Calculation Policy for Year 4: Calshot Primary School

ADDITION

Informal methods to support mental calculations

- Practise mental methods with increasingly large numbers.

  55 + 37 = 55+ 30 + 7
  = 85 + 7
  = 92

- Consolidate partitioning and re-partitioning
- Use compensation (see below) for adding too much/little and adjusting
- Use Numicon, base 10, place value counters, empty number lines etc.

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

I know that 63 + 29 is the same as 63 + 30 - 1

Written calculations

- Add numbers with up to four digits, using formal written (columnar) methods.
- Add three digit numbers using column addition and then move onto 4 digits.
- Include decimal addition for money.

```
  4 5 7 8  +
  2 3 4 9
-----------
  6 9 2 7
-----------
    1 1
```

SUBTRACTION

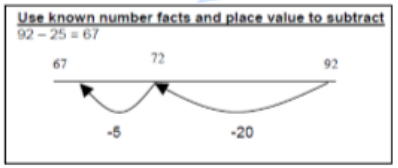
Informal methods to support mental calculations

Continue to practise mental methods with increasingly large numbers to aid fluency.

Methods to support fluent calculation and encourage efficiency of method:

- Find a small difference by counting on, e.g. 5003 – 4996
- Subtract nearest multiple of ten and adjust.
- Partition larger numbers.

This could be done using an empty number line. Children should recall and use number facts to reduce the number of steps.



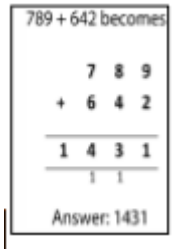
Whenever possible, children should be encouraged to visualise number lines and other basic, supporting representations to promote fluent work without jottings.

Written calculations

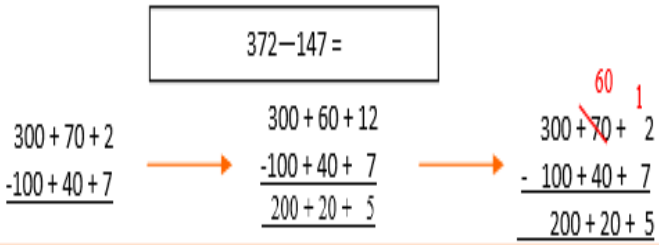
- Subtract numbers with up to 4 digit numbers using the formal written methods of columnar subtraction where appropriate.
- Build on formal, expanded column subtraction using exchange (moving/taking tens/ hundreds) wherever necessary.

- Base 10 equipment and Numicon is used to support understanding for those that need it.

Revert to expanded methods if children find formal calculation method difficult



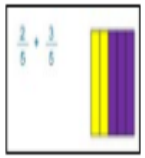
- Continue to use representations and manipulatives to develop understanding of place value.
- Use of base 10 and Numicon equipment is used to support understanding for those that need it.

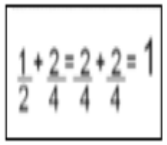


Apply understanding of subtraction with larger integers to that of decimals in context of money and measures. (See Year 5.)

Fractions (if needed)

- Addition of fractions with the same denominator to become fluent through a variety of increasingly problems beyond one whole.
- Counting using simple fractions and decimals, both forwards

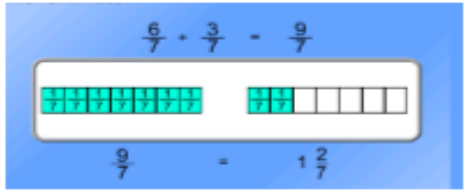




and backwards.

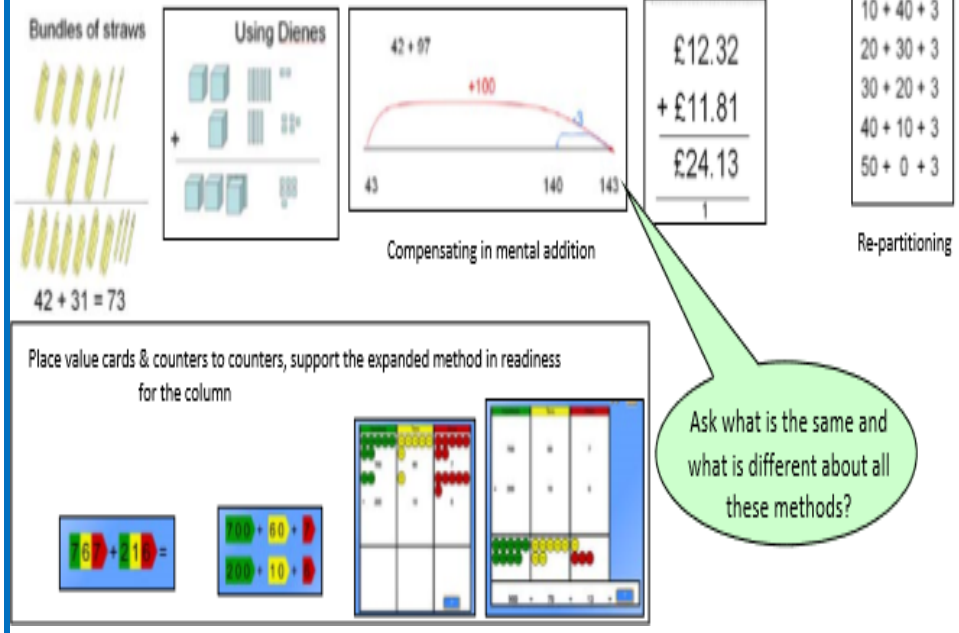
Fractions (if needed)

