



Ashcroft Infant and Nursery School Calculation Policy

Key Stage 1

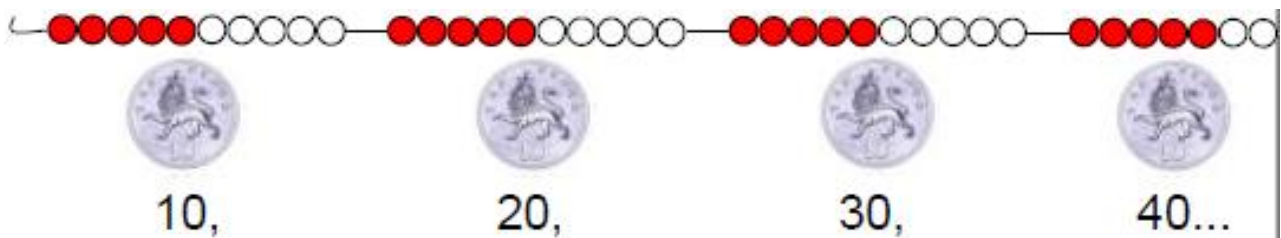
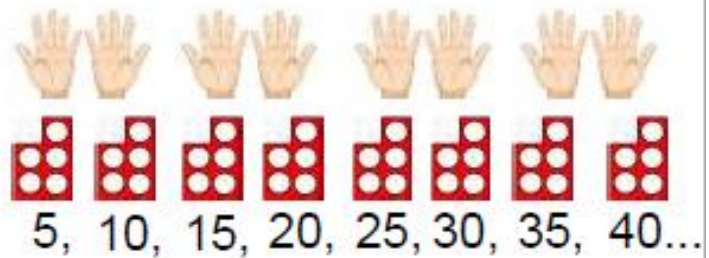
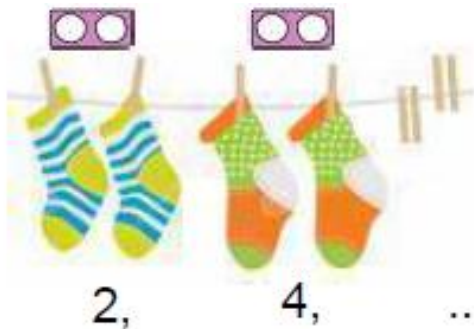
Multiplication and Division

Year 1

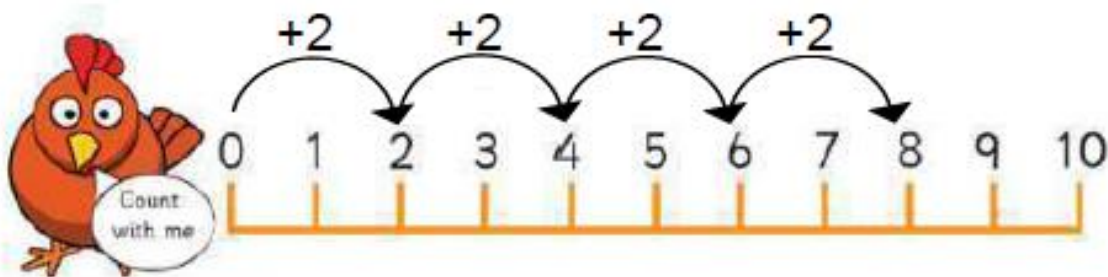
Children are expected to:

Count in multiples of twos, fives and tens.

A child's first introduction to multiplication will be through counting in steps of either 2, 5 or 10. Use of concrete objects will enable them to grasp this concept more quickly.



Number lines can also support children when they multiply, as a way to add on and count in steps.



Children could use a counter, a finger or a pencil to help them 'hop' along the number line.

They should begin to look at counting backwards in these steps as well.



