Early Learning Goal:

Children at the expected level of development will: explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Children should be encouraged to develop a mental picture of the number system in their head. They should experience practical calculation opportunities using a wide range of equipment, including small world play, role play, counters, unifix etc.

NURSERY 1

Repeated addition in 1s through role play

The teddies are having a picnic. Everyone needs 1 plate. How many plates will we need? Count plates as they are given out.

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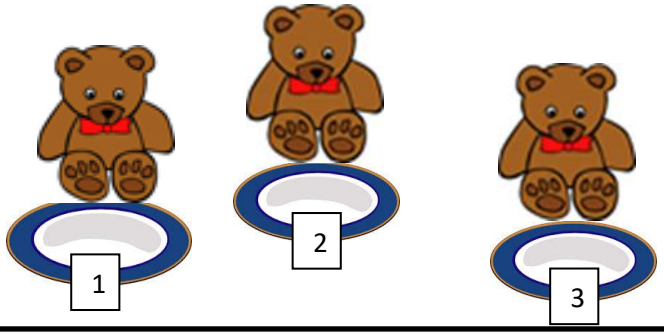
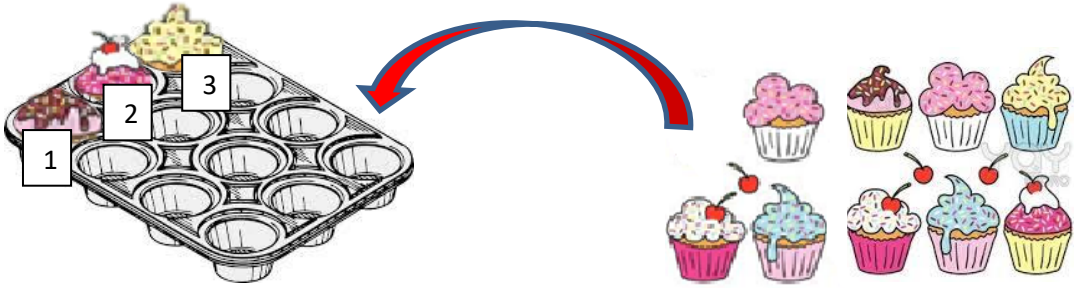


NURSERY 2

Investigate putting items into resources which are arrays

Place items into resources such as egg boxes, ice cube trays and baking tins which are shaped liked arrays.



Count items as you place and encourage children to notice groups.

RECEPTION

Informally record observations through drawing

Record observations and calculations using pictures.

Eg: Two groups of 5 or double 5. Show doubles through fingers on hands.

Eg: two groups of three or double three as three cookies on a plate.

EARLY LEARNING MULTIPLICATION VOCABULARY:

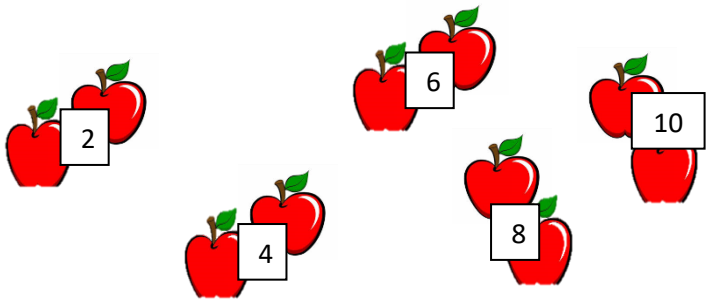
YEAR 1 END OF YEAR MENTAL MULTIPLICATION OBJECTIVES:
***Begin to understand doubling numbers and quantities**
(Use of apparatus including dice etc)

***Count in 2s, 5s and 10s**

YEAR 1 END OF YEAR WRITTEN OBJECTIVE:
Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
Children should continue to experience calculations involving concrete objects and jottings.

STEP 1: Use concrete objects to multiply.

5 children need 2 apples each. How many apples do we need altogether?



Give apples out counting in 1s or 2s to find the answer.

STEP 3: Familiarisation with arrays through use of concrete objects.

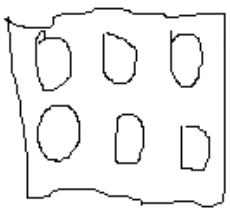
We are making 3 cakes. I need two eggs for each cake.
How many eggs do I need altogether?

