Dosthill Primary school

Key stage 2

Mathematics Parent workshop

Delivered by J. Lewis 24.02.16

Professional Aims

- **Provide you with a greater understanding of how mathematics is taught in school.**
- **Show you the progression of the 4 operation methods through Key Stage 2.**
- **Enable you to see the types of different questions children are asked in their assessments**
- **See the importance of mental maths skills and the strategies children are taught.**
- **Help you understand how you can help your child at home.**

Primary Maths – what has changed?

- Higher expectations overall – benchmarked against other nations
- Conceptual development of number addressed in more detail
- Fewer things in more depth
- All pupils expected to build firm foundations to help become secondary ready

Lower key stage 2 – years 3 and 4

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their

Upper KS2 - Years 5 and 6

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Written and mental methods of calculation.

The aim is that children use mental methods where appropriate, but for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence.

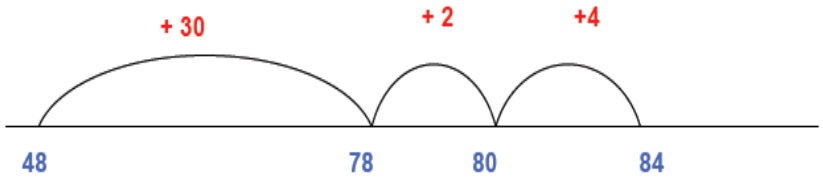
Children are entitled to be taught and to acquire secure mental methods and efficient written methods of calculation for each operation which they know they can rely on when mental methods are not appropriate. We teach them a range so they can choose the one they prefer and proves most accurate for them.

Addition:

Addition – Lower KS2

Blank Number Line:

Continuing to bridge through multiples of ten (using number bonds learnt in KS1)



48 + 36 = 84

Addition – Upper KS2

Column Method:

This method remains efficient when adding larger numbers and decimals. It is a quick and reliable method.
48 + 36 = 84

4 8
3 6 +
8 4
1 carrying 'ten'

Addition – Lower KS2

Partitioning:
Partitioning means splitting the number into the tens and units.

48 + 36 = 40 + 30 = 70 40 + 8

8 + 6 = 14 30 + 6

= 84 70 + 14 = 84

Addition – Upper KS2

- Column Method
This method remains efficient when adding larger numbers and decimals. It is a quick and reliable method.
379 + 92 = 471

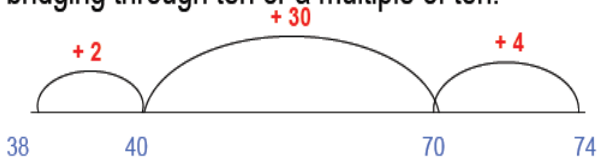
3 7 9
9 2 +
4 7 1
1 1 carrying 'ten' and 'one hundred'

Subtraction

Subtraction – Lower KS2

Counting On 'Finding the difference'

-Count on from the smallest to the largest once again bridging through ten or a multiple of ten.



74 – 38 = 36

341- 123

300	40	1
-100	20	3
200	10	8

or

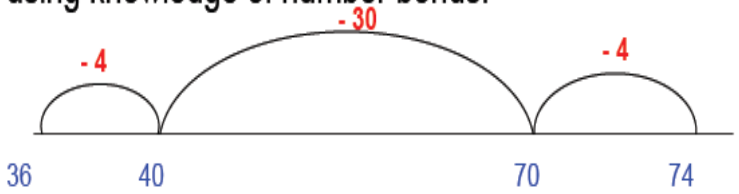
341- 123

300	~~40~~	1
-100	20	3
200	10	8

Subtraction – Lower KS2

Counting Backwards:

-Count back from the largest to the smallest once again using knowledge of number bonds.



Subtraction – Lower & Upper KS2

Column Method – Decomposition:

This method is the most efficient for subtraction. However it relies on the children's understanding of place value due to the need to 'borrow' tens or hundreds if the number being subtracted is larger than the number being subtracted from.