- Count up and down in hundredths.
- Add and subtract fractions with the same denominator.
- Solve simple measure and money problems involving fractions and decimals to two decimal places.

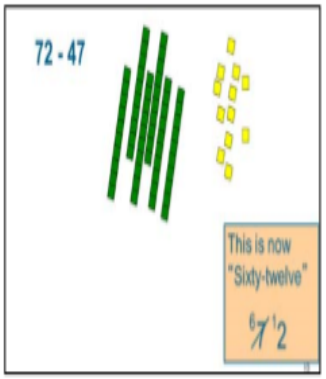


Concrete and pictorial representations, including:

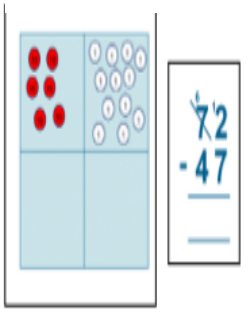
Use physical/pictorial representations alongside expanded and columnar methods.



Concrete and pictorial representations, including:



Base 10 and place value counters used to model underlying place value concepts.



Compare and discuss the suitability of different strategies/methods in different contexts.

Pupils decide which operations and methods would be useful and why.

I would count on using a number line to calculate 5003-4896; because the numbers are close together.

Calculation Policy for Year 4: Calshot Primary School

MULTIPLICATION

Informal methods to support mental calculations

- Recall multiplication and division facts for multiplication tables up to 12 x 12
- Use place value, known and derived facts to multiply and divide mentally, including:
  - Multiplying by 0 and 1;

DIVISION

Informal methods to support mental calculations

The relationship between multiplication and division must be continually reinforced.

Pupils should be taught to:

- Recall multiplication and division facts for multiplication

- Multiplying together three numbers

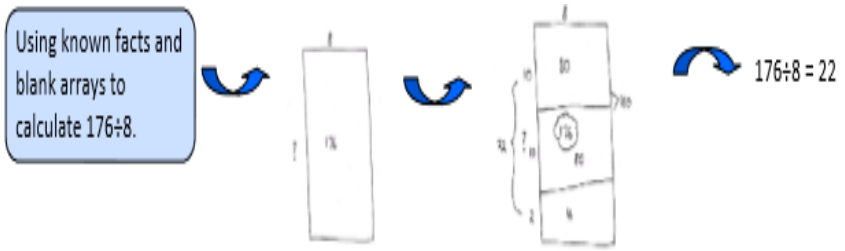
- Recognise and use factor pairs and commutative property of multiplication (multiplication can be rearranged e.g. 4 x 7 = 7 x 4) in mental calculations
- Practise mental methods and extend this to three-digit numbers to derive facts

Using the **distributive** law:
39 x 7 = 30 x 7 + 9 x 7
Using the **associative** law:
(2 x 3) x 4 = 2 x (3 x 4)

Using facts and rules:
2 x 6 x 5 = 10 x 6 = 60

tables up to 12 x 12

- Use place value, known and derived facts to multiply and divide mentally, including:
  - Dividing by 1;
  - Multiplying together three numbers
- Recognise and use factor pairs and commutative property of multiplication in mental calculations
- Practise mental methods and extend this to three-digit numbers to derive facts ,(for example 600÷3 = 200 can be derived from 2 x3 =6)
- Begin to understand remainders in the context of a problem

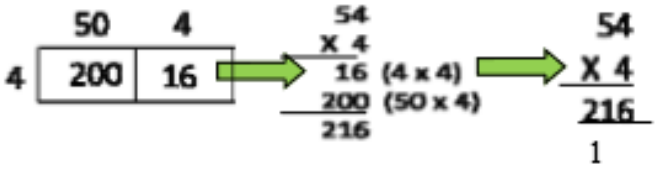


Written calculations

- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- Estimate before calculating
- Ensure written methods build on/ relate to mental methods (e.g. grid method)
- Introduce alongside grid expanded column multiplication

