Multiplication and Division

at Mareham Le Fen Church of England Primary School

A guide for parents

How can you help in early years?

- Matching up socks
- Counting in twos and tens
- Sharing objects equally between two people

How can you help in KS1?

- Counting backwards and forwards in tens, twos and fives (you could extend to threes).
- Sharing objects equally (more than two people).

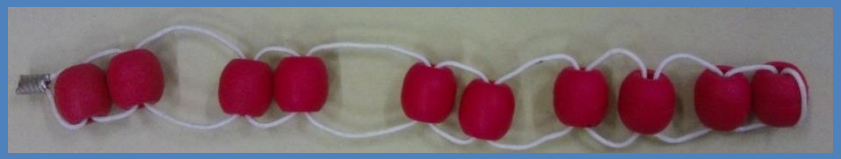
How can you help in KS2?

- Make sure they know all the times table facts to 12 x 12 with rapid recall
- Know all the corresponding division facts
- Practise doubling and halving
- Ask children what a quarter of something is

Children will experience practical opportunities involving equal sets or groups using a wide range of equipment.
They will begin to count in different multiples including twos, fives and tens.

Counting in fives and tens using hands

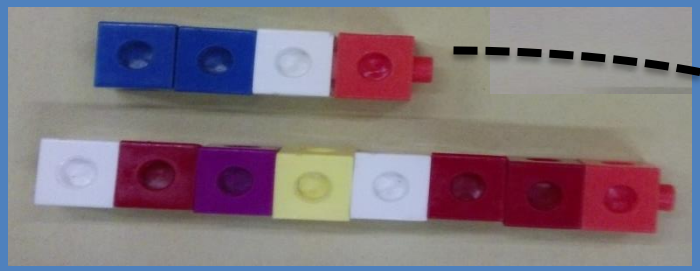
Counting socks in twos



Counting in twos using a bead string

X Multiplication x Stage1

Counting in tens using coins

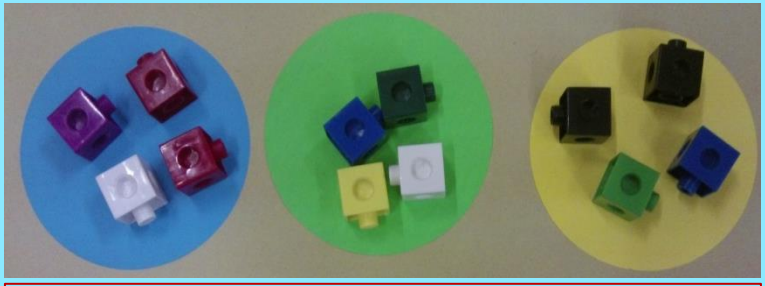


Double 4 is 8

Doubling

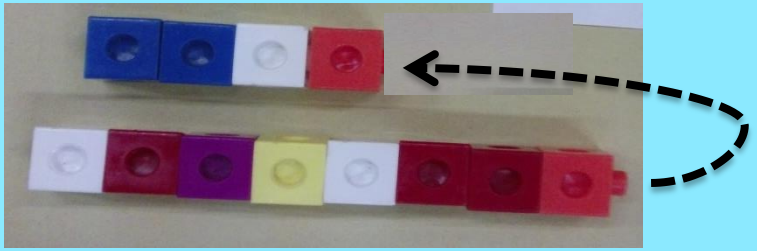
Children can begin to recognise and continue patterns of multiples using a range of practical resources.

Children will explore the language of sharing. They will experience practical activities sharing equally objects between a small number of people.
Children will also be introduced to grouping objects.

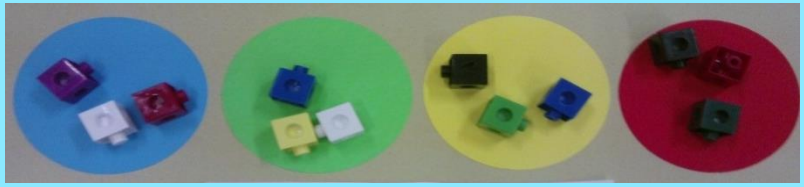


12 shared into 3 groups
12 shared equally into groups of 4

Half of 8 is 4



Halving



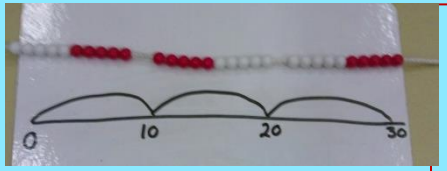
12 shared into 4 groups
12 shared equally into groups of 3

÷ Division ÷
Stage 1

6 stickers, how many people can have 2 each?

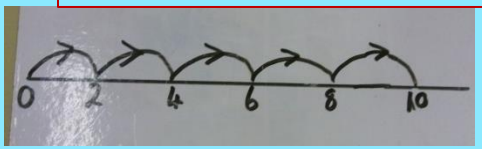
Children will begin to use the language of halving.

