St George's C of E Primary School

Calculation Policy

ST GEORGE'S
CHURCH OF ENGLAND
PRIMARY SCHOOL

Key Stage 1 – Addition

Y1

Through practical activities in meaningful contexts and informal written methods.

- Recall number bonds to 20 and within 20.
- Pictures and Marks – 1 more / 2 more.

There are 3 cars in the garage. 1 more came along.

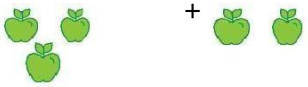


3 + 1 = 4

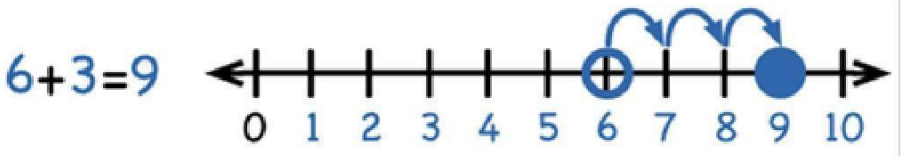


4 + 1 = 5

Terry has 3 apples and Tony has 2 apples. How many altogether?



- Number lines to 20.



- Derive related facts to 20.

□ = 5 + 4

5 + 4 = □

□ + 4 = 9

□ + □ = 9



- Money and addition up to 20p.



- Read, write and interpret mathematical statement involving addition (+) and equals (=).

Video clips:

Using a range of equipment and strategies to reinforce addition statements

National Curriculum requirements:

Add 1 digit and 2 digit numbers to 20, including 0.

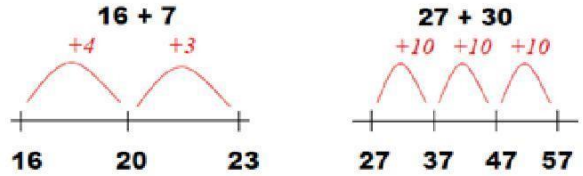
Y2

Through practical activities in meaningful contexts and informal written methods.

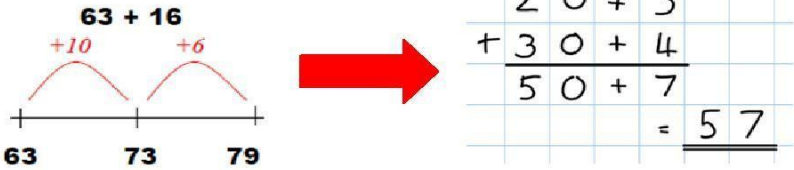
- Fluent recall of bonds to 20 and within 20.
- Derive and use related facts up to 100.
- Addition of money up to £1.



- Add numbers using concrete objects, pictorial representations and mentally.



- Show that addition of two numbers can be done in any order (commutative).
- Recognise and use the inverse relationship between addition and subtraction.
- Progressing to partitioned column method (in preparation for year 3).



National Curriculum requirements:

(using concrete objects, pictorial representations and mentally)

Add 2 digit numbers and ones.

Add 2 digit number and tens.

Add two 2 digit numbers.

Add three 1 digit numbers.

Year 2 and Key Stage 2 – Addition

Y2/3

- Continue with partitioned column method.
- Introduce expanded column addition.

H	T	O
	2	3 6
+		7 3
		9
	1	0 0
	2	0 0
	3	0 9

Progressing to the compact column method.

TO	HTO	TO	HTO	TO	HTO
23	315	94	561	47	237
+ 42	+ 624	+ 73	+ 718	+ 25	+ 516
65	939	167	1279	72	753
				1	1

- Add money using both £ and pence in practical contexts.

Video clip:
Demonstration of expanded 3 digit column addition

National Curriculum requirements:
Add numbers with up to 3 digits, using the formal written method of column addition.

Y4

- Continue with column addition.