Give out eggs in 2s whilst counting in 2s

Show an object with an array which matches the total of the problem.

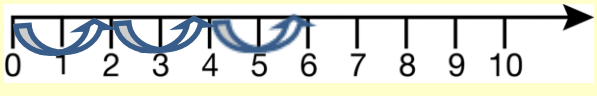
How many eggs will fill the box?

STEP 3: Record calculations with pictorial representations
Draw pictures to show their working. Encourage children where possible to draw in an array.



Gradually begin using unifix to represent concrete objects when children are ready.

Number line representation modelled alongside children's practical method.



3 lots of 2 eggs = 6

YEAR 1 MULTIPLICATION VOCABULARY: red words new to Year 1

lots of

groups of

pairs, threes… tens

YEAR 2 END OF YEAR MENTAL MULTIPLICATION OBJECTIVES:

***Recall and use multiplication for the 2, 5 and 10 times table, including recognising odd and even numbers.**

Children become fluent in these tables and connect to each other. Connect 10 x table to place value and 5 x table to divisions on a clock face.

***Understand and write commutative statements.**

Eg 2 x 5 = 10 5 x 2 = 10

YEAR 2 END OF YEAR WRITTEN OBJECTIVE:

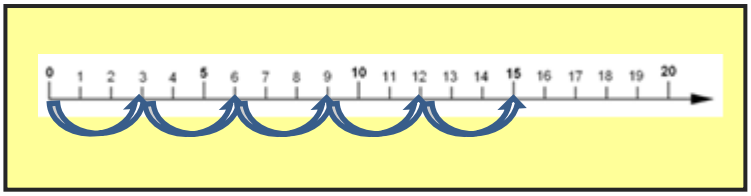
Calculate mathematical statements for multiplication (using repeated addition) and write them using the multiplication (x) and equals (=) signs. *Concrete representations are used in teacher modelling, unifix apparatus are used for children to calculate with.*

STEP 1: Show multiplication as groups of items resembling repeated addition

Children create groups of 3 using unifix. Unifix to remain the same colour.

Children write 5 lots of 3 = 15

Children who are not secure with their 3 x table will use a number line to support.



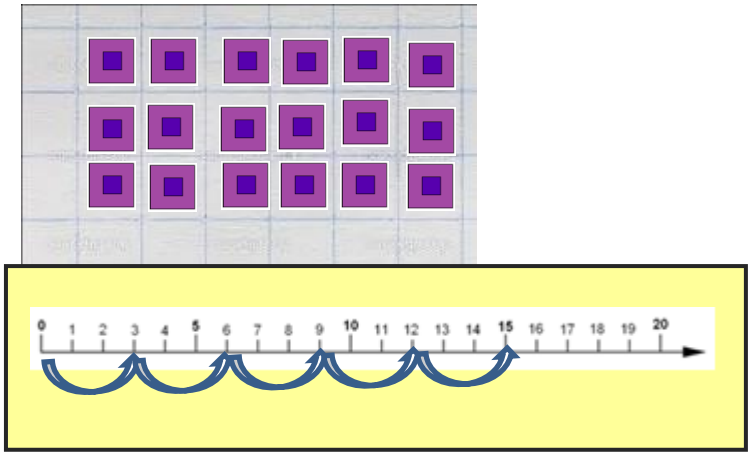
STEP 2: Children begin to use arrays to represent multiplication

Children record

5 lots of 3 = 15

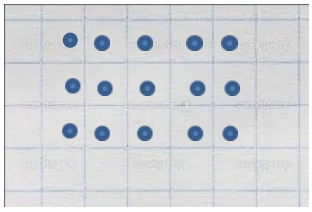
3 lots of 5 = 15

Arrays created on squared paper or grid which can be rotated to show the associated multiplication fact .



STEP 3: Record an array alongside repeated addition sentences.

Children become familiar with various calculation sentences.