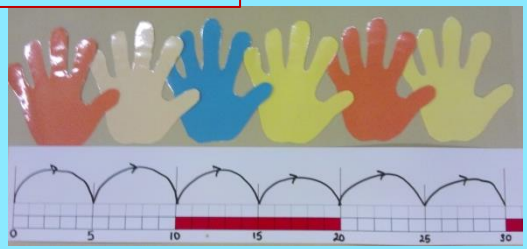
Count in twos, fives and tens



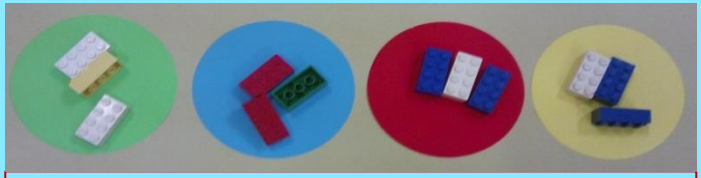
Children will be introduced to repeated addition in a variety of ways. By seeing different representations alongside one another they can begin to make connections between them.

x Multiplication x Stage 2





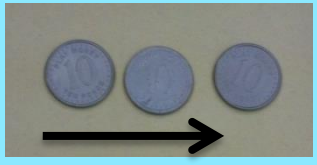
Counting in threes



Children will begin to arrange objects into equal groups to help their counting

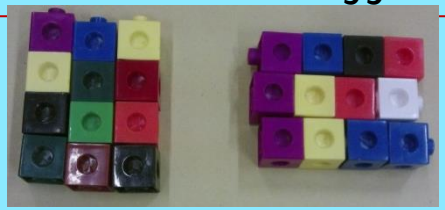
They will count in multiples and begin to relate this to multiplication through finger counting

'3' '6' '9' '12' '15'

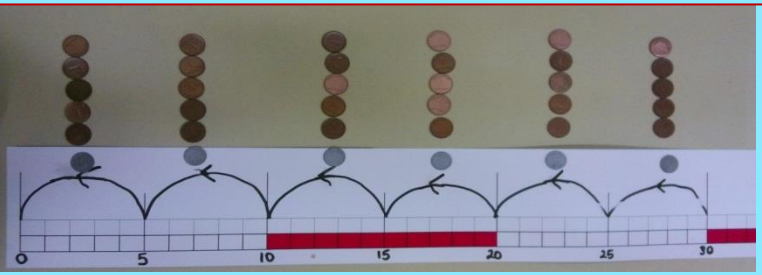


Counting in Tens from zero

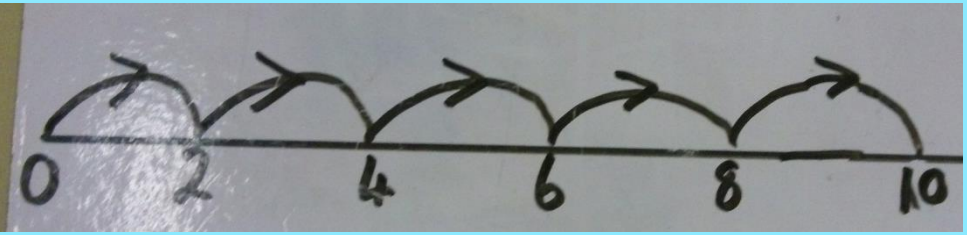
Children will be introduced to the array, using concrete equipment. They should explore arrays in the world around us, e.g. egg boxes, baking trays, wrapping papers; and use them to answer questions like 'How many eggs would we need to fill this egg box?'



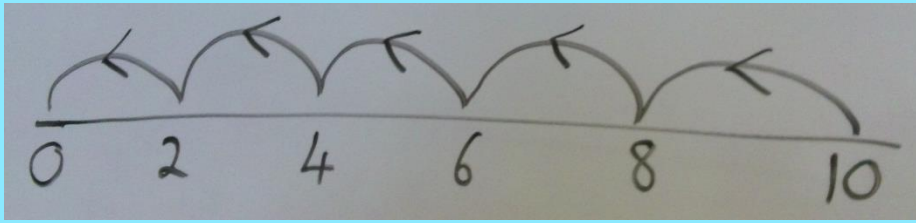
Children will relate the groupings of objects to repeated subtraction and begin to represent this using a number line whilst continuing to use concrete equipment.



Children will use their knowledge of counting up in multiples to solve division calculations and recognise that this is the inverse of multiplication.

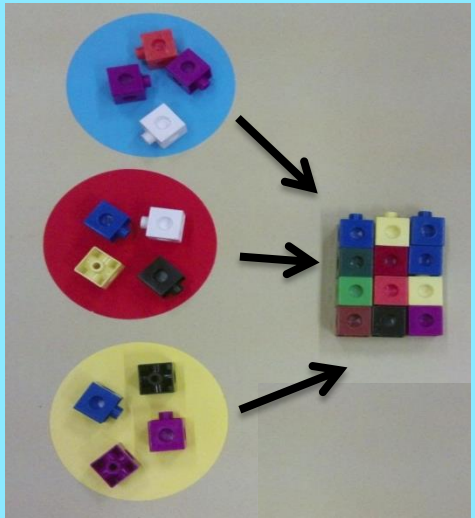


How many 2s are in 10?



How many 2s can we take away from 10?

