Godmanchester Community Academy

Calculation Policy
Multiplication

Objectives relating to multiplication by year group

Pre-requisites:

Number: pupils need to be able to read, write and order numbers to at least 20

Representations: Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object.)

- Year 1 – Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays Count in 2s, 5s and 10s.
- Year 2 – Multiply 1 digit x 1 digit. Count in steps of 2, 3, and 5 from 0 and 10s from any number forward and backward.
- Year 3 - Multiply 2 digit x 1 digit. Count from 0 in multiples of 4, 8, 50 and 100. Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- Year 4 - Multiply 2 and 3 digit x 1 digit. Count in multiples of 6, 7, 9, 25 and 1000. Recall multiplication and division facts for multiplication tables up to 12 × 12.
- Year 5 - Multiply up to 4 digits x 1 or 2 digit number (inc. long multiplication for 2 digits).
- Year 6 - Multiply multi digit up to 4 digit x 2 digit using formal written method. Multiply one-digit numbers with up to two decimal places by whole numbers.

Vocabulary:

multiplication multiply groups of lots of

product repeated addition double multiple

times (take care with this word though as some children often confuse with 'time'.)

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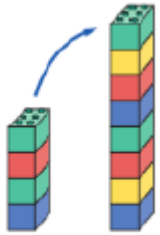
Concrete

Doubling



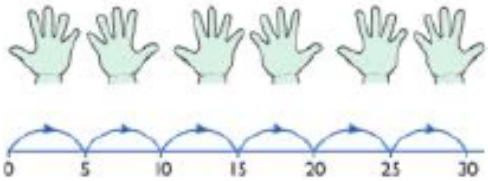
Counting in multiples

Equal groups

Repeated addition

Pictorial

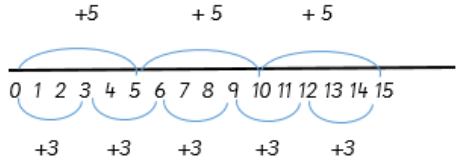
Double 4 is 8



Abstract

Showing commutativity on a number line

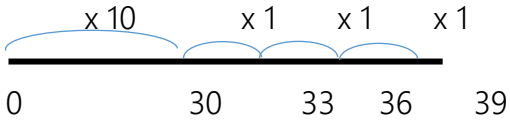
5 + 5 + 5 =



3 + 3 + 3 3 + 3 =

Chunking on a numberline

3 x 13 =



Grid Method

Start with multiplying by one digit numbers and showing the clear addition of the 2 products alongside the grid.

x		3	0		5			2	1	0
7	2	1	0	3	5		+		3	5
								2	4	5

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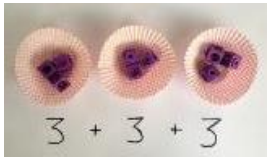

Arrays

Grid Method

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

x	10	3
4		

4 rows of 10
4 rows of 3

Arrays

X	X	X	X
X	X	X	X
X	X	X	X

X	X	X
X	X	X
X	X	X
X	X	X

Repeated addition

4 + 4 + 4 =
3 + 3 + 3 + 3 =
4 x 3 =
3 x 4 =

NB In different orientations to support commutativity

Grid Method

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

	x		1	0		8							
1	0	1	0	0		8	0			1	8	0	
	3		3	0		2	4		+		5	4	
										2	3	4	
										1			

Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.

59 X 8

?							
59	59	59	59	59	59	59	59

59 x 8
60 x 8 - 8
6 x 8 = 48
60 x 80 = 480
480 – 8 = 472

Column Method - Short Multiplication (x 1 digit number)

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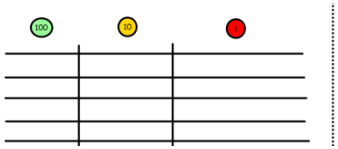
Move on to using Base 10 to move towards a more compact method.

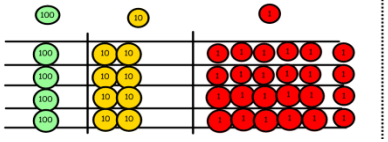
x	T	U

4 rows of 13

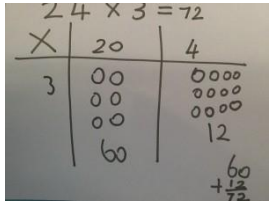
Move on to place value counters to show how we are finding groups of a number.We are multiplying by 4 so we need 4 rows.
4 x 126 or 126 x 4



Fill each row with 126



Total each column exchanging where necessary
E.g Exchange 20 ones for 2 tens



	X	2	0		4						
	3	○	○	○	○	○	○			6	0
		○	○	○	○	○	○			1	2
		○	○	○	○	○	○			7	2
		6	0		1	2					

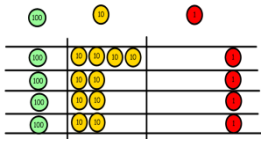
If it helps, children can write out what they are solving next to their answer.

	2	4					
x		6					
	2	4		6	x	4	
1	2	0		6	x	2	0
1	4	4					

Moving on to multiplying without partitioning

	2	4	
x		6	
1	4	4	
	2		

	3	4	2	
x			7	
2	3	9	4	
	2	1		



Exchange 10 tens for 1 hundred

Column Method - Long Multiplication (x 2 digit number)

It is important that children are confident at multiplying by 10 and multiples of ten

Using partitioning

	3	2									
x	2	4									
		8		4	X	2					
1	2	0		4	X	3	0				
	4	0		2	0	X	2				
6	0	0		2	0	X	3	0			
7	6	8									

Moving onto only partitioning the multiplier

	3	2							
x	2	4							
1	2	8		4	x	3	2		
6	4	0		2	0	x	3	2	
7	6	8							

Moving on to multiplication where regrouping is required. Exchanged digits can be 'recorded' at the top or underneath each calculation (see diagram).

	2								
	3	4							
x	2	6							
2	0	4		6	x	3	4		
6	8	0		2	0	x	3	4	

		8 8 4 1 3 4 2 x 1 8 1 0 7 3 6 2 3 1 1 3 4 2 0 2 4 1 5 6 1