All Saints C of E Primary School

Calculation Policy

- Early Mathematics Learning
- Addition
- Subtraction
- Multiplication
- Division

Linked documents:

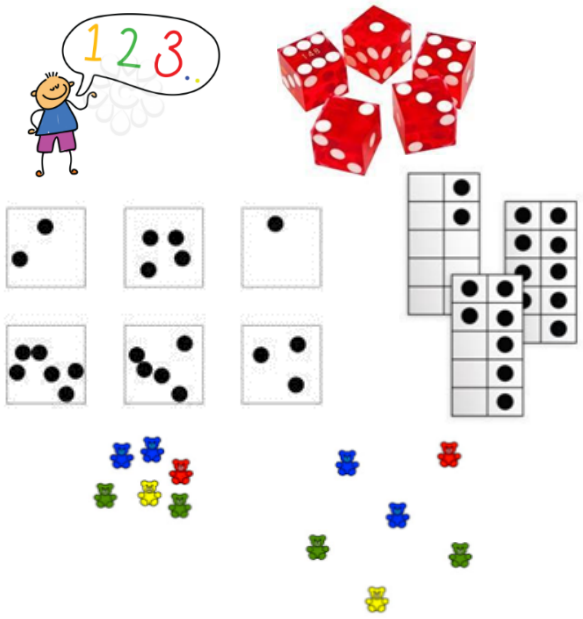
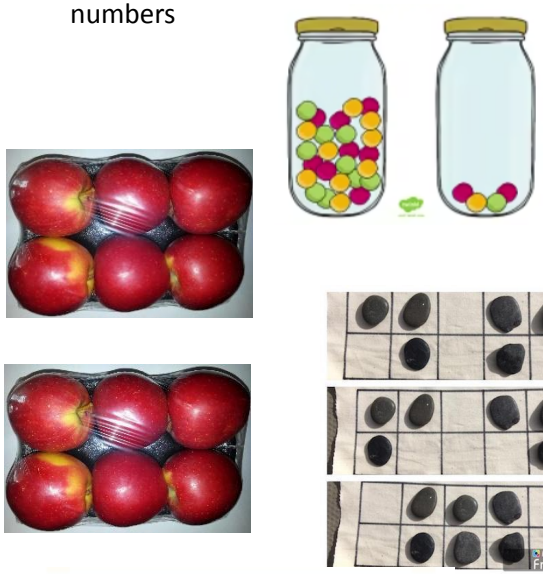
- Maths Curriculum Intent
- Maths Feedback Policy
- Vocabulary Progression Document

September 2022

All Saints C of E Primary School

Early Mathematics Learning

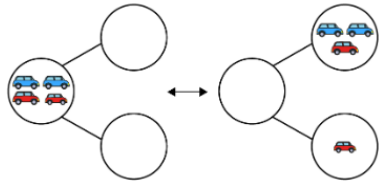
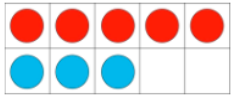
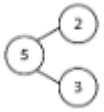
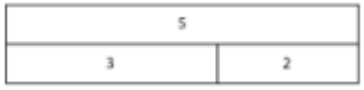
There are key areas of early mathematics learning, which collectively provide a platform for everything children will encounter as they progress through primary school, and be
The areas that are particularly linked to developing calculation include:

Cardinality and Counting	Comparison	Composition
Understanding that the cardinal value of a number refers to the quantity, or 'howmanyness' of things it represents.	Understanding that comparing numbers involves knowing which numbers are worth more or less than each other.	Understanding that one number can be made up from (composed from) two or more smaller numbers.
Progression of key idea: • **Counting**: saying number names in sequence • **Counting**: tagging each object with one number word • **Counting**: knowing the last number counted gives the total so far • **Subatising**: recognising small quantities without needing to count them all • **Numeral meanings** • **Conservation**: knowing that the number does not change if things are rearranged (so long as none have been added or taken away 	**Progressions of key ideas:** • more than and less than • identifying groups with the same number of things • comparing numbers and reasoning • knowing the 'one more than/one less than' relationship between counting (sequential) numbers 	**Progression of key ideas:** • Part-whole: identifying smaller numbers within a number (conceptual subatising – seeing groups and combining to a total • Inverse operations • A number can be partitioned into different pairs of numbers • A number can be partitioned into more than two numbers • Number bonds: knowing which pairs make a given number 

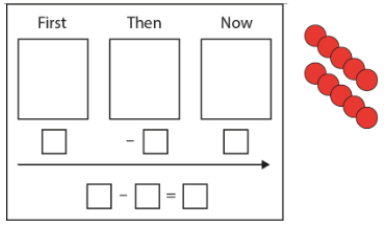
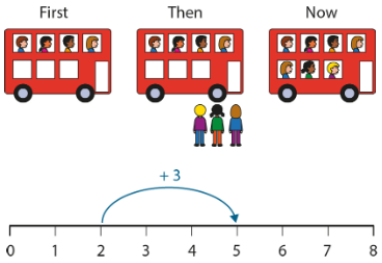
All Saints C of E Primary School

Progression in the teaching of **ADDITION**

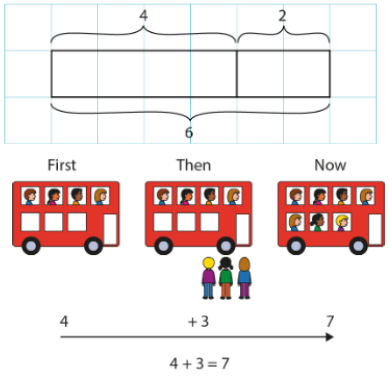
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Calculation expectations to be solved using a range of strategies. See examples below	Demonstrate a deep understanding of number to 10, including the composition of each number.	To add one digit and two digit numbers to 20. To solve additions using missing number problems e.g. 7 + =9	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones • a two-digit number and tens • two two-digit numbers • adding three one-digit numbers	Add and subtract numbers mentally, including: • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds • Add up to 3 digits using compact column method Pupils add two numbers that bridge through 10 Pupils add a pair of 2-digit numbers using column addition	Add and subtract numbers with up to 4 digits using compact column method where appropriate. Pupils add a pair of 2-digit numbers using column addition with regrouping in the tens column	Add and subtract whole numbers with more than 4 digits using compact methods. Add and subtract numbers mentally with increasingly large numbers.	Perform mental calculations, including with mixed operations and large numbers

Stem sentences	Concrete	Pictorial	Abstract
__ is the whole, __ is a part, __ is a part. __ = __ plus __ and __ plus __ = __ There are __ in total. **Year R/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 

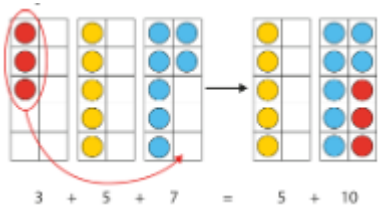
<table>
<tr>
<td>First… Then… Now…
e.g. First there were 4 children on the bus, then 3 children got on. Now there are 7 children on the bus.

Year R/1</td>
<td>Role play getting ‘on the bus’ or use a toy bus.
 
</td>
<td> 

4 + 3 = 7

2 + 3 = 5</td>
<td> 

4 + 2 = 6</td>
</tr>
<tr>
<td>We can look for pairs of addends which sum to 10.
__ plus __ is equal to 10, then 10 plus __ is equal to __.

Year 2</td>
<td> 
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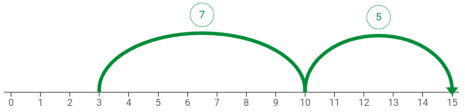
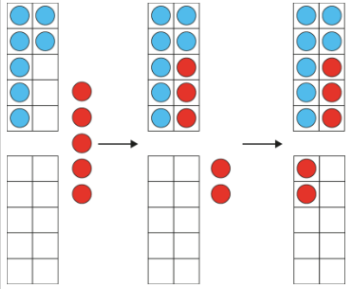
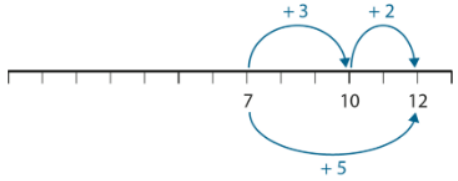
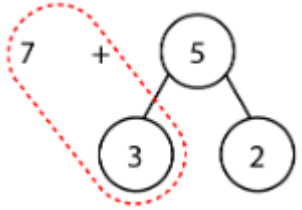
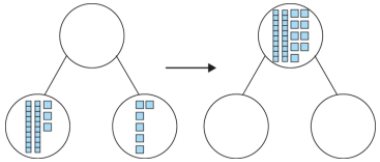
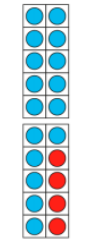
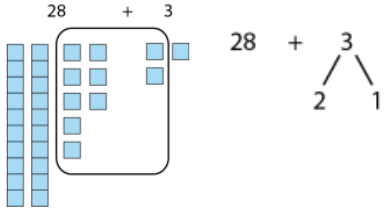
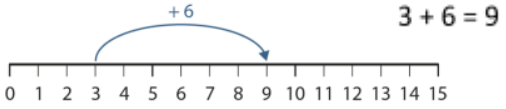
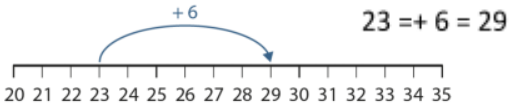
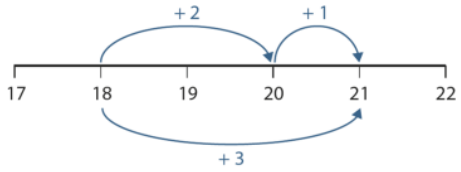
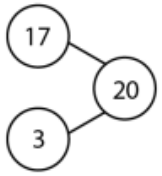
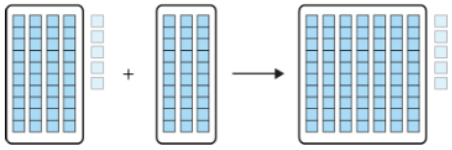
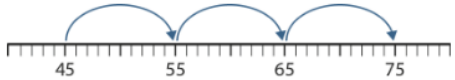
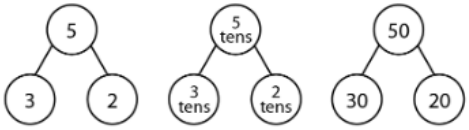
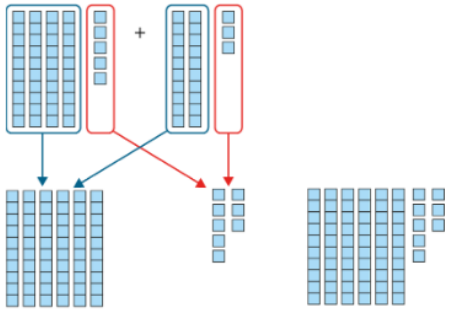
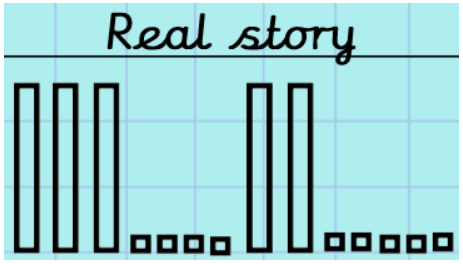
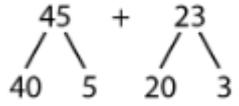
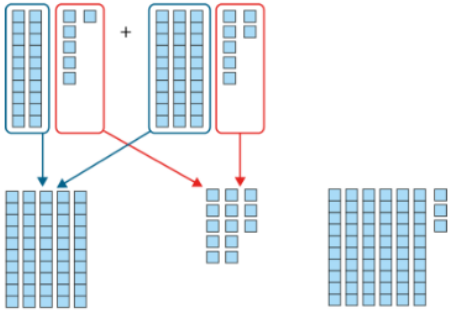
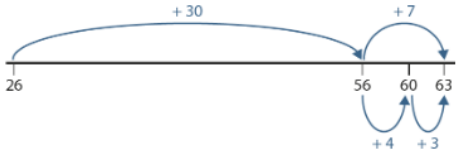
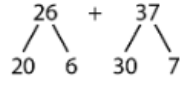
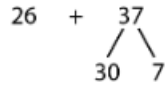
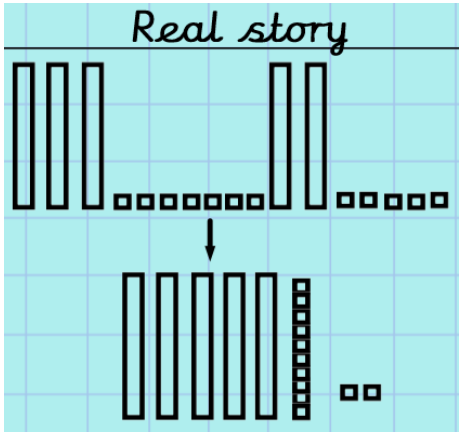
<td> 
</td>
<td>3 + 5 + 7 = 3 + 7 + 5 = 10 + 5 = 15</td>
</tr>
<tr>
<td>First I partition the __: __ plus __ is equal to __.
Then __ plus __ is equal to ten …
and ten plus __ is equal to __.