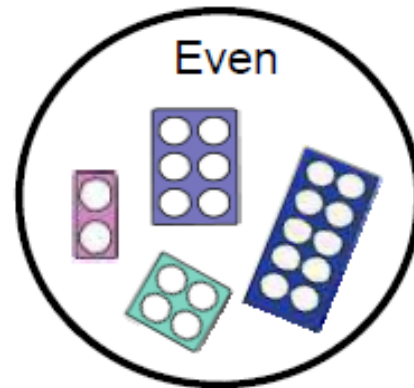
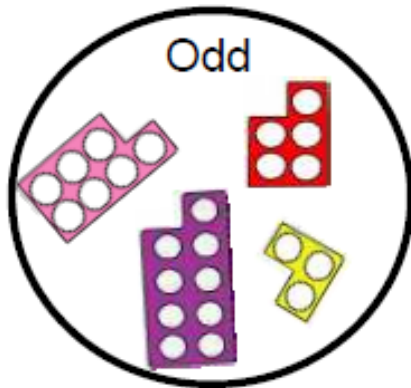
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Key Stage 1

Multiplication and Division

Year 1

When counting in 2s, children may start to recognise the difference in structure between odd and even numbers.



Solve one step multiplication or division problems using concrete objects, pictorial representations or number arrays.

By grouping or sharing small quantities, children should begin to gain some understanding of multiplication and division.

At this stage, they will solve simple problems using **repeated addition**, although the language of **multiplication** will also be introduced.



There are 10 crayons in each box. How many are there altogether?

$$10 + 10 + 10 + 10 = 40 \text{ crayons}$$

There 4 groups of 10

$$10 \times 4 = 40$$

10 multiplied by 4 is 40

How much money do I have?

$$5 + 5 + 5 + 5 + 5 = 25\text{p}$$

There are 5 lots of 5p

$$5 \times 5 = 25$$



Year 1

Children will become familiar with the concept of **division** through **sharing** and **grouping** concrete objects **equally**.

Sharing:

Can you share the cows *equally* between the two fields?



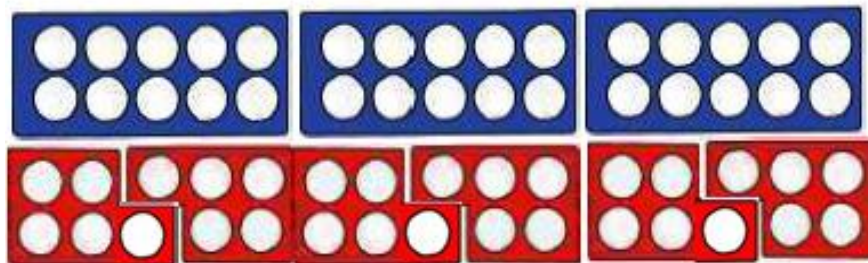
$$6 \text{ shared by } 2 = 3$$

Grouping:

Organise these children into groups of 3.



$$9 \text{ shared by } 3 = 3$$



How many 5s are there in 30?



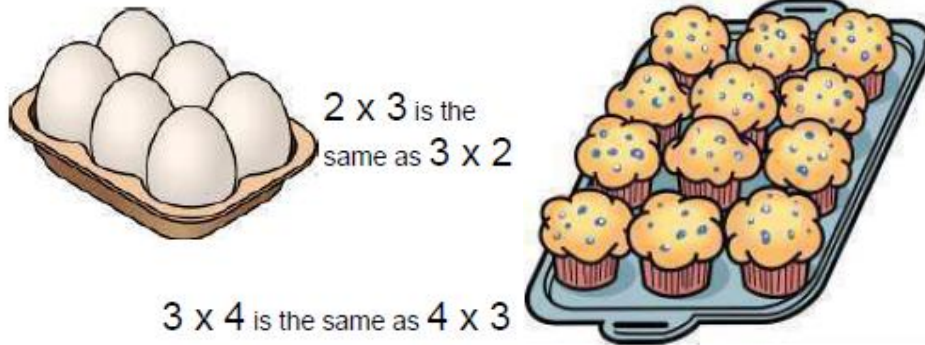
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Key Stage 1

Multiplication and Division

Year 1

Arrays will also be used to help children visualise and understand **multiplication** and **division**.