HTO	HTO	ThHTO
371	376	2388
+ 485	+ 485	+ 1124
856	861	3512
1	1 1	1 1

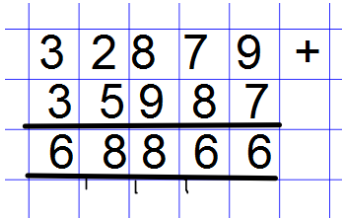
- Estimate and use inverse operations to check answers to a calculation.
- Add money using both £ and pence in practical contexts.

National Curriculum requirements:
Add numbers with up to 4 digits, using the formal written method of column addition.

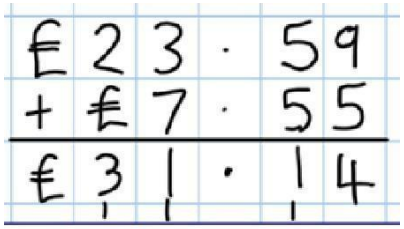
Key Stage 2 – Addition

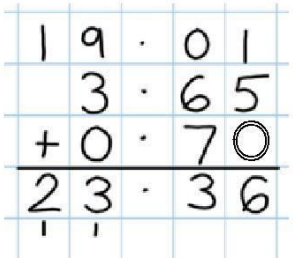
Y5

- Continue to use column addition, adding numbers with more than 4 digits.



- Addition of money and decimals.



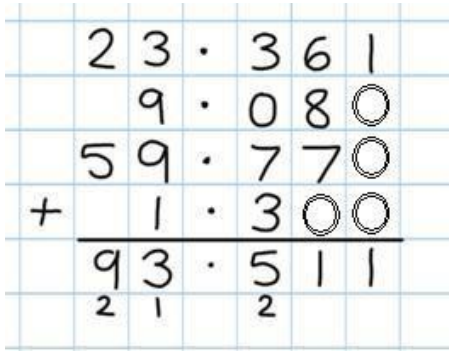


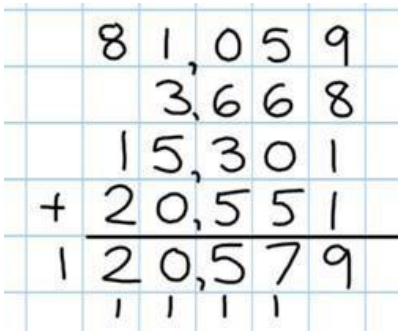
National Curriculum requirements:

Add whole numbers with more than 4 digits, using the formal written method of column addition.

Y6

- Add several numbers of increasing complexity using column addition.





National Curriculum requirements:

Add whole numbers with more than 4 digits, using the formal written method of column addition.

Key Stage 1 – Subtraction

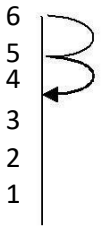
Y1

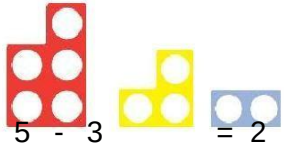
Through practical and meaningful contexts and informal written methods.

- We made 6 cakes. We ate 2 of them.
How many cakes are left?



- Link to vertical number line 6 – 2 =





5 - 3 = 2

- Represent and use number bonds within 20.
- Record using subtraction (–) and equals signs (=)
- Derive related facts up to 20.

5 - ? = 3 ? = 5 – 2

5 – 2 = ? 3 = ? - 2

? – 2 = 3

3 = 5 - ?



- Counting back on a 100 square and a vertical number line.

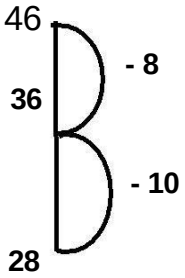
National Curriculum requirements:
Subtract 1 digit and 2 digit numbers up to 20, including 0.
Represent and use number bonds and related subtraction facts.

Y2

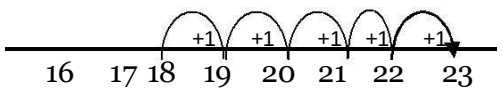
Through practical and meaningful contexts.