Year 2</td>
<td> 
7 + 5 =
7 + 3 = 10
10 + 2 = 12</td>
<td> 

7 + 5 =
7 + 3 = 10
10 + 2 = 12</td>
<td> 

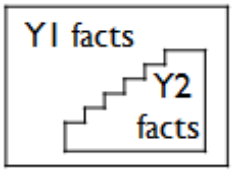
7 + 3 = 10
10 + 2 = 12</td>
</tr>
</table>

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  16 + 4 = 20  	  	 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**	 40 + 30 = 70 so 45 + 30 = 75	 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)	 26 + 37 = 50 + 13 = 63	 26 + 30 = 56 56 + 7 = 63	 or  20 + 30 = 50 6 + 7 = 13 50 + 13 = 63 26 + 30 = 56 56 + 7 = 63

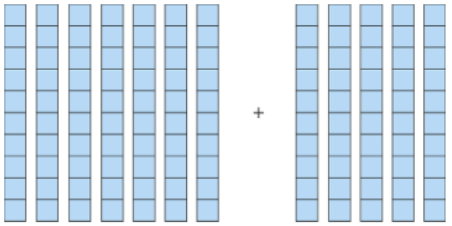
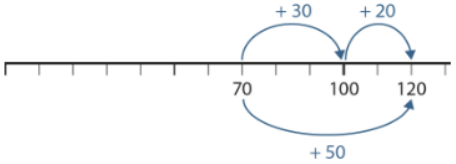
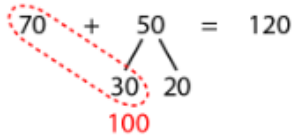
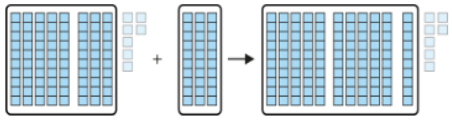
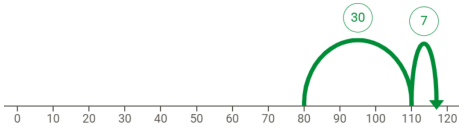
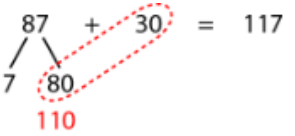
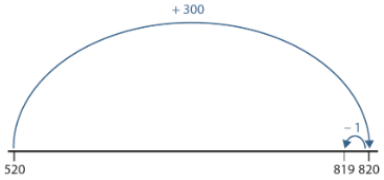
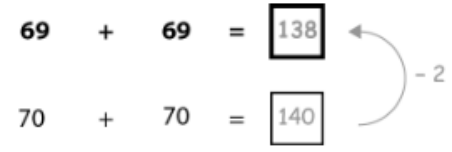
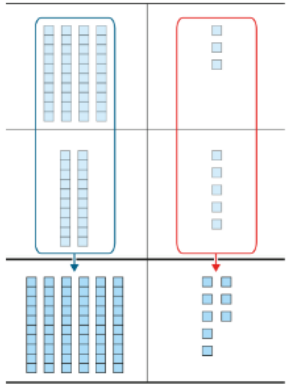
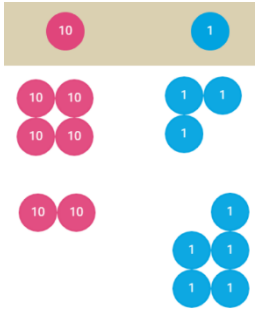
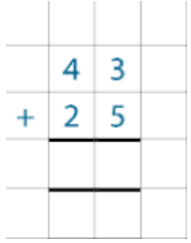
Year 2		 37 + 25 = 62	

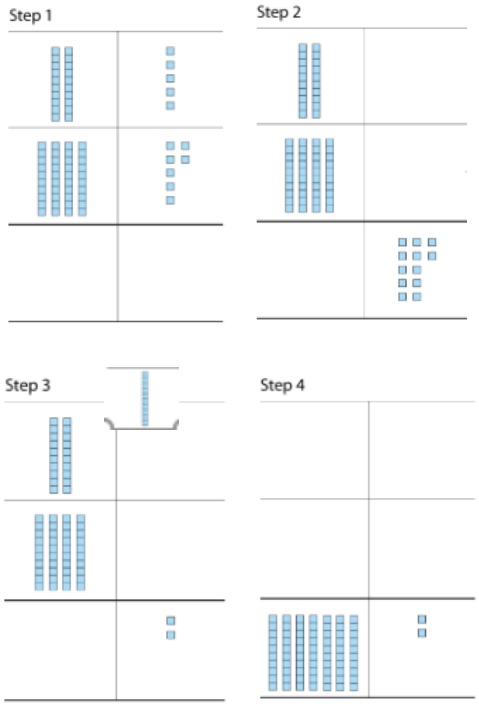
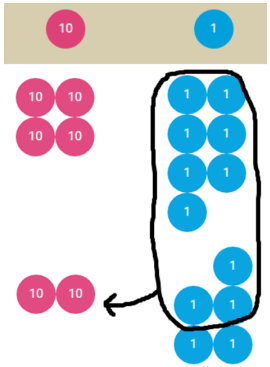
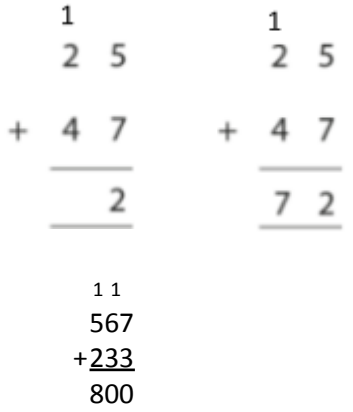
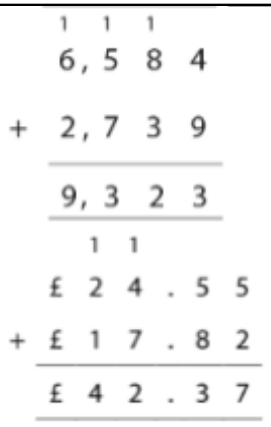
Addition Facts

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



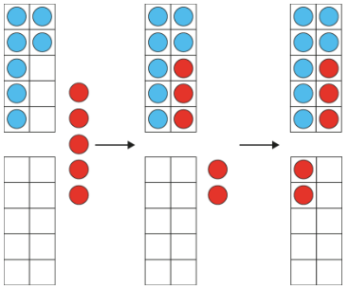
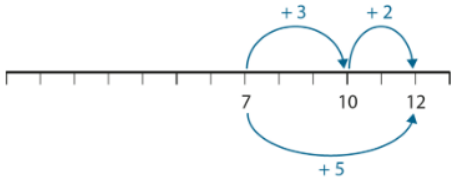
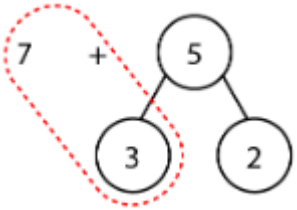
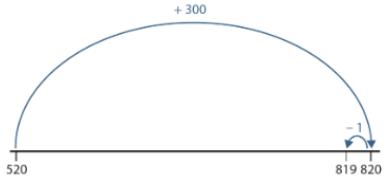
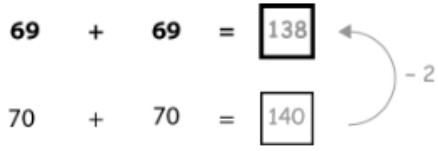
+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	1 + 10
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8	2 + 9	2 + 10
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7	3 + 8	3 + 9	3 + 10
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	Pictorial	Abstract
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**	 7 + 5 = 12 7 tens + 5 tens = 12 tens 70 + 50 = 120	 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**	 87 + 30 = 110 + 7 = 117	 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**	35 + 49 = 34 + 50 = 84 	 520 + 299 = 520 + 300 = 820 820 – 1 = 819	
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. **Year 3**	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*. **Year 3** *regroup/ rename /exchange are used interchangeably.	Start with two-digit numbers to exemplify the regrouping. 	Children could draw place value counters. 	Start with two-digit numbers to exemplify the regrouping.  1 1 567 +233 800
If the column sum is equal to ten or more, we must regroup*. **Year 4** *regroup/ rename /exchange are used interchangeably.	See Year 3 examples	See Year 3 examples	
If the column sum is equal to ten or more, we must regroup* *regroup/ rename /exchange are used interchangeably.. **Years 5 and 6**	See Year 3 examples	See Year 3 examples	As in Year 4 but using numbers with more than 4 digits

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Mental Calculation strategies	Perceptually and conceptually subatise up to 10	1 more within 20	1 more within 100 10 more Add three 1-digit numbers	Add multiples of 10, 100 Add single digit numbers bridging through boundaries	Add multiples of 10s, 100s and 1000s	Add multiples of 10s, 100s, 1000s, 10000,100000 and 1000000 and tenths	Add multiples of 10s, 100s, 1000s, 10000,100000 and 1000000, tenths and hundredths
	1:1 correspondence	2 more within 20 Adding 2 to an odd/even number gives the next odd/even number	Add a 1-digit number to a 2-digit number by bridging through 10	Add 3-digit number and ones 3-digit number and tens 3 digit number and hundreds	Add 4-digit number and ones 4-digit number and tens 4-digit number and hundreds 4-digit number and thousands	Add numbers mentally With increasingly large numbers.	Perform mental calculation, including with mixed operations and large numbers. Use knowledge of order of operations to carry out calculations involving the 4 operations
	Conservation of number (quantity remains the same regardless of organisation)	Concept of zero When zero is added to a number the sum remains the same.	Use number facts within 10 to add a 1-digit number to a 2-digit number.	Partition second number to add pairs to 100	Partition second number to add decimal pairs of 10 and 1	Partition second number to add	Partition second number to add
	1 more	Addition is commutative	Make 10 to add a 1-digit number to a 2 digit number	Use near doubles to add	Use near doubles to add	Use number facts, bridging and place value	Use number facts, bridging and place value
	Doubles	Doubles up to 20	Add a 2-digit number to a 2-digit number	Add near multiples of 10 and 100 by rounding and adjusting	Adjust both numbers before adding Add near multiples	Adjust numbers to add	Adjust numbers to add
	Whole and parts of numbers to 5	Near doubles to 10	Doubles up to 20 and multiples of 5 Add near multiples of 10	Partition and recombine	Partition and recombine	Partition and recombine	Partition and recombine
	‘5 and a bit’ structure of numbers within 10	Using number bonds	Using known facts	Using known facts	Using known facts	Using known facts	Using known facts
Known Facts	Recall and use number bonds for all numbers up to 5 Doubles up to 5	Recall and use number bonds for all numbers up to 10 Doubles to 10	Recall and use addition and subtraction facts to 20 fluently and derive/use related facts up to 100	Derive new facts using bonds learnt in KS1	Derive new facts using bonds learnt in KS1	Derive new facts using bonds learnt in KS1	Derive new facts using bonds learnt in KS1

