St Leonard's C E Primary School

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Safeguarding Children In Banbury

St Leonard's C E Primary School

Calculation Policy - Multiplication

Mathematics Mastery

At the centre of the mastery approach to the teaching of mathematics is the belief that **all children have the potential to succeed**. They should have access to the same curriculum content and, rather than being extended with new learning, they should **deepen their conceptual understanding by tackling challenging and varied problems**. Similarly, with calculation strategies, children must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations. This policy outlines the different calculation strategies that should be taught and used in Year 1 to Year 6 in line with the requirements of the 2014 Primary National Curriculum.

Mathematical Language

The 2014 National Curriculum is explicit in articulating the importance of children using the correct mathematical language as a central part of their learning (*reasoning*). Indeed, in certain year groups, the non-statutory guidance highlights the requirement for children to extend their language around certain concepts. It is therefore essential that teaching using the strategies outlined in this policy is accompanied by the use of appropriate and precise mathematical vocabulary. New vocabulary should be introduced in a suitable context (for example, with relevant real objects, apparatus, pictures or diagrams) and explained carefully. High expectations of the mathematical language used are essential, with teachers only accepting what is correct.

> The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof.
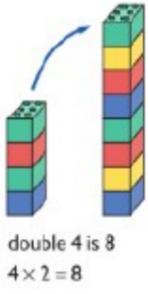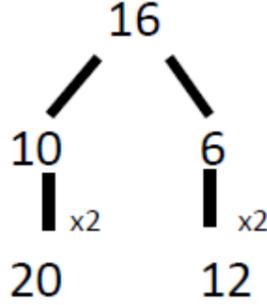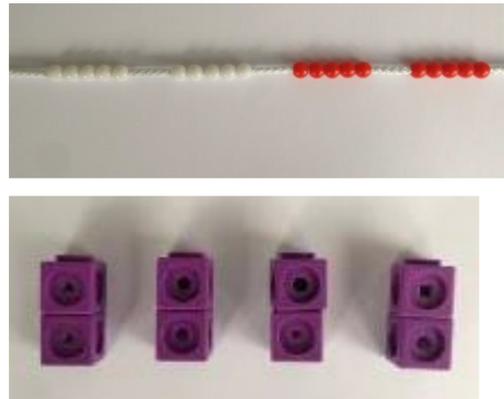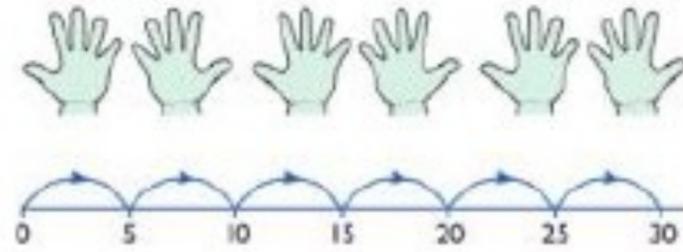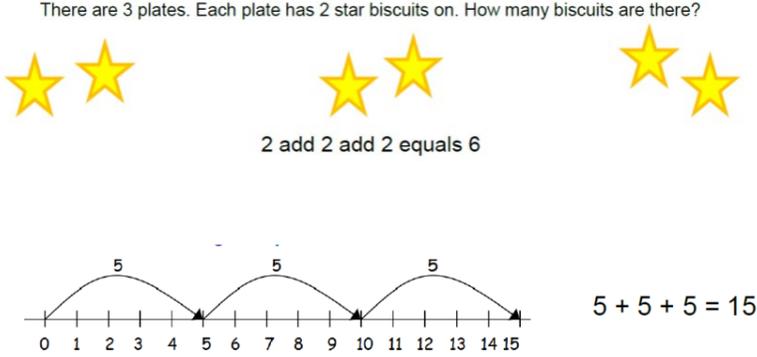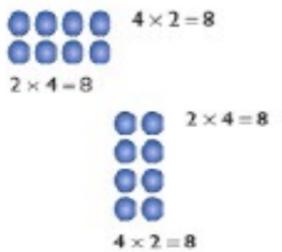>
> *2014 Maths Programme of Study*

How to use the policy

This mathematics policy is a guide for all staff at St Leonard's Primary school and has been adapted from work by the NCETM. It is purposely set out as a progression of mathematical skills and not into year group phases to encourage a flexible approach to teaching and learning. It is expected that teachers will use their professional judgement as to when consolidation of existing skills is required or if to move onto the next concept. However, the **focus must always remain on breadth and depth rather than accelerating through concepts.** Children should not be extended with new learning before they are ready, they should deepen their conceptual understanding by tackling challenging and varied problems. All teachers plan maths lessons taking ideas form a range of sources such as the NCETM Mastery documents and White Rose. Teachers are required to base their planning around their year groups modules and not to move onto a higher year groups scheme work. These modules use the Singapore Maths Methods and are affiliated to the workings of the 2014 Maths Programme of Study.

