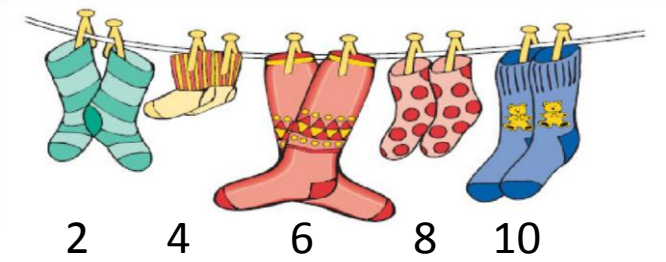
MULTIPLICATION

STAGE 1

SUMMARY –

Children should begin to be able understand that multiplication is repeated addition and grouping.

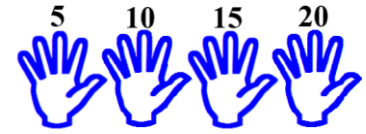
IMAGES



How many socks are there? How many socks altogether?

Counting objects or pictures. They are also being introduced to the language of multiplication e.g. lots of

Using finger to count in 5s



3 lots of 5 =

Children physically make sets or groups and then add them up by counting from 1 until all the objects have been used.

RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, Numicon, counting beads etc.

VOCABULARY

Groups of, lots of, times, array, altogether, multiply, count, multiple

KEY SKILLS

- Count in multiples of 2,5 and 10
- Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Make connections between arrays, number patterns and counting in twos, fives and tens
- Begin to understand doubling using concrete objects and pictorial representations

MULTIPLICATION

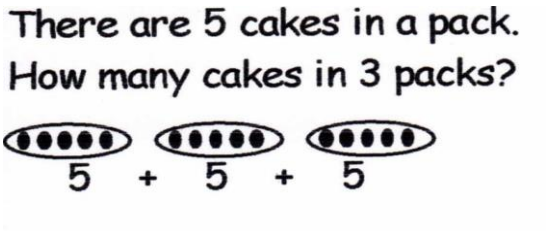
STAGE 2

SUMMARY –

Children should begin to solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

IMAGES

Adding groups of



3 x 5 =

Dots or tally marks are often drawn in groups. This shows how many 'lots of' there are.

Use Numicon to support multiplication. E.g. pick out 3 lots of 5 and get the children to count up.

Example of counting beads to find lots of.
E.g. 3 lots of 5=
Get the children to split the beads into 3 lots of 5 and count up.

RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, numicon, counting beads etc.

VOCABULARY

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times

KEY SKILLS

- Count in steps of 2,3 and 5 from zero, and in 10's from any number
- Recall and use multiplication facts from the 2, 5 and 10 multiplication tables including recognizing odds and evens.
- Write and calculate number statements using the x and = signs.
- Show that multiplication can be done in any order (commutative)
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts
- Pupils use a variety of language to discuss and describe multiplication.

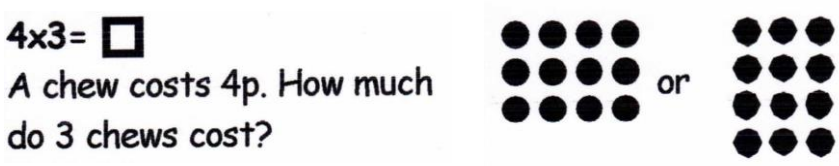
MULTIPLICATION

SUMMARY –

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 (×) and equals (=) signs
show that multiplication of 2 numbers can be done in any order (commutative) solve problems involving multiplication using materials, arrays, repeated addition, hops on a number line, mental methods, and multiplication including problems in contexts Make links between grouping and multiplication.

IMAGES

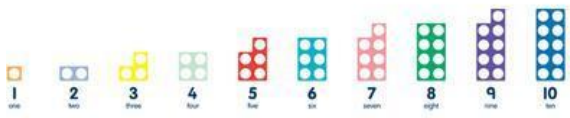
Representing multiplication by using/drawing sets or arrays



Drawing sets give children an image of the answer. It also helps them to see that the numbers in multiplication are reversible (eg. 3 x 4 = 12 and 4 x 3 = 12)

7 x 3 = can be solved by splitting 7 into 5 + 2.
3 lots of 5 can be found and added to 3 lots of 2.

Multiply 2 numbers using counting in steps of 2, 3, 5, and 10



Use Numicon to support multiplication. E.g. pick out 3 lots of 5 and get the children to count up.

RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, Numicon, counting beads, place value cards, Abacus games etc.

STAGE 3

VOCABULARY

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, ones, value

KEY SKILLS

- Recall and use multiplication facts for the 2,3,5,4,5 and 10 multiplication tables and multiply multiples of 10.
- Write and calculate number statements using the multiplication tables they know, including 2-digit x single digit, drawing upon mental methods, and progressing to reliable written methods.
- Solve multiplication problems, including missing number problems
- Develop mental strategies using commutatively (e.g.. 4 x 12 x 5 = 4 x 5 x 1 2 = 20 x 12 = 240)
- Solve simple problems in context, deciding which operations and methods to use
- Develop efficient mental methods to solve a range of problems e.g. using commutatively (4 x 12 x 5 = 4 x 5 x 12 = 20 x 12 = 240) and for mission number problems $?x\ 5 = 18,\ ?x\ ? = 32$

