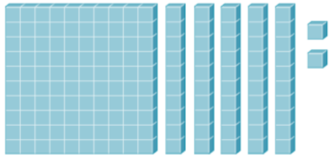
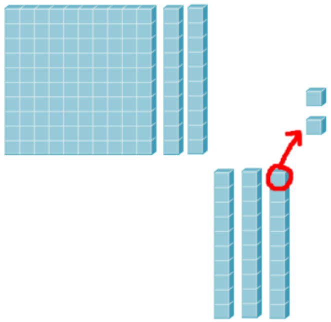
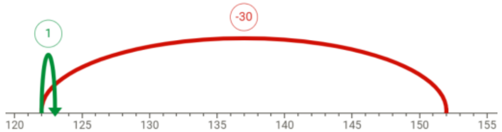
First I subtract the tens, then I subtract the ones. **Year 2**	 45 – 23 = 45 – 20 = 25 25 – 3 = 22	67 – 34 = 33  	45 – 23 = 22
First I subtract the tens, then I subtract the ones. **Year 2**		  62 – 34 = 28	63 – 17 = 46
I know that __ minus __ is equal to __. (bridging ten) So __ tens minus __ tens 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**		544 – 16 	Count back to multiples of 10/100
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	Count on to multiples of 10/100

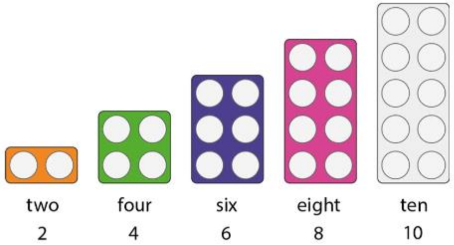
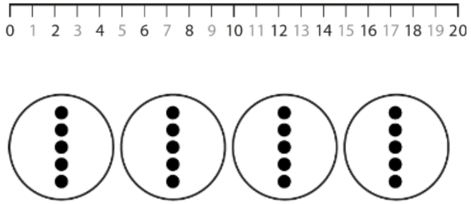
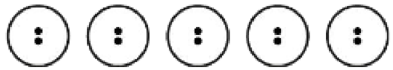
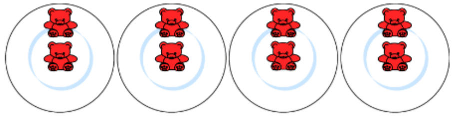
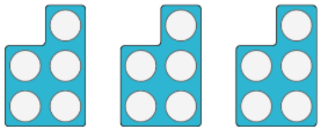
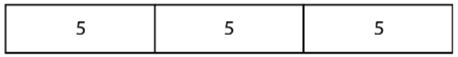
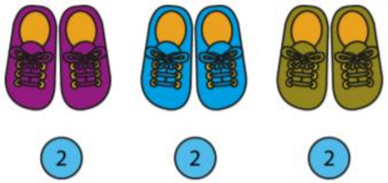
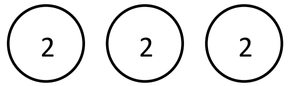
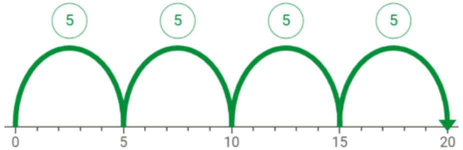
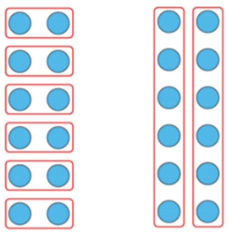
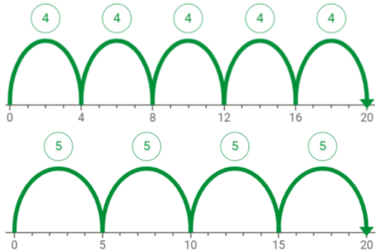
We line up the ones; __ ones plus __ ones. We line up the tens: __ tens plus __ tens. The __ is in the ones column – it represents __ ones. __ ones minus __ ones is equal to __ ones. The __ is in the tens column – it represents __ tens. __ tens minus __ tens is equal to __ tens. In column subtraction we start at the right-hand side. **Year 3**		Children could draw place value counters. 	$\begin{array}{rrr} & 6 & 5 \\ - & 2 & 3 \\ \hline & 4 & 2 \end{array}$ $\begin{array}{rrrr} & 4 & 6 & 2 \\ - & 2 & 5 & 1 \\ \hline & & & \\ \hline \end{array}$
If there is an insufficient number to subtract from in a given column, we must exchange from the column to the left. **Year 3**		Children could draw place value counters. 	$\begin{array}{r\|l} 10s & 1s \\ \cancel{9}^{8} & {}^{1}4 \\ - & 6 \\ \hline & \\ \hline \end{array}$ $\begin{array}{r\|l} 10s & 1s \\ \cancel{9}^{8} & {}^{1}4 \\ - & 6 \\ \hline 8 & 8 \\ \hline \end{array}$ $\begin{array}{r\|c\|l} 100s & 10s & 1s \\ 2 & 2 & 3 \\ -\ 1 & 4 & 2 \\ \hline & & \\ \hline \end{array}$ $\begin{array}{r\|c\|l} 100s & 10s & 1s \\ \cancel{2}^{1} & {}^{1}2 & 3 \\ -\ 1 & 4 & 2 \\ \hline & & \\ \hline \end{array}$ $\begin{array}{r\|c\|l} 100s & 10s & 1s \\ \cancel{2}^{1} & {}^{1}2 & 3 \\ -\ 1 & 4 & 2 \\ \hline 0 & 8 & 1 \\ \hline \end{array}$