3 x 5 = 15 3 lots of 5 = 15 3 times 5 = 15

3 x 5 = 5 + 5 +5

5 x 3 = 3 + 3 + 3 + 3 + 3

YEAR 2 MULTIPLICATION VOCABULARY: words in red new to Year 2

lots of

groups of

x

times

multiply

multiplied by

multiple of

once, twice, three times, four times, five times… ten times…

times as (big, long, wide and so on)

repeated addition

array

YEAR 3 END OF YEAR MENTAL MULTIPLICATION OBJECTIVES:

***Recall and use multiplication facts for the 3, 4 and 8 times table, including recognising odd and even numbers.**

Children become fluent in these tables and connect the 2,4 and 8 times table through doubling.

***Develop efficient mental multiplication methods.**

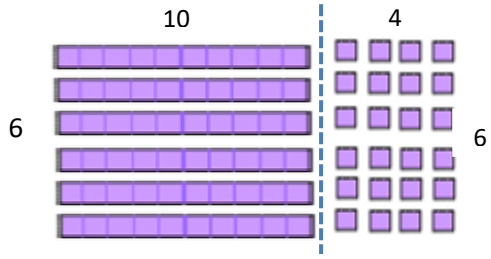
Use commutativity and associativity (4 x 12 x 5 = 4 x 5 x 12 = 20 x 12 = 240)

Use multiplication facts to derive and related facts (3 x 2 = 6 3 x 20 = 60)

YEAR 3 END OF YEAR WRITTEN OBJECTIVE:

Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, progressing to formal written methods.

STEP 1: Use dienes apparatus to represent partitioned arrays



6 x 14 = 84

6 x 10 = 60 **6 x 4 = 24**

60 + 24 = 84

STEP 2: Use more formal representation to multiply a teens number by a single digit.

Manipulate dienes on place value charts.

10s	1s	
1	*4*	
	6	
//	⋮	(6 x 4)
////		(6 x 10)
80	4	

6 x 14 = 84

STEP 3: Use more formal written method to multiply a teens number by a single digit.

10s	1s	
1	*4*	
	6	
2	*4*	(6 x 4)
6	*0*	(6 x 10)
8	4	

6 x 14 = 84

YEAR 3 MULTIPLICATION VOCABULARY: words in red new to Year 3

X

lots of

groups of

times

multiplication

multiply

multiplied by

multiple of

product

once, twice, three times, four times, five times… ten times…

times as (big, long, wide and so on)

repeated addition

array

YEAR 4 END OF YEAR MENTAL MULTIPLICATION OBJECTIVES:

***Recall and use multiplication facts up to 12 x 12.**

Children become fluent in these tables and connect the 3,6 and 12 times table through doubling.

***Use place value, known and derived facts to multiply mentally, including multiplying by 0 and 1, multiplying 3 numbers together.**

Extend mental methods to three-digit numbers to derive facts. (3 x 400= 1200 can be derived from 3 x 4 = 12)

Use knowledge of number facts and rules of arithmetic to solve 3 digit multiplications (2 x 6 x 5 = 10 x 6)

***Recognise and use factor pairs and commutativity in mental calculations.**

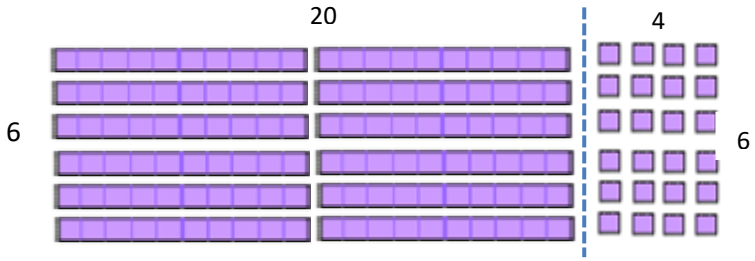
Write statements about the equality of expressions – distributive law – (39 x 7 = 30 x 7 + 9 x 7)

and associative law – (2 x 3) x 4 = 2 x (3 x 4)

YEAR 4 END OF YEAR WRITTEN OBJECTIVE:

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

STEP 1: Use a formal representation to multiply a number between 20 and 30 by a single digit.



6 x 24 =144

6 x 20 = 120 **6 x 4 = 24**

120 + 24 = 144

STEP 2 and 3: Use a formal representation and written method to multiply a number between 20 and 30 by a single digit.

Same as Year 3 Step 2 and 3 but with numbers between 20 and 30 but without the annotations in brackets unless needed.