- Fluent recall of bonds to 20 and within 20.
- Derive and use related facts up to 100
e.g. 10 – 7 = 3 so 100 – 70 = 30.
- Counting back by partitioning second number. Subtract the ones first to be in line with columnar subtraction

E.g. 46 - 18
46 - 10 - 8



23 – 18 = 5



- Recognise and use the inverse relationship between addition and subtraction
- Show that subtraction is not commutative (done in any order)
- Progressing to the partitioned columnar method in preparation for year 3
- Subtraction of money, including change.

National Curriculum requirements:
(using concrete objects, pictorial representations and mentally)
Subtract 2 digit numbers and ones.
Subtract 2 digit number and tens.
Subtract two 2 digit numbers.
Subtract three 1 digit numbers.

Key Stage 2 – Subtraction

Y3

- Continue with vertical number line subtraction progressing to the expanded column subtraction method.

89–35 = 54

80 + 9

- 30 + 5

50 + 4 = **54**

- Introduce exchanging through the expanded column subtraction method.

72 - 47



60 ~~70~~ + 12

- 40 + 7

20 + 5 = **25**

- Progressing on to compact column subtraction.

T O	H T O	T O
4 7	8 6 4	~~5~~ 1
- 2 3	- 6 2 1	- 3 6
2 4	2 4 3	1 5

- Emphasise value of digit, e.g. 4 tens subtract 2 tens = 2 tens. Use the correct language for subtraction i.e. exchange rather than borrow.
- Subtract amounts of money to give change.

Video clips:

Subtraction - teaching children to consider the most appropriate methods before calculating

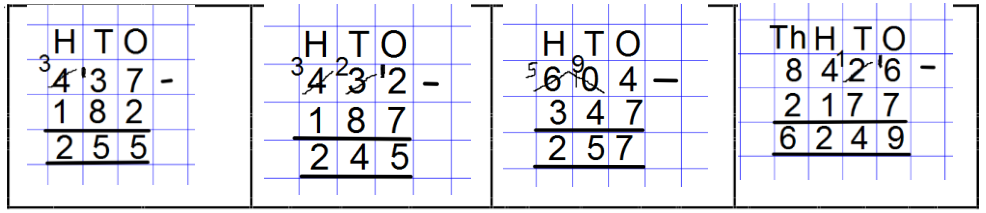
Introducing partitioned column subtraction method, from practical to written

National Curriculum requirements:

Subtract numbers with up to 3 digits using the formal written method of column subtraction.

Y4

- Continue with partitioned column subtraction progressing to compact column subtraction.



- Estimate and use inverse operations to check answers to a calculation.
- Subtract amounts of money using column method.

Video clips:

Subtraction - teaching children to consider the most appropriate methods before calculating

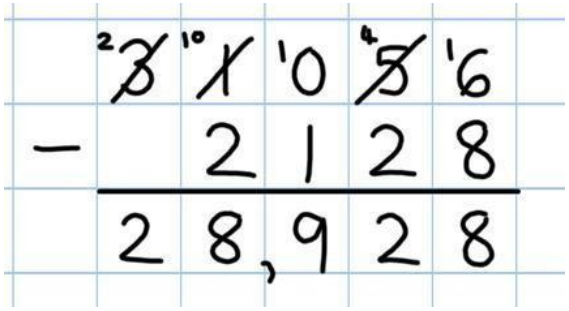
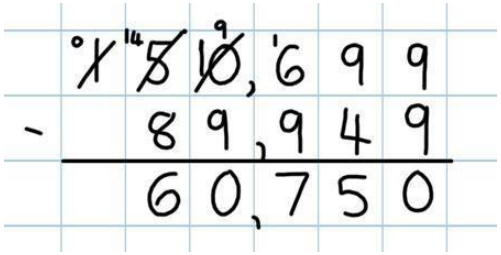
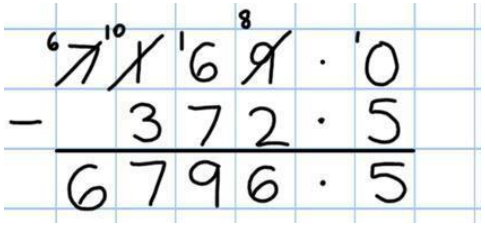
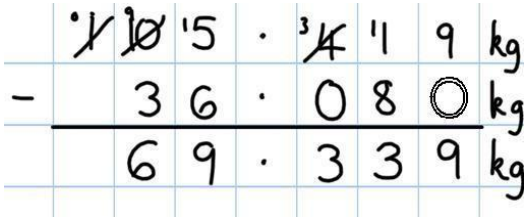
Introducing partitioned column subtraction method, from practical to written

Moving to the compact column method of subtraction

National Curriculum requirements:

Subtract numbers up to 4 digits using the formal written method of column subtraction.