÷ Division ÷ Stage 2

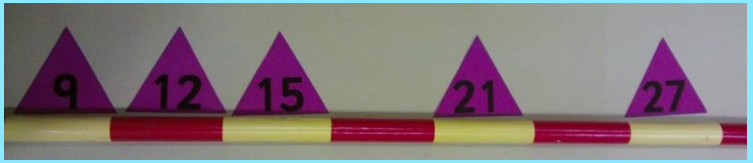


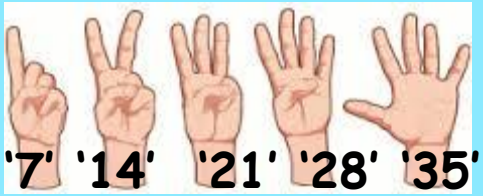
Children will continue to group and share equally using concrete equipment and will now begin to organise their groups into an array.

Children will continue to make links between division and fractions. They will be aware that the division sign is the equivalent to the fraction line.

$$1 \div 2 = \frac{1}{2}$$

Children will continue to count in multiples and relate this to multiplication through finger counting.





X Multiplication x Stage 3

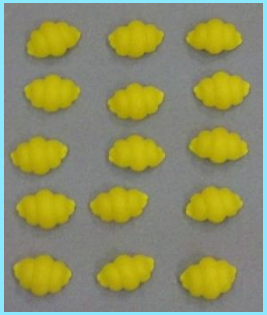
Representing 12

3 x 4 =12
4 x 3 = 12

2 x 6 = 12
6 x 2 = 12

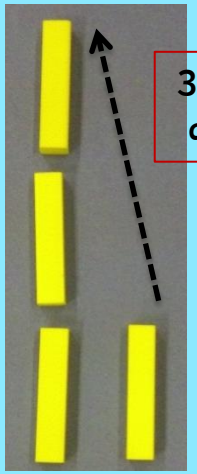
1 x 6 = 12
12 x 1 = 12

5 + 5 + 5 = 15



3+3+3+3+3=15

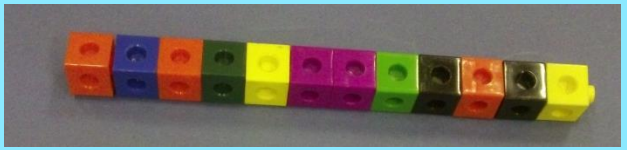
The children should be confident with their use of the language of scaling when talking about multiplication.



3 times as big

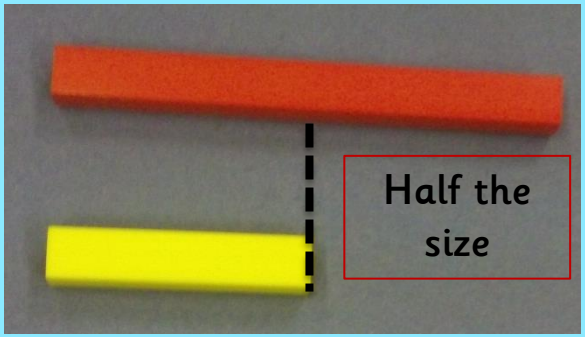
Children will continue to use their knowledge of counting in multiples to support the inverse of multiplication and repeated subtraction.

Representing 12



12 into __ equal groups gives __ in each group
12 into equal groups of __ gives __ groups

÷ Division ÷ Stage 3

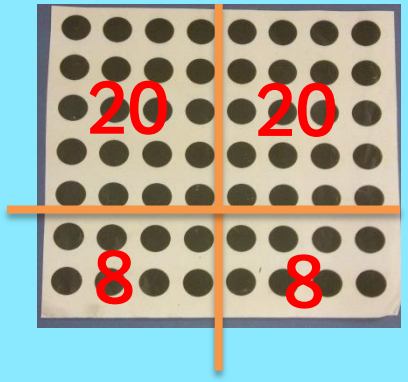


Children will build on their concrete arrays for division recognising the links between repeated subtraction and the invers of multiplication in order to derive the associated division facts. Children need to explore related division facts of a given number by making a variety of arrays and explaining what they show.

x Multiplication x Stage 4

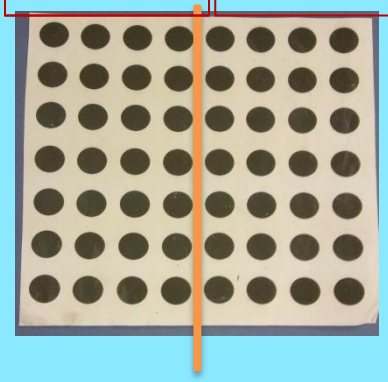
Children will explore practical arrays for larger numbers. They will think flexibly when working with arrays and think about repeated addition. They will look for 'friendly' numbers to help them calculate totals within arrays.

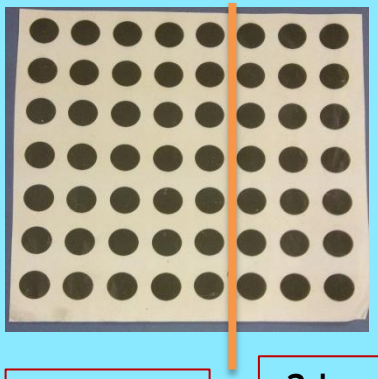
Thinking flexibly about 7 x 8



4 lots of 7

Doubled

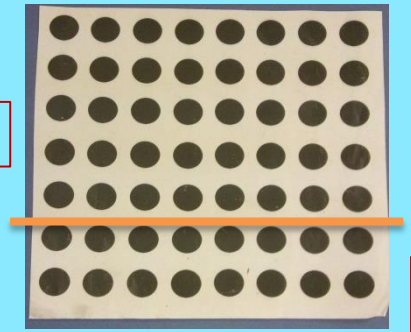




5 lots of 7

3 lots of 7

5 lots of 8



And another 8

E.g. for 7 x 8

Children may find counting in 7s or 8s tricky but they can look for 'friendly' numbers which are easier to calculate e.g. 4x5, 4x2, 4x5, 4x2.