STEP 4 and 5: Use formal written method to multiply a two-digit number by a single-digit number

Same as Year 3, Step 2 and 3 but with numbers up to 100 but without the annotations in brackets unless needed.

STEP 6: Use formal representation to multiply a three-digit number by a single-digit number.

1000s	100s	10s	1s
	3	6	6 8
			
			
			
			
2	9	2	8

366 x 8 = 2928

STEP 7: Use formal written method to multiply a three-digit number by a single-digit number.

1000s	100s	10s	1s
	3	6	6 8
		~~40~~	8
	400	~~80~~	0
2000	400	0	0
	100	20	
2000	900	20	8

366 x 8 = 2928

YEAR 4 MULTIPLICATION VOCABULARY: words in red new to Year 4

x

lots of, groups of

times

multiplication

multiply

multiplied by

multiple of

product

once, twice, three times, four times, five times… ten times…

times as (big, long, wide and so on)

repeated addition

array

row, column

YEAR 5 END OF YEAR MENTAL MULTIPLICATION OBJECTIVES:

***Identify multiples of 2 numbers**

Apply all multiplication tables to memory and use them confidently

***Multiply numbers mentally drawing upon known facts**

Distributivity can be expressed as ***a(b + c) = ab + ac***

***Multiply whole numbers and those involving decimals by 10, 100 and 1000**

***Recognise and use square numbers and cube numbers and the notation for squared (^{2}) and cubed (^{3})**

***Solve multiplication problems using knowledge of factors, multiples, squares and cubes.**

Use factors to construct equivalence statements (eg: 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x9 x 10 = 9 squared x 10)

***Solve multiplication problems including scaling by simple fractions and problems involving simple rates**

Use multiplication as an inverse to support introduction of ratio in Year 6, for example, by multiplying by powers of 10 in scale drawings or by multiplying by powers of 1000 in converting units such as kilometres and metres.

YEAR 5 END OF YEAR WRITTEN OBJECTIVE:

Multiply numbers up to 4 digits by a one-digit or two-digit number using a formal written method, including long multiplication for two-digit numbers.

Children continue to experience use of dienes as a representation for understanding.

STEP 1: Use compact method to multiply two-digits by one-digit numbers

Show representation of Year 3 STEP 3 alongside new compact method. What is the same? What is different? Model each method simultaneously for understanding.

	T	O
	1	4
x		6
	2	4
	6	0
	8	4

Year 3 – Step 3

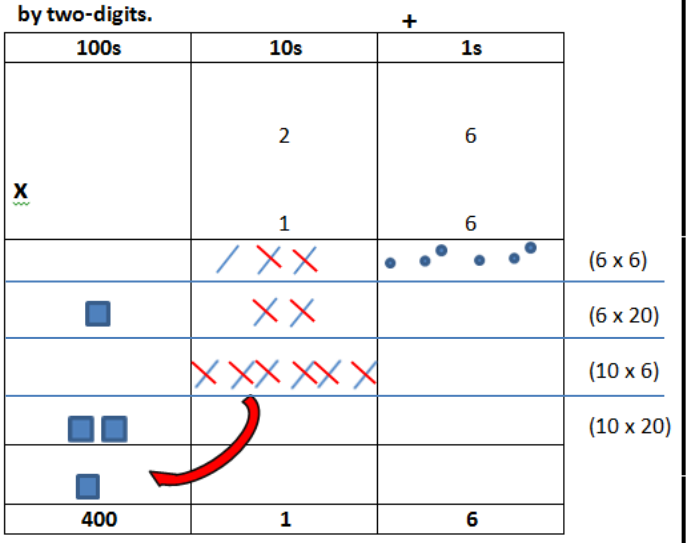
	T	O
	1	4
x		6
	8	4
	2	

Compact

STEP 2: Use compact method to multiply three digits by one- digit.

		H	T	O
		3	1	4
x				6
	1	8	8	4
	1		2	

STEP 3: Use formal representation to multiply two-digits by two-digits.



26 x 16 = 416

STEP 4: Use expanded column method to multiply two-digits by two-digits

		T	O
		2	6
x		1	6
		3	6
	1	2	0
		6	0
	2	0	0
	4	1	6
	1		

Annotataed brackets optional

STEP 5: Use compact column method to multiply two-digits by two-digits.