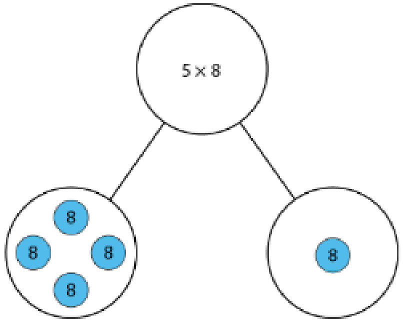
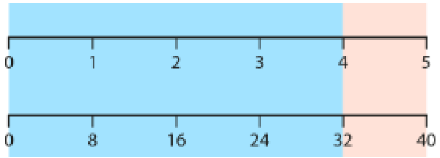
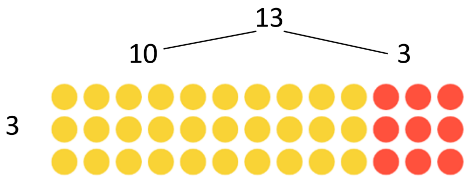
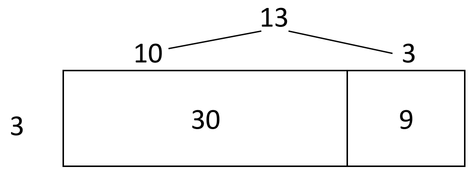
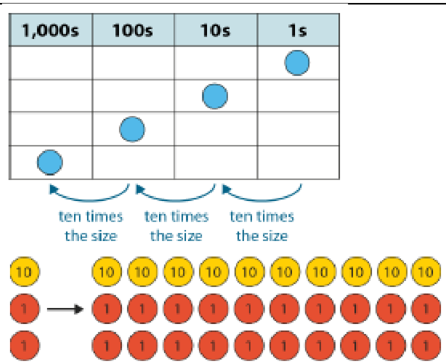
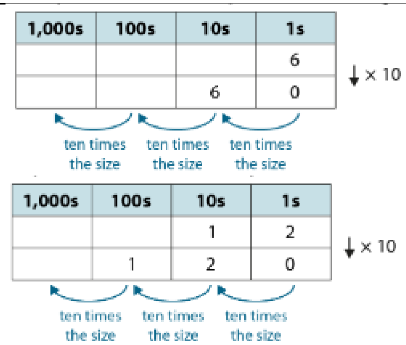
If there is an insufficient number to subtract from in a given column, we must exchange from the column to the left. **Year 4**	See Year 3 examples	See Year 3 examples	$\cancel{6}^{5},\ \cancel{5}^{14}\ \cancel{3}^{12}\ {}^{1}8$ $-\ 2,\ 7\ \ 8\ \ 9$ $3,\ 7\ \ 4\ \ 9$ $£\ 2\ \cancel{9}^{8}.\ \cancel{5}^{14}\ {}^{1}0$ $-\ £\ 1\ 8\ .\ 9\ 4$ $£\ 1\ 0\ .\ 5\ 6$
If there is an insufficient number to subtract from in a given column, we must exchange from the column to the left. **Years 5 and 6**	See Year 3 examples	See Year 3 examples	As in Year 4 but using numbers with more than 4 digits

Subtraction – Key mental strategies for Key Stage 2

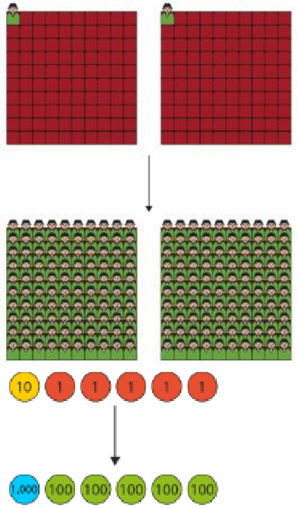
Strategy	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
Bridging through a multiple of 10, 100, etc **Years 3, 4, 5 and 6**	 12 – 4 = 12 – 2 = 10 10 – 2 = 8 12 – 4 2 2	 120 – 30 = 120 – 20 = 100 100 – 10 = 90	 120 – 30 = 120 – 20 = 100 100 – 10 = 90
Compensating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

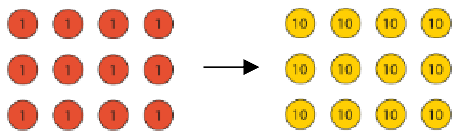
__ is equal to __ plus __, so __ times __ is equal to __ times __ plus __ times __. __ is equal to __ minus __, so __ times __ is equal to __ times __ minus __ times __. Multiplication is distributive. (NCETM Year 4 unit 2.10) **Year 3**			5 = 4 + 1 5 x 8 = 4 x 8 + 1 x 8 = 32 + 8 = 40 4 = 5 – 1 4 x 8 = 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. (NCETM Year 4 unit 2.10) **Year 3**			3 x 13 = 3 x 10 + 3 x 3 = 30 + 9 = 39
To multiply a whole number by 10, place a zero after the final digit of that number. **Year 4**			6 x 10 = 60 12 x 10 = 120

<table>
<tr>
<td>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.

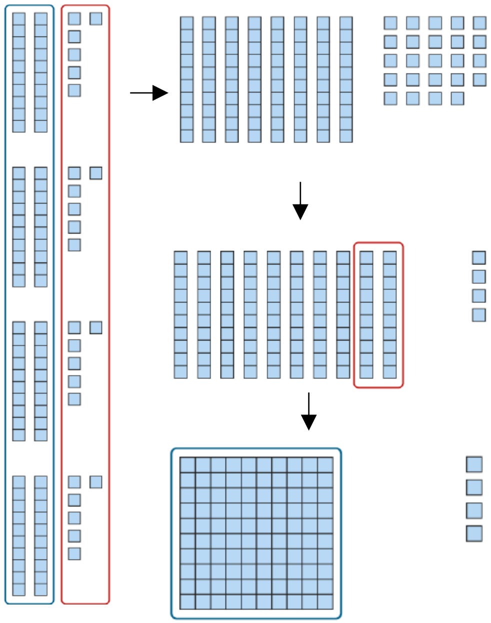
Year 4</td>
<td></td>
<td>
<table>
<tr><th>1,000s</th><th>100s</th><th>10s</th><th>1s</th></tr>
<tr><td></td><td></td><td></td><td>6</td></tr>
<tr><td></td><td>6</td><td>0</td><td>0</td></tr>
</table>
↓ × 100
100 times the size

<table>
<tr><th>1,000s</th><th>100s</th><th>10s</th><th>1s</th></tr>
<tr><td></td><td></td><td>1</td><td>5</td></tr>
<tr><td>1</td><td>5</td><td>0</td><td>0</td></tr>
</table>
↓ × 100
100 times the size 100 times the size
</td>
<td>2 x 100 = 200
There are 100 times as many people as before.