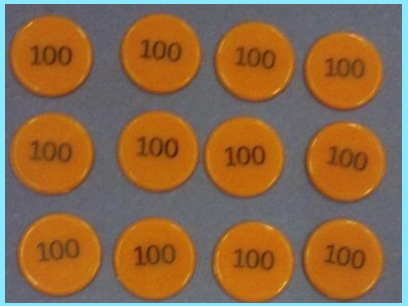
÷Division÷ Stage 4

Children will continue to organise groups into an array now working with larger numbers by either grouping or sharing.

120 ÷ 3

120 shared equally between 3 is 40.
120 shared equally between 4 is 30.
3 equal groups of 40 make 120.
4 equal groups of 30 make 120.

1200 ÷ 3



1200 shared equally between 3 is 400.
1200 shared equally between 4 is 300.
3 equal groups of 400 make 1200.
4 equal groups of 300 make 1200.

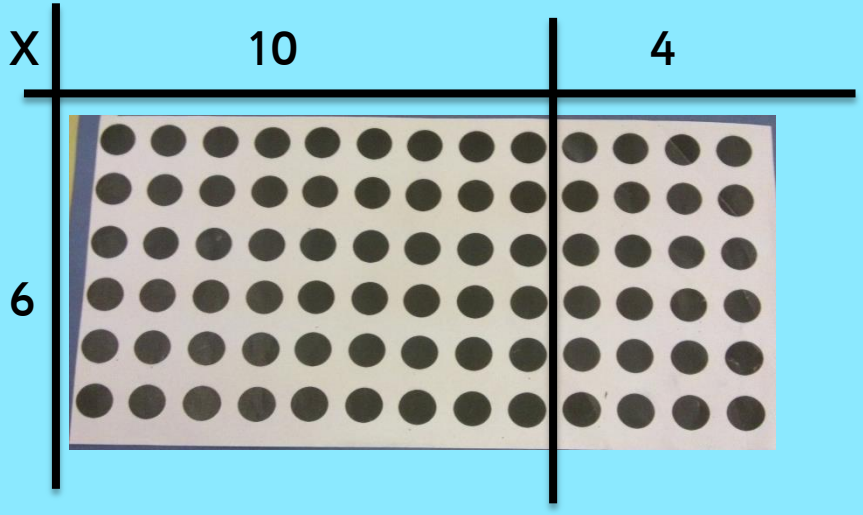
Children will be able to explain all the facts they know about a given array with no remainder.

They should be making arrays with equipment to establish 'How many in each group?' or 'How many groups?'.

Children should continue to experience the language of scaling (e.g. converting between units of measure).

x Multiplication x Stage 5

Children will continue to work with arrays, exploring larger numbers, leading into the grid method of multiplication.



To begin with, children will use the array in the grid lines. When they are ready they will move onto the grid showing the numbers only.

X	10	4
6	60	24

(6x 10) + (6 x 4)

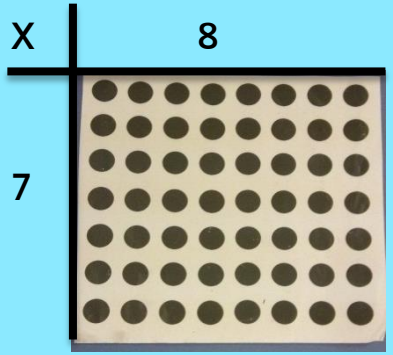
60 + 24

84

Throughout this stage, children should be encouraged to estimate an answer in order to check for reasonableness and this should become standard practice.

÷ Division ÷ Stage 5

Children will continue to work with concrete arrays, exploring known multiplication/division facts.



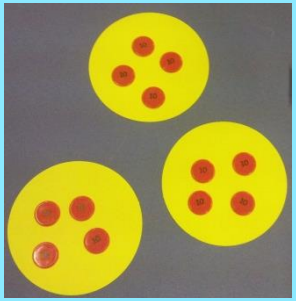
How many equal groups of 7 can I make?
(grouping is represented in the columns)
Or
If I put these into 7 groups, how many in each group?
(sharing between is represented in the rows)

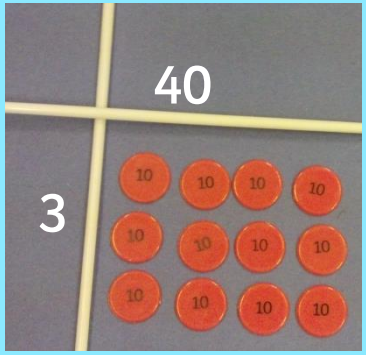
The children understand that the array within short division can be interpreted for both sharing between or equal groups of where the dot represents one.