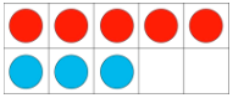
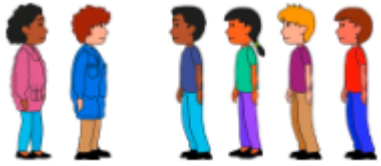
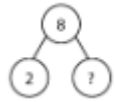
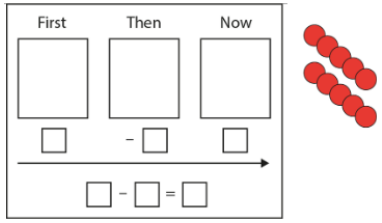
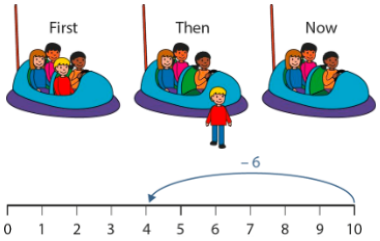
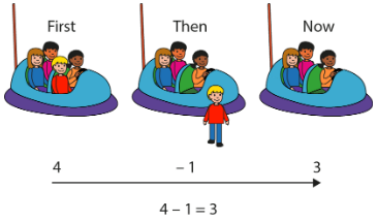
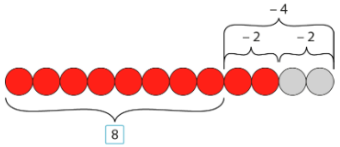
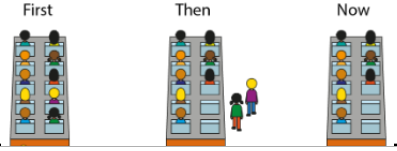
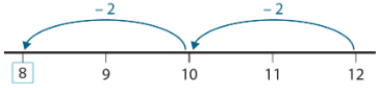
Addition – Key mental strategies for Key Stage 2

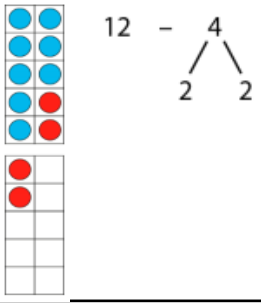
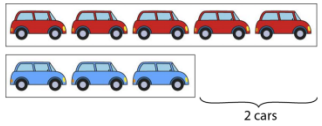
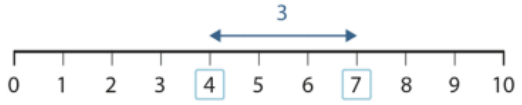
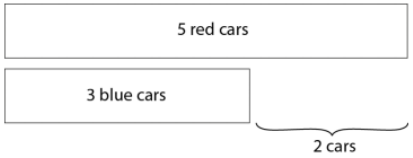
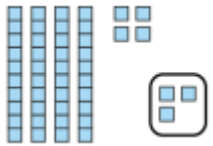
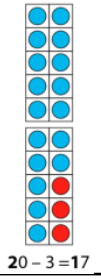
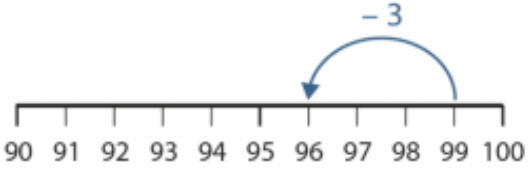
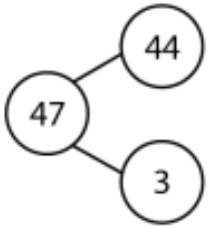
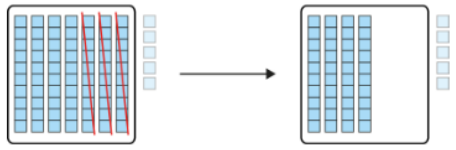
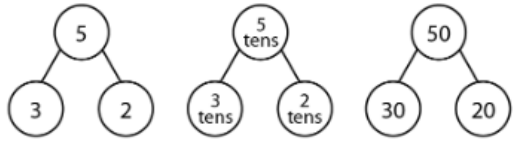
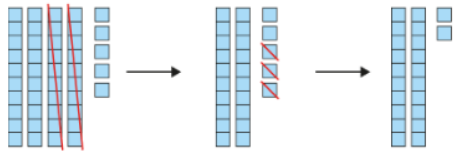
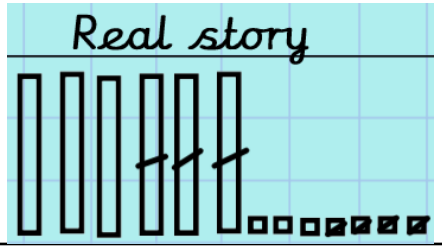
Strategy	Concrete	Pictorial	Abstract
Bridging through a multiple of 10, 100, etc **Years 3, 4, 5 and 6**	 7 + 5 = 7 + 3 = 10 10 + 2 = 12	 7 + 5 = 7 + 3 = 10 10 + 2 = 12	 7 + 3 = 10 10 + 2 = 12
Compensating – rounding to the nearest multiple 10, 100, etc and adjusting **Years 3, 4, 5 and 6**	35 + 49 = 34 + 50 = 84 	 520 + 299 = 520 + 300 = 820 820 – 1 = 819	

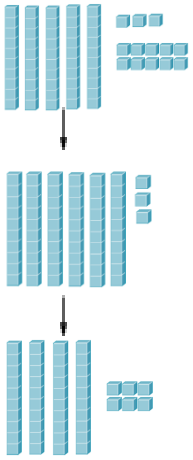
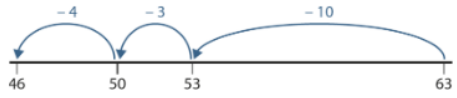
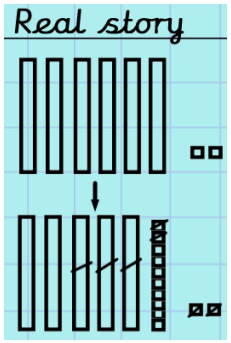
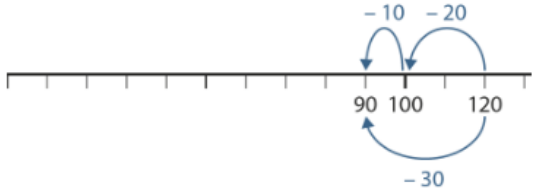
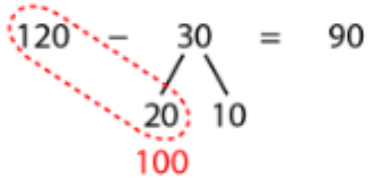
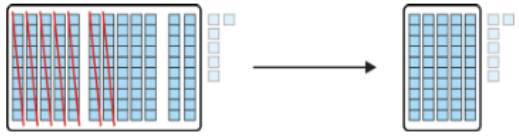
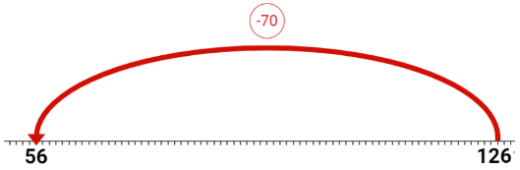
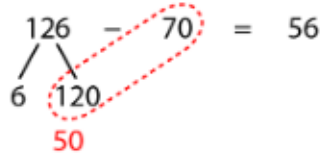
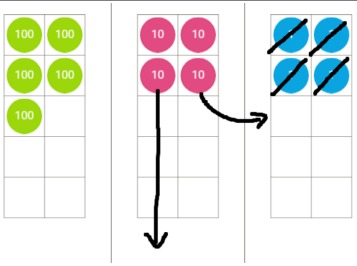
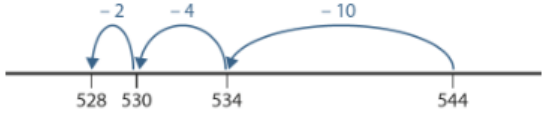
All Saints C of E Primary School

Progression in the teaching of **SUBTRACTION**

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Calculation expectation's to be solved using a range of strategies. See below for some ideas	Knowing the numbers 1 – 10 and knowing what is one less/fewer than any number to 10	To subtract one digit and two digit numbers to 20. To solve subtraction problems using number problems such as 7 = - 9 Use number bonds for subtraction facts within 20.	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones • a two-digit number and tens • two two-digit numbers	Add and subtract numbers mentally, including: • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds • subtract up to 3 digits using compact column method	Add and subtract numbers with up to 4 digits using compact column method where appropriate.	Add and subtract whole numbers with more than 4 digits using compact methods. Add and subtract numbers mentally with increasingly large numbers.	Perform mental calculations, including with mixed operations and large numbers

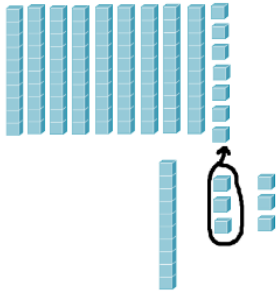
Stem sentences	Concrete	Pictorial	Abstract
__ is the whole, __ is a part, __ is a part. __ = __ minus __ and __ minus __ = __ **Year R/1**	I have 8 counters. 5 counters are red. How many are blue? 	There are 6 children. 2 have their coat on. How many do not have their coat on? 	There are 8 flowers. 2 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'. 	 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

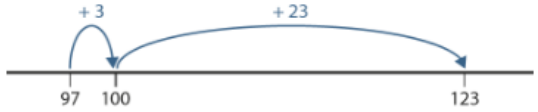
			
There are more __ than __. There are fewer __ than __. The difference between __ and __ is __. **Year 2**	 The difference between 2 and 5 is 3. The difference between 5 and 2 is 3.	 The difference between 4 and 7 is 3. The difference between 7 and 4 is 3.	 5 – 3 = 2
I know that __ minus __ is equal to __. (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**	 7 – 3 = 4 47 – 3 = 44 	 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



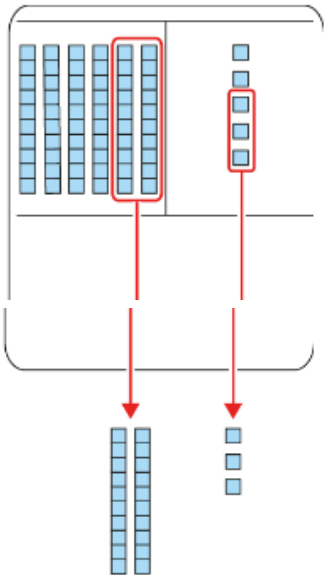


123 – 97 = 26

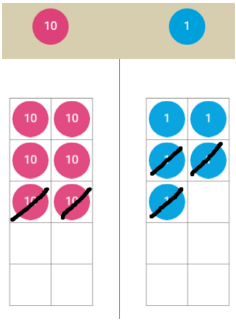
Count on to multiples of 10/100

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.



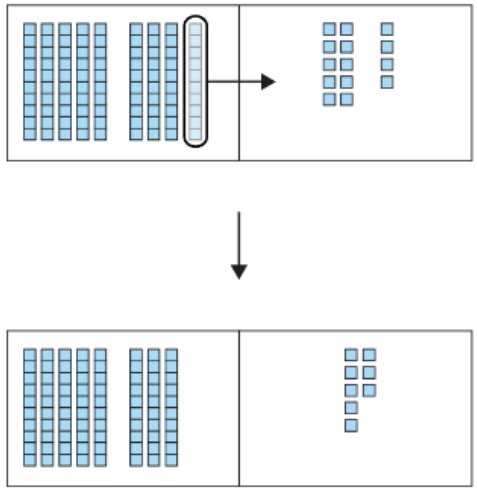
$$\begin{array}{r} 6\ 5 \\ -\ 2\ 3 \\ \hline 4\ 2 \end{array}$$

$$\begin{array}{r} 4\ 6\ 2 \\ -\ 2\ 5\ 1 \\ \hline \\ \hline \end{array}$$

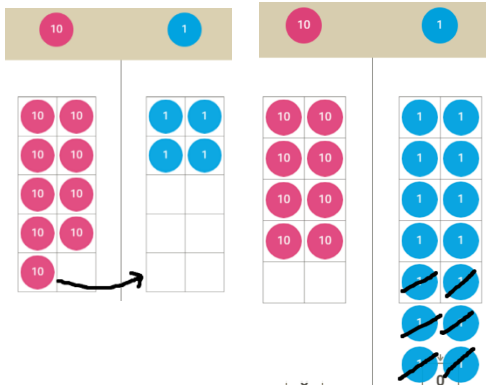
If there is an insufficient number to subtract from in a given column, we must regroup* from the column to the left.

