

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

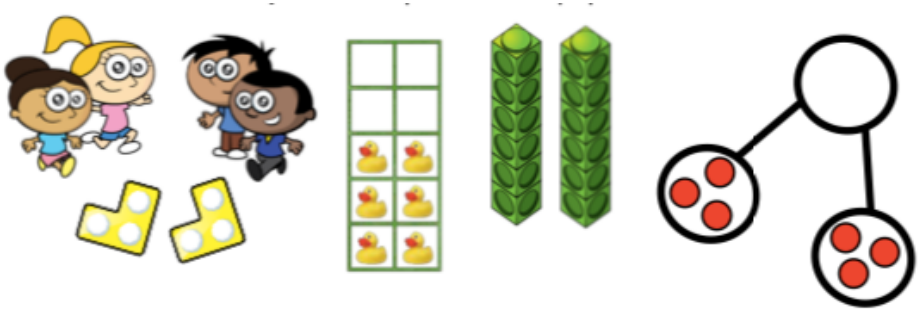
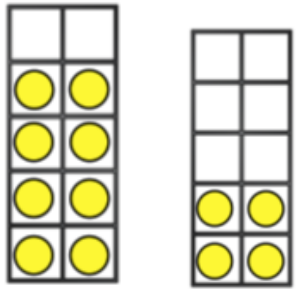
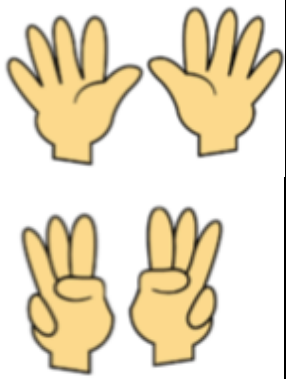
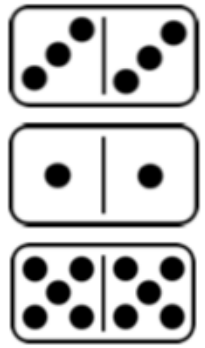
MULTIPLICATION: Vocabulary Progression:

- Using **correct mathematical language** is crucial for thinking, learning and communicating mathematically.
- We encourage children to explain **what they are doing** and **why they are doing it**.
- When children are first introduced to new vocabulary, it is **not essential** that children remember these words - but this modelling will help them become **familiar with the terms**, gradually beginning to use them accurately and with understanding in later years.

	EYFS	KS1		KS2			
	YR R	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
Place Value	ones/tens/digit the same number as as many as more/larger/bigger/greater fewer/smaller/less most/biggest/larges/greatest compare/order first, second, third... last/last but one before/after/next/between	equal to half-way between above/below one more/ten more one less/ten less	place value stands for represents exchange	one hundred more one hundred less	one thousand more one thousand less		
Multiplication	doubling number patterns	multiplication multiply multiplied by multiple grouping array	groups of times once, twice, three times ... ten times repeated addition group in pairs/three/tens equal groups of row/column multiplication table multiplication/division fact	factor product	inverse square/squared cube/cubed		

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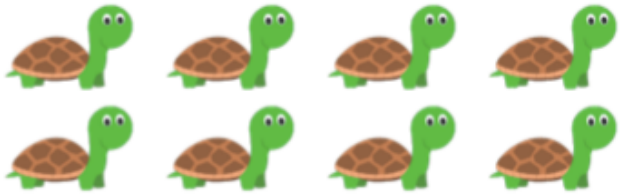
EYFS – solve problems by **doubling**.			
As with division, we start EYFS with **LOTS** of **concrete** resources.			
	 Building numbers in pairs		
Build Doubles using Concrete Resources	*10 Frame*	*Fingers*	*Matching Pairs*

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

Year 1 – solve 1 step multiplication calculations using concrete objects, pictorial representations and arrays

Concrete Resources (various objects):



Abstract Calculation:

2 + 2 + 2 + 2 = 10 (4 **equal** groups of 2 is 8)
or
4 + 4 = 8 (2 **equal** groups of 4 is 8)

Making Arrays – Repeated Addition

Concrete Resources (everyday objects):



There are 4 groups of 4 pencils.