Children will begin to use counters within an array to show the sharing model of division, using their knowledge of the principle of exchange where necessary. At this stage, children are encouraged to consider the links between the sharing model and fractions.

120 can be exchanged for 12 tens in order to make the array.

120 shared into 3 equal groups gives 40 in each group.

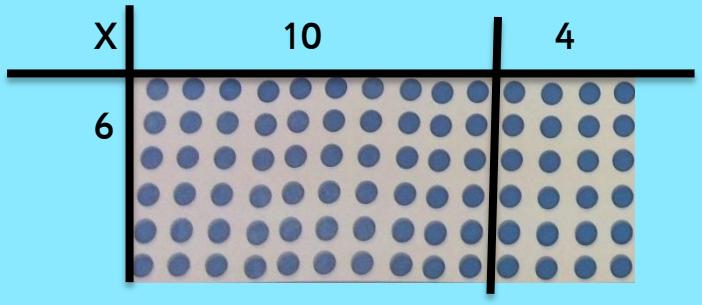


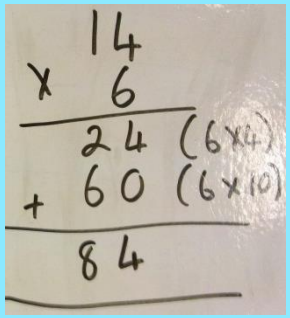


We can see 40 three times.
3 rows of 40, 1/3 of 120 is 30.
We can divide the array into three parts and there is 40 in each part.

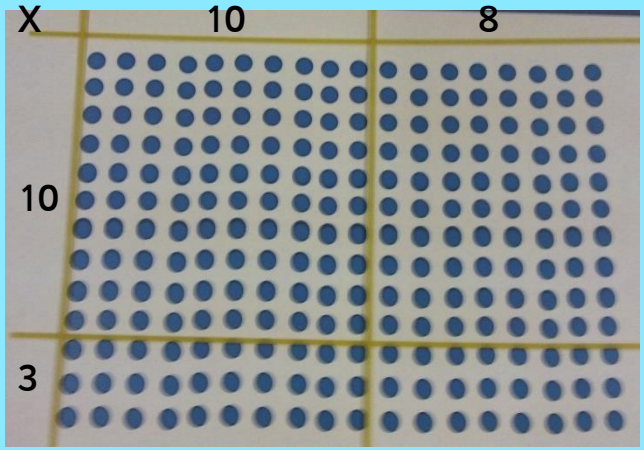
x Multiplication x Stage 6

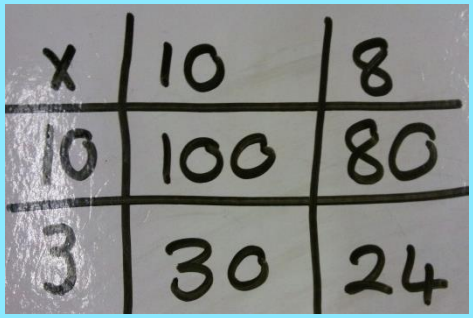
Children will now be secure in using the grid method for multiplying by one-digit numbers and will begin to explore the links between the grid method and the expanded method of short multiplication.

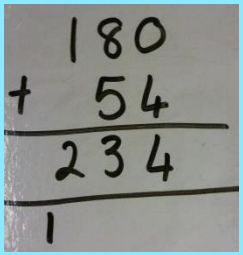




Children will also begin to explore the use of arrays and the grid method for multiplying by two-digit numbers.





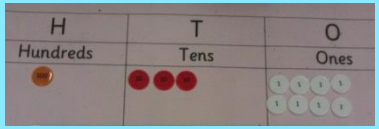


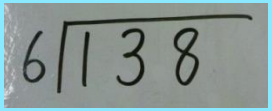
÷Division ÷ Stage 6

Children will work with equipment to divide any integer by a single digit divisor using their sound knowledge of the principle of exchange.

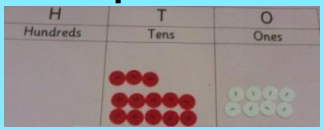
They will begin to be introduced to numbers that have remainders and will recognise and be able to talk about these when they do not 'fit' into the array.

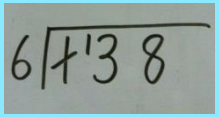
Step 1



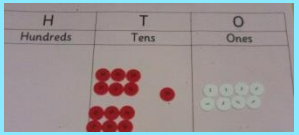


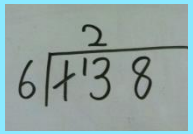
Step 2





Step 3





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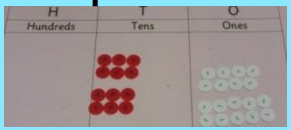
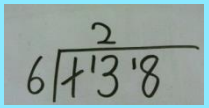
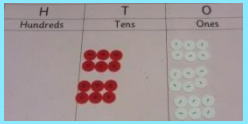
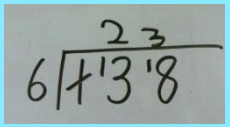
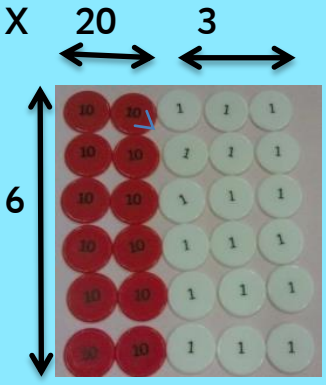