Year 3

*regroup/ rename /exchange are used interchangeably.



Children could draw place value counters.

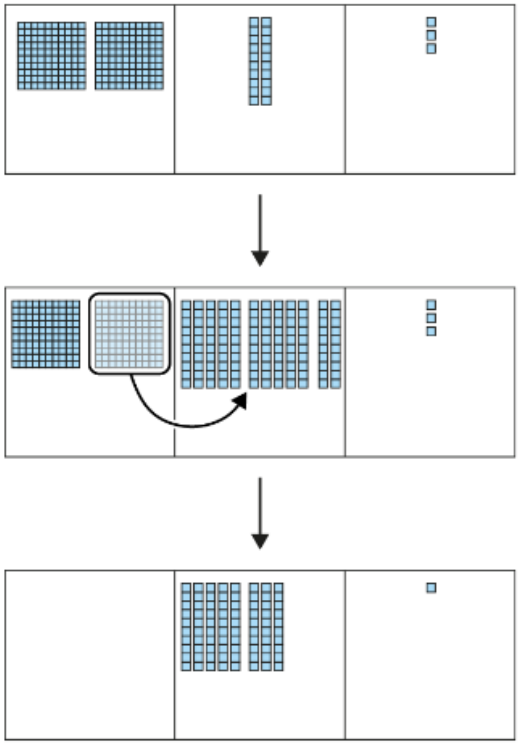


10s	1s
~~9~~ ^{8}	^{1}4
	6

Children in year 3 can cross out the 4 once regrouped and rewrite the new amount as 14. Once more fluent in the method children will add the ten to the ones as shown in the example.

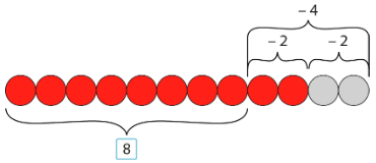
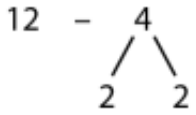
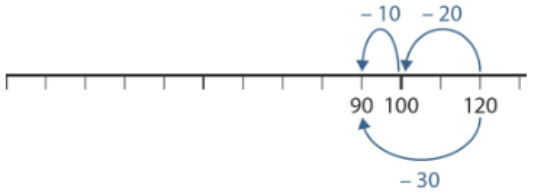
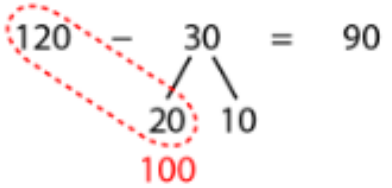
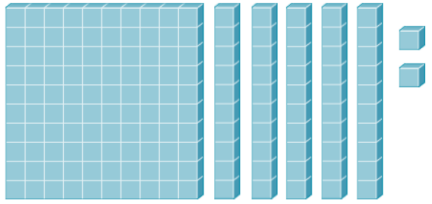
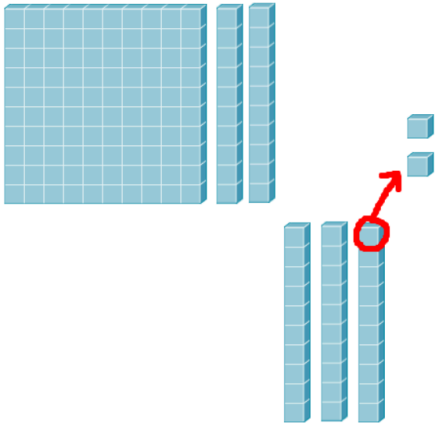
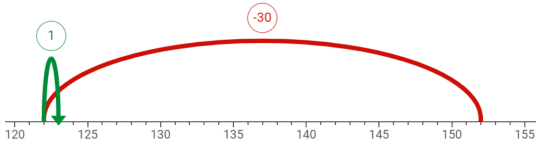
100s	10s	1s
2	2	3
1	4	2

100s	10s	1s
~~2~~ ^{1}	^{1}2	3

			
If there is an insufficient number to subtract from in a given column, we must regroup* from the column to the left. **Year 4** *regroup/ rename /exchange are used interchangeably.	See Year 3 examples	See Year 3 examples	$\begin{array}{r} \cancel{6}^{5}\,\cancel{5}^{1}\,\cancel{3}^{1}\,{}^{1}8 \\ -\ 2,789 \\ \hline 3,749 \end{array}$ $\begin{array}{r} £\,2\,\cancel{9}^{8}.\,\cancel{5}^{1}{}^{1}4\,0 \\ -\ £\,1\,8.\,9\,4 \\ \hline £\,1\,0.\,5\,6 \end{array}$
If there is an insufficient number to subtract from in a given column, we must regroup* from the column to the left. *regroup/ rename /exchange are used interchangeably. **Years 5 and 6**	See Year 3 examples	See Year 3 examples	As in Year 4 but using numbers with more than 4 digits

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Mental Calculation strategies	Perceptually and conceptually subatise up to 10 All numbers are made of 1's	1 less/fewer within 20	1 less within 100 10 less	Subtract multiples of 10, 100	Subtract multiples of 10s, 100s and 1000s	As before and 10,000 100,000 and 1,000,000 and tenths	As before and hundredths
	1:1 correspondence	2 less/fewer Consecutive odd/even numbers have a different of 2	Subtract a 1-digit number from a 2-digit number by bridging through 10	Subtract single digit bridging through boundaries	Fluency of 2-digit subtract 2-digit	Fluency of 2 digit - 2 digit including with decimals	Fluency of 2 digit - 2 digit including with decimals
	Conservation of number (quantity remains the same regardless of organisation)	Concept of zero When zero is subtracted from a number it remains the same. Subtracting a number from itself gives a difference of zero.	Use number facts within 10 to subtract a 1-digit number from a 2-digit number. Make 10 to subtract a 1-digit number from a 2 digit number	Subtract numbers mentally including a 3-digit number and ones, 3-digit number and tens and 3-digit number and hundreds.	Partition second number to subtract decimal subtraction from 10 or 1	Partition second number to subtract	Partition second number to subtract
	1 less/fewer within 10	Subtract from the whole	Partition second number, count back in 10s then 1s			Use number facts, bridging and place value	Use number facts, bridging and place value
	Halves up to 10	Halves up to 20	Halves up to 100 (multiples of 10)	Subtract near multiples of 10 and 100 by rounding and adjusting	Subtract near multiples by rounding and adjusting	Adjust numbers to subtract	Adjust numbers to subtract
	Missing parts for numbers to 5	Difference between consecutive numbers and consecutive odd/even numbers	Difference between	Difference between	Difference between		
	Using number bonds	Using number bonds	Subtract near multiples of 10,11, 19, 21,29	Subtract multiples of 10, 100	Subtract multiples of 10s, 100s and 1000s	Using known facts	Using known facts
Known Facts	Recall and use number bonds for all numbers up to 5	Recall and use number bonds for all numbers up to 10 and halves to 20	Recall and use addition and subtraction facts to 20 fluently and derive/use related facts up to 100	Derive new facts using bonds learnt in KS1	Derive new facts using bonds learnt in KS1	Derive new facts using bonds learnt in KS1	Derive new facts using bonds learnt in KS1

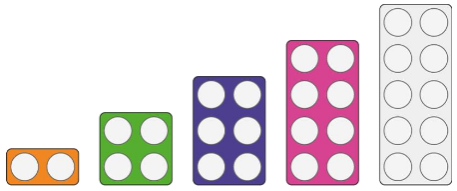
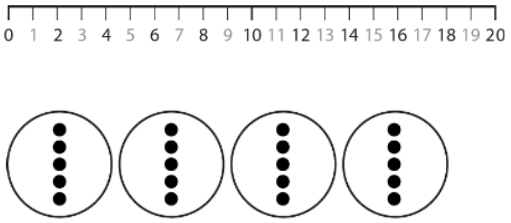
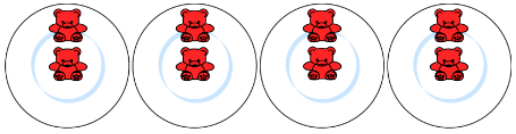
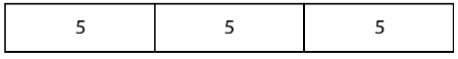
Subtraction – Key mental strategies for Key Stage 2

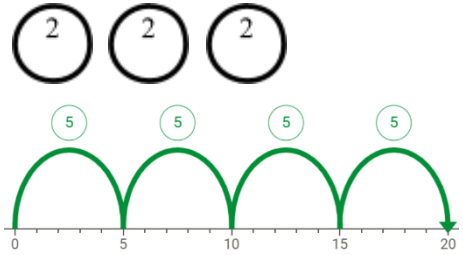
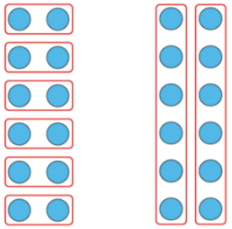
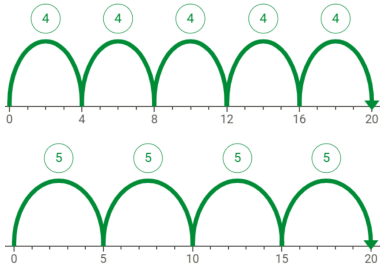
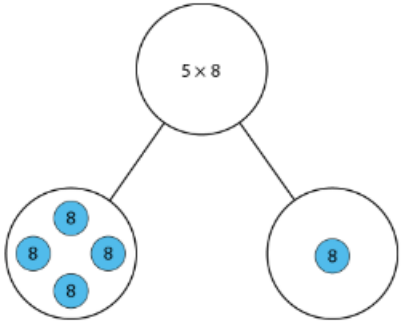
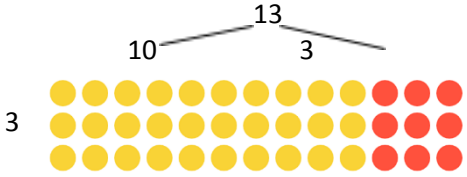
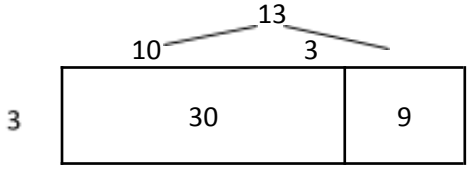
Strategy	Concrete	Pictorial	Abstract
Bridging through a multiple of 10, 100, etc **Years 3, 4, 5 and 6**	 12 – 4 = 12 – 2 = 10 10 – 2 = 8 	 120 – 30 = 120 – 20 = 100 100 – 10 = 90	 120 – 30 = 120 – 20 = 100 100 – 10 = 90
Compensating – rounding to the nearest multiple 10, 100, etc and adjusting **Years 3, 4, 5 and 6**	 152 – 29 		152 – 30 = 122 122 + 1 = 123

