Calculation Policy

Introduction

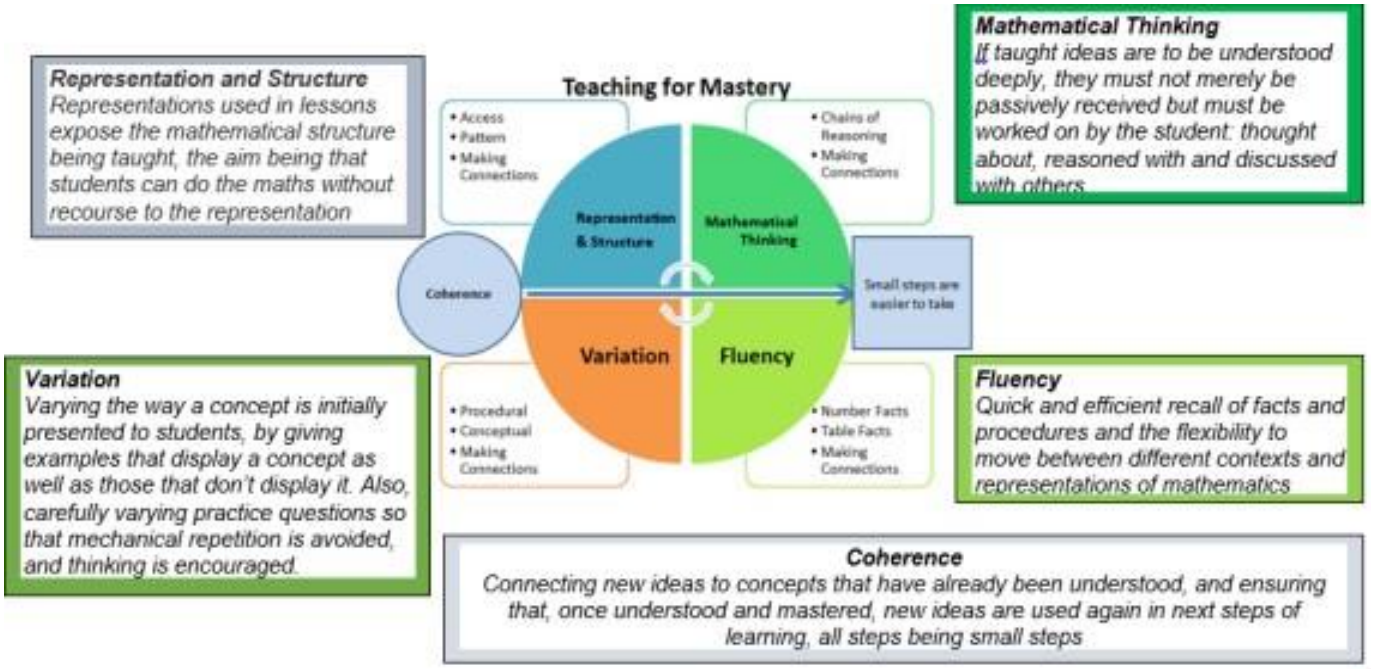
The Ferns Primary Academy follows the White rose Maths Scheme and uses the White Rose Calculation policy which follows the National Curriculum and the mastery approach

The National Curriculum aims to ensure that all children:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

National Curriculum 2014 - The Maths Mastery Approach

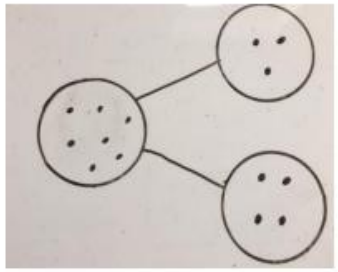


As a school, we use the White Rose Maths Scheme and follow the White Rose calculation policy. However, it is important that the children follow the process of **concrete, pictorial and abstract** when learning calculation and that they are given consistency in both procedural and conceptual understanding to support fluency and confidence with mental and written methods.

