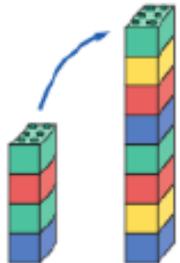# Calculation Journey

Multiplication

September 2021

GREEN PARK SCHOOL
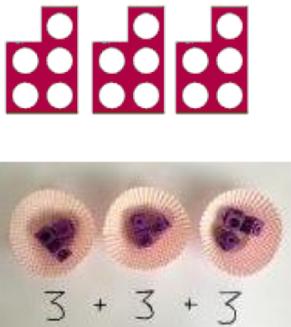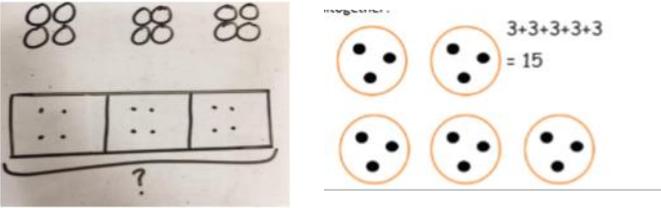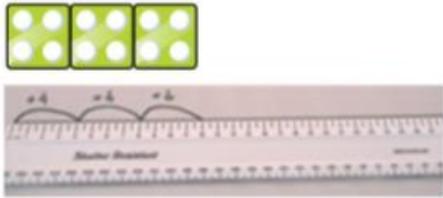
Concrete	Pictorial	Abstract
We begin every new skill with the use of concrete apparatus. This can include counter, cubes, beads, numicon, base 10 etc. This helps children to visualise the numbers and understand the process clearly.	Next, we use drawings and models to show a pictorial version of the concrete apparatus used.	Finally, the children are confident enough to apply their knowledge to an abstract written method including numbers and symbols. They can then apply this to problem solving.
Reasoning at every level		

Multiplication key language: double, times, multiply by, the product of, groups of, lots of.
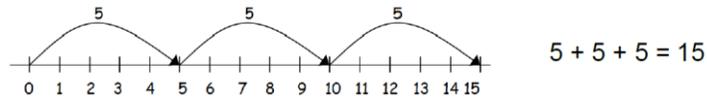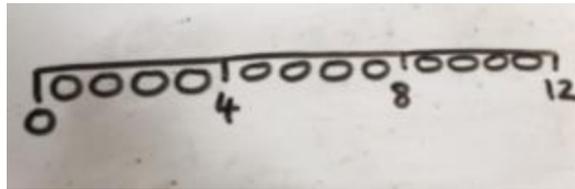
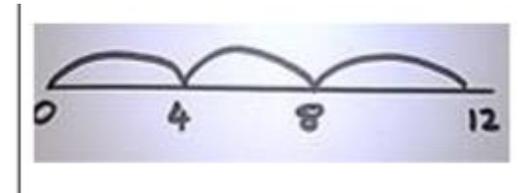|	Concrete	Pictorial	Abstract
Doubling	Using concrete cubes, Numicon or objects to double a number. double 4 is 8 $4 \times 2 = 8$	Draw pictures to show how to double a number. Double 4 is 8	Partition a number and then double each part before recombining it back together. 16 10 6 x2 x2 20 12
Repeated addition	Using objects to count and add equal groups. 3 + 3 + 3	Repeated addition using the drawings, the bar model and number lines. 3+3+3+3+3 = 15 ?	Abstract number line or using times table knowledge. $4 \times 3 = 12$ $4 + 4 + 4 = 12$
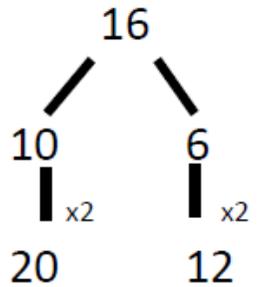
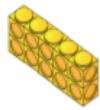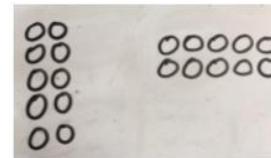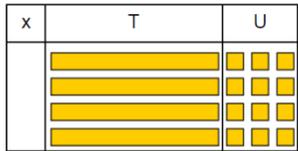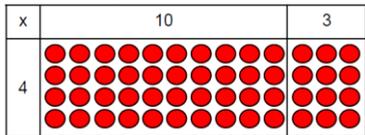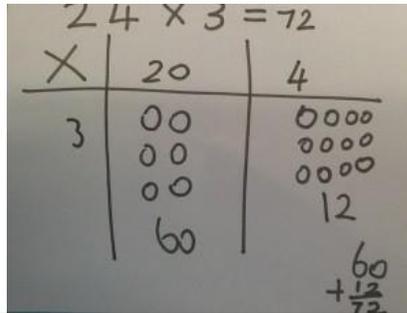|			
Repeated addition on a number line	Using number lines to show repeated addition.	Pictorial representations of number lines.	$4 \times 3 = 12$
			$5 + 5 + 5 = 15$
Arrays	Make arrays using counters or cubes to show that multiplication is commutative. 2 lots of 5 5 lots of 2	Draw arrays with different rotations to show multiplication sentences. $4 \times 2 = 8$ $2 \times 4 = 8$ $2 \times 4 = 8$ $4 \times 2 = 8$	Use arrays to write multiplication sentences and reinforce repeated addition. $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 + 3 = 15$

Grid method	Use counters of cubes to demonstrate link with arrays before moving onto using Base 10 or place value counters. 	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. 24 X 3 = 72	Start with multiplication the ones. Show addition and work out using the column method if necessary. **× 30 5** **7 210 35** **210 + 35 = 245** Add up each row and then add them together.

Grid method — last column tables:

×	30	5
7	210	35

210 + 35 = 245

X	1000	300	40	2
10	10000	3000	400	20
8	8000	2400	320	16
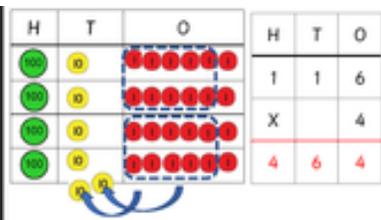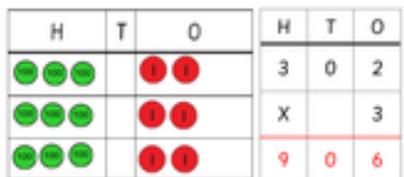
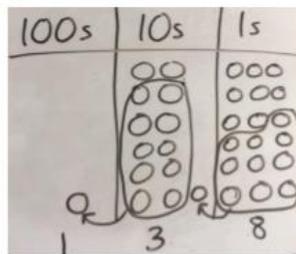|			
Column method	Show relationship between grid and column method. Multiply using place value counters for support (must be taught to start with the ones). 	Using drawings of place value counters to support grid method. 100s 10s 1s Teach expanded method if needed. 37 x 5 35 (7 x 5) 150 (30 x 5) 180	Move to the compact method. 6 x 23 = 23 x 6 138 1 1 1342 x 18 13420 10736 24156