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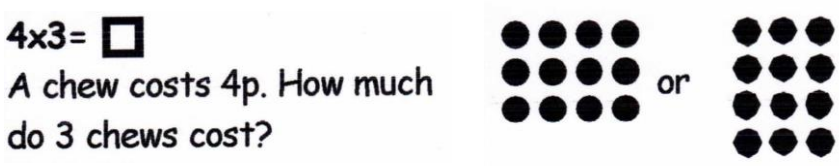

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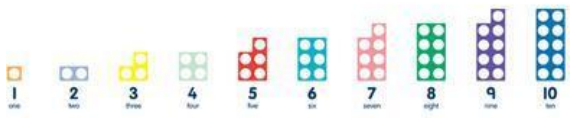

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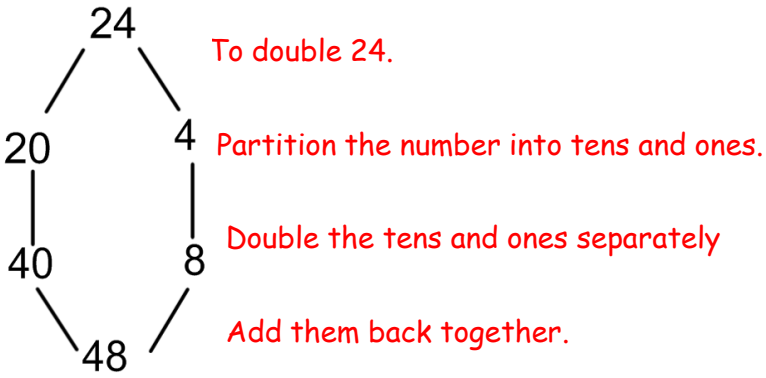
MULTIPLICATION

SUMMARY –

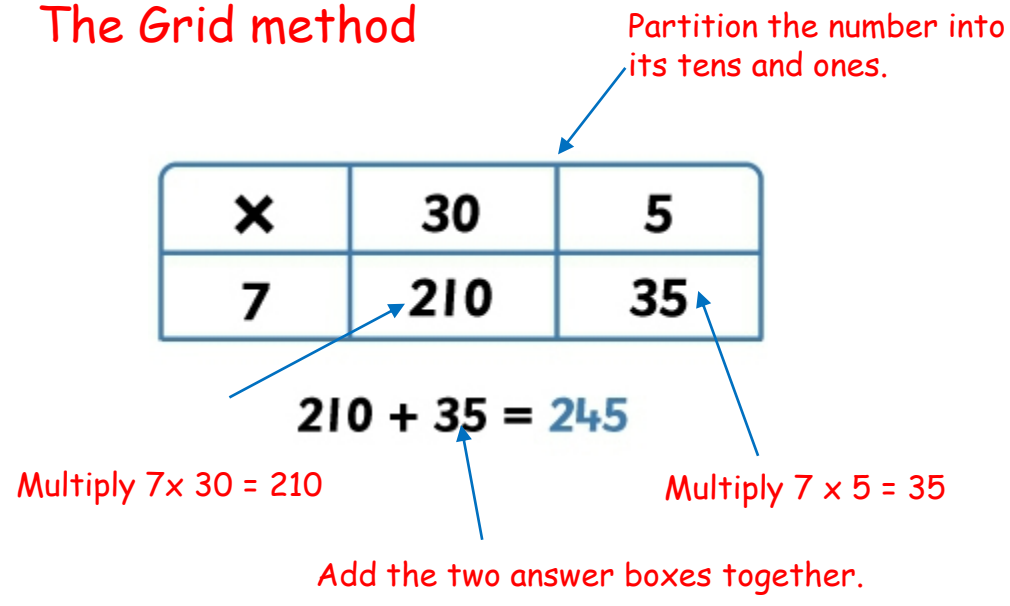
Children are taught to calculate then quickly recall their 2,3,4,5,8 and 10 times tables. They use partitioning to double and halve. They use known division facts to multiply mentally then move onto the grid method to multiply numbers beyond their known times tables facts.

IMAGES

Partitioning Involves splitting numbers up into TENS and ONES. It can be used to double or halve numbers.



The Grid method



RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, numicon, Hundred square, place value cards, Abacus. etc.

STAGE 4

VOCABULARY

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, sets of, inverse, double and practise

KEY SKILLS

- Recall and use multiplication and division facts for the 2,3,4,5,8 and 10 multiplication (through doubling, connect the 2,4 and 8s)
- Understand that multiplication is the inverse of division.
- Double numbers up to 100.
- Write and calculate mathematical statements for multiplication, using the multiplication tables that they know, including for two-digit numbers times one-digit numbers.
- Solve problems, in contexts, and including missing number problems, involving multiplications.
- Pupils develop efficient mental methods, for example, using multiplication and division facts
- Progress to using formal written methods, for example the grid method, to multiply numbers beyond know division facts.

MULTIPLICATION

STAGE 5

SUMMARY –

Recall multiplication and division facts for multiplication tables up to 12 × 12
•use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers. Solve problems involving multiplying

IMAGES

Introducing the grid method (multiplying by a 1 digit number)

6 x 124 = 124 books were sold. Each book cost £6.

124 is split into (or partitioned) into parts (100, 20, 4) and each of these is multiplied by 6. The three answers are then added together.

The layout on the example underneath particularly suits children who are left handed.
This method requires children to be good at knowing their multiplications and remembering to add up the the total at the end.

	H	T	1's
X	100	20	4
6	600	120	24

600+120+24= 744

H	T	1's	
100	20	4	X
600	120	24	6

RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, numicon, Hundred square, place value cards, Abacus. etc.

VOCABULARY