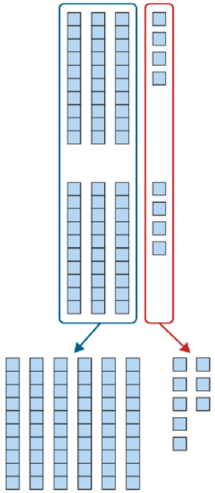
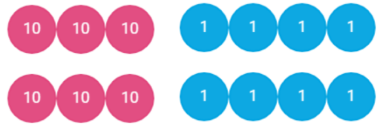
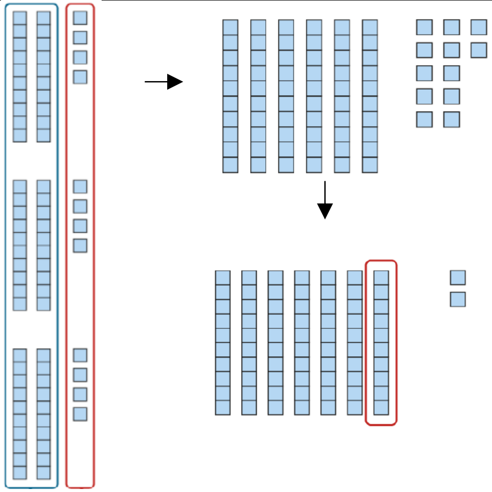
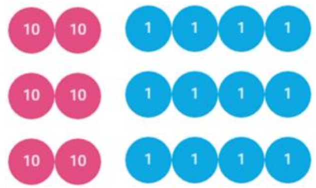
15 x 100 = 1500</td>
</tr>
<tr>
<td>If one factor is made ten times the size, the product will be ten times the size.

Year 4</td>
<td></td>
<td>2 × 3 = 6
× 10 × 10
2 × 30 = 60</td>
<td>4 x 3 = 12 so 4 x 30 = 120</td>
</tr>
<tr>
<td>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.

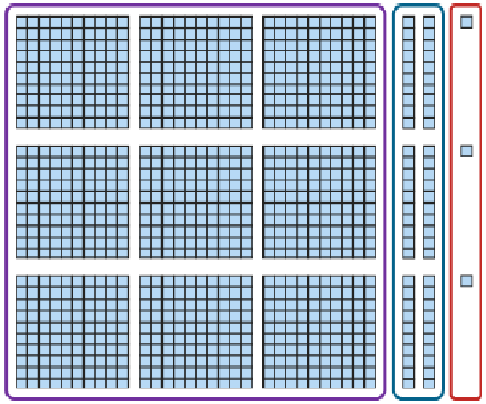
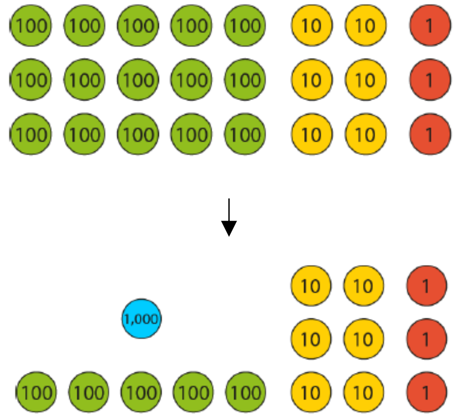
Year 4</td>
<td></td>
<td>84 × 6 = 504
80 4

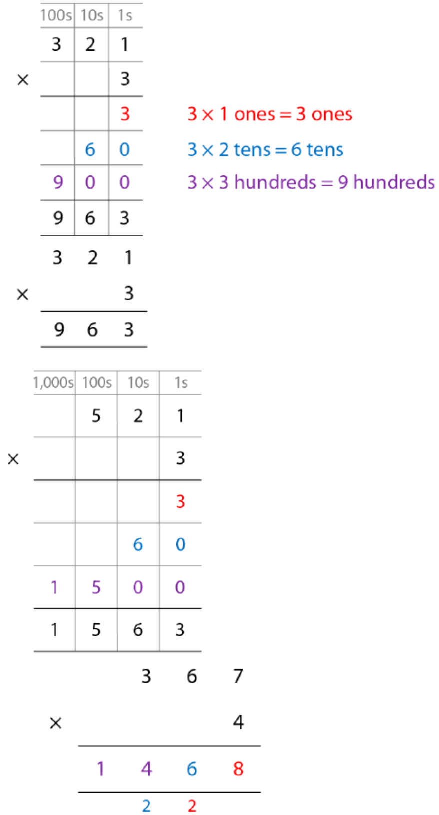
80 × 6 = 480
4 × 6 = 24
480 + 24 = 504</td>
<td>84 x 6 = 80 x 6 + 4 x 6
= 480 + 24
= 504</td>
</tr>
</table>