Key skills to support:

- know or quickly recall multiplication facts up to 12 × 12
- understand the effect of multiplying numbers by 10, 100 or 1000
- multiply multiples of 10, for example, 20 × 40;
- approximate, e.g. recognise that 72 × 38 is approximately 70 × 40 = 2800 and use this information to check whether their answer appears sensible

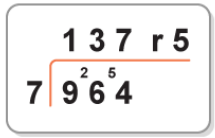


Revert to expanded methods if children find formal calculation method difficult

Written calculations

Pupils are introduced to:

- A formal written layout (short division) to divide 2- and 3-digit numbers by a one digit number
- Children begin to understand remainders in context of a problem

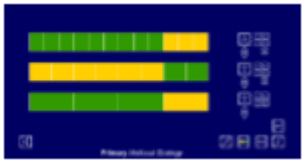


Fractions (if needed)

- Recognise and show, using diagrams, families of common equivalent fractions
- Understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths
- Make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities

Fractions (if needed)

- Recognise and show, using diagrams, families of common equivalent fractions

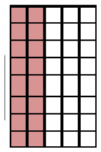


- Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten
- Solve problems involving increasingly harder fractions to calculate quantities and fractions to divide quantities,

- Use factors and multiples to recognise equivalent fraction and simplify where appropriate

$\frac{4}{10}\ \frac{6}{15}\ \frac{8}{20}\ \frac{10}{25}\ \frac{12}{30}\ \frac{14}{35}\ \frac{16}{40}$

$\frac{2}{5} = \frac{16}{40}$



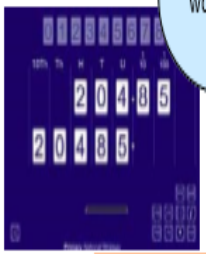
including non-unit fractions where the answer is a whole number

- Find the effect of dividing a one or two digit number by 10 or 100, identifying the value of the digits in the answer as ones, tenths and hundredths

Concrete and pictorial representations, including:

Ensure children can confidently multiply & divide by 10 and 100, that multiplying by 10 makes the number bigger and all digits move one place to the left, while dividing by 10 makes the number smaller and all the digits move one place to the right.

Moving digits ITP

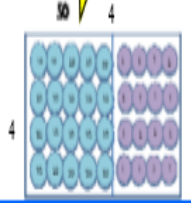


This digit is worth 200

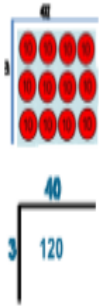
245 X 6 1470

This digit is worth 30

I can use place value counters to model the grid method



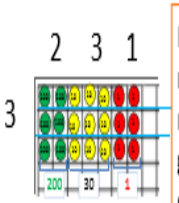
Use arrays made with place value counters to demonstrate the link between multiplication and division. This will support understanding of the grid method.



Children need to understand and apply the language of multiples and factors and use it in solving multiplication and division problems, for example, 'All factors of 36 are multiples of 2, true or false? Find me two factors of 48 that are also multiples of 3.'

Concrete and pictorial representations, including:

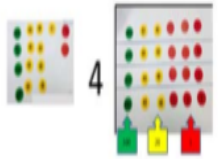
693 ÷ 3



Children can work in pairs: child A constructs the array (dividing manipulatives into 3 rows), child B checks it and records this in a formal, short division format.

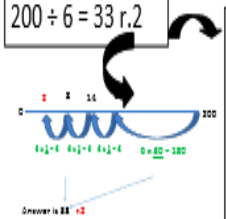
By working through larger number calculations with manipulatives, children gain experience of exchange (re-partitioning) within division algorithms.

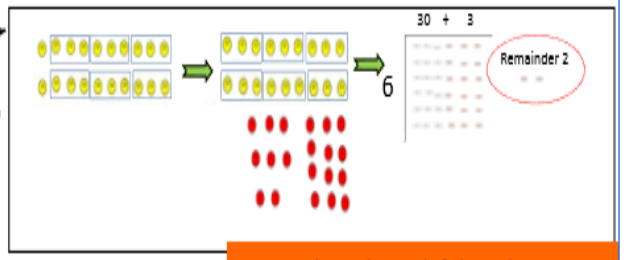
492 ÷ 4



By the end of Year 4, children need to have encountered remainders in a number of contexts. Pupils can be introduced to remainders using known facts: e.g. 13÷4; and then progress to larger numbers. (See below).

200 ÷ 6 = 33 r.2





Money can be used instead of place value counters.