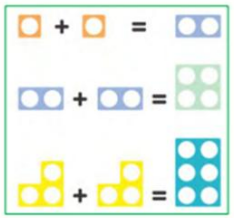
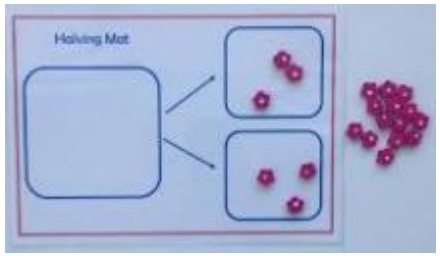
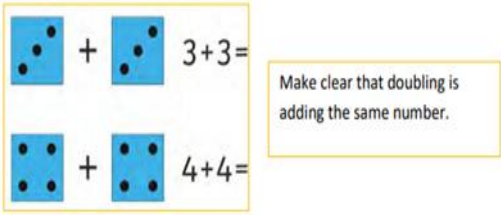
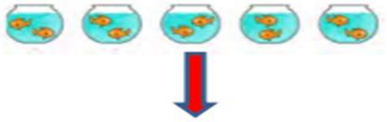
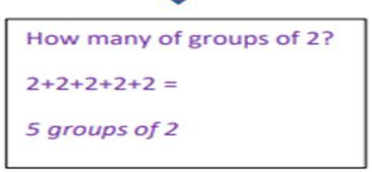
Porthleven 2024 Multiplication Calculation Policy

EYFS

Strategies

Early Learning Goal - Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

Language	Concrete	Pictorial	Abstract
A range of language linked to multiplication should be used: • lots of • groups of • times (once, twice etc.) • multiply • add again and again • double	Doubling Halving Sharing  One plus one equals two Double one is two. Create opportunities in and outdoors for pupils to double and share into groups of two. 	  Note the use of the stem sentence. 	   

Year 1 Multiplication

National Curriculum

Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Multiplication in year 1 builds on the learning in EYFS. It is important that children have a secure understanding of doubling before moving on. Concrete resources and pictorial representations should be then used to develop children's understanding of multiplication being 'groups of'.

Language

- lots of
- groups of
- Times (once, twice etc.)
- multiply
- add again and again
- double

Concrete

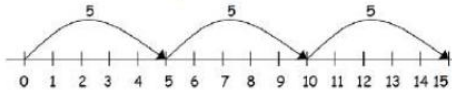
Counting in groups of …..
There are 3 groups of four.
There are ……. groups of …….

Cuisenaire and number tracks counting in groups of 2 5 10

Pictorial

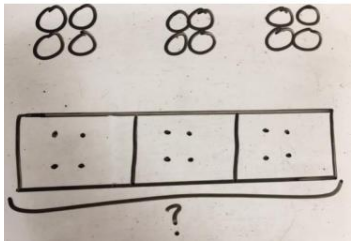
There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?

2 + 2 + 2 = 6



5 + 5 + 5 = 15

Represent the practical resources in a picture and using a bar model.



Abstract

Write repeated addition equations

Write addition sentences to describe objects and pictures

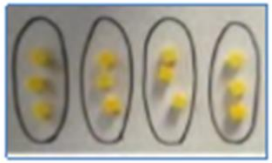
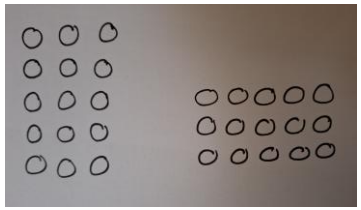
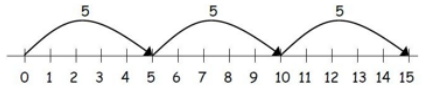
2 + 2 + 2 = 6

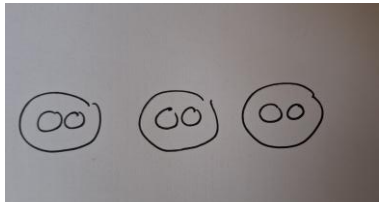
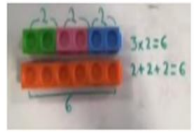
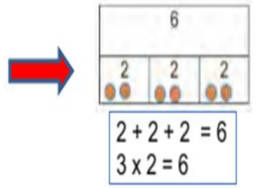
There are 3 groups of two
3 groups of two socks
3 lots of two socks
3 x 2

Year 2 Multiplication

National Curriculum:

- Recall and use multiplication facts for the 2, 3 and 5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
- Multiplication in year 2 builds on the children's prior learning and at this stage children should have fluent recall of the 2,5 and 10 times table (progression may take place to the 4 times table by doubling and doubling again). A lot of focus should be on the use of arrays, both through the use of concrete resources and pictorial representations, to demonstrate that multiplication is commutative; a bar model can also be used to show this.

