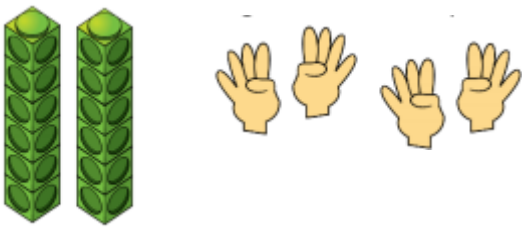


Early Learning Goals:

- Have a deep understanding of number to 10, including the composition of each number
- Subitise (recognise quantities without counting) up to 5
- Explore and represent patterns within numbers to 10, including evens and odds and double facts
- Automatically recall (without reference to rhymes, counting or other aids) double facts
- (Solve problems including doubling)

Concrete

Building doubles using real objects and practical equipment

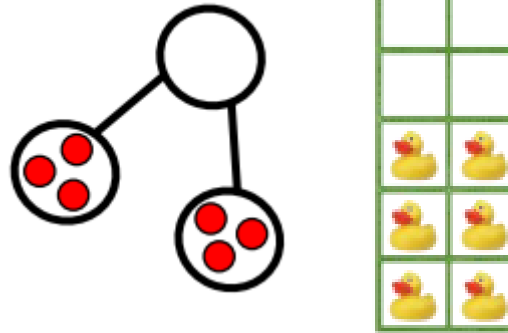


- Odd and even—grouping in pairs



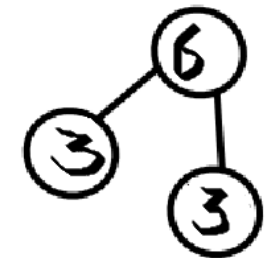
Pictorial

- Doubling



Abstract

- Using digits to represent doubling in the part part whole model
- Number sentence $5 + 5 = 10$



Key Vocabulary:

Double, doubling, sets of, groups of, lots of, equal, is equal to, pairs, odd, even, number patterns, objects, count in 2s/5s/10s, left over, spare

STEM Sentences:

Double ___ is ___

NC Learning Objectives:

End of Year One

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

NC Learning Objectives:

End of Year 2

- Recall and use multiplication facts for the 2, 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 (x) and equals (=) signs
- Show that multiplication of two numbers can be done in any order (commutative)
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Concrete

Pictorial

Abstract

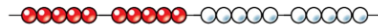
Multiplication through arrays/ repeated addition:



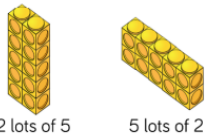
$2+2+2=6$



$2 \times 5 = 5 \times 2$

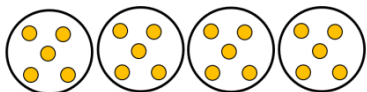
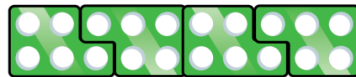


4 lots of 5 = 4×5

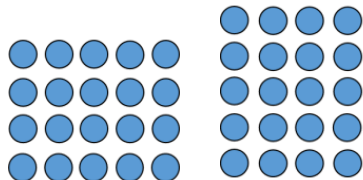
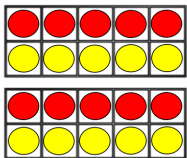


2 lots of 5

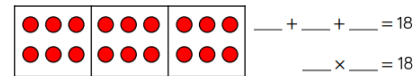
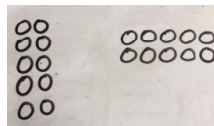
5 lots of 2



$4 \times 5 = 5 \times 4$

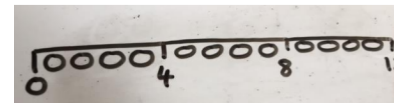
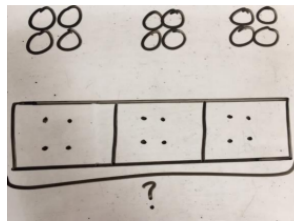


Multiplication through arrays/ repeated addition



There are ___ equal groups with ___ in each group.
There are three ___.

