Calculation Policy for Year 6: Calshot Primary School

ADDITION

Informal methods to support mental calculations

Pupils should use knowledge of BODMAS to understand the order of operations when carrying out calculation involving more than one operation

- Perform mental calculations, including with mixed operations and large numbers (more complex calculations)
- Children use representation of choice
- Consolidate partitioning and repartitioning
- Use compensation for adding too much/ little and adjusting.
- Refer back to pictorial and physical representations when needed.

Common mental calculation strategies:
Partitioning and recombining
Doubles and near doubles
Use number pairs to 10 and 100
Adding near multiples of ten and adjusting
Using patterns of similar calculations
Using known number facts
Bridging though ten, hundred
Complementary addition

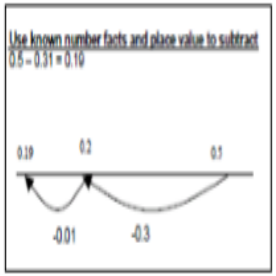
SUBTRACTION

Informal methods to support mental calculations

Pupils should use knowledge of BODMAS to understand the order of operations when carrying out calculation involving more than one operation

- Perform mental calculations, including with mixed operations and large numbers (more complex calculations)
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
- Pupils should undertake mental calculations with increasingly large numbers and more complex calculations.

Children draw on basic, Mental subtraction Strategies, (See Year 5.)
Children use, or visualise, representation of choice.
Refer back to physical representations as required.



Written calculations

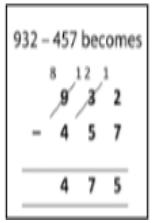
- Add larger numbers, up to seven-digit whole numbers, using the formal written (columnar) method
- Add three digit numbers using columnar method and then move onto 4 digits.
- Include decimal addition for money.
- Number line addition using partitioning

Revert to expanded methods if children find formal calculation method difficult

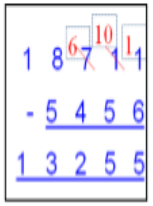
Written calculations

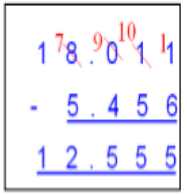
- Subtract whole numbers with more than four digits, using formal written methods (columnar subtraction.)
- Solve problems involving the calculation and conversions of units of measure, using decimal notation of up to three decimal places where appropriate.
- Subtract using a number line using partitioning and counting on

Move towards consolidation of formal, columnar method.
For more complex calculations, with increasingly larger or smaller numbers, compare representations and expanded algorithms alongside columnar methods. Ask: What is the same? What's different?
Compare and discuss the suitability of different methods, (mental or written), in context.
Revert to expanded methods whenever difficulties arise



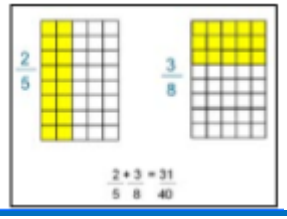
Consolidate columnar methods , paying particular attention to the occurrence of zeros as place holders.





Fractions (if needed)

- Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
- Start with fractions where the denominator of one fraction is a multiple of the other (e.g. ½ + 1/8 = 5/8)and progress to varied and increasingly complex problems
- Practise calculations with simple fractions and decimal equivalents



Fractions (if needed)

- Subtract fractions with different denominators and mixed numbers.
- Pupils should practise calculations with simple fractions and decimal fraction equivalents to aid fluency.

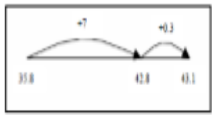
to aid fluency

Concrete and pictorial representations, including:

Use physical/pictorial representations alongside columnar methods where needed. Ask what is the same and what is different?

12 462 + 2300
= 12 462 + 2000 + 300
= 14 462 + 300
= 14 762

Partitioning and recombining

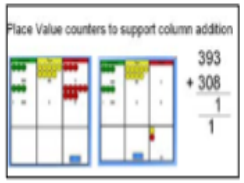


234 kg + 49 kg = 273 kg

200 + 30 + 4
40 + 9
200 + 70 + 13

I can explain my method using place value counters

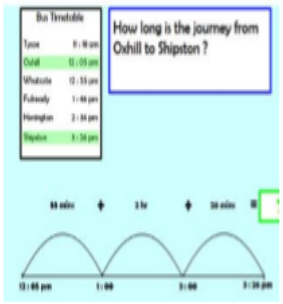
What is the same and what is different about all these methods?

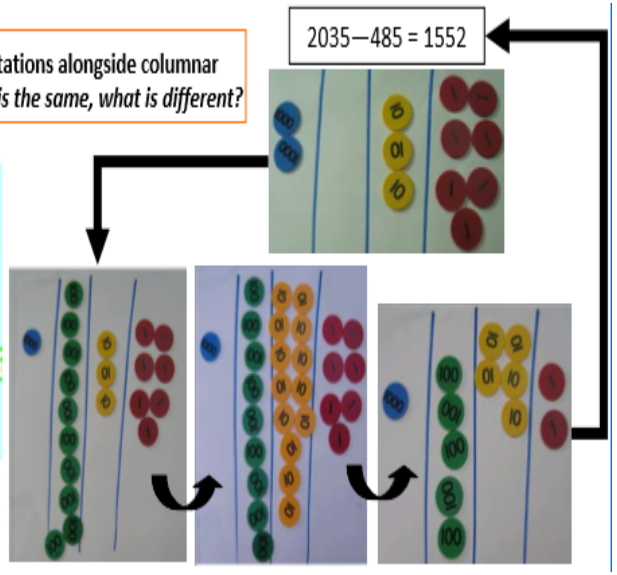


Concrete and pictorial representations, including:

Use physical/pictorial representations alongside columnar methods where needed. *What is the same, what is different?*

2035—485 = 1552





Calculation Policy for Year 6: Calshot Primary School

MULTIPLICATION

Informal methods to support mental calculations

Pupils should use knowledge of BODMAS to understand the order of operations when carrying out calculation involving more than one operation

- Recall multiplication and division facts for multiplication tables up to 12 x 12
- Perform mental calculations, including with mixed operations and large numbers (increasingly large numbers and more complex calculations)
- Use all the multiplication tables to calculate mathematical statements in order to maintain fluency
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
- Identify the value of each digit in numbers given to three decimal places and multiply numbers by 10,100 and 1000 giving answers up to three decimal places.