We work from the least significant digit, on the right, to the most significant digit, on the left. Multiplication is distributive. **Year 4**		 34 x 2 = 60 + 8 = 68	$\begin{array}{rcc} & 10s & 1s \\ & 3 & 4 \\ \times & & 2 \\ \hline & & 8 \\ & 6 & 0 \\ \hline & 6 & 8 \end{array}$ 2×4 ones $= 8$ ones 2×3 tens $= 6$ tens ↓ $\begin{array}{rcc} & 2 & 1 \\ \times & & 4 \\ \hline & 8 & 4 \end{array}$
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 4**		 24 x 3 = 60 + 12 = 72	$\begin{array}{rcc} & 10s & 1s \\ & 2 & 4 \\ \times & & 3 \\ \hline & 1 & 2 \\ & 6 & 0 \\ \hline & 7 & 2 \end{array}$ 3×4 ones $= 12$ ones $= 1$ ten $+ 2$ ones 3×2 tens $= 6$ tens ↓ $\begin{array}{rcc} & 1 & 8 \\ \times & & 5 \\ \hline & 9 & 0 \\ \hline & 4 & \end{array}$ $\begin{array}{rccc} & & 3 & 8 \\ \times & & & 4 \\ \hline & 1 & 5 & 2 \\ \hline & & 3 & \end{array}$

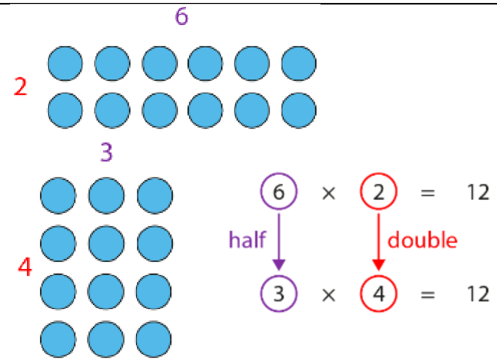
<table>
<tr>
<td>If there are ten or more ones, we must regroup the ones into tens and ones.
If there are ten or more tens, we must regroup the tens into hundreds and tens.
If there are ten or more hundreds, we must regroup the hundreds into thousands and hundred.

Multiplication is distributive.

Year 4</td>
<td>
321 x 3 = 963</td>
<td>

521 x 3 = 1000 + 500 + 60 + 3 = 1563</td>
<td>
</td>
</tr>
<tr>
<td>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</td>
<td>
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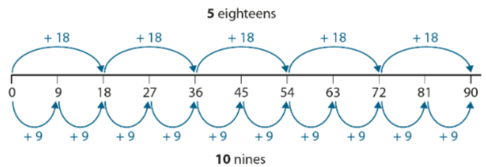
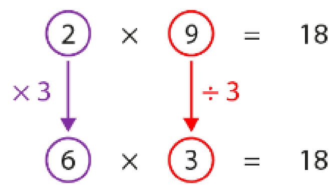
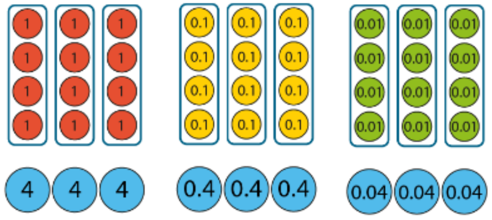
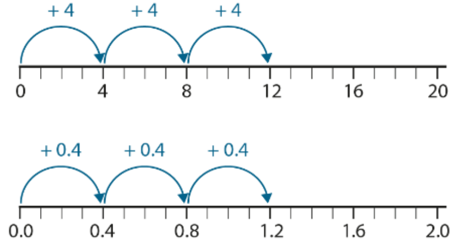
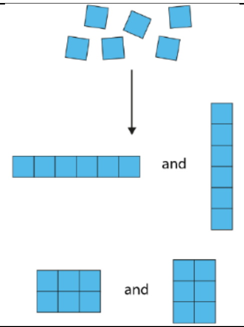
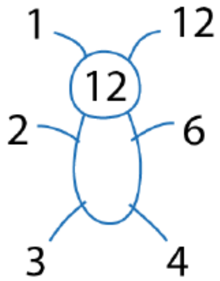
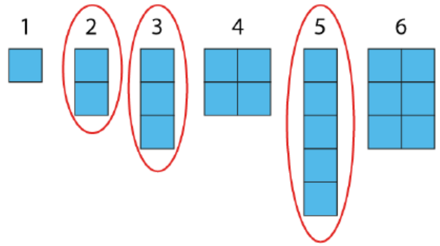
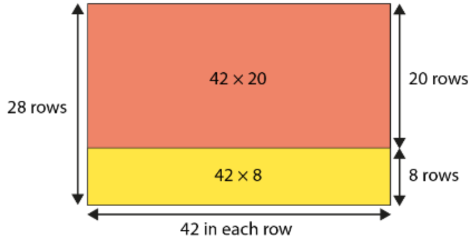
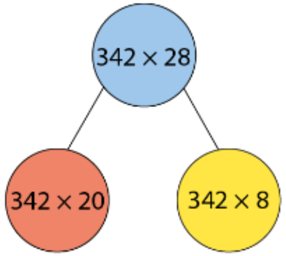
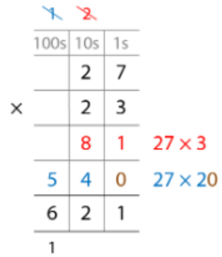
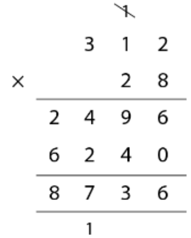
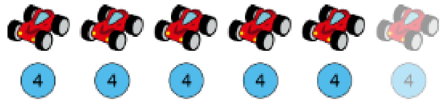
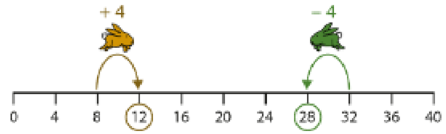
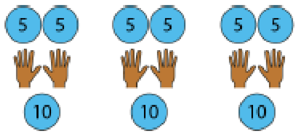
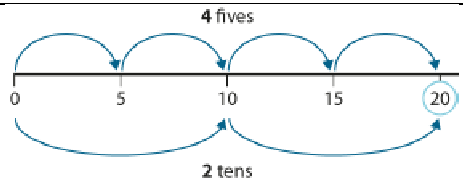
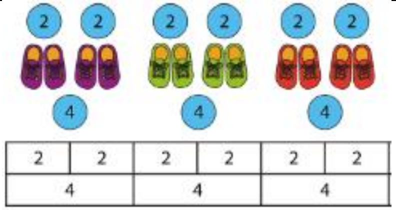
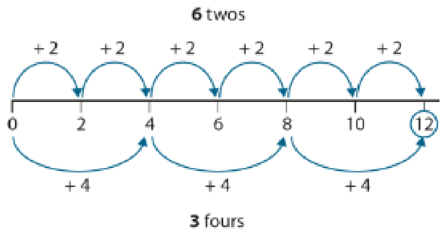
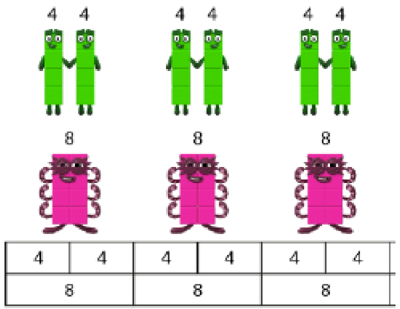
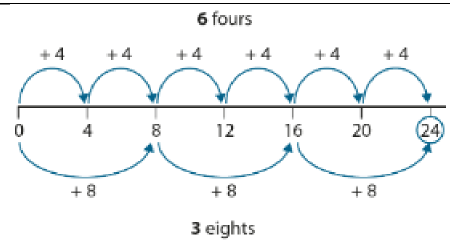
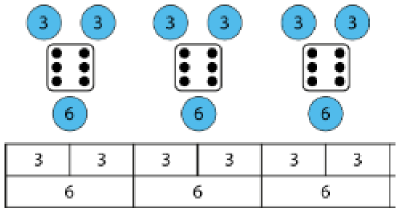
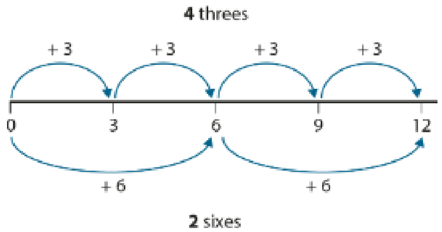
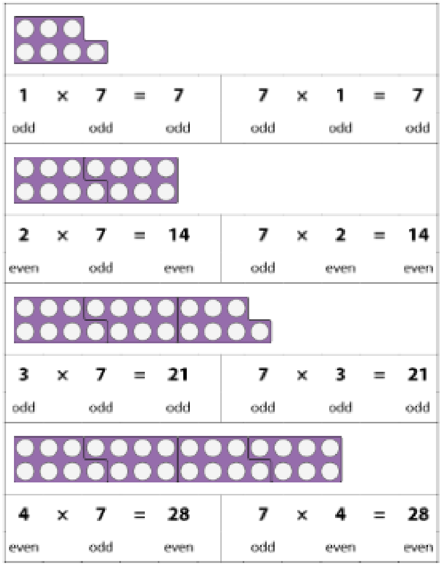
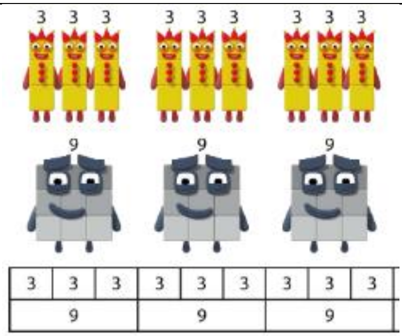
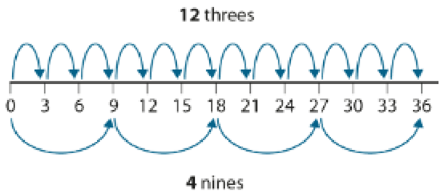
<td>
</td>
<td>
</td>
</tr>
</table>