Subtraction – Lower & Upper KS2

Column Method – Decomposition:

Children must keep being referred back to place value – it is 3 tens not just 3.

$$\begin{array}{r} {\scriptstyle 1\ \ \ } \\ 6\not{7}\,6 \\ 3\,9- \\ \hline 3\,7 \end{array}$$

Borrowing 'ten' not 1

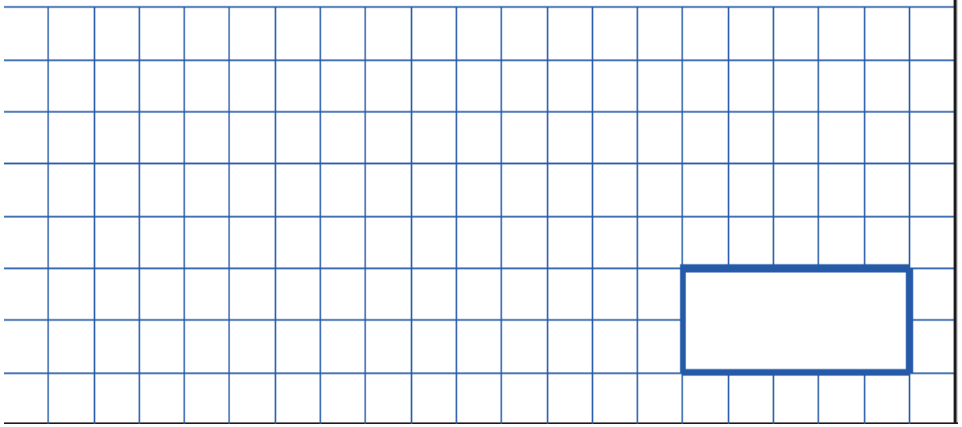
$$\begin{array}{r} {\scriptstyle 1\ \ \ } \\ 1\not{2}\,3\,7 \\ 8\,4- \\ \hline 1\,5\,3 \end{array}$$

Now its your turn……

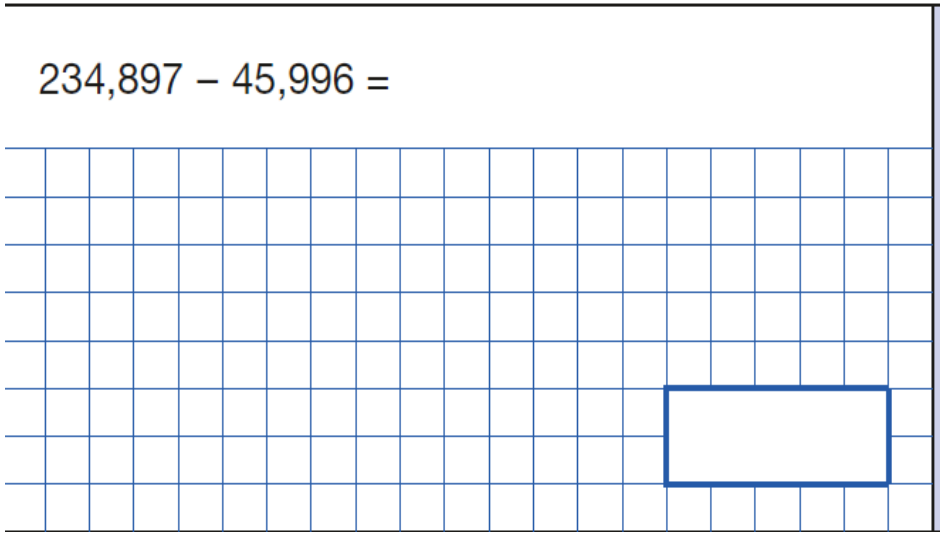
Write the four missing digits to make this **addition** correct.

	6		8	
+	3		9	
9	0	1	9	

5,756 + 8,643 =



234,897 – 45,996 =



Multiplication

Multiplication – Lower KS2

Partitioning:

Once again Place Value is essential so children can understand why 40 x 6 = (4 x 6) x10

43 X 6 = 40 x 6
= (4 x 6) x 10
= 24 x 10 = 240
= 3 x 6 = 18+
258

Children learn to multiply the tens first and then the units.

Children are taught to record their mental multiplication using partitioning

Multiplication – Lower & Upper KS2

Grid Method:

This method links directly to the mental method of multiplication.

43 X 6

X	6
40	240
3	18
	258

124 X 32

x	30	2	
100	3000	200	3200
20	600	40	640
4	120	8	128
			3968

Multiplication – Lower & Upper KS2

Expanded Short Method:

This method is the next step on from the grid method.

43 X 6

43
6 x
18
240+
258

Multiplication – (Lower) & Upper KS2

Short Multiplication:

This method is the next step on from the expanded method.