Key Stage 2 – Subtraction

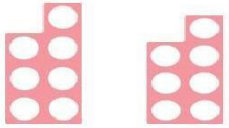
Y5	Y6
• Continue with compact column subtraction, including subtraction of decimals.	• Continue with compact column subtraction, including subtraction of decimals.
	
	
• Use rounding to check answers to calculations and to determine, in the context of a problem, levels of accuracy.	• Use estimation to check answers to calculations and to determine, in the context of a problem, levels of accuracy.
Video clip: **Moving to the compact column method of subtraction** **National Curriculum requirements:** Subtract numbers with more than 4 digits.	**National Curriculum requirements:** Subtract numbers with more than 4 digits.

Key Stage 1 – Multiplication

Y1

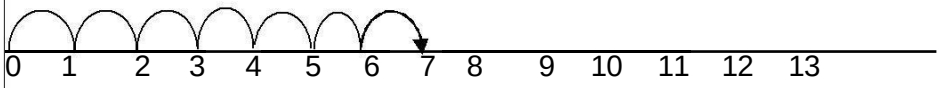
Through practical activities and meaningful contexts using concrete objects, pictorial representations and arrays with the support of the teacher.

- Doubles.



7 + 7 = 14

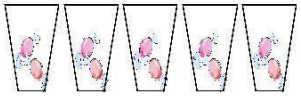
- Make connections between arrays, number patterns and counting in 2s, 5's to 50 and 10's to 100.
- Use of number lines.



- "100 Square" to count in 2s, 5s and 10s.

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

- There are 2 sweets in one bag. How many sweets are there in 5 bags?



- Counting multiples of coins: 2p, 5p, 10p.

2p + 2p + 2p



National Curriculum requirements:
Solve one step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Y2

Through practical activities and meaningful contexts using concrete objects, pictorial representations and arrays.

- Double numbers (by partitioning and recombining) 17 + 17.



10 + 10 7 + 7

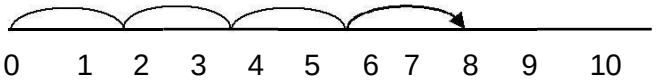
- Understand multiplication as repeated addition/groups/lots.
- Read arrays.



2x4 (2, 4 times)

- Repeated addition on a number line.

2 + 2 + 2 + 2 (4 groups of 2, 2 four times, 2 x 4)



4 + 4 (2 groups of 4, 4 two times, 4x2)



- Know the multiplication tables for 2, 5 and 10.
- Calculate mathematical statements within the multiplication tables using the multiplication (x) and equals (=) signs.
- Show that the multiplication of two numbers can be done in any order (commutative).

Video clips: **Teaching for understanding of multiplication facts**
Practical multiplication and the commutative law

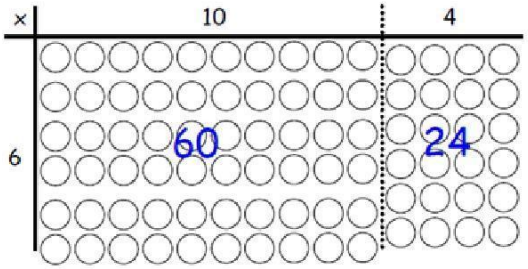
National Curriculum requirements:
Solve problems involving multiplication using materials, arrays, mental methods and multiplication facts.