$3 \times 4 = 4 \times 3$



Ba

35						
5	5	5	5	5	5	5

35				
7	7	7	7	7

Writing calculations using the x and = symbols

$5 + 5 + 5 + 5 = 20$

$4 \times 5 = 20$

$5 \times 4 = 20$

Addition	Multiplication	Story
$10 + 10 + 10$		
	6×5	

Use <, > or = to make the statements correct.

2×5 ○ 5×2

3×2 ○ 4×5

10×5 ○ 5×5

Key Vocabulary:

Multiplication, multiply, multiplied by, lots of, groups of, repeated addition, multiplication, represent, column, row, equal, twice, array, multiple, count up, times table, row, column, fact family, odd, even, multiplication fact, multiplication table, repeated addition, commutative, equals, is equal to

STEM Sentences:

There are _____ equal groups with _____ in each group.

NC Learning Objectives:

Year Three

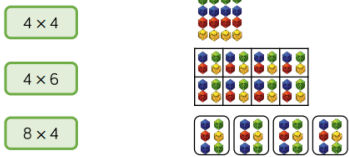
- Recall and use multiplication facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods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

Year Four

- Recall multiplication facts for multiplication tables up to 12×12
- Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1; 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 using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Concrete

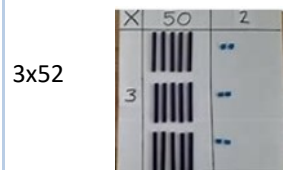
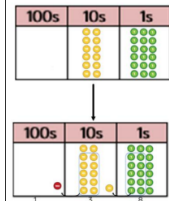
Matching multiplication to concrete representation



Using resources and place value counters to multiply e.g.

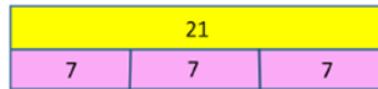


Formal column method with place value counters.

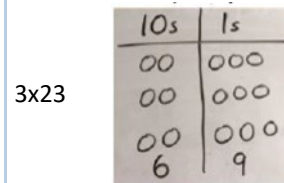


Pictorial

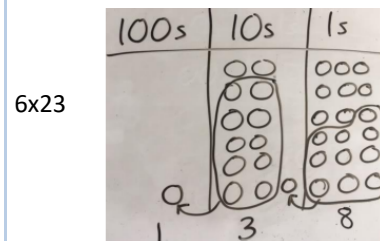
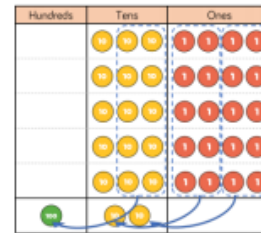
Using the bar model



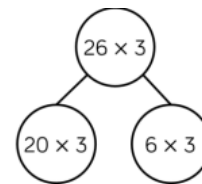
Representations of place value counters for multiplication without and with exchange (linked to formal written method)



5x34



6x23



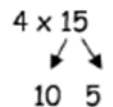
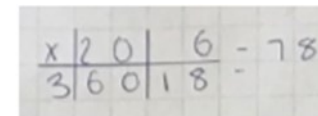
Abstract

Linking repeated addition to multiplication

$$\begin{aligned} & _ + _ + _ + _ + _ = _ \\ & _ \times _ = _ \end{aligned}$$

$$\begin{aligned} 3 \times 8 &= \square \\ 6 \times \square &= 24 \\ \square \times 8 &= 48 \end{aligned}$$

$$\begin{aligned} 26 \times 4 & \\ &= (20 + 6) \times 4 \\ &= (20 \times 4) + (6 \times 4) \\ &= 80 + 24 \\ &= 104 \end{aligned}$$



Formal written methods

$$\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$$

$$\begin{array}{r} 23 \\ \times 6 \\ \hline 138 \end{array}$$

24 x 6 becomes

$$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \end{array}$$

Answer: 144

Renamed digits underneath and crossed out when used.