There are 4 groups of 2 flowers.

Abstract Calculation:

4 + 4 + 4 + 4 = 16 pencils
or
2 + 2 + 2 + 2 = 8 pencils

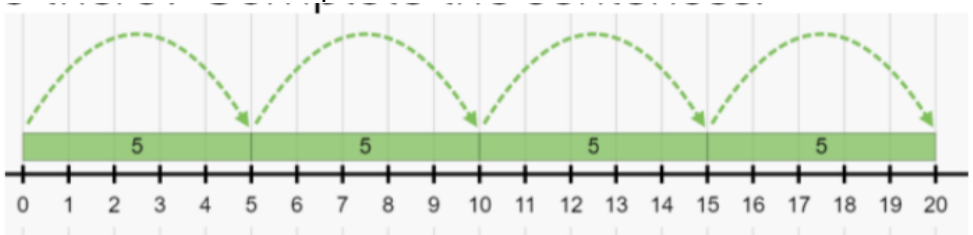
Making Equal Groups

Concrete Resource:



5 + 5 + 5 + 5 = ____

Pictorial Representation:



Abstract Calculation:

Number Line – Repeated Addition

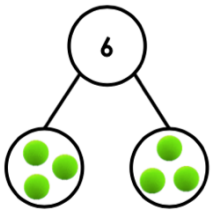
Concrete Resource:

Abstract Calculation:

10 + 10 + 10 + 10 = 40

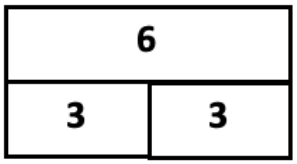
Bead Strings – Counting in 10s

Pictorial Representation – Abstract Calculation



Abstract:
2 group of 3 = 6

Part Whole Model – Making Doubles



Abstract: 2 groups of 3 = 6

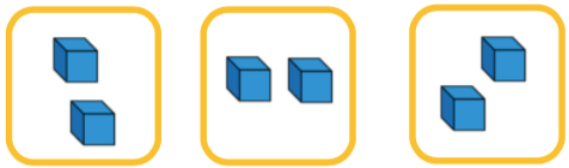
Bar Model

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

Year 2 - calculate multiplication within the multiplication tables (x2, x5, x10), and write them using the multiplication symbol "x"

Concrete/Pictorial:



Abstract Calculation:

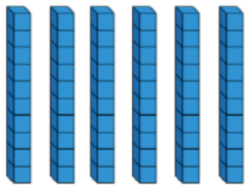
3 x 2 = 6 **or** 2 x 3 = 6

3 **lots of** 2 = 6

3 **equal** groups of 2 = 6

Base 10 - Equal Groups

Concrete:



Abstract:

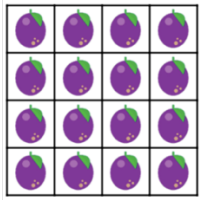
6 x 10 = 60

or

10 x 6 = 60

Base 10 – Equal Groups (x10)

Concrete/Pictorial:



Abstract:

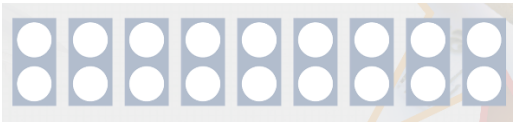
4 x 4 = 16

or

4 **lots of** 4 = 16

Making Arrays

Concrete:



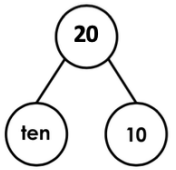
Abstract:

9 x 2 = 18

9 **lots of** 2 = 18

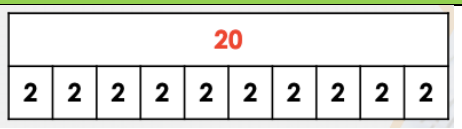
Numicon – Equal Groups (x2, x5, x10)