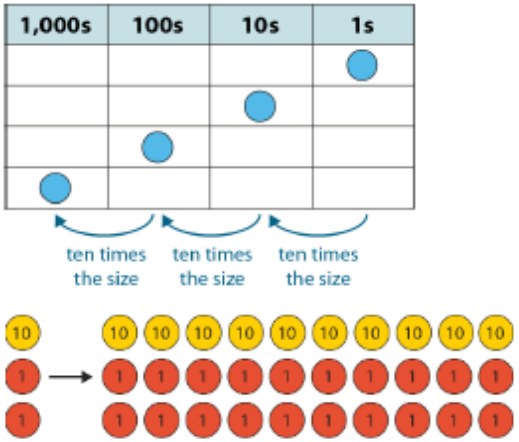
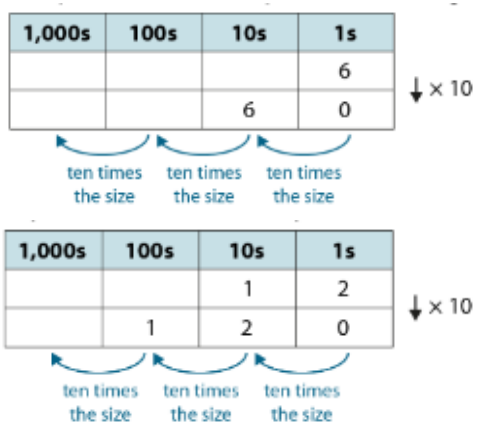
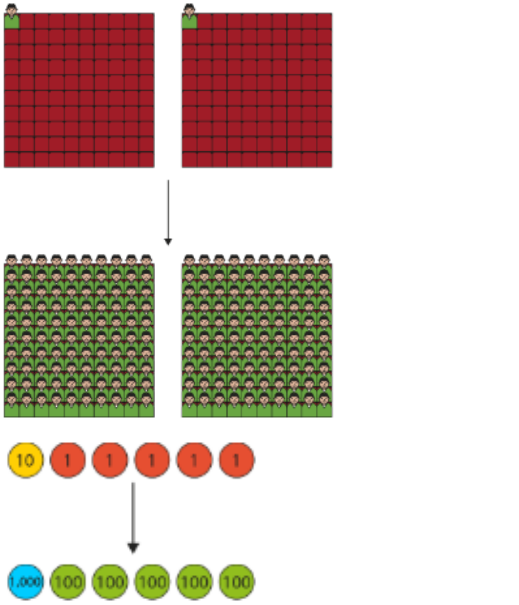
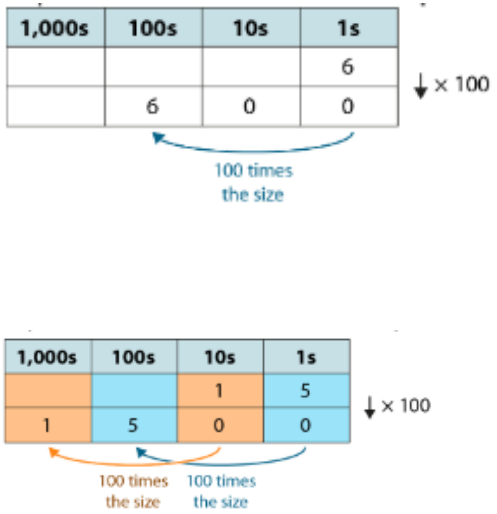
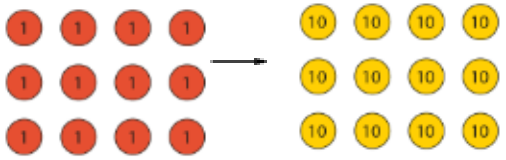
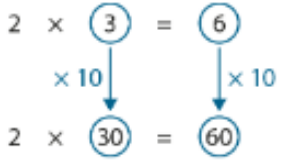
All Saints C of E Primary School

Progression in the teaching of **MULTIPLICATION**

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Calculation expectations to be solved using a range of strategies. See examples below.	Solve problems doubling, halving and sharing	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	Write & calculate mathematical statements for x and ÷ using the multiplication tables that they know, (inc. two-digit numbers x one-digit numbers), using mental & progressing to formal written methods Solve problems, including missing number problems, involving multiplication	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit Recognise and use factor pairs and commutativity in mental calculations	Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers Identifying multiples and factors, finding all factors and common factors of a number. Prime numbers and composite numbers. Recognise squared and cubed numbers.	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication to the context Identify common factors and prime multiples and prime numbers

Stem sentences	Concrete	Pictorial	Abstract
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

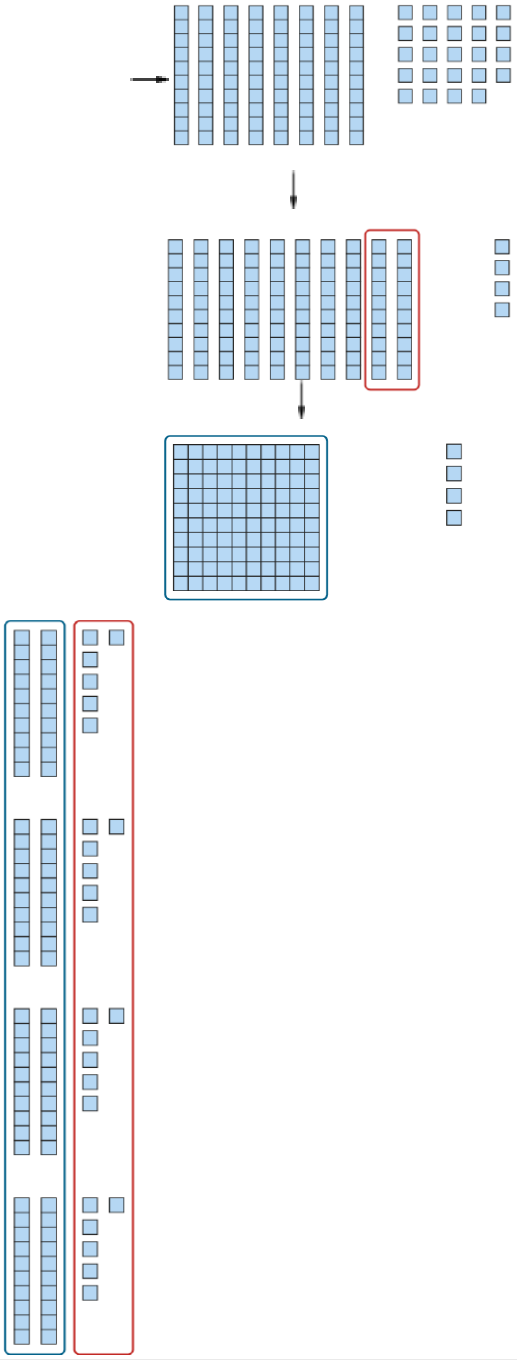
			5 + 5 + 5 = 15 5 x 3 = 15
Factor times factor is equal to the product. The product is equal to factor times factor. **Year 2**	 Unitising equal groups – representing each group by one object	 	2 x 3 = 6 6 = 2 x 3
__ times __ can represent __ in a group and __ groups. It can also represent __ groups of __. Multiplication is commutative. **Year 2 and 3**		 	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 4**	 	 	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 4**	 	 	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
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**			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. **Year 4**			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.

Year 4



84 × 6 = 504

80 4

$80 \times 6 = 480$

$4 \times 6 = 24$

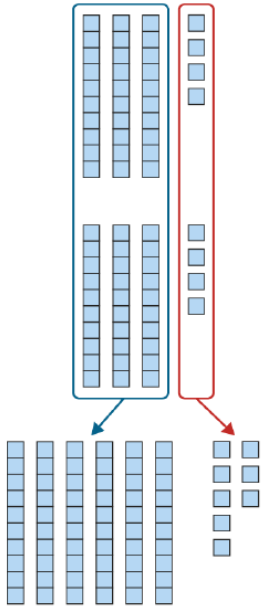
$480 + 24 = 504$

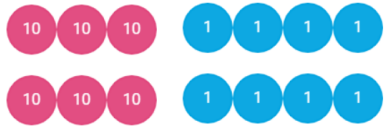
84 x 6 = 80 x 6 + 4 x 6
= 480 + 24
= 504

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

	10s	1s
	3	4
×		2
		8
	6	0
	6	8

2×4 ones $= 8$ ones

2×3 tens $= 6$ tens

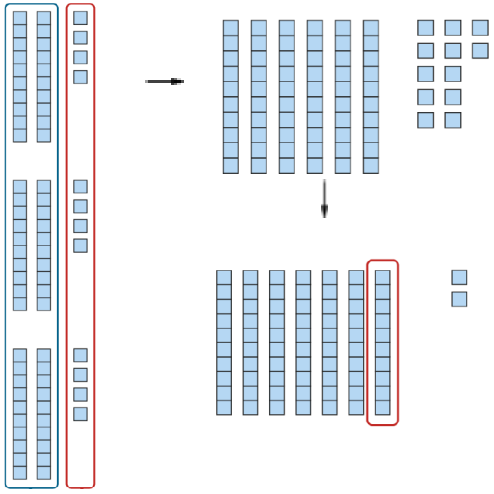
	2	1
×		4
	8	4

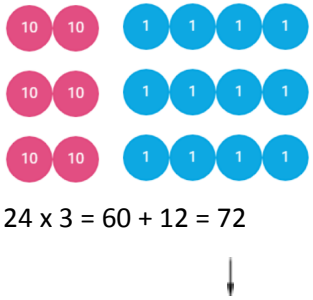
If there are ten or more ones, we must regroup the ones into tens and ones.
If there are ten or more tens, we must regroup* the tens into hundreds and tens.

Multiplication is distributive.

Year 4

*regroup/ rename /exchange are used interchangeably.





24 x 3 = 60 + 12 = 72

	10s	1s
	2	4
×		3
	1	2
	6	0
	7	2

3×4 ones $= 12$ ones $= 1$ ten $+ 2$ ones

3×2 tens $= 6$ tens

	4		
	1	8	
×		5	
	9	0	

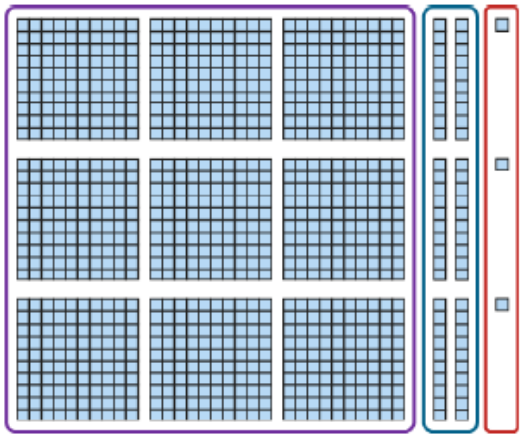
		3	
	3	8	
×		4	
	1	5	2

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.

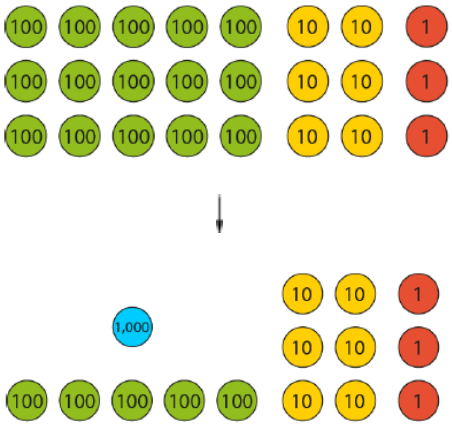
Multiplication is distributive.

Year 4

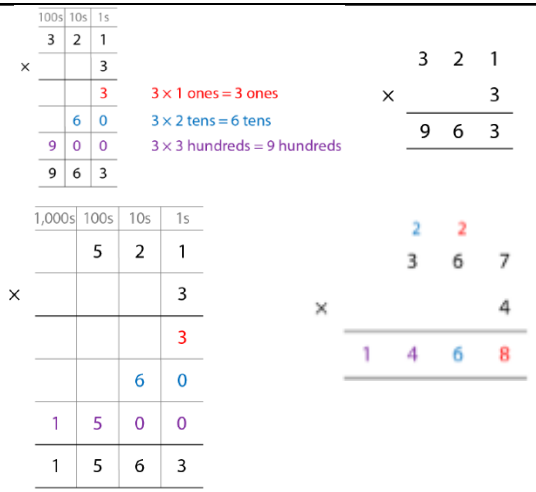
*regroup/ rename /exchange are used interchangeably.