Key Vocabulary:

Multiply, multiplied by, times tables facts, fact family, equal groups, lots of, groups, partitioning, multiply, multiples, factor, factor pairs, product, grid, compact method, short multiplication, distributive law e.g. 64×5 can be solved as $(60 \times 5) + (4 \times 5)$, commutativity.

STEM/ model Sentences:

How does addition link to multiplication? How does partitioning help you multiply a 2 digit number by a 1 digit number? How does the written method match the concrete representation?

NC Learning Objectives: End of Year 5

- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers; Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Multiply numbers mentally drawing upon known facts;
- Multiply whole numbers and those involving decimals by 10, 100 and 1000
- Recognise and use square numbers and cube numbers, and notation for squared and cubed
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- Solve problems involving multiplication including using their knowledge of factors and multiples, squares and cubes; involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign; involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

NC Learning Objectives:

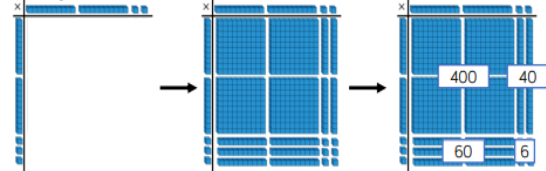
End of Year 6

- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Perform mental calculations, including with mixed operations and large numbers; Identify common factors, common multiples and prime numbers Use their knowledge of the order of operations to carry out calculations involving the four operations
- Solve problems involving addition, subtraction, multiplication and division.
- Use estimation to check answers to calculations and determine, in the context of the problem, an appropriate degree of accuracy
- Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers

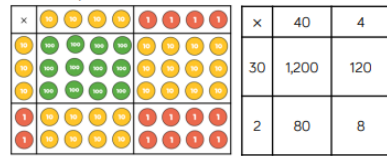
Concrete

Using base 10 or place value counters to multiply 2 digit by 2 digit numbers

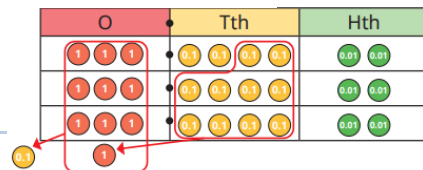
Whitney uses Base 10 to calculate 23×22



Rosie adapts the Base 10 method to calculate 44×32



Dexter uses place value counters to work out 3.42×3



Pictorial

Multiply on place value grid using counters (when multiplying by 10, 100)

HTh	TTh	Th	H	T	O
			● ●	● ● ● ●	● ● ● ● ● ●

Multiplication with place value representations linked to formal method

Annie earns £1,325 per week.

How much would he earn in 4 weeks?

Thousands	Hundreds	Tens	Ones
1000	300	20	5
1000	300	20	5
1000	300	20	5
1000	300	20	5

Th	H	T	O
1	3	2	5
x			4

$$\begin{array}{r}
 378 \times 4 \\
 \times \quad 300 \quad 70 \quad 8 \\
 \hline
 4 \quad 1200 \quad 280 \quad 32 = 1512
 \end{array}$$

Abstract

Formal multiplication methods

		2	3
x		1	4
		9	2
	2	3	0

(23×4)
 (23×10)

		3	4	2
x				3
		1	0	2
				6

Renamed digits underneath and crossed out when used.

Calculations do not need to be labelled as children become confident.

		3	2	5	0
x				2	6
		1	9	5	0
	6	5	0	0	0
	8	4	5	0	0

$(3,250 \times 6)$
 $(3,250 \times 20)$

Key Vocabulary:

Multiplying, partition, exchange, zero, prime number, multiple, common factor, common multiple, factor, product, square number, prime number, composite number, cube number, squared, cubed, long multiplication, expanded method.

STEM Sentences:

What is important to remember as we begin to multiply the tens number? Can the inverse operation be used? How could you draw the problem? What can we exchange if the product is 42 ones?