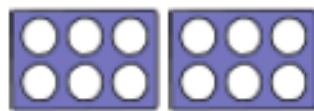
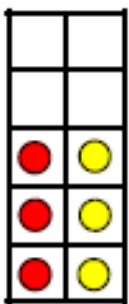
These everyday items, arranged in rows and columns, highlight an important multiplication fact to the children: that multiplication can be done in any order (**commutative**).



10 shared into 2 groups is 5.

Find and name a half of a quantity as two equal parts, or a quarter of a quantity as four equal parts.

Children should begin to explore finding simple fractions of quantities, such as $\frac{1}{2}$ and $\frac{1}{4}$. In particular, they will be expected to have some understanding of **doubling** and **halving**.



$$6 + 6 = 6 \times 2 = 12$$





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Key Stage 1

Multiplication and Division

Year 1



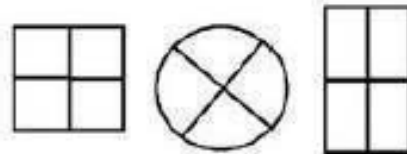
Half of 8 is 4.
 $8 \div 2 = 4$



Half of 4 is 2.
 $8 \div 2 = 4$

Children should be shown that **halving** and **dividing by 2** are the same.

Can you shade in one quarter of these shapes?



Four children share 12 toy cards equally. How many do they get each?



Vocabulary

Ones, groups, lots of, doubling repeated addition, groups of, lots of, times, columns, rows, longer, bigger, higher, times as (big, long, wide >etc), share, share equally, one each, two each, group, groups of, lots of, array.

Please note: that the \div and \times symbols are not in the year 1 curriculum. The language will be used and the children will work out divide and multiply calculations using concrete objects and pictorial representations but the abstract symbols will not be used until year 2 (unless the teacher feels that the children are ready during the summer term).



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Key Stage 1

Multiplication and Division

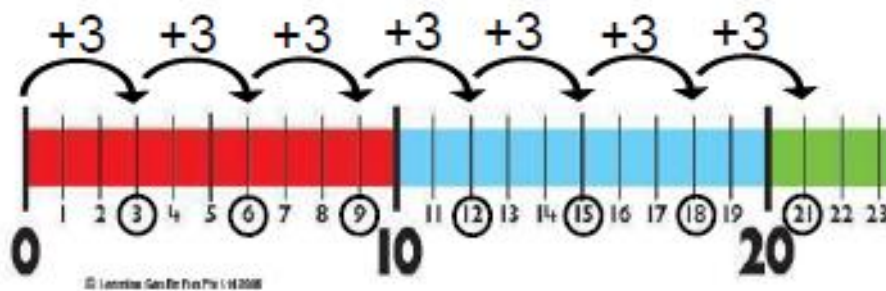
Year 2

Children are expected to:

Count in multiples of two, three, five and ten, both forwards and backwards.

Children will continue to practise counting in steps of 2, 5 and 10, so that they become increasingly fluent at doing so. They will also be expected to count backwards from a given number in these steps.

Furthermore, they must now be able to count up from 0 in threes.



A clock face can help support counting in 5s, whilst money (2p, 5p, 10p, 20p, 50p) can be a great way to practise counting in other intervals.



Knowledge of the 2 times table will enable the children to count up in 20s as well.

20

40

60

80



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Key Stage 1

Multiplication and Division

Year 2

Recall and use multiplication and division facts for the 2, 5 and 10 times tables.

The children should now be able to recall, from memory, multiplication facts for the 2, 5 and 10 times tables. They could use this knowledge to solve a variety of missing number problems:

$$7 \times 2 = \square$$

$$\square \times 2 = 14$$

$$7 \times \square = 14$$

$$\square \times \bigcirc = 14$$

Children should also start to recognise patterns in these different multiplication tables.

Which of these numbers are in the 5 times table?
How do you know?

72

45

53

80

69

95

5 times table	
1 x 5 =	5
2 x 5 =	10
3 x 5 =	15
4 x 5 =	20
5 x 5 =	25
6 x 5 =	30
7 x 5 =	35
8 x 5 =	40
9 x 5 =	45
10 x 5 =	50
11 x 5 =	55
12 x 5 =	60

10 times table	
1 x 10 =	10
2 x 10 =	20
3 x 10 =	30
4 x 10 =	40
5 x 10 =	50
6 x 10 =	60
7 x 10 =	70
8 x 10 =	80
9 x 10 =	90
10 x 10 =	100
11 x 10 =	110
12 x 10 =	120

The 5 times table is half the 10 times table. So to find 6×5 , I could work out 6×10 and then halve it!