Teachers can use any teaching resources that they wish to use and the policy does not recommend one set of resources over another, rather that, a variety of resources are used. For each of the four rules of number, different strategies are laid out, together with examples of what concrete materials can be used and how, along with suggested pictorial representations. The principle of the concrete-pictorial-abstract (CPA) approach [Make it, Draw it, Write it] is for children to have a true understanding of a mathematical concept, they need to master all three phases within a year group's scheme of work.

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Multiplication

Objective and Strategies	Concrete	Pictorial	Abstract
Doubling	Use practical activities to show how to double a number. double 4 is 8 $4 \times 2 = 8$	Draw pictures to show how to double a number. Double 4 is 8	Partition a number and then double each part before recombining it back together. 16 10 6 x2 x2 20 12
Counting in multiples	Count in multiples supported by concrete objects in equal groups.	Use a number line or pictures to continue support in counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers. **2, 4, 6, 8, 10** **5, 10, 15, 20, 25, 30**
Repeated addition	Use different objects to add equal groups.	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there? 2 add 2 add 2 equals 6 5 5 5 $5 + 5 + 5 = 15$	Write addition sentences to describe objects and pictures. $2 + 2 + 2 + 2 + 2 = 10$
Arrays- showing commutative multiplication	Create arrays using counters/ cubes to show multiplication sentences.	Draw arrays in different rotations to find **commutative** multiplication sentences. $4 \times 2 = 8$ $2 \times 4 = 8$ $2 \times 4 = 8$ $4 \times 2 = 8$	Use an array to write multiplication sentences and reinforce repeated addition.
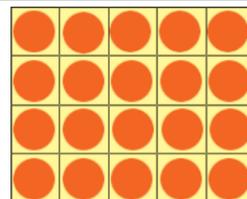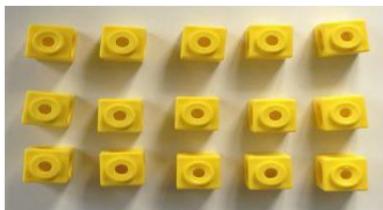
Link arrays to area of rectangles.

$5 + 5 + 5 = 15$

$3 + 3 + 3 + 3 + 3 = 15$

$5 \times 3 = 15$

$3 \times 5 = 15$

Grid Method	Show the link with arrays to first introduce the grid method.

Show the link with arrays to first introduce the grid method.

4 rows of 10
4 rows of 3

Move on to using Base 10 to move towards a more compact method.

4 rows of 13

Move on to place value counters to show how we are finding groups of a number.
We are multiplying by 4 so we need 4 rows.

Calculations
4 x 126

Fill each row with 126.

Calculations
4 x 126

Add up each column, starting with the ones making any exchanges needed.

Children can represent the work they have done with place value counters in a way that they understand.

They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.
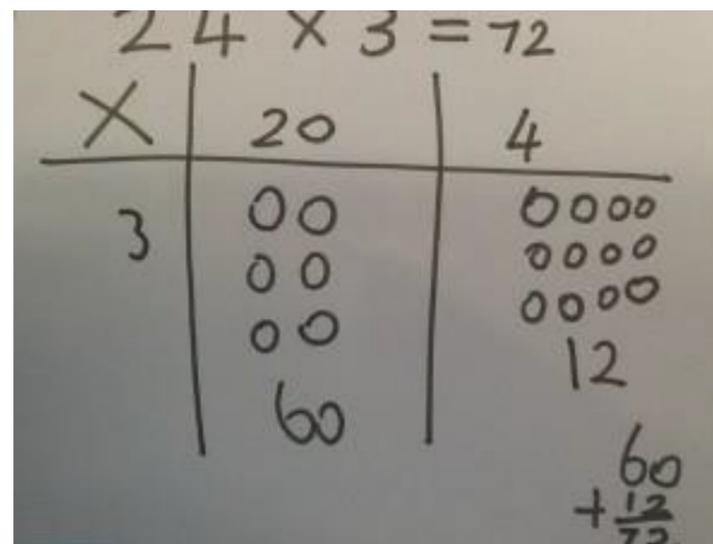
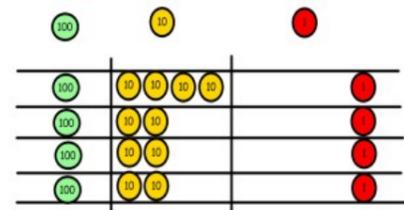Start with multiplying by one digit numbers and showing the clear addition alongside the grid.