43 X 6

43
6 x
258
1

Once again children have to be secure with their place value and know they are carrying 'ten' not one.

Multiplication – Upper KS2

Expanded Short Method for 2-digit x 2 digit:

56 x 27 =

56
27 x
42 (units 6 x 7)
350 (tens x unit 50 x 7)
120 (tens x unit 20 x 6)
1000+ (tens x tens 50 x 20)
1512
1

Multiplication – Upper KS2

Short Multiplication for 2-digit x 2 digit:

5 6 x 2 7 =

```
  5 6
  2 7 x
  3 9 2
  4
1 1 2 0 +
  1
1 5 1 2
```

When multiplying by the ten (20 in this example) children must remember to put the place holder '0' in the units column.

Now its your turn

23

Show your method

			5	4
×			2	3

Write the two missing digits to make this **long multiplication** correct.

			4	□
×		□		6
		2	4	6
		8	2	0
1	0	6	6	

What is 444 minutes in hours and minutes?

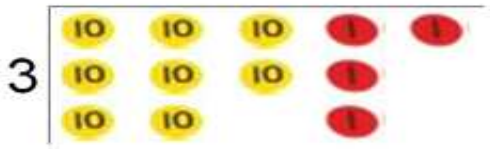
hours minutes

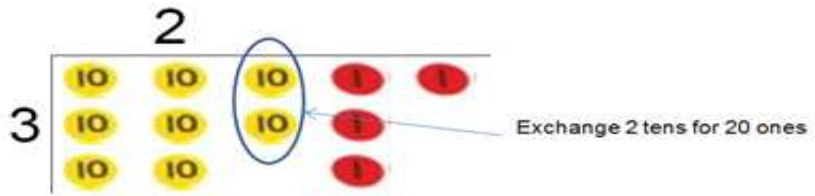
Division

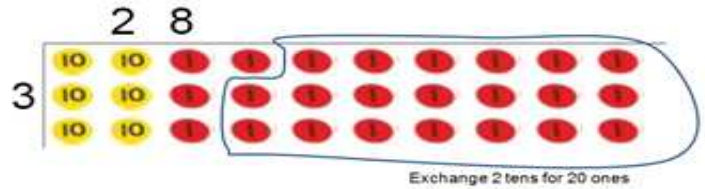
Lower Juniors

Pupils progress to use the formal written method of short division.

e.g. 84 ÷ 3



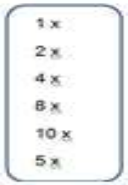


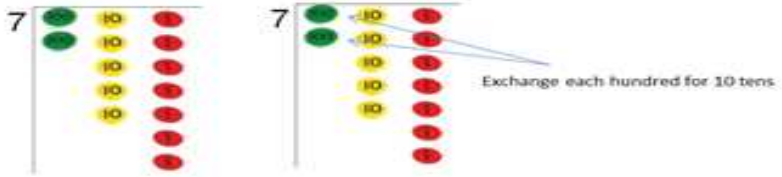


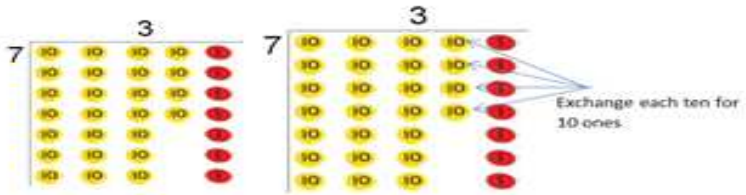
In Year 4 pupils continue to use the number line to support mental division.

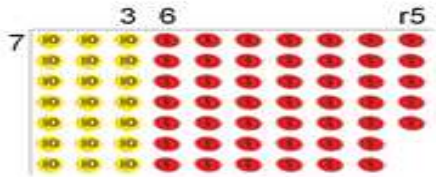
Extend to HTU ÷ U, e.g. 257 ÷ 7, using key fact strategy and a formal method of short division

Some pupils may need to use the place value counters.









Division

Division – Upper KS2

Short Division – HTU ÷ U:

This method links on from partitioning but is a more compact method.

291 ÷ 3 =

$$3\overline{)291} = 97$$

Answer = 97

Pupils divide numbers up to 4 digits by a two-digit number using the formal written method of short division (up to ÷ 12 in line with times tables recall) where appropriate, interpreting remainders according to the context,
e.g. 496 pupils attend a football tournament. When they are put into teams of 11, how many full teams will there be? Will everyone be in a team?