321 x 3 = 963



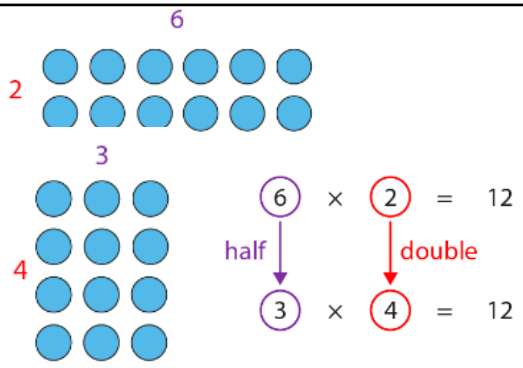
521 x 3 = 1000 + 500 + 60 + 3 = 1563

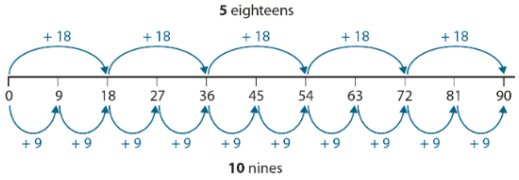


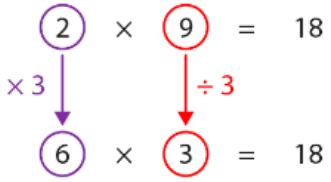
If there is a multiplicative increase in one factor and a multiplicative decrease in the other, the product remains the same.

If I multiply one factor by __, I must divide the other factor by __ for the product to remain the same.

Year 5 and 6





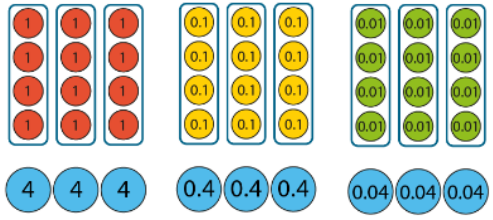


If one factor is made one tenth of the size, the product will be one tenth of the size.

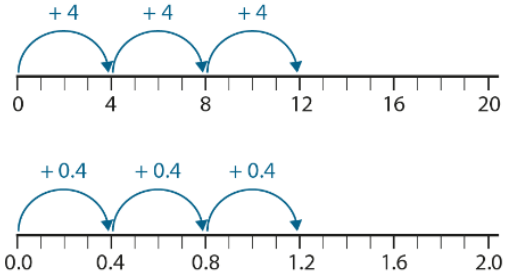
If one factor is made one hundredth of the size, the product will be one hundredth of the size.

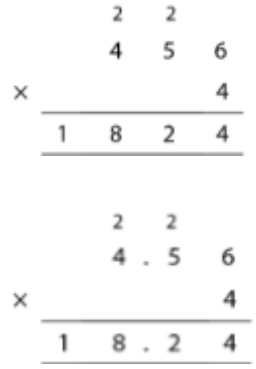
I move the digits of the number I am multiplying __ places to the left until I get a whole number; then I multiply; then I move the digits of the product __ places to the right.

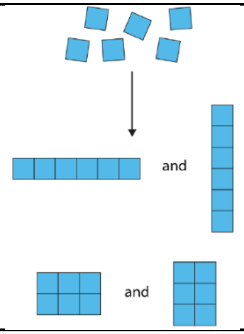
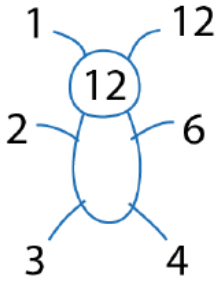
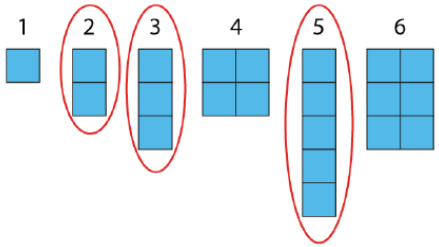
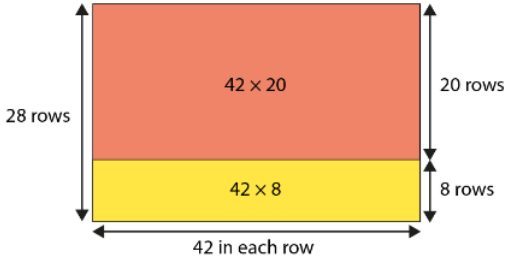
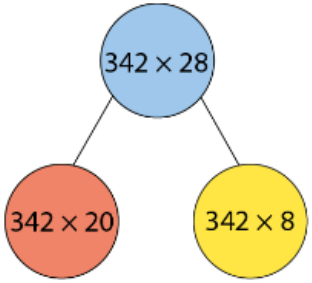
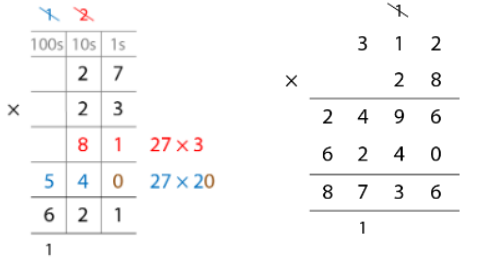
Year 5



4 x 3 = 12
0.4 x 3 = 1.2
0.04 x 3 = 0.12



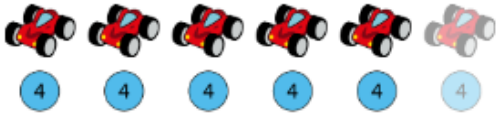
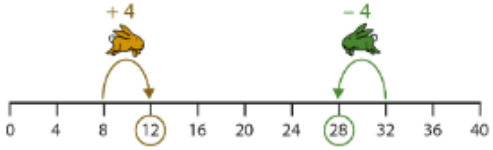


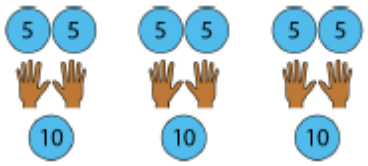
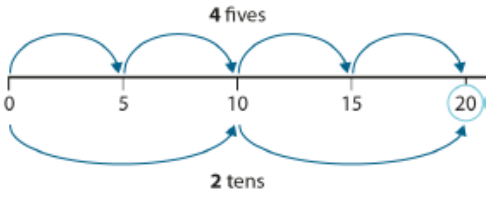
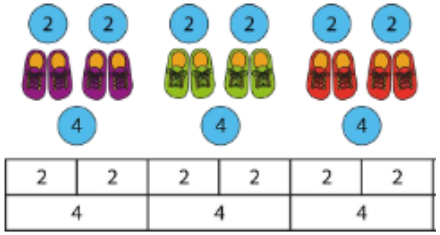
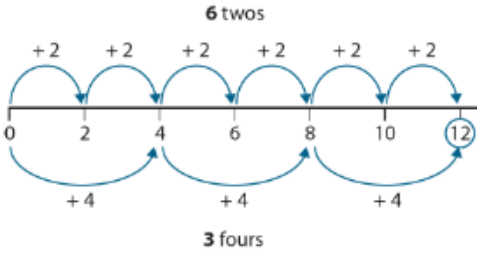
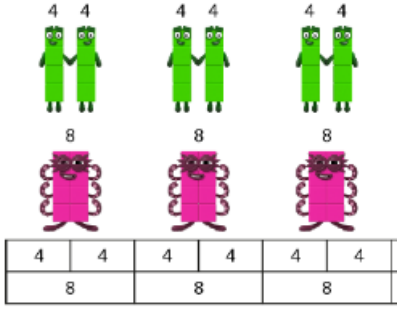
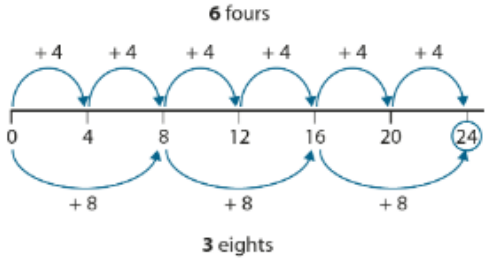
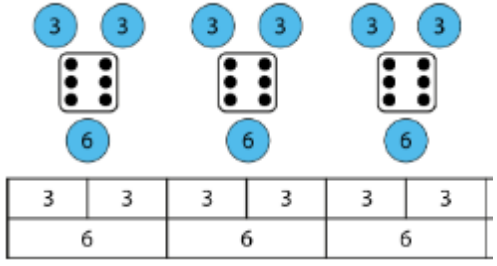
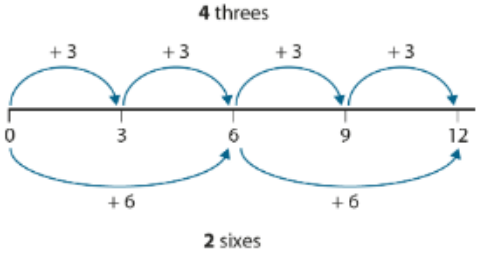
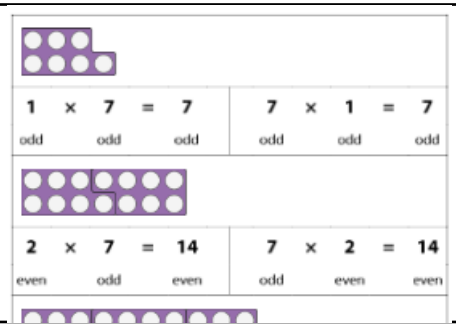
Numbers that have more than two factors are composite numbers. **Year 5**	 Factors of 6 are 1, 2, 3 and 6.	 Factor bugs	Factors of 6 are 1, 2, 3 and 6.
Numbers that have only two factors are prime numbers. **Year 5**			17 is a prime number because its only factors are 1 and 17.
To multiply two two-digit 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**			 When adding the calculations children regroup at the top not the bottom.

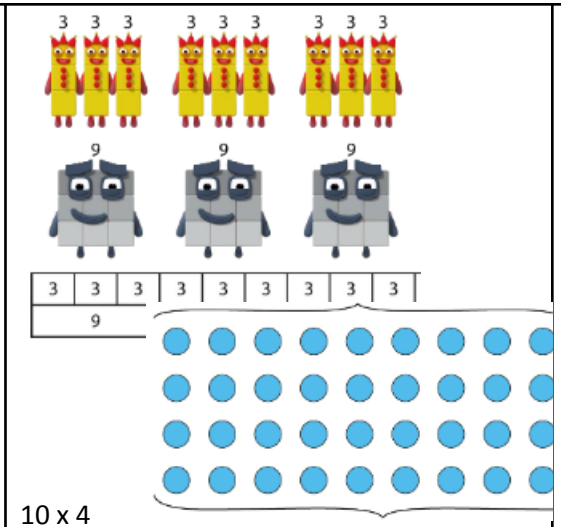
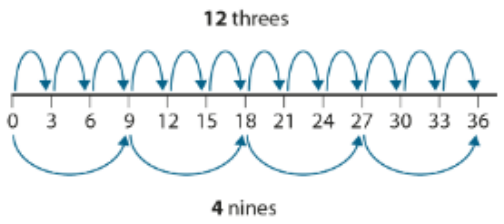
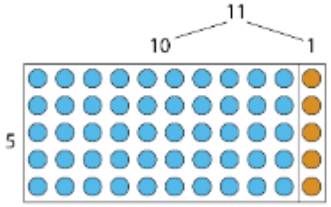
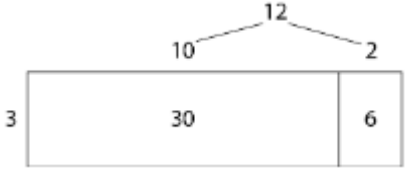
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Mental calculation strategies	Grouping	Count in 2s	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	Recall multiplication and division facts for multiplication tables up to 12 × 12	Identify multiples using known number facts	Multiply numbers mentally drawing upon known facts
	Doubling (numbers up to 5)	Count in 10s	Show that multiplication of two numbers can be done in any order (commutative)	Scale known multiplication facts by 10	Scale known multiplication facts by 100	Multiply numbers mentally drawing upon known facts	Doubling and near doubles