×	**30**	**5**
7	**210**	**35**

210 + 35 = 245

Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

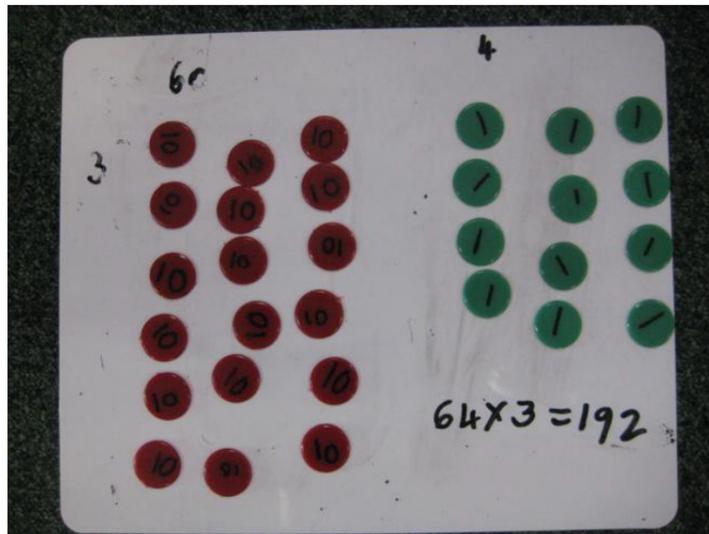| X	1000	300	40	2
10	10000	3000	400	20
8	8000	2400	320	16

Then you have your answer.
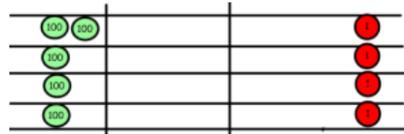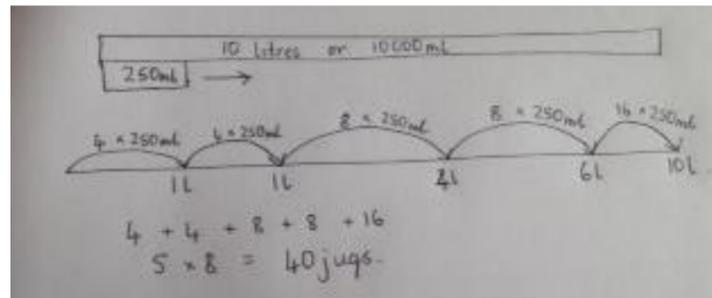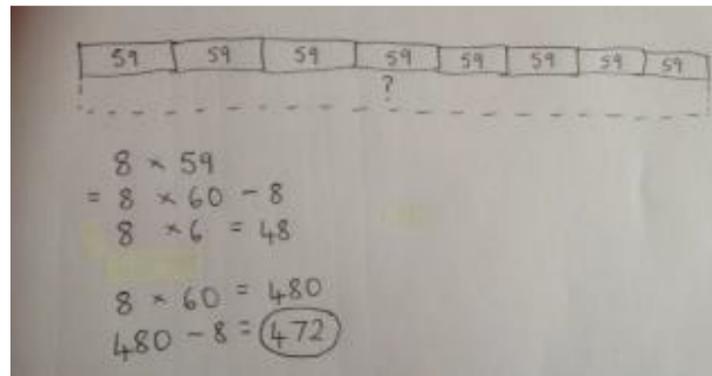

| Column multiplication | Children can continue to be supported by place value counters at the stage of multiplication. It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below. | Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. | Start with long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer. This moves to the more compact method. |

Mathematical Language

Correct Terminology
ones
zero
Is equal to, equivalent to, is the same as
add and addition
subtract and subtraction
exchange, exchanging, regrouping
calculation, equation
bar model, cherry model
whole and part