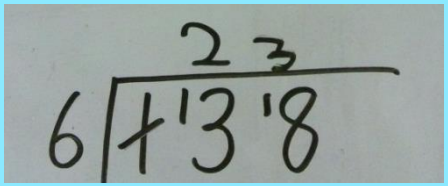


Step 5







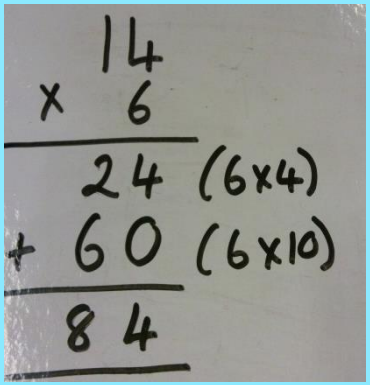


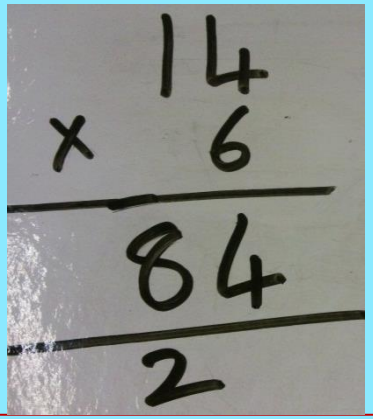
Children will be introduced to the notation of short division, linking with the principle of exchange and how this relates to the practical representations.

Children continue to be encouraged to consider the links between the sharing model and fractions.

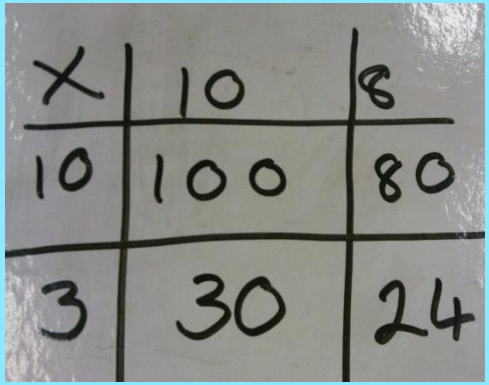
x Multiplication x Stage 7

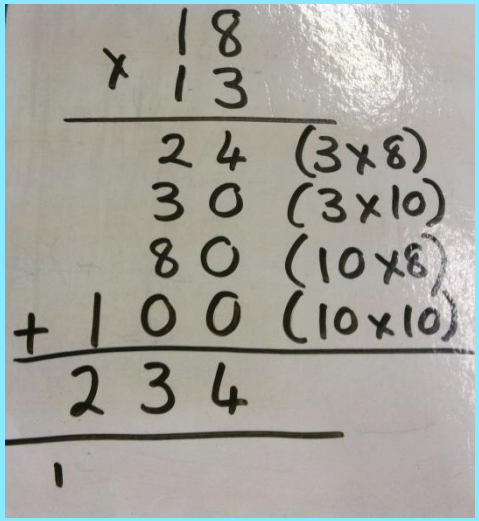
Children will now have a good understanding of the expanded short multiplication method and will begin to represent this as compact short multiplication for TO X O.





Children will be secure in using the grid method for multiplying by two-digit numbers and will begin to explore the links between the grid method and the expanded method of long multiplication.



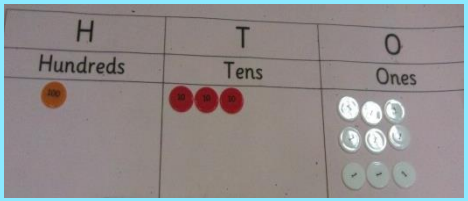


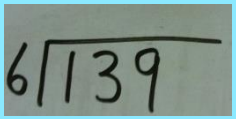
÷Division ÷ Stage 7

Children will now be secure in using short division for one-digit divisors with an integer quotient.

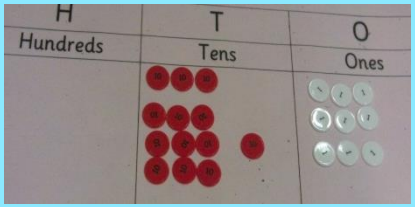
They will now begin to use the short division notation for calculations involving remainders.