An odd number can't be shared equally between two.

The use of Numicon can help children build internal, visual structures of numbers, and thus elicit a much more secure understanding of the difference between odd and even numbers.





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Key Stage 1

Multiplication and Division

Year 2

Calculate multiplication and division statements within the multiplication tables and write them using multiplication (x), division (\div) and equals (=) signs.

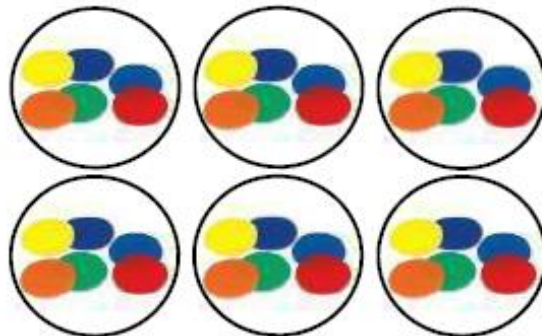
Multiplication:

Children should continue to use **grouping** or **number lines** to calculate other unknown multiplications, developing their understanding of multiplication as **repeated addition**.

$$6 \times 6 = ?$$

6 groups of 6

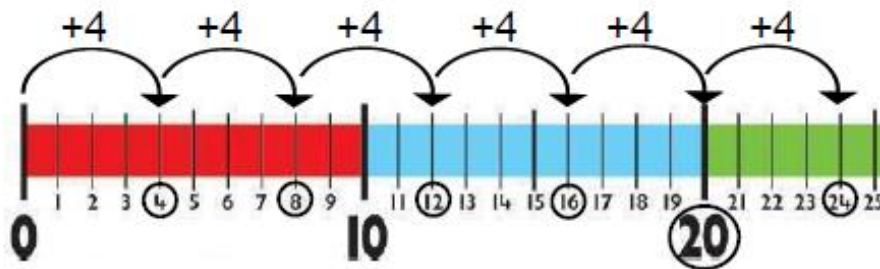
$$6 + 6 + 6 + 6 + 6 + 6 = 36$$
$$6 \times 6 = 36$$



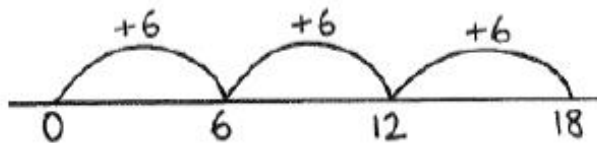
$$6 \times 4 = ?$$

6 lots of 4

$$4 + 4 + 4 + 4 + 4 + 4 = 24$$
$$6 \times 4 = 24$$



Some children may be able to use a blank number line to record their mental processes:



$$3 \times 6 = ?$$

3 lots of 6

$$6 + 6 + 6 = 18$$
$$3 \times 6 = 18$$



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Key Stage 1

Multiplication and Division

Year 2

As well as knowing doubles up to $10 + 10$, children should use these known facts to double bigger, 2-digit numbers.

So...

Double 16 = Double 10 + Double 6

The diagram illustrates the strategy for doubling 16. On the left, there is one ten-block (a vertical rectangle with 10 dots) and one one-unit block (a smaller vertical rectangle with 6 dots). This is followed by an equals sign. To the right of the equals sign, there are two ten-blocks and two one-unit blocks. Below this visual representation is a series of equations: $= 20 + 12$, $= 20 + 10 + 2$, $= 30 + 2$, and $= 32$.

$$\begin{aligned} &= 20 + 12 \\ &= 20 + 10 + 2 \\ &= 30 + 2 \\ &= 32 \end{aligned}$$

Children may want to use informal jottings when presenting this strategy:

The informal jotting shows the number 16 at the top. Two lines branch down from 16 to 10 and 6. Below 10, there is a vertical line with 'x2' to its left and '20' below it. Below 6, there is a vertical line with 'x2' to its right and '12' below it. To the right of '12' is an equals sign followed by '32'.