Pictorial Representation – Abstract Calculation



Abstract: 2 **lots of** 10 = 20

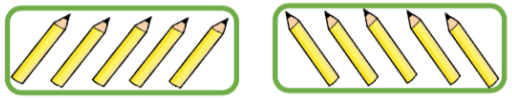
Part Whole Model



Abstract: 10 x 2 = 20 or 2 x 10 = 20

Bar Model

Concrete/Pictorial:



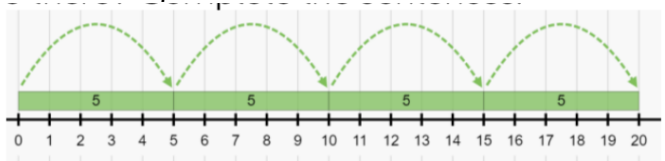
Abstract Calculation:

2 x 5 = 10 **or** 5 x 2 = 10

2 **lots of** 5 = 10

Concrete Objects – Equal Groups

Pictoria Representionl:



Abstract Calculation:

4 x 5 = 20 **or** 5 x 4 = 20

4 **equal** jumps of 5 = 20

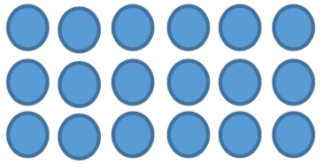
Number Line – Repeated Addition

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

Year 3 – use multiplication (x3, x4 and x8); multiply **two-digit numbers** times **one-digit numbers** using formal written methods

Concrete/Pictorial:



Abstract Calculation:

3 x 6 = 18 **or** 6 x 3 = 18

3 lots of 6 = 18

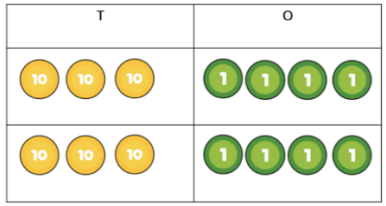
6 **equal** groups of 3 = 18

Making Arrays – Repeated Addition

Concrete/Pictorial:

34 x 2 =

34 is the **same as** 3 tens and 4 ones



Abstract Calculation:

2 lots of 34 = 68

2 x 34 = 68

Place Value Counters

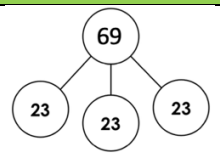
Abstract:

34 x 2 =

	T	O
	3	4
×		2
	6	8

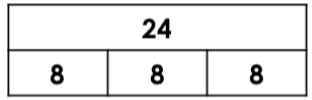
Column Multiplication

Pictorial Representation – Abstract Calculation



Abstract: 23 x 3 = 69

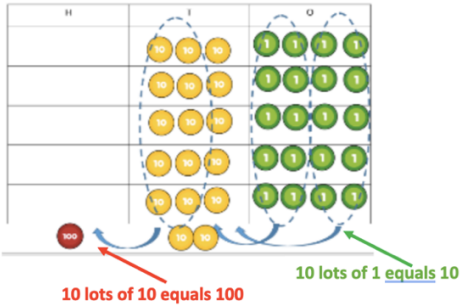
Part-Whole Model



Abstract: 3 x 8 = 24

Bar Model

Concrete/Pictorial:



Abstract: 34 x 5 = 170

Place Value Counters – Column Multiplication (with crossing)

Abstract Calculation: 35 x 5 = 175

	T	O
	3	5
×		5
1	7	5
1	2	

Written Column Multiplication (with crossing)

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

Year 4 - multiply **two-digit** and **three-digit numbers** by a **one-digit number** using formal written layout

Concrete/Pictorial:



Abstract Calculation:

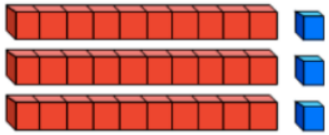
5 x 9 = 45

9 **lots of** 5 = 45

5 **equal** groups of 9 = 45

Making Arrays

Concrete:



Abstract:

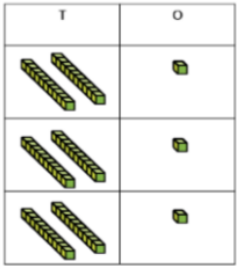
3 x 11 = 33

3 **lots of** 11 = 33

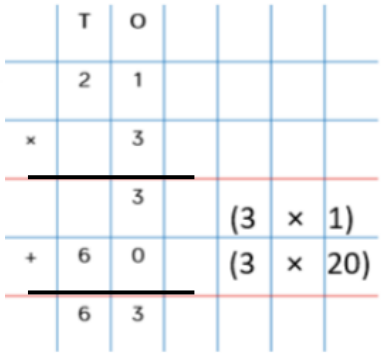
3 **equal** groups of 11

Base 10 – Equal Groups

Concrete:



Abstract:



Abstract: 21 x 3 = 63

3 **lots of** 21 = 63

Base 10 – expanded method

Concrete:

Hundreds	Tens	Ones
●●●●	●●	●
●●●●	●●	●
●●●●	●●	●

Abstract:

	4	2	1
x			3
			3
		6	0
1	2	0	0
1	2	6	3

(3 x 1)
(3 x 20)
(3 x 400)

421 x 3 = 1263

Place Value Counters

Concrete:

Hundreds	Tens	Ones
●●●●	●●●●●	●●●
●●●●	●●●●●	●●●
●●●●	●●●●●	●●●
●●●●	●●●●●	●●●
●●●●	●●●●●	●●●

5 **lots of** 253 = 1265

Place Value Counters – Column Multiplication

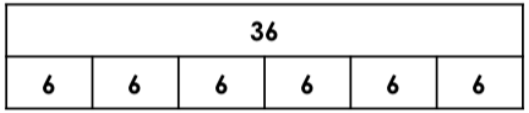
Abstract:

	2	5	3
x			5
1	2	6	5
	2	1	

253 x 5 = 1265

Column Multiplication

Pictorial Representation – Abstract Calculation



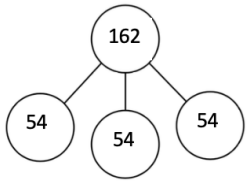
Abstract Calculation:

6 **lots of** 6 = 36

6 **equal** groups of 6 = 36

6 x 6 = 36

Bar Model



Abstract Calculation

3 **equal** groups of 54 = 162

3 x 54 = 162

Part Whole Model

Our Progression in Calculation – Multiplication

Concrete – Pictorial - Abstract

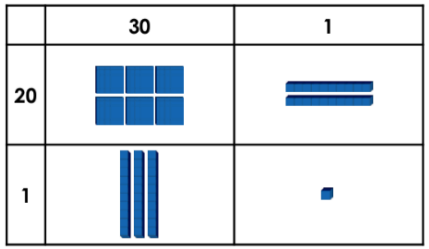
Year 5 – multiply numbers up to **4 digits** by a **one- or two-digit number** using a formal written method
Year 6 - solve multiplication **multi-step problems** in contexts

Base 10 – Area Model

Concrete/Pictorial:

31 x 21 =

(30 + 1) x (20+1)



630 + 21 = 651

Abstract: 31 x 21 = 651

Place Value Counters

Concrete/Pictorial:

1221 x 4 =

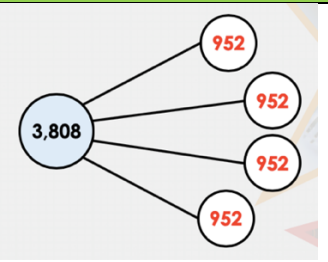
4 **lots of** 1221 = 4884



Abstract Calculation:

	1	2	2	1
x				4
	4	8	8	4

Part Whole Model



Abstract Calculation:

952 x 4 = 3808

4 **lots of** 952 = 3808

Written Column Multiplication

Abstract Calculation:

			5	2	
x			3	6	
		3	1 (1)	2	(6 x 52)
	1	5	6	0	(30 x 52)
	8	8	7	2	

Written Column Multiplication

Abstract Calculation:

		1	3	4	3	
x				3	2	
		2	6	8	6	
	4	0	2	9	0	← Place Holder
	4	2	9	7	6	
	1					

Bar Model

5,244			
1311	1311	1311	1311

Abstract Calculation:

1311 x 4 = 5244

4 **lots of** 1311 = 5244