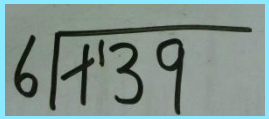
Step 1



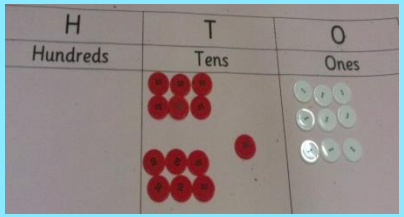


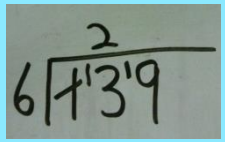
Step 2



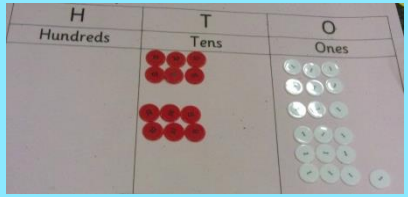


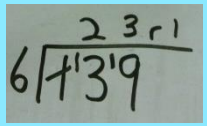
Step 3

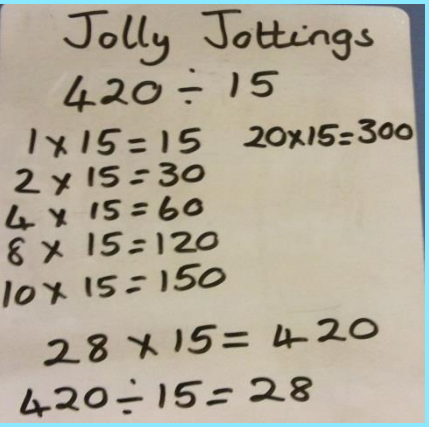




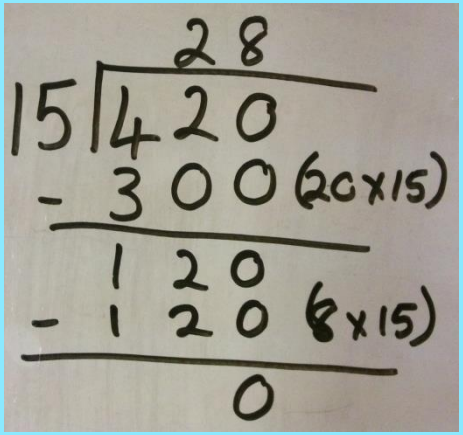
Step 4





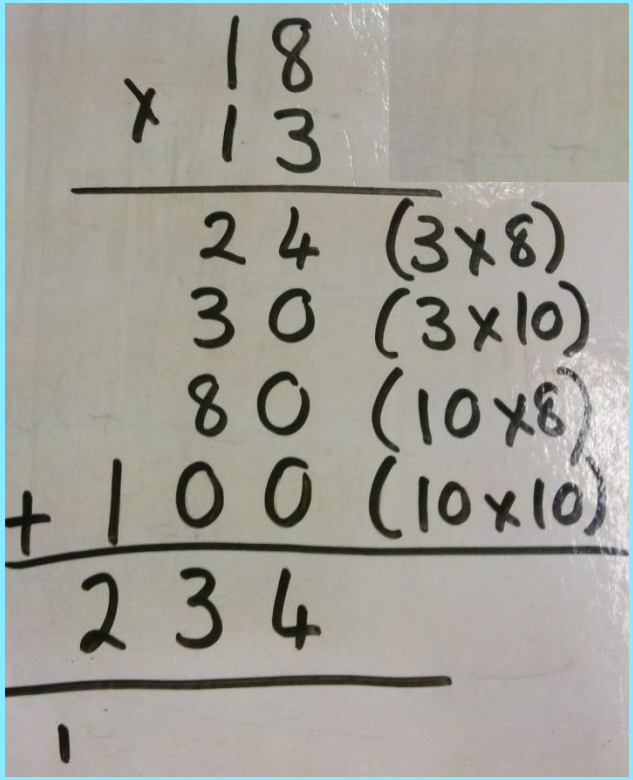


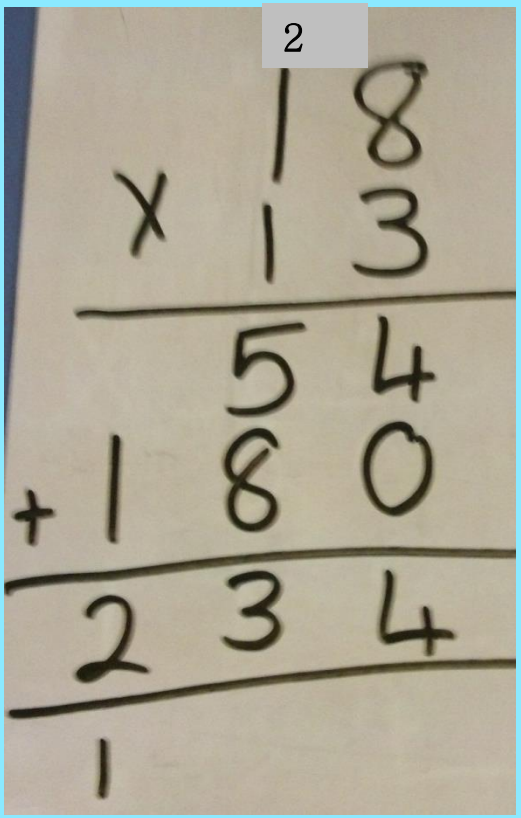
Children will also begin to explore the use of jottings (Jolly Jottings) of friendly numbers to support long division of calculations with 2-digit divisors.



× Multiplication × Stage 8

Children will now have a good understanding of the short multiplication method.