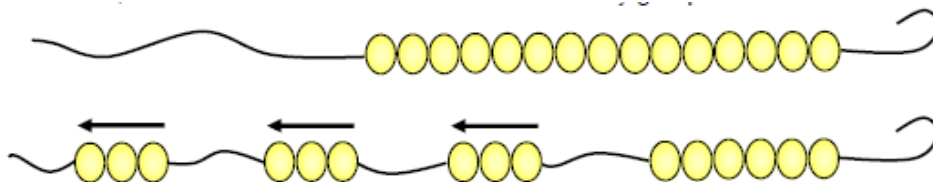
$$\begin{array}{r} 16 \\ \swarrow \quad \searrow \\ 10 \quad 6 \\ \begin{array}{l} \times 2 \\ | \\ 20 \end{array} \quad \begin{array}{l} | \\ \times 2 \\ 12 \end{array} \\ = 32 \end{array}$$

Division:

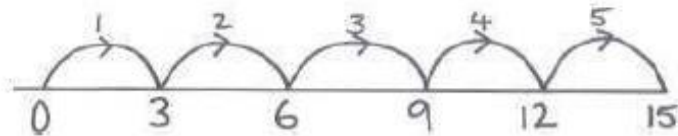
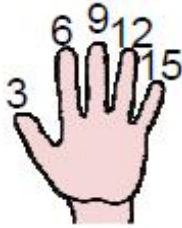
The principles of division should continue to be taught through **grouping** and **sharing**.

Grouping: When grouping, you count the number of groups you have made.

For instance, $15 \div 3 = 5$ can be viewed as 'How many groups of 3 are there in 15?'



Blank number lines, or even fingers, can support the same line of thinking:

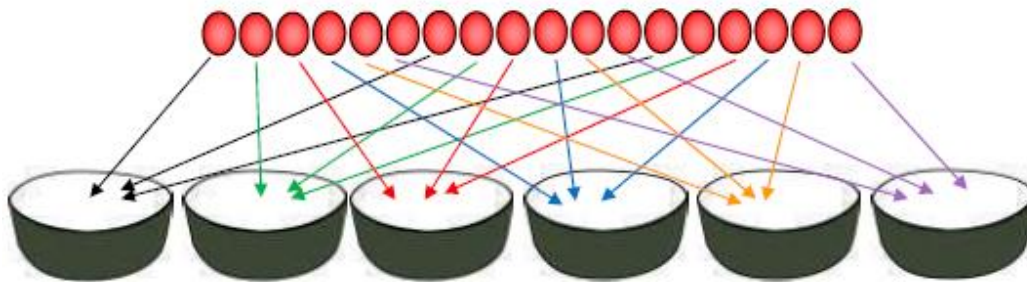


These strategies will also help children make the link between multiplication and division.

Sharing: When sharing, we count the number of objects in each group.

$$18 \div 6 = ?$$

18 shared between 6 makes 3 in each group.



Children should also be given the opportunity to find a half, a quarter and a third of shapes and quantities. Finding a fraction of a number should be related to sharing and division.

Show that multiplication of two numbers can be done in any order (commutative) but that division of one number by another cannot.

By creating, and looking at, arrays, children will begin to recognise the inverse relationship between multiplication and division.



$$3 \text{ groups of } 4 = 3 \times 4 = 12$$

$$4 \text{ groups of } 3 = 4 \times 3 = 12$$

$$12 \text{ divided into } 4 \text{ groups} = 12 \div 4 = 3$$

$$12 \text{ divided into } 3 \text{ groups} = 12 \div 3 = 4$$

Eventually, children should be able to answer questions like:

“If $12 \times 2 = 24$, what is $24 \div 2$?”



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Key Stage 1

Multiplication and Division

Year 2

Vocabulary

multiple, multiplication array, multiplication tables/facts, groups of, lots of, times, columns, rows, group in pairs, 3s D 10s etc, equal groups of, divide, \div , divided by, divided into, shared into, remainder.