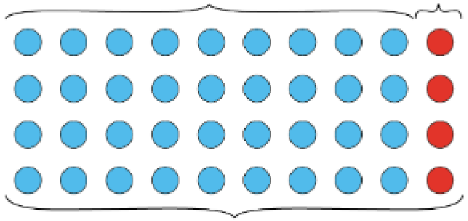
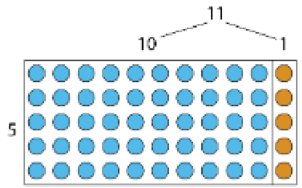
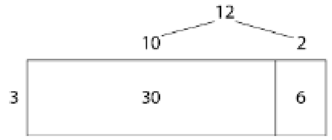
If one factor is made one tenth of the size, the product will be one tenth of the size. If one factor is made one hundredth of the size, the product will be one hundredth of the size. I move the digits of the number I am multiplying __ places to the left until I get a whole number; then I multiply; then 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	 	$\begin{array}{r} 4\ 5\ 6 \\ \times\quad 4 \\ \hline 1\ 8\ 2\ 4 \\ \hline {}_{2\ 2\ } \end{array}$ $\begin{array}{r} 4\ .\ 5\ 6 \\ \times\quad 4 \\ \hline 1\ 8\ .\ 2\ 4 \\ \hline {}_{2\ \ 2\ } \end{array}$
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**			