		Count in 5s	Multiplying together three one-digit numbers, making choices about which order to do them in	Near doubles	Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1	Multiply whole numbers and those involving decimals by 10, 100 and 1000 using PV knowledge	
		Doubling (numbers up to 10) Recognising odd and even numbers to 20	Double 2-digit numbers	Doubling and near doubles	Recognise and use factor pairs and commutativity in mental calculations		
		Near doubles using numbers up to 10	Doubling and near doubles				
Known Facts		Doubles (numbers up to 10)	Recall multiplication and division facts for 2, 5, 10, including recognising odd and even numbers.	Multiplication and division facts for 3,4 and 8	Recall multiplication and division facts for multiplication up to 12x12	Recall multiplication and division facts for multiplication up to 12x12	Recall multiplication and division facts for multiplication up to 12x12
			Count in multiples of 2,3, and 5 from 0 and in 10's forwards and backwards.	Count in multiples of 4,8,50,100	Count in multiples of 6,7,9,25,1000	Recall prime numbers up to 19	Recall prime numbers up to 19

Multiplication – Key mental strategies for Key Stage 2

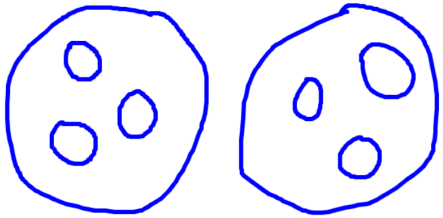
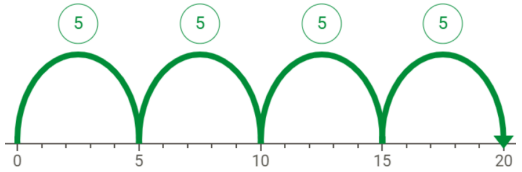
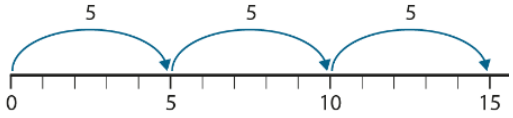
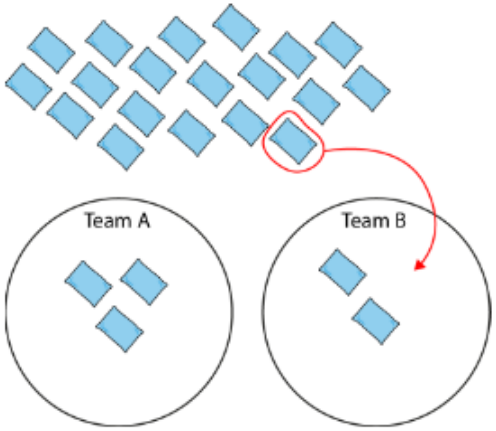
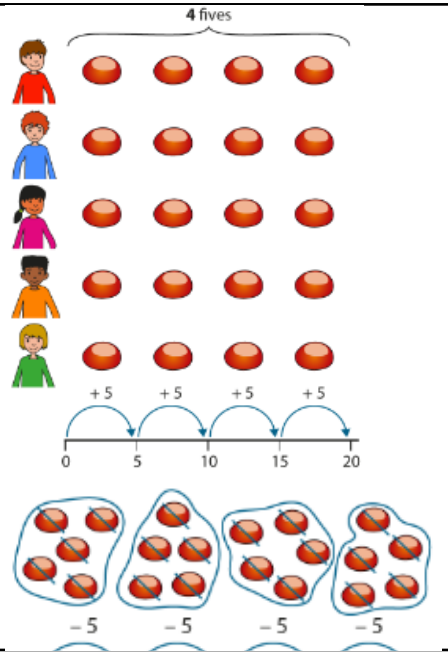
Strategy	Concrete	Pictorial	Abstract
Adjacent multiples of __ have a difference of __. **Year 3 onwards**			4 x 6 = 4 x 5 + 4 4 x 9 = 4 x 10 - 4

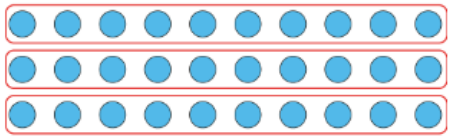
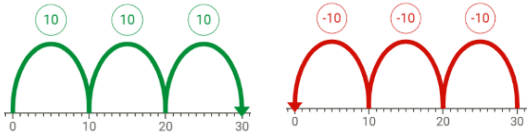
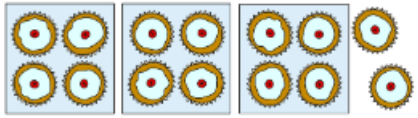
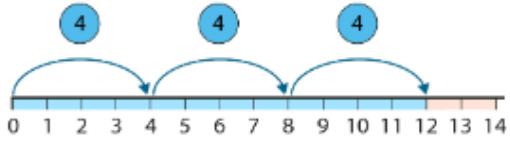
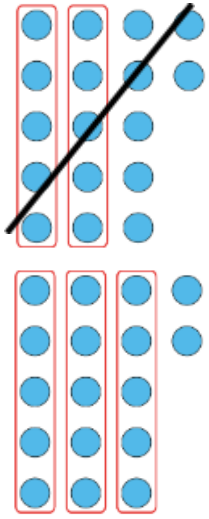
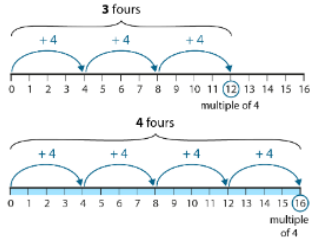
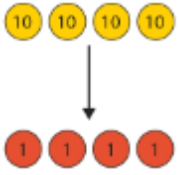
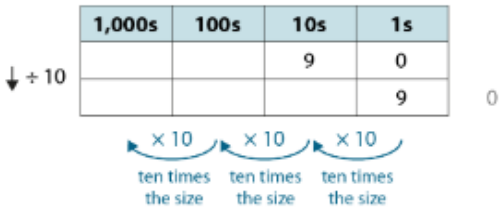
Products in the 10 times table are double the products in the 5 times table. Products in the 5 times table are half of the products in the 10 times table. **Year 2 onwards**			5 x 4 = 10 x 2
Products in the 4 times table are double the products in the 2 times table. Products in the 2 times table are 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 3 onwards**			odd x odd = odd odd x even = even even x odd = even even x even = even

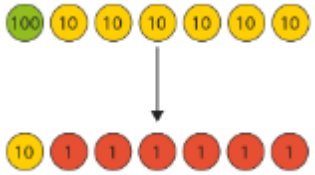
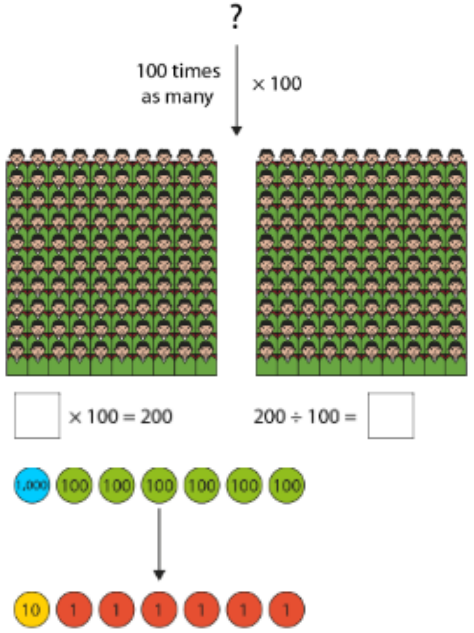
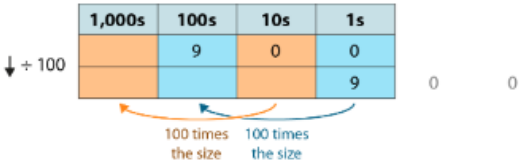
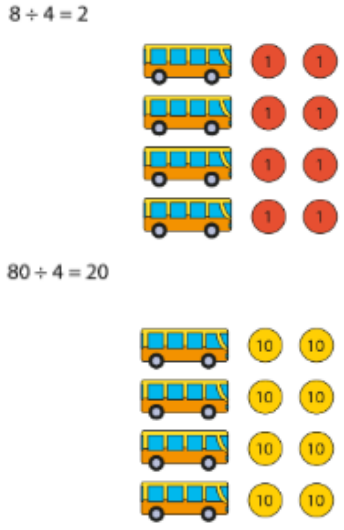
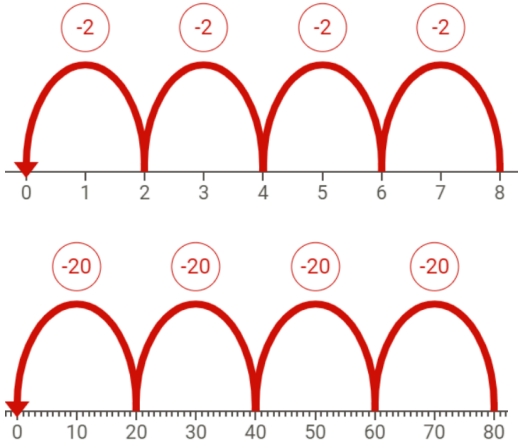
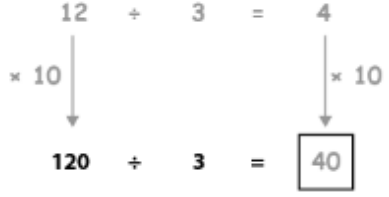
Products in the 9 times table are triple the products in the 3 times table. Products in the 10 times table can be used to find products in the 9 times table. **Year 4 onwards**			3 x 12 = 9 x 4 9 x 4 = 10 x 4 – 1 x 4
Products in the 10 times table can be used to find products in the 11 times table and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

All Saints C of E Primary School							
Progression in the teaching of **DIVISION**							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Calculation expectations to be solved using a range of strategies. See examples below.	Solve problems doubling, halving and sharing	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	Write and calculate mathematical statements for x and ÷ using the multiplication tables that they know, (inc. for two-digit numbers times one-digit numbers), using mental and progressing to formal written methods Solve problems, including missing number problems,	Solve problems involving multiplying and division	Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context Solve problems involving multiplication and division including using their knowledge of factors and multiples,	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as a whole, fractions or by rounding.

				involving multiplication and division		squares and cubes	

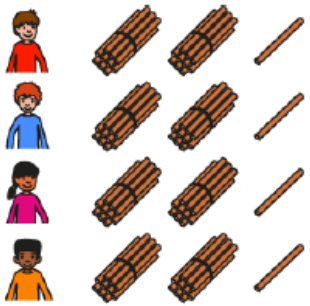
Stem sentences	Concrete	Pictorial	Abstract
One group of two, two groups of two, three groups of 2, … Ten, twenty, thirty, … One five, two fives, three fives, … **Year R/1**			6 biscuits shared between 2 children gives 3 biscuits each.
The _____ costs __p. Each coin has a value of __p. So I need __ coins. **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

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 and 3**	 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 __. **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
To divide a multiple of ten by 10, remove the zero from the ones place. **Year 4**	 4 tens ÷ 10 = 4 ones 40 ÷ 10 = 4		90 ÷ 10 = 9 150 ÷ 10 = 15

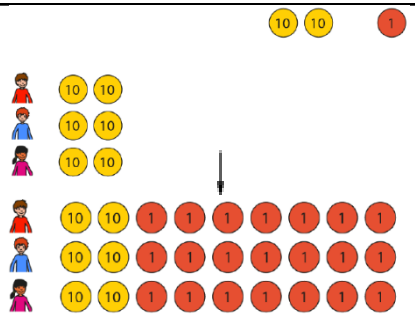
			
To divide a multiple of 100 by 100, remove two zeros (from the tens and ones places). **Year 4**			900 ÷ 100 = 9 1500 ÷ 100 = 15
If the dividend is made ten times the size, the quotient will be ten times the size. **Year 4**			

If dividing the tens gives a remainder of one or more tens, we must regroup the remaining tens for ones.