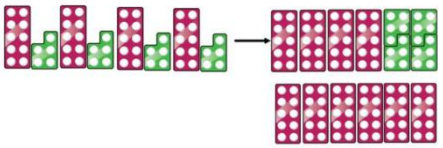
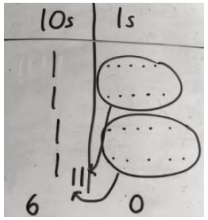
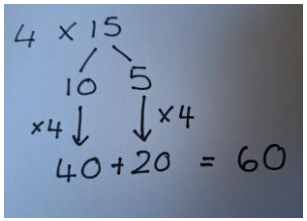
Language	Concrete	Pictorial	Abstract
2	Arrays		
• Lots of • Groups of • Times (once, twice etc.) • Multiply • Add again and again • Double • Times tables • Commutative • Multiple of • Array • Row • Column	 Building arrays. Discuss the concepts of rows and columns There are 3 rows of 5 There are 5 columns of 3 	Draw arrays in different rotations to find commutative multiplication sentences.  Use number lines to show repeated addition. 	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

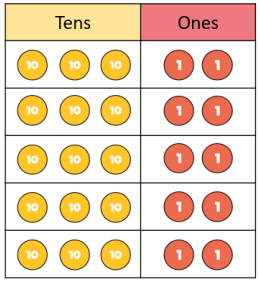
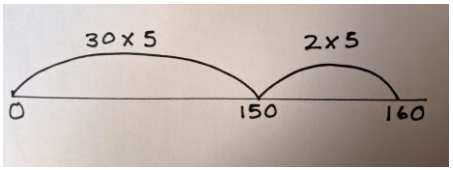
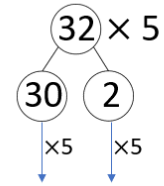
	Groups of		
	3 groups of 2  3 x 2 = 6	 3 groups of 2	  There are 3 groups of 2 2 + 2 + 2 3 lots of 2 equals 6 3 x 2 = 6 It is important to stress that each of the groups are the same size.

Year 3 Multiplication

National Curriculum

- Recall and use multiplication facts for the 3, 4 and 8 multiplication table (Use of doubling for 4 and 8 times tables)
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including two digit numbers times one-digit numbers, using mental and progressing to written methods
- Solve problems involving missing number problems involving multiplication including positive number scaling problems and correspondence problems where n objects are connected to m objects.

Language	Concrete	Pictorial	Abstract
As above • Product • Multiplication • Factor • Commutativity. • There are 3 times as many • 10 times bigger • 100 times bigger	Use Numicon, dienes or place value counters 4 x 15 	Children to represent the concrete manipulatives pictorially. 	Children to be encouraged to show the steps they have taken. 

	32 x 5  Note how this represents 32 five times. This uses the concept of commutativity. Place value frame should also be used when teaching multiplying by 10 and 100.	Number lines can also be used:  	 $150 + 10 = 160$ $32 \times 5 = 160$ Procedural fluency linked to understanding of multiplying by 10 and 100 4 x 6 = 24 4 x 60 = 240 4 x 600 = 2400 60 x 4 = 240

Year 4 Multiplication

National Curriculum

- Use place value, known and derived facts to multiply mentally, including x0 x1 and multiplying together three numbers
- Recognise and use factor pairs and commutativity in mental calculations
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- Solve problems involving multiplying, including the distributive law to multiply two-digit numbers by one-digit including positive number scaling problems and correspondence problems where n objects are connected to m objects

Language

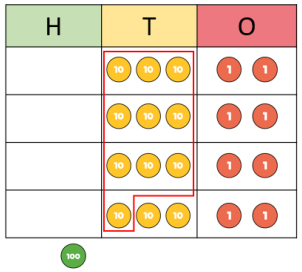
As above

Distributive law (Multiplying a group of large 2- or 3-digit no's will create the same value as those numbers being partitioned e.g. 52 x 8 =416. This is the same as (50 x8) + (2 x 8))

Concrete

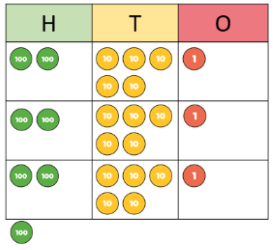
Use representations from Year 3, developing further.