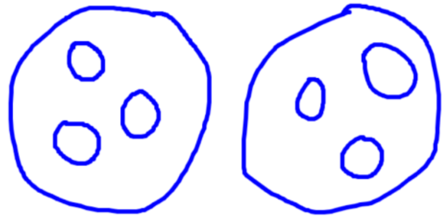
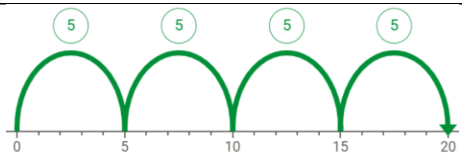
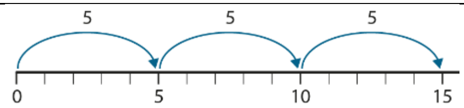
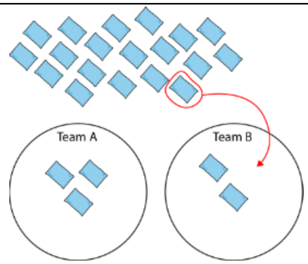
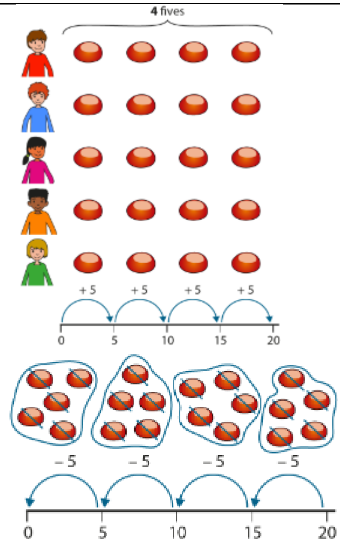
Multiplication – Key mental strategies for Key Stage 2

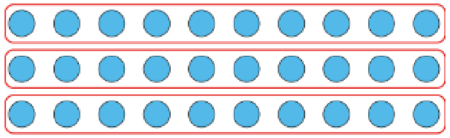
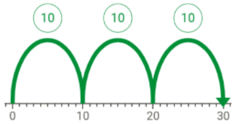
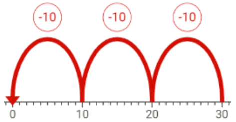
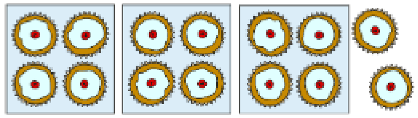
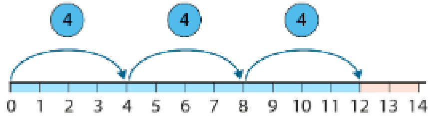
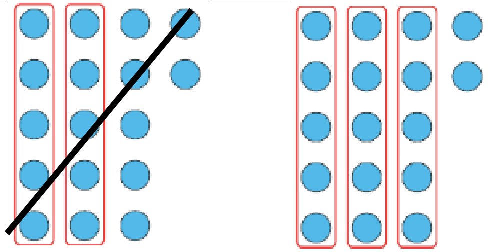
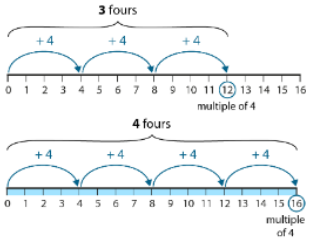
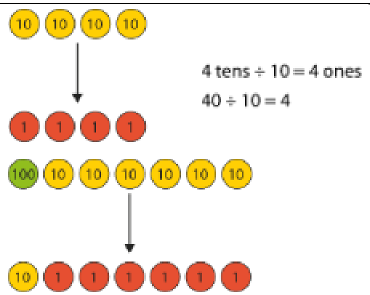
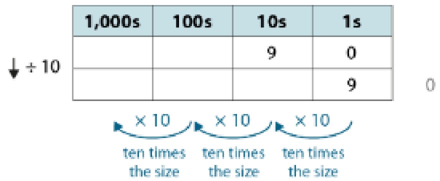
Strategy	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
Adjacent multiples of __ have a difference of __. **Year 3 onwards**			4 x 6 = 4 x 5 + 4 4 x 9 = 4 x 10 - 4
Products in the 10 times table are double the products in the 5 times table. Products in the 5 times table are half of the products in the 10 times table. (NCETM Year 2 unit 2.5) **Year 3 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. (NCETM Year 3 unit 2.9) **Year 3 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.	 9 x 4 1 x 4		3 x 12 = 9 x 4

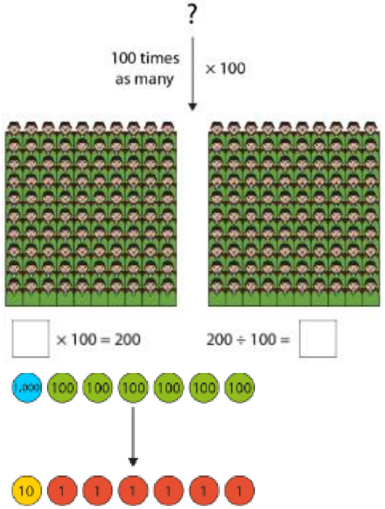
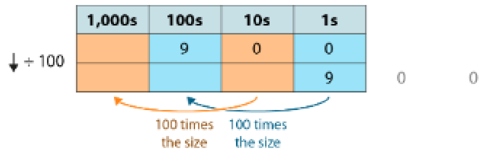
Products in the 10 times table can be used to find products in the 9 times table. (NCETM Year 3 unit 2.8) **Year 4 onwards**	 10 x 4		9 x 4 = 10 x 4 – 1 x 4
Products in the 10 times table can be used to find products in the 11 times table and 12 times table. **Year 4 onwards**			12 x 3 = 10 x 3 + 2 x 3 = 30 + 6 = 36

Division

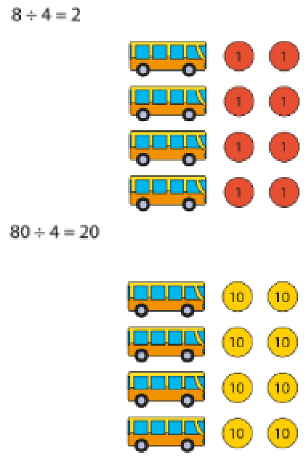
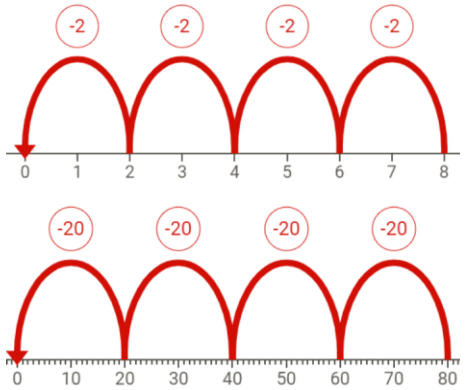
Stem sentences	Concrete (Can we make it?)	Pictorial (Can we draw it?)	Abstract (Can we write the equation?)
One group of two, two groups of two, three groups of 2, … Ten, twenty, thirty, … One five, two fives, three fives, … **Year R/1**			6 biscuits shared between 2 children gives 3 biscuits each.
The _____ 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 Dividend divided by the divisor equals the quotient.