Year 4



84 ÷ 4 = 21



8 tens	÷	4	=	2 tens
4 ones	÷	4	=	1 one
84	÷	4	=	21

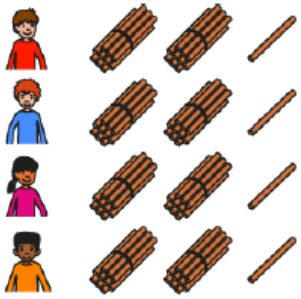
6 tens	÷	3	=	2 tens
21 ones	÷	3	=	7 ones
81	÷	3	=	27

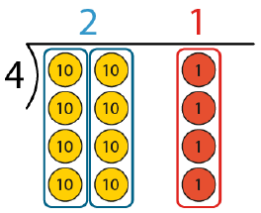
If dividing the tens gives a remainder of one or more tens, we must regroup* the remaining tens for ones.

Year 4

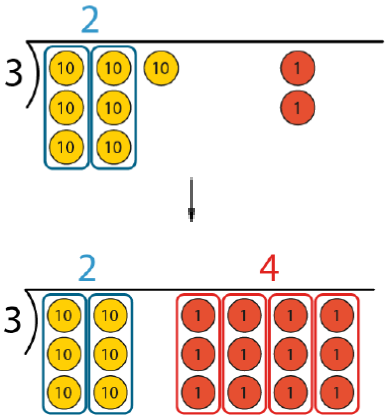
Short division is formally introduced in year 5 but can be introduced in year 4 at teacher discretion.

*regroup/ rename /exchange are used interchangeably.

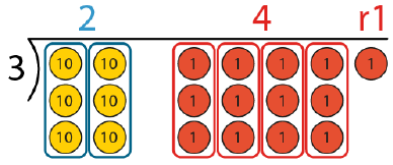




72 ÷ 3 = 24



73 ÷ 3 = 24 r 1



10s	1s
2	1
8	4

8 tens ÷ 4 = 2 tens
4 ones ÷ 4 = 1 one

2	1
8	4

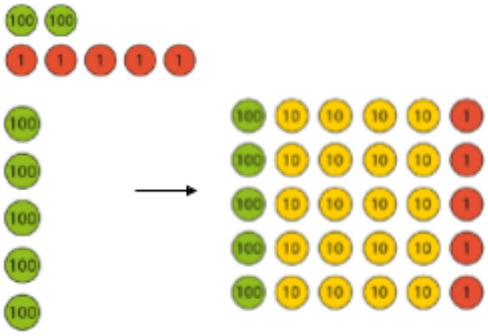
2	4
7	12

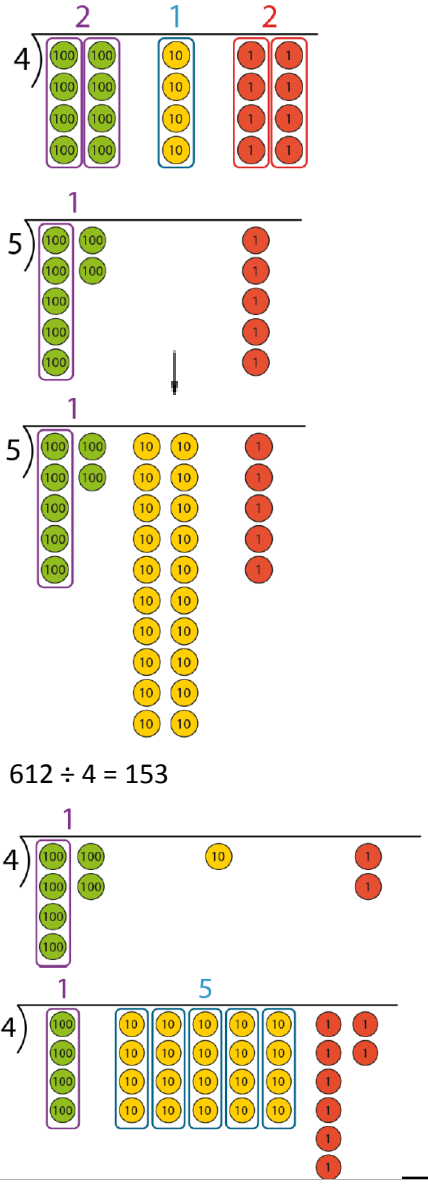
2	4r1
7	13

If dividing the hundreds gives a remainder of one or more hundreds, we must regroup* the remaining hundreds for tens.

Year 4

*regroup/ rename /exchange are used interchangeably.





$$\begin{array}{r} 2\ 1\ 2 \\ 4\overline{)\ 8\ 4\ 8} \end{array}$$

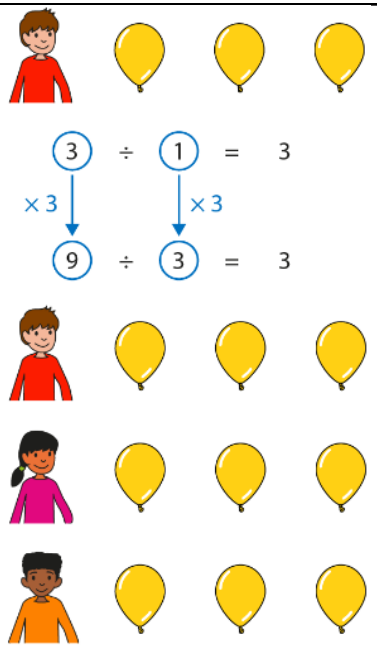
$$\begin{array}{r} 1\ 4\ 1 \\ 5\overline{)\ 7\ {}^{2}0\ 5} \end{array}$$

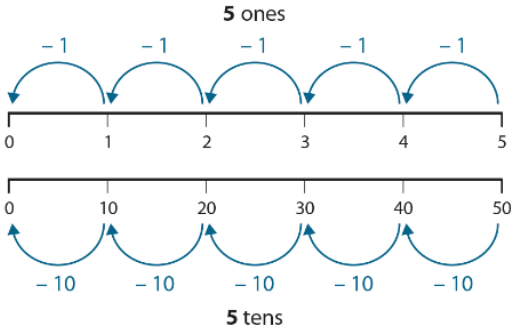
$$\begin{array}{r} 1\ 5\ 3 \\ 4\overline{)\ 6\ {}^{2}1\ {}^{1}2} \end{array}$$

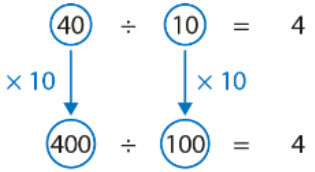
If there is a multiplicative change to the dividend factor and a corresponding change to the divisor, the quotient remains the same.

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

Year 5 and 6





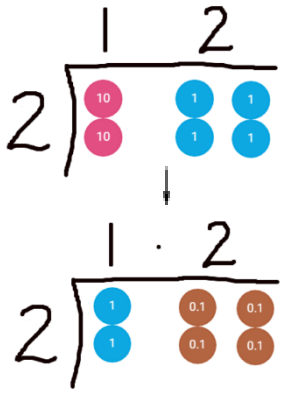


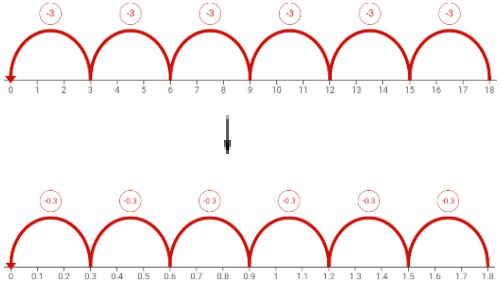
If the dividend is made one tenth of the size, the quotient will be one tenth of the size.

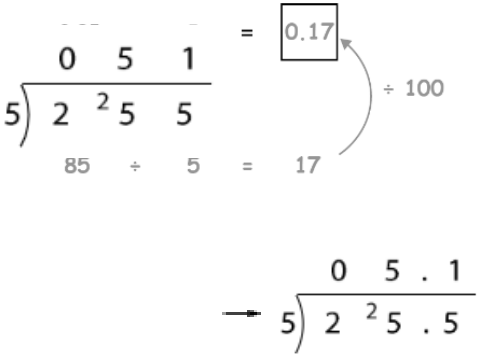
If the dividend is made one hundredth of the size, the quotient will be one hundredth of the size.

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





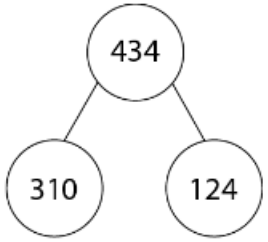


Any two-, three- or four-digit dividend can be divided by a two-digit divisor using skip-counting in multiples of the divisor, or by short division or long division.

Year 6

In year 6 children are shown both long and short division and can choose their preferred method.

Partitioning



310 ÷ 31 = 10

124 ÷ 31 = 4

434 ÷ 31 = 14

Short division

$$\begin{array}{r} 0\ 1\ 4 \\ 31\overline{)4\ {}^{4}3\ {}^{12}4} \end{array}$$

Long division

$$\begin{array}{r} 0\ 1\ 4 \\ 31\overline{)4\ 3\ 4} \\ 3\ 1 \\ \hline 1\ 2\ 4 \\ 1\ 2\ 4 \\ \hline 0 \end{array}$$

(1 ten × 31 = 31 tens)

(4 ones × 31 = 124 ones)

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 = ?

$$\begin{array}{r} 2\ 3\ \text{r}9 \\ 15\overline{)3\ 5\ 4} \\ 3\ 0 \\ \hline 5\ 4 \\ 4\ 5 \\ \hline 9 \end{array}$$

So, 354 ÷ 15 = 23 r 9

$$\begin{array}{r} 2\ 3\ \frac{9}{15} \\ 15\overline{)3\ 5\ 4} \\ 3\ 0 \\ \hline 5\ 4 \\ 4\ 5 \\ \hline 9 \end{array}$$

$\frac{9}{15} = \frac{3}{5}$

So, $354 \div 15 = 23\frac{3}{5}$

$$\begin{array}{r} 2\ 3.6 \\ 15\overline{)3\ 5\ 4.0} \\ 3\ 0 \\ \hline 5\ 4 \\ 4\ 5 \\ \hline 9\ 0 \\ 9\ 0 \\ \hline 0 \end{array}$$

So, 354 ÷ 15 = 23.6

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Mental calculation strategies	Sharing equally	Sharing equally	Sharing equally	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables	Recall and use multiplication and division facts for multiplication tables up to 12 × 12	Recall and use multiplication and division facts for multiplication tables up to 12 × 12	Divide numbers mentally drawing upon known facts

	Halving equally	Halving equally	Halving equally	Recall and use multiplication and division facts for the 4 and 8 multiplication tables	Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1	Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1	Use knowledge of factors and multiples to determine whether a number will have a remainder
		Counting in 2s, 5s & 10s	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables	Scale division derived from multiplication facts by 10	Recognise and use factor pairs in mental calculations (e.g. I know that 3 and 12 are factors of 36, therefore I know that 36 ÷ 12 = 3)	Recognise and use factor pairs in mental calculations (e.g. I know that 3 and 12 are factors of 36, therefore I know that 36 ÷ 12 = 3)	Perform mental calculation including mixed operations and large numbers.
		Use counting for grouping	Use multiplication facts for grouping	Recall half of any even number up to 100	Scale division derived from multiplication facts by 100	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	
		Recognising odd and even numbers (this leads in to knowing whether a number is divisible by 2)	Recognising odd and even numbers (this leads in to knowing whether a number is divisible by 2)	Halving equally Recall half of any multiple of ten	Strategies for finding simple unit fractions of a number	Strategies for finding simple unit fractions of a number	
			Half of any even number up to 100				
Known Facts			Recall multiplication and division facts for 2, 5, 10, including recognising odd and even numbers.	Multiplication and division facts for 3,4 and 8	Recall multiplication and division facts for multiplication up to 12x12	Recall multiplication and division facts for multiplication up to 12x12	Recall multiplication and division facts for multiplication up to 12x12
			Count in multiples of 2,3, and 5 from 0 and in 10's forwards and backwards.	Count in multiples of 4,8,50,100	Count in multiples of 6,7,9,25,1000	Recall prime numbers up to 19	Recall prime numbers up to 19