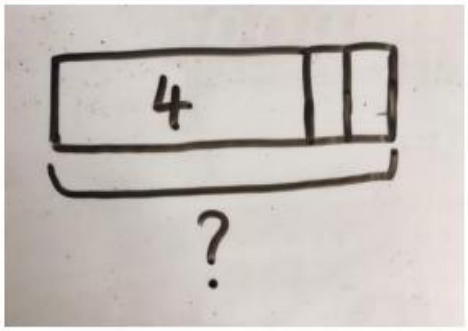
Below are examples that should be used when children are drawing their own representations. It is expected that children will use circles to represent ones/units.

Addition

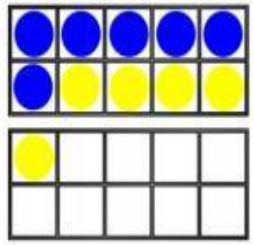
Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.



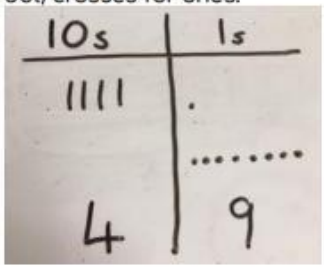
A bar model which encourages the children to count on, rather than count all.



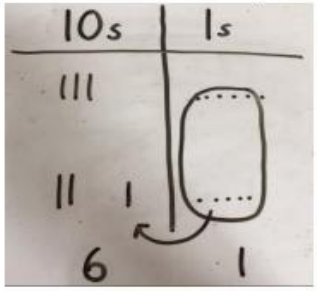
Children to draw the ten frame and counters/cubes.



Children to represent the base 10 e.g. lines for tens and dot/crosses for ones.

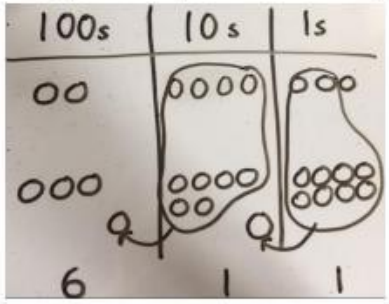


Chidlren to represent the base 10 in a place value chart.



36 + 25 =

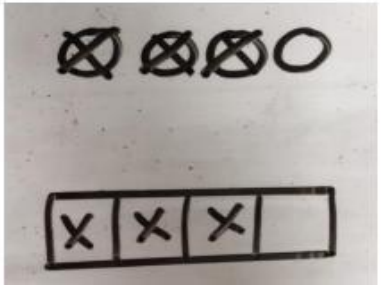
Chidren to represent the counters in a place value chart, circling when they make an exchange.



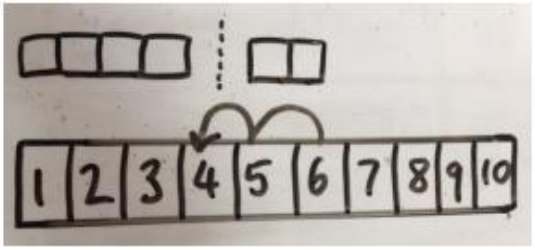
243 + 368 =

Subtraction

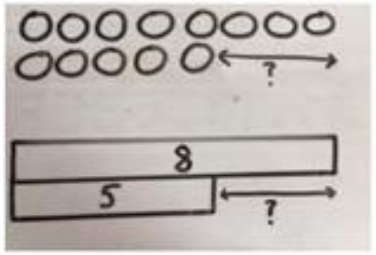
Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.



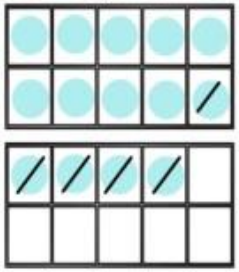
Children to represent what they see pictorially e.g.



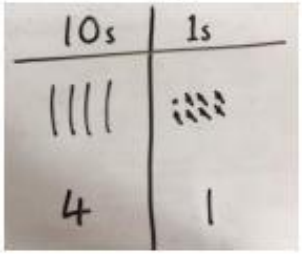
Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.



Children to present the ten frame pictorially and discuss what they did to make 10.