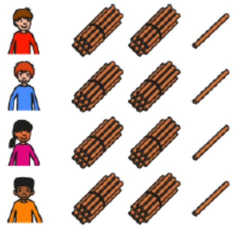
Ten times __ is equal to __ so __ divided into groups of ten is __. If the divisor is __, we can use the __ times table to find the quotient. **Year 2**	 30 represents the total number of counters. 10 represents the number in each group. 3 represents the number of groups.	 	10 x 3 = 30 3 x 10 = 30 30 ÷ 10 = 3
__ is divided into groups of __. There are __ groups and a remainder of __. (NCETM Year 4 unit 2.12) **Year 3**			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. (NCETM Year 4 unit 2.12) **Year 3 or 4?**			17 ÷ 5 = 2 r 7 is incorrect because 7 is greater than 5. 17 ÷ 5 = 3 r 2
To divide a multiple of ten by 10 move the digits one place to the right and remove the zero. **Year 4**			90 ÷ 10 = 9 150 ÷ 10 = 15

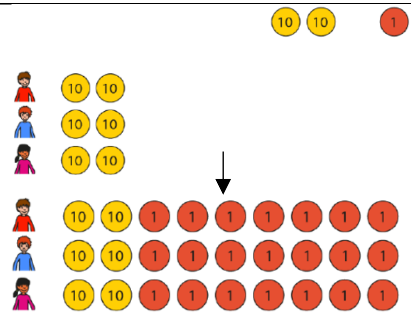
<table>
<tr>
<td>To divide a multiple of 100 by 100 move the digits 2 places to the right and remove the 2 zeros.

Year 4</td>
<td></td>
<td></td>
<td>900 ÷ 100 = 9

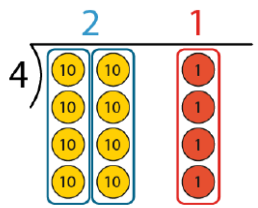
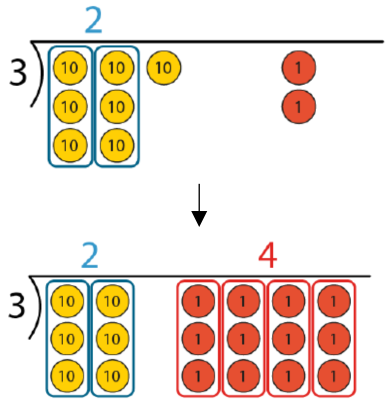
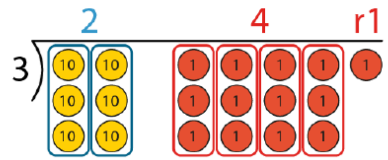
1500 ÷ 100 = 15</td>
</tr>
<tr>
<td>If the dividend is made ten times the size, the quotient will be ten times the size.

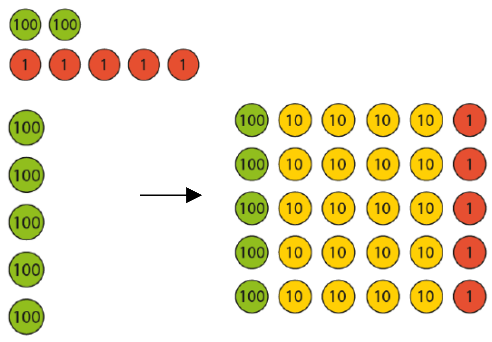
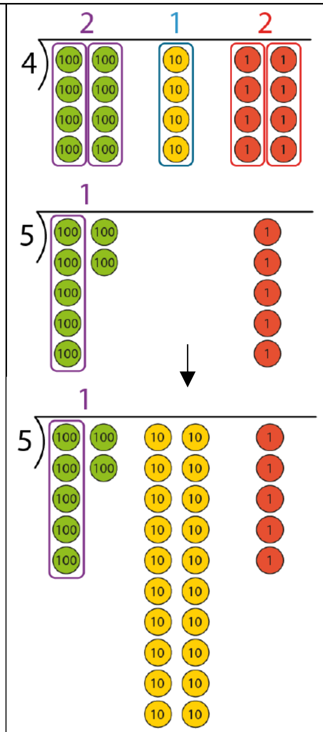
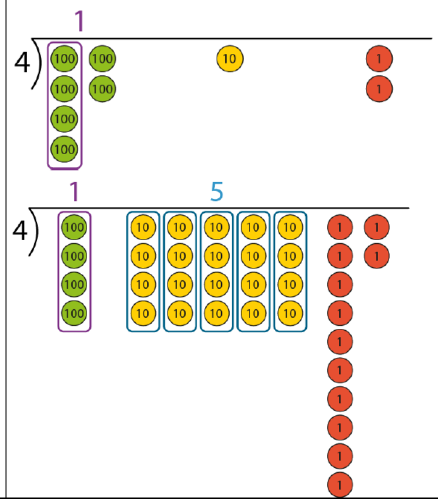
Year 4</td>
<td></td>
<td></td>
<td>12 ÷ 3 = 4
× 10   × 10
120 ÷ 3 = $\boxed{40}$</td>
</tr>
<tr>
<td>If dividing the tens gives a remainder of one or more tens, we must exchange the remaining tens for ones.