496 ÷ 11 becomes

$$11\overline{)496} = 45 \text{ r } 1$$

Answer: there will be 45 full teams of 11 players and one pupil will not have a team.

In Year 6 pupils divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
Progressing to expressing the remainder as a decimal,
e.g.
£432 was raised at the school fair and is to be shared equally between 15 classes. How much will each class receive?

432 ÷ 15 becomes

$$15\overline{)432.0} = 28.8$$

Answer: 28·8

Answer: Each class will receive £28.80

Now its your turn

25

1 3 3 0 1 6

Show your method

7,505 ÷ 5 =

16 Large pizzas cost £8.50 each.

Small pizzas cost £6.75 each.

Five children together buy one large pizza and three small pizzas.

They share the cost equally.

How much does each child pay?

Show your method

£

Mental Mathematics

It is essential children have secure knowledge and recall of mental facts including:

- Place Value including decimals
- Number bonds
- Times tables from 0 to 12!
- Corresponding division facts.

Mental Maths Strategies:

- Use number bonds to 10, 20 and 100 transferable to 1,000 and decimals
- Use doubles and near doubles
- Partition into thousands, hundreds, tens and units
- Adding near multiples of 10. Adding the multiple then add or subtract 1
- Subtracting near multiples of 10. Subtracting the multiple then subtracting or adding 1.
- These are transferable to multiples of 100, 1,000 etc.

Mental or written method

2000

-102

This is most sensibly done by counting back, not by decomposition

Requires a secure understanding of place value

26 + 32 =

20 + 6 + 30 + 2 =

6 + 2 = 8

20 + 30 = 50

8 + 50 = 58

25 x 8

Children relying on written procedures forget how much they can do mentally

25 x 8 is double 25 x 4

Re-ordering

3 + 8 + 7 + 6 + 2 as

3 + 7 + 8 + 2 + 6

Why re-order?

180 + 650 as

650 + 180 (thinking of 180 as 150 and 30)

4.7 + 5.6 – 0.7 as

4.7 – 0.7 + 5.6 = 4 + 5.6

Problem Solving

Using and applying knowledge and skills

- **Understanding mathematical vocabulary**
- **Applying strategies taught**
- **Explaining process**
- **Reasoning for why doing that**
- **Justifying answer**

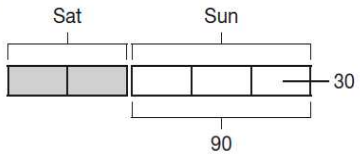
20 On Saturday Lara read $\frac{2}{5}$ of her book.

On Sunday she read the **other** 90 pages to finish the book.

How many pages are there in Lara's book?

Show your method

pages

20	Award **TWO** marks for the correct answer of 150 pages. If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • $\frac{3}{5} = 90$ $9 \div 3 = 30$ 30×5 **OR** •  30×5	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.

Reasoning

Three whole numbers add up to 50
Seb says, ***'All three numbers must be even numbers.'***
Is Seb correct?
Circle **Yes** or **No**.
Yes / No
Explain how you know.

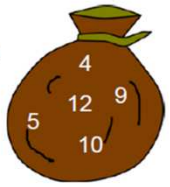
Reasoning: Upper KS2

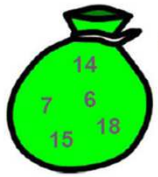
The ratio of the total of the numbers in Bag A and Bag B is 2:3

Swap a number from each bag so that the ratio of the totals is now 9:11

Show your working

Bag A





Bag B

Reasoning: Lower KS2

If the width of a rectangle is 3 metres less than the length and the perimeter is between 20 and 30 metres, what could the dimensions of the rectangle be?

Convince me.

What can you do at home to help?

- **Lots of practice**
- **Playing games – cards, snakes and ladders, dominoes**
- **Cooking**
- **Telling the time**
- **MyMaths.co.uk**
- **Online Applications**
- **www.transum.org**
- **Calculation policy**

Four operation practice

Squeebles Times Tables 2

Achieve Level 4

Multi player mental maths game

Math Bingo: Four operation bingo

King of Maths

Long division touch

Algebra touch

http://www.dosthill.staffs.sch.uk/