Key Stage 2 – Multiplication

Y3

- Recall and use multiplication tables for 3, 4 and 8.
- Continue to use arrays and number lines/Cuisenaire rods for 3, 4 and 8 multiplication tables.
- Write and calculate mathematical statements for multiplication. Statements to include the multiplication tables that they know and 2 digit numbers x 1 digit numbers. Pupils use mental methods and progress to formal written methods.
- Introduce grid model.

X	104
6	60 + 24 = 84



- Progressing to expanded method of multiplication.

```
  T O
  1 4
x   5
  2 0  (5x4)
+ 5 0  (5x10)
  7 0
```

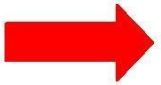
Video clips: [Teaching the grid method as an interim step]
(Partitioning and counters to introduce grid).

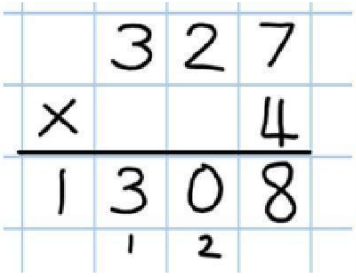
National Curriculum requirements: Multiply 2 digits by 1 digit, using mental and progressing to formal written methods.

Y4

- Recall and use multiplication tables up to 12x12 (Including multiplying by 0 and 1).
- Continue using grid method and expanded method as appropriate, progressing to short multiplication.

x	100	30	6
5	500	150	30





- Short Multiplication.

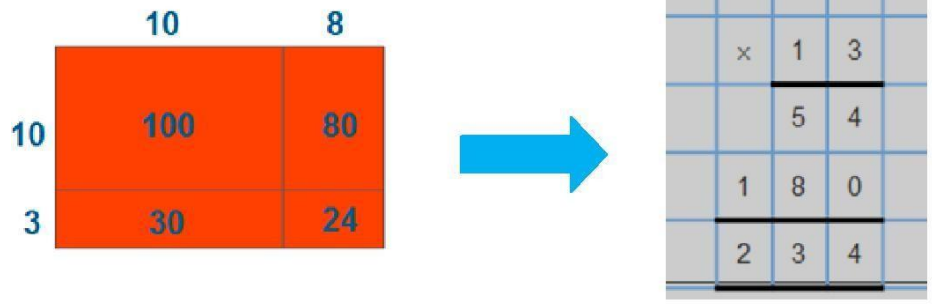
No carrying	Extra digit	Carrying	Zeros	Ext.
T O 3 2 x 3 9 6	**H T O** 5 1 x 2 1 0 2	**H T O** 3 8 x 7 2 6 6 5	**H T O** 2 0 2 x 4 8 0 8	**H T O** □ □ x 4 6 1 2 2 1

National Curriculum requirements:
Multiply 2 digits by 1 digit using formal written layout.
Multiply 3 digits by 1 digit using formal written layout.

Key Stage 2 – Multiplication

Y5

- Recall and use multiplication tables up to 12x12 (Including multiplying by 0 and 1).
- Continue to practise short multiplication.
- Use Grid Method to introduce long multiplication.



Video clips:
Moving from grid method to a compact method
Reinforcing rapid times table recall
Demonstration of long multiplication

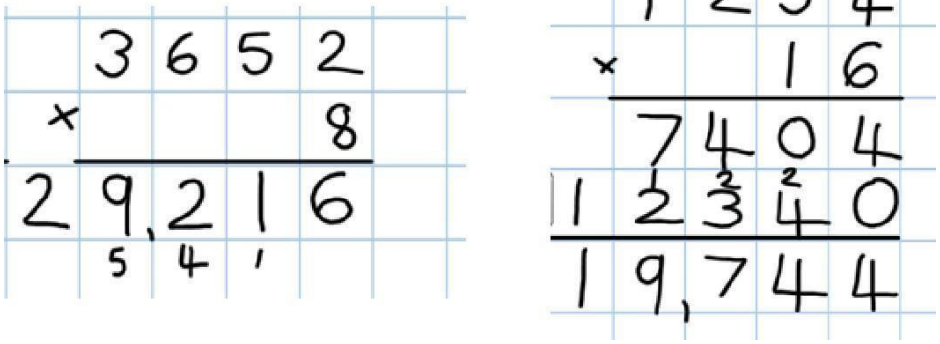
National Curriculum requirements:
Multiply numbers up to 4 digits by a 1 digit number using the formal written method of short multiplication.