Children should know the square numbers up to 12 × 12 & derive the corresponding squares of multiples of 10 e.g. 80 × 80 = 6400

Use mental strategies to solve problems e.g.

- x4 by doubling and doubling again
- x5 by x10 and halving
- x20 by x10 and doubling
- x9 by multiplying by 10 and adjusting
- x6 by multiplying by 3 and doubling

What is the best approximation for 4.4 x 18.6?

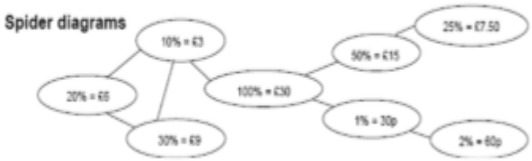
DIVISION

Informal methods to support mental calculations

Pupils should use knowledge of BODMAS to understand the order of operations when carrying out calculation involving more than one operation

Pupils should be taught to:

- Recall multiplication and division facts for multiplication tables up to 12 x 12
- Perform mental calculations, including with mixed operations and large numbers (increasingly large numbers and more complex calculations)

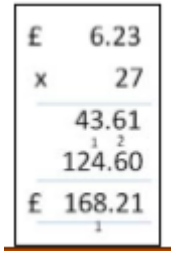


- Identify common factors, common multiples and prime numbers.
- Solve problems involving division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
- Identify the value of each digit in numbers given to three decimal place and divide numbers by 10,100 and 1000 giving answers up to three decimal places.

I know that 366 will divide by 6 because it has 2 and 3 as factors

Written calculations

- Identify common factors and then split into prime numbers to find the prime factors
- Multiply multi-digit numbers up to four-digits by a two-digit whole number using the formal written method of long multiplication (short and long multiplication)
- Multiply one-digit numbers with up to two decimal places by whole numbers

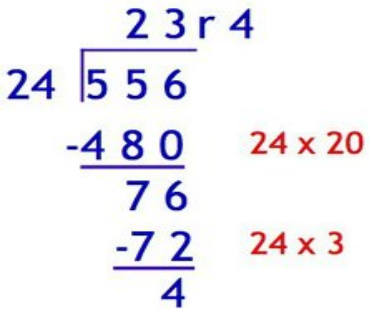


Revert to expanded methods if children find formal calculation method difficult

Written calculations

Pupils practise and extend their use of the formal written methods of short division.

- Divide numbers up to four-digits by a one or two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.
- Divide numbers up to four-digits by a two-digit 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.



Revert to expanded methods if children find formal calculation method difficult

Fractions (if needed)

- Multiply simple pairs of proper fractions, writing the answer in its simplest form e.g. $\frac{1}{4} \times \frac{1}{2} = 1/8$

Fractions (if needed)

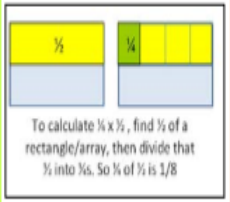
- Use common factors to simplify fractions
- Compare and order fractions, including fractions > 1
- Divide proper fractions by whole numbers (e.g. 1/3 ÷2 = 1/6)

- Pupils should be able to answer calculations such as '2/5 of a number is 20, what is the number?'

•multiply simple pairs of proper fractions, writing the answer in its simplest form e.g. ¼ x ½ = 1/8

Three key applications of understanding:

- Recognise that ¼ of 12, ¼ x 12 and 12 divided by 4 are equivalent
- Use cancellation to simplify the product of a fraction and an integer e.g. ⅓ x 15 = 3, ⅔ x 15 = 2 x ⅓ x 15 = 2x3 = 6
- Work out how many ½s in 15, how many ⅔s in 15, how many 2/5s in 1 etc.

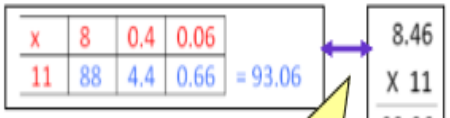


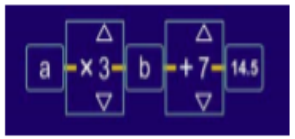
Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, e.g. as parts of a rectangle.

- Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375.)
- Pupils use their understanding of the relationship between unit fractions and division to work backwards.

Concrete and pictorial representations, including:

Look at long-multiplication calculations containing errors, identify the errors and determine how they should be corrected





What's the same?
What's different?

Concrete and pictorial representations, including

Revert to expanded methods if children find formal calculation method difficult

To introduce the long division model, use a calculation which can be represented both with manipulatives and by a short division algorithm. Use questioning and discussion to compare written methods.

£1362.72 ÷ 40 = ?

£1362.72 ÷ 4 = £340.68
[½ and ½ again.]
£340.68 ÷ 10 = £34.068
which rounds to £34.07.