32 x 4



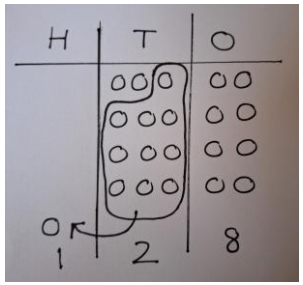
Add up each column, starting with the ones making any exchanges needed.
Moving onto 3 digit by 1 digit

251 x 3

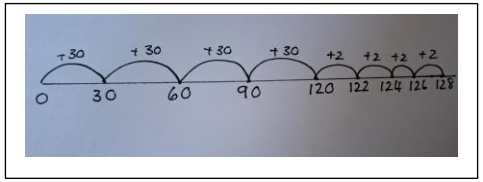


Pictorial

32 x 4



Use number lines to show 32 x4
Four jumps of 30 then four jumps of 2.



Abstract

See year 3 for procedural fluency

	H	T	O	
		3	2	
×			4	
			8	
	1	2	0	
	1	2	8	

Long multiplication (x 1digit no.)

↓

Short multiplication (x 1 digit no.)

	H	T	O	
	2	5	1	
×			3	
	7	5	3	
	1			

Year 5 and 6 Multiplication

National Curriculum

- Identify multiples and factors: all factor pairs of a number, common factors of two numbers,
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Multiply numbers up to four digits by a one- or two-digit number using a formal written method
- Multiply whole numbers and those involving decimals by 10, 100 and 1000.

Language

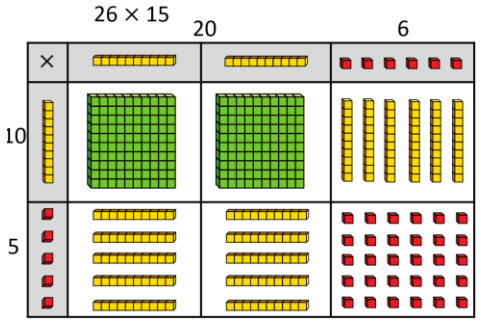
As above

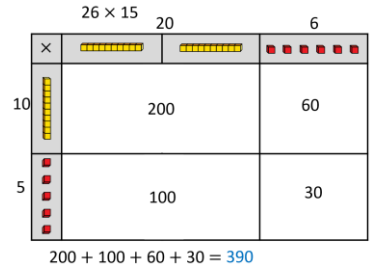
- Product
- Multiplication
- Factor
- Prime
- Square Number
- Cube Number
- Composite
- Commutativity.
- There are 3 times as many
- 10 times bigger
- 100 times bigger
- 1000 times bigger

Concrete

4 digits by 1 digit – continue as year 4

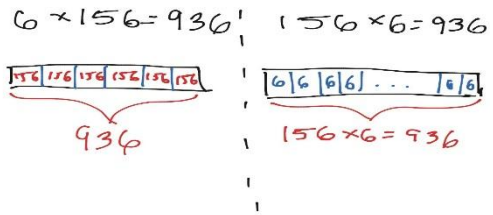
2 digit by 2 digit





Secure understanding of multiplication of decimals using place value grids.

Pictorial



We can use factor pairs to mentally solve multiplication

28 x 3 = 84

1 and 28 2 and 14 4 and 7

Which factor pair is easiest to use?

28 × 3

4 × 7 × 3

4 × 3 × 7 12 × 7

Abstract

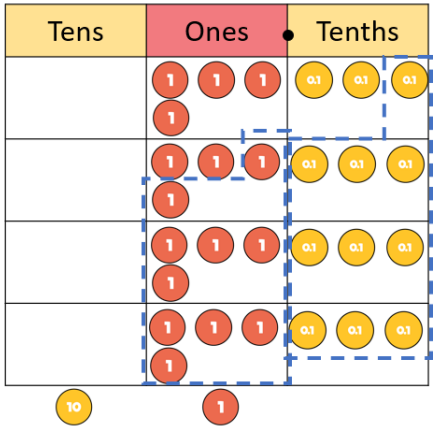
Long Multiplication

	H	T	O	
		2	3	
×		3	1	
		2	3	23 x 1
+	6	9	0	23x30
	7	1	3	
	1			

3 digit by 2 digit numbers

		1	2	8		
×			7	3		
		3	8_{2}	4		(128 × 3)
	8_{1}	9_{5}	6	0		(128 × 70)
	9	3	4	4		
	1	1				

4.3 × 4 = 17.2

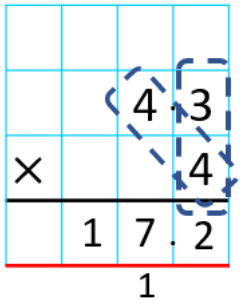


Up to 4 digit by 2 digit numbers

4,145 × 52 = 215,540

		HthTTh	Th	H	T	O	
			4	1	4	5	
×					5	2	
			8	2	9	0	(4,145 × 2
+		2 0	7	2	5	0	(4,145 × 50
		2 1	5	5	4	0	
		1		1			

Progress to the multiplication of decimals.



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