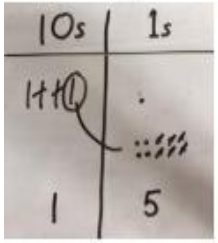


Children to represent the base 10 pictorially.



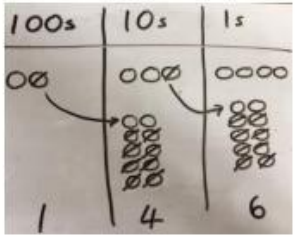
48 - 7 =

Represent the base 10 pictorially, remembering to show the exchange.



41 - 26 =

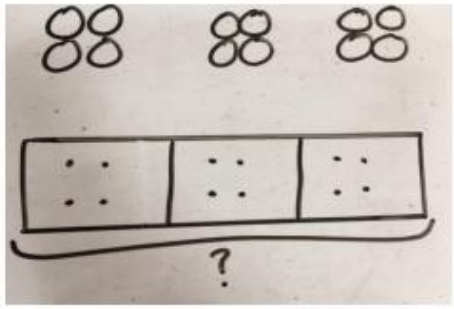
Represent the place value counters pictorially; remembering to show what has been exchanged.



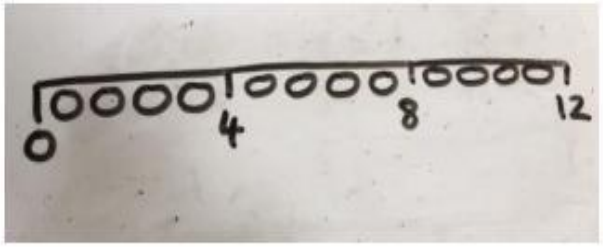
234 - 88 =

Multiplication

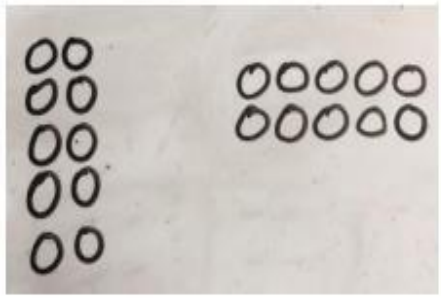
Children to represent the practical resources in a picture and use a bar model.



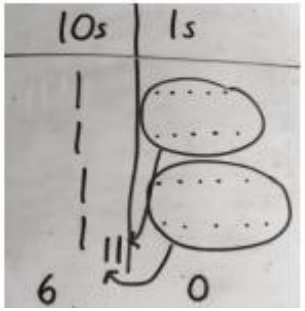
Represent this pictorially alongside a number line e.g.:



Children to represent the arrays pictorially.

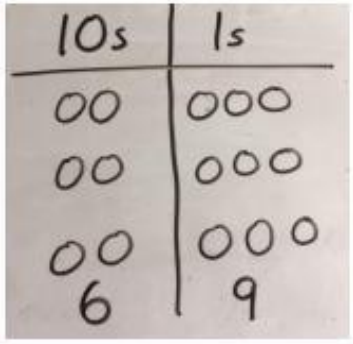


Children to represent the concrete manipulatives pictorially.



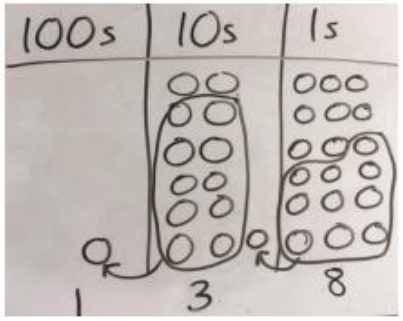
4 x 15 =

Children to represent the counters pictorially.



3 x 23 =

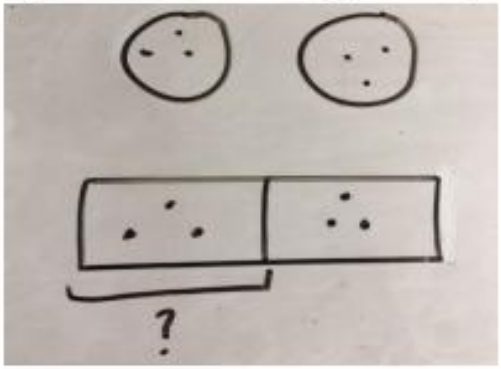
Children to represent the counters/base 10, pictorially e.g. the image below.