Multiply numbers up to 4 digits by a 2 digit number using the formal written method of long multiplication.

Multiple whole numbers and those involving decimals by 10, 100, 1000.

Y6

- Recall and use multiplication tables up to 12x12 (Including multiplying by 0 and 1).
- Continue to practise short multiplication.
- Continue to practise long multiplication.



- Multiply decimals using the grid method and progressing on to short multiplication.
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Video clips:
Moving from grid method to a compact method
Reinforcing rapid times table recall
Demonstration of long multiplication

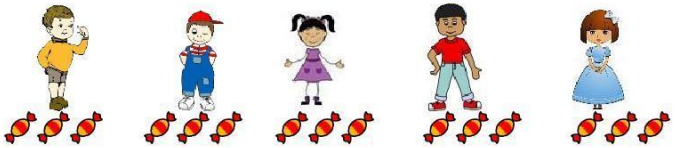
National Curriculum requirements:
Multiply up to 4 digits by 2 digits using the formal written method of long multiplication.
Multiply numbers by 10,100, 1000 giving answers up to 3 decimal places.

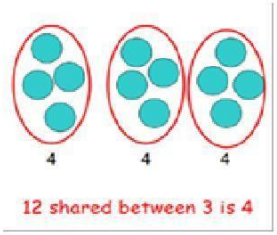
Key Stage 1 – Division

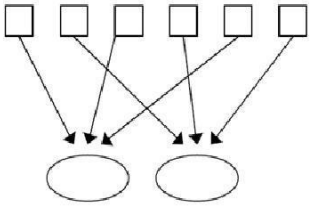
Y1

Through practical activities in meaningful contexts.

- Division as sharing.
  Emphasise the importance of sharing equally.
  Share a bag of 15 sweets between 5 children – one for you, one for you, one for you, one for you, one for me.









- Introduce halving even numbers up to 10. E.g. Half of 4:



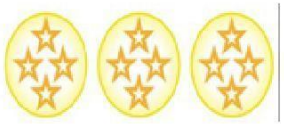
National Curriculum Requirements:

Solve one step problems involving division, by calculating the answer by using concrete objects, pictorial representations and arrays with support.

Y2

Through practical activities in meaningful contexts.

- Recall and use division facts for 2, 5 and 10 times tables.
- Continue to use division as sharing.
- Division as grouping.

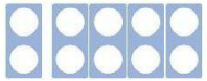


- 15 children get into teams of 5 to play a game. How many teams are there?



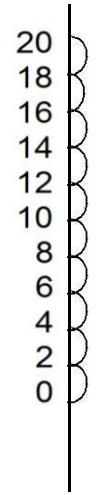
How many groups of 5 in 15?

How many 5s have been counted?

- 
  How many 2s in 10?

- Understand '÷ 2' as 'half of'.
- Understand that division is not commutative.
- Recognise relationship between x and ÷
- Record using division (÷) and equals (=) signs.
- Use number lines to answer questions such as 20 ÷ 2 =





National Curriculum Requirements:

Solve problems involving division using materials, mental methods and division facts.

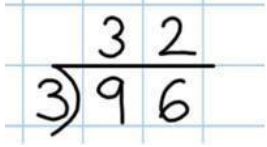
Key Stage 2 – Division

Y3

- Recall and use division facts for 3, 4, and 8 times tables.
- Continue with repeated subtraction on a vertical number line.
- Write and calculate mathematical statements for division using the tables they know.
- Introduce grouping method before short division, encourage children to estimate answers before attempting calculation. Create fact box to encourage efficient grouping e.g. not always groups of 10 - 1x, 2x, 5x, 10x, 20x, 50x, 100x.

```
  13
5) 65
 - 50  (5 x 10)
  15
 - 15  (5 x 3)
   0
```

- Introduce short division, with exact answers.