		T	O
		2	6
x		1	6
	1	5	6
	1	3	
	2	6	0
	2	6	
	4	1	6
	1		

26 x 16 = 416

It is important that digits are exchanged and carried to aid understanding with larger numbers.

STEP 6: Same as Step 5 but multiplying three-digits by two-digits.

STEP 7: Same as Step 5 but multiplying four-digits by two- digits.

YEAR 5 MULTIPLICATION VOCABULARY: words in red new to Year 5

x

lots of, groups of

times

multiplication

multiply

multiplied by

multiple of

product

once, twice, three times, four times, five times… ten times…

times as (big, long, wide and so on)

repeated addition

array

row, column

YEAR 6 END OF YEAR MENTAL MULTIPLICATION OBJECTIVES:

***Perform mental multiplications including mixed operations and large numbers**

Continue to use all multiplication tables to calculate mathematical statements in order to maintain their fluency.

***Identify common multiples**

***Use knowledge of the order of operations to carry out calculations involving four operations**

Explore the order of operations using brackets;for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9

***Use estimation to check answers to multiplication and determine, in the context of a problem, an appropriate degree of accuracy.**

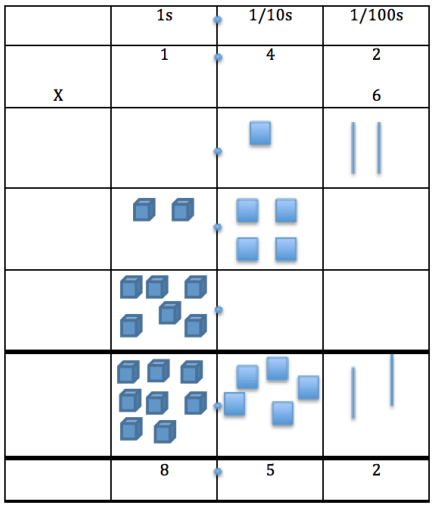
Round answers to a specified degree of accuracy, for example, to the nearest 10,20,50 etc but not to a specified number of significant figures.

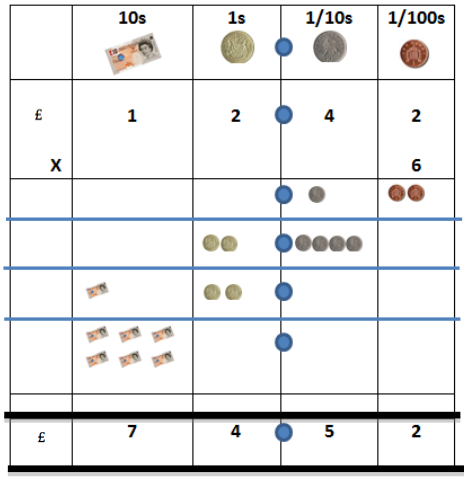
YEAR 6 END OF YEAR WRITTEN OBJECTIVE:

Multiply multi-digit numbers up to four digits by a two-digit whole number using the formal written method of long multiplication.

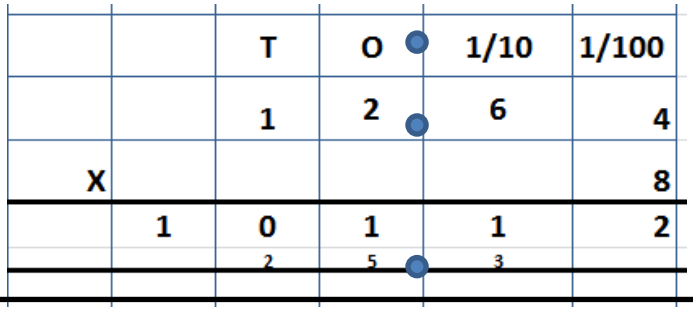
Multiply numbers with up to two decimal places by whole numbers.

Step 1: Use formal representation to multiply numbers with two decimal places by whole numbers.





STEP 2: Use columnar written method to multiply decimals.



YEAR 6 MULTIPLICATION VOCABULARY: words in red new to Year 6

x

lots of, groups of

times

multiplication

multiply

multiplied by

multiple of

product

once, twice, three times, four times, five times… ten times…

times as (big, long, wide and so on)

repeated addition

array

row, column