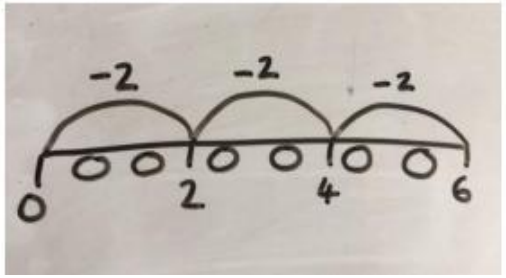
6 x 23 =

Division

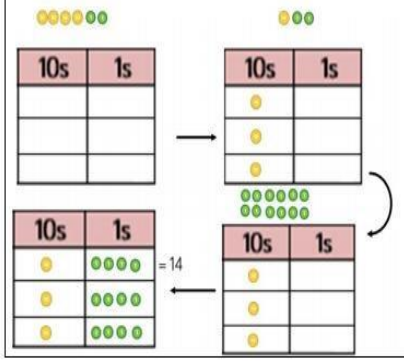
Represent the sharing pictorially.



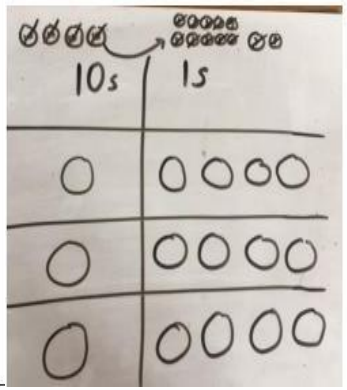
Children to represent repeated subtraction pictorially.



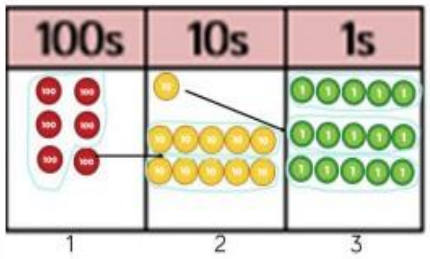
Sharing using place value counters.
42 ÷ 3 = 14



Children to represent the place value counters pictorially.