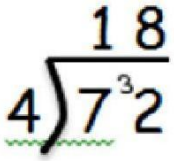
- Progressing to short division involving carrying, with exact answers.

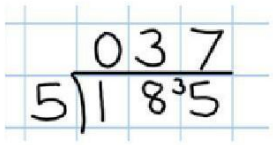
National Curriculum requirements:
Division questions based on multiplication tables they know.

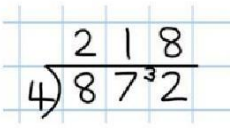
Divide 2 digits by 1 digit, progressing to formal written methods.

Y4

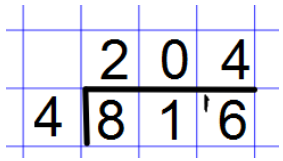
- Recall and use all division facts for all tables up to 12 (Including dividing by 1).
- Continue with short division method.

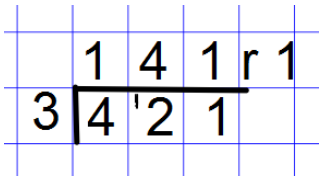






- Progressing to short division with remainders.



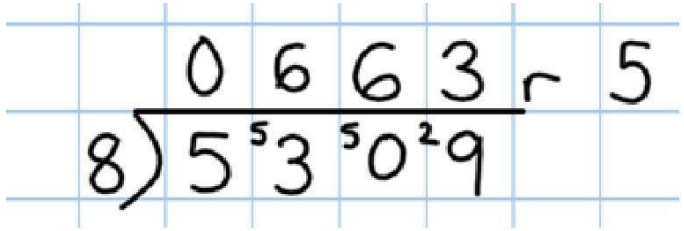


National Curriculum requirements:
Divide 2 digits by 1 digit and 3 digits by 1 digit becoming fluent with formal written method of short division with exact answers and progressing to remainders.

Key Stage 2 – Division

Y5

- Consolidate the use of the formal written method of short division.



National Curriculum requirements:

Divide 2 digits by 1 digit.
Divide 3 digits by 1 digit.
Divide 4 digits by 1 digit.

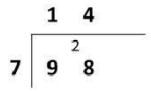
Children interpret the remainders appropriately for the context.
e.g. as fractions, decimals or by rounding
98÷4 = 98/4 = 24r2 = 24 ½ = 24.5 rounded to 25

Divide whole numbers and those involving decimals by 10, 100, 1000.

Y6

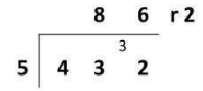
- Consolidate short division.
- Children should be able to interpret remainders as whole number remainders, fractions or by rounding, as appropriate for the context.

98 ÷ 7 becomes



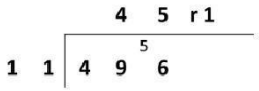
Answer: 14

432 ÷ 5 becomes



Answer: 86 remainder 2

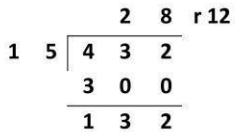
496 ÷ 11 becomes



Answer: $45\frac{1}{11}$

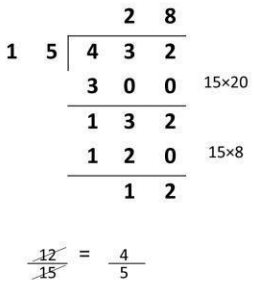
- Introduce long division.

432 ÷ 15 becomes



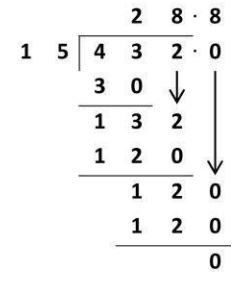
Answer: 28 remainder 12

432 ÷ 15 becomes



Answer: $28\frac{4}{5}$

432 ÷ 15 becomes



Answer: 28·8

N.B: The above examples are taken from the National Curriculum for Mathematics appendix.

National Curriculum requirements:
Divide numbers up to 4 digits by a 2 digit number using the formal written method of short division where appropriate.

Divide up to 4 digits by a 2 digits whole number using the formal written method of long division.

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