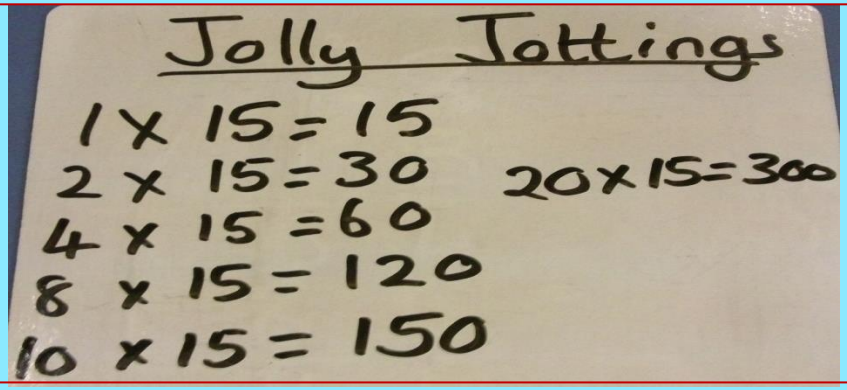




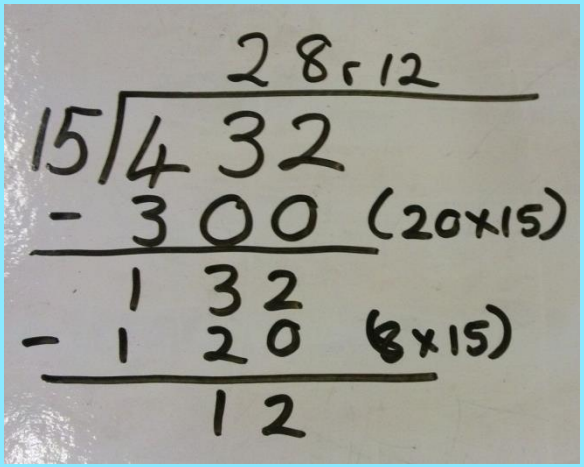
Children will now have a good understanding of the expanded long multiplication method and will begin to represent this as the compact long multiplication method.

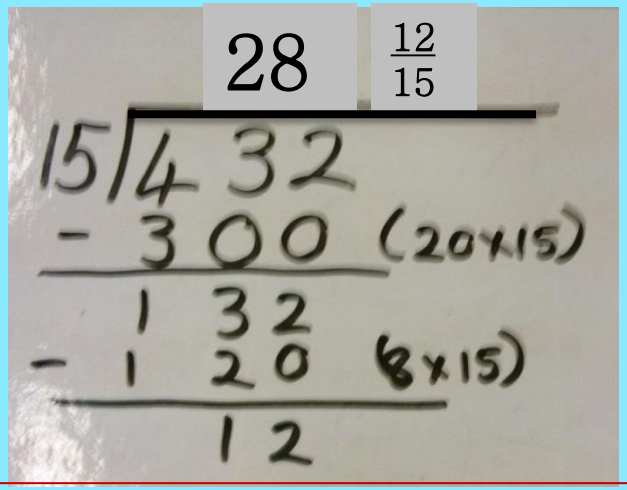
÷Division ÷ Stage 8

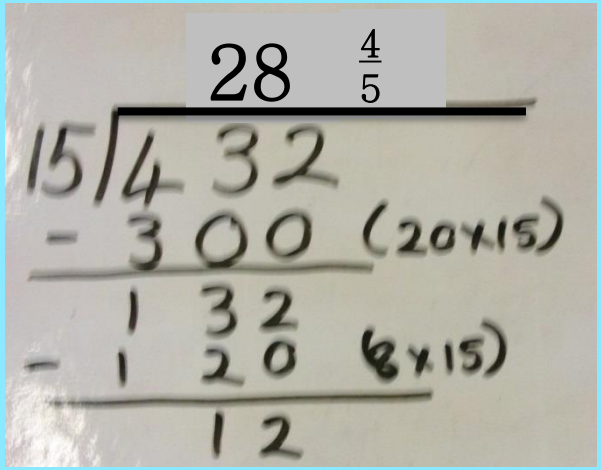
Children will now be secure in using short division for one-digit divisors and long division for two-digit divisors with an integer quotient.



They will now explore the use of long division for two-digit divisors which may include a remainder.







The children will begin to interpret remainders as whole number remainders, fractions or by rounding, as appropriate for the context.

Glossary

- Array: It is a set of objects or shapes that are arranged in a rectangle. They show how a multiplication is worked out.
- Divisor: the quantity by which another quantity is to be divided. E.g. for 12÷3, the divisor is 3
- Integer: a whole number
- Inverse: the opposite calculation
- Long Division: where you divide multi-digits by multi-digits. It requires several steps using both multiplication knowledge and subtractions.
- Long multiplication: is a multi-stage calculation that builds on from the grid method. It requires a final addition calculation.
- Multiples: a number that may be divided by another a certain number of times without a remainder.
- Number Line: used for counting on or back in small jumps of ones and twos(to aid mental arithmetic)
- One-digit: numbers: numbers 0 to 9
- Principle of exchange: swap ten ones for one ten or ten tens for one hundred and visa versa
- Quotient: the result of a division calculation.
- Repeated addition: adding the same number over and over again.
- Repeated subtraction: taking away the same number over and over again.
- Short Division: where you divide multi-digits by a single digit. It relies on mental arithmetic.
- Short multiplication: where you multiply a single-digit number by a multi-digit number. It is set out vertically.
- Two-digit number: numbers which have tens and ones in e.g. 34