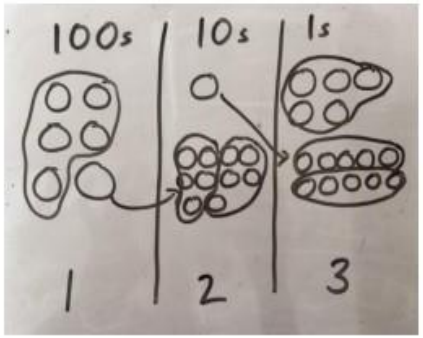


Short division using place value counters to group.
615 ÷ 5

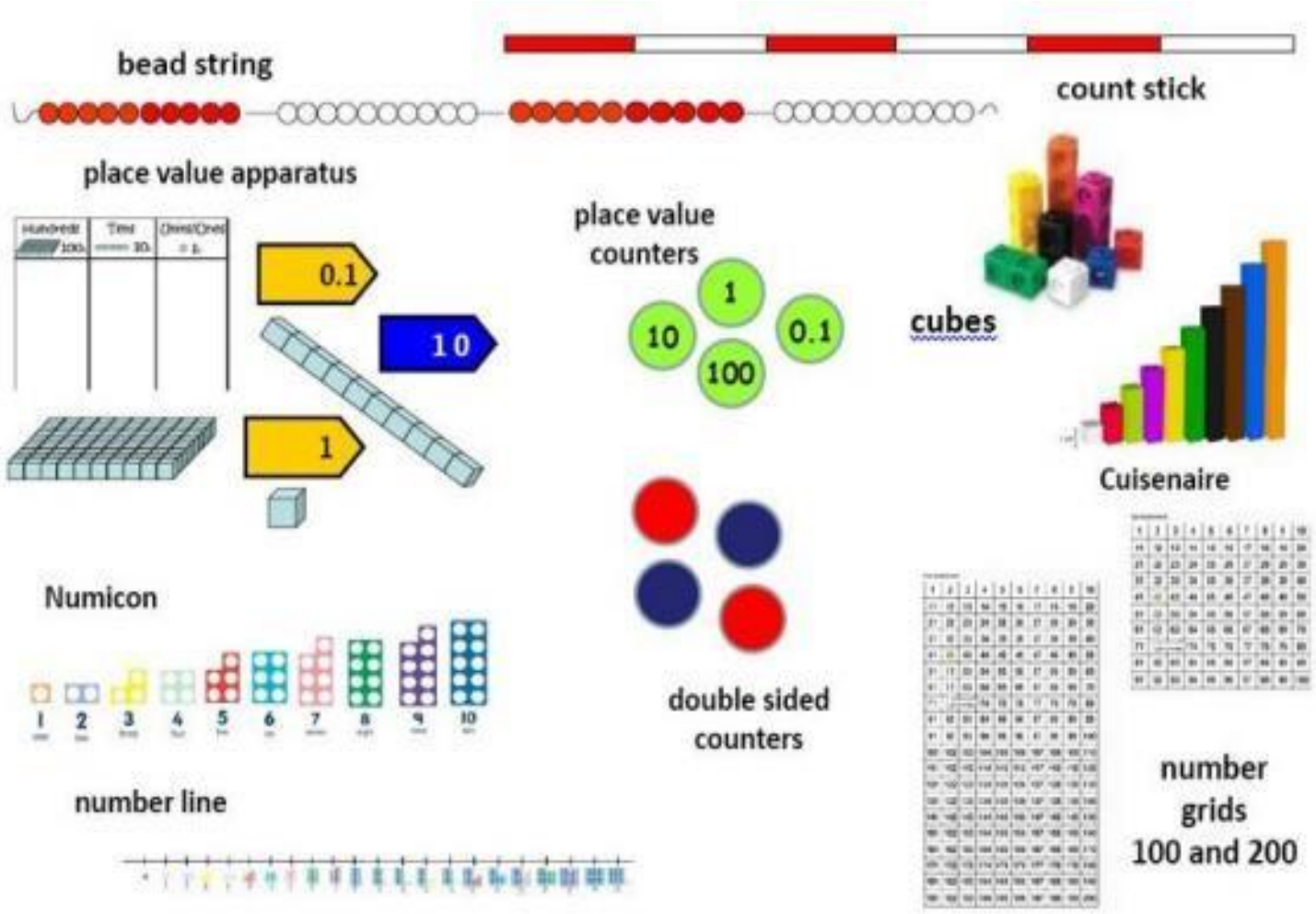


1. Make 615 with place value counters.
2. How many groups of 5 hundreds can you make with 6 hundred counters?
3. Exchange 1 hundred for 10 tens.
4. How many groups of 5 tens can you make with 11 ten counters?
5. Exchange 1 ten for 10 ones.
6. How many groups of 5 ones can you make with 15 ones?

Represent the place value counters pictorially.



Examples of Manipulatives to Support Learning



Useful websites for modelling calculations using manipulatives:

https://www.didax.com/math/virtual-manipulatives.html

https://toytheater.com/category/teacher-tools/virtual-manipulatives/

https://mathsbot.com/manipulativeMenu

Key Vocabulary

Addition

put together, add, altogether, total, distance between, difference between, more than and less than, addend

Subtraction

subtract, minus, less than, decrease, difference between, distance between, less than, take away, fewer, leave, subtrahend

Multiplication

lots of groups of times multiply multiplication multiple product once, twice, three times array, row, column double repeated addition, multiplicand, multiplier

Division

groups of divided by left over lots of share remainder Half halve double times dividend

Please see White Rose Calculation as the policy to be followed at The Ferns Primary Academy.