Year 4</td>
<td>

84 ÷ 4 = 21</td>
<td></td>
<td>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</td>
</tr>
</table>

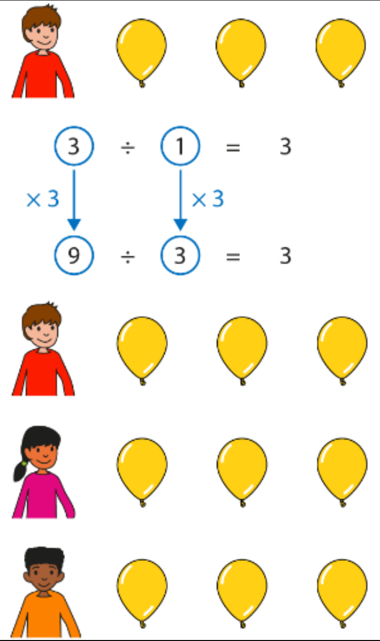
If dividing the tens gives a remainder of one or more tens, we must exchange the remaining tens for ones. **Year 4**		 72 ÷ 3 = 24  73 ÷ 3 = 24 r 1 	10s 1s $\begin{array}{r} 2\ \ 1 \\ 4\overline{)8\ \ 4} \end{array}$ 8 tens ÷ 4 = 2 tens 4 ones ÷ 4 = 1 one $\begin{array}{r} 2\ \ 1 \\ 4\overline{)8\ \ 4} \end{array}$ $\begin{array}{r} 2\ \ 4 \\ 3\overline{)7\ {}^{1}2} \end{array}$ $\begin{array}{r} 2\ \ 4\,r\,1 \\ 3\overline{)7\ {}^{1}3} \end{array}$

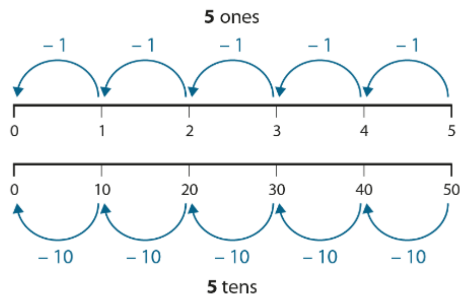
If dividing the hundreds gives a remainder of one or more hundreds, we must exchange the remaining hundreds for tens. **Year 4**		 612 ÷ 4 = 153 	$\begin{array}{r} 2\;\;1\;\;2 \\ 4\overline{)\,8\;\;4\;\;8} \end{array}$ $\begin{array}{r} 1\;\;4\;\;1 \\ 5\overline{)\,7\;\;{}^{2}0\;\;5} \end{array}$ $\begin{array}{r} 1\;\;5\;\;3 \\ 4\overline{)\,6\;\;{}^{2}1\;\;{}^{1}2} \end{array}$

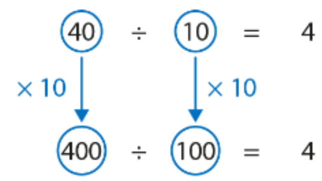
If there is a multiplicative change to the dividend factor and a corresponding change to the divisor, the quotient remains the same.

If I multiply the dividend by __, I must multiply the divisor by __ for the quotient to remain the same.

Year 5 and 6





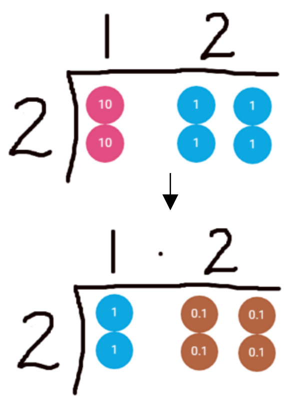


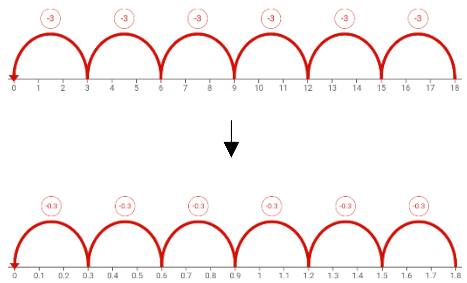
If the dividend is made one tenth of the size, the quotient will be one tenth of the size.

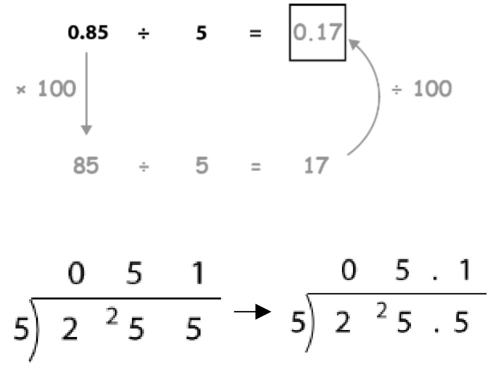
If the dividend is made one hundredth of the size, the quotient will be one hundredth of the size.

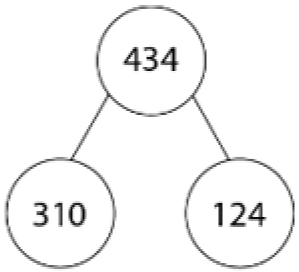
I move the digits of the dividend __ places to the left until I get a whole number; then I divide; then I move the digits of the quotient __ places to the right.

Year 5 onwards







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. **Year 6**	**Partitioning**  $310 \div 31 = 10$ $124 \div 31 = 4$ $434 \div 31 = 14$ **Short division** $\begin{array}{r} 0\;\;1\;\;4 \\ 31\overline{)4\;\;{}^{4}3\;\;{}^{12}4} \end{array}$
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**	$\begin{array}{r} 2\;\;3\;\;r\,9 \\ 15\overline{)3\;\;5\;\;4} \end{array}$ $\begin{array}{r} 2\;\;3\;\;\frac{9}{15} \\ 15\overline{)3\;\;5\;\;4} \end{array}$ $\begin{array}{r} 2\;\;3\;.\;6 \\ 15\overline{)3\;\;5\;\;4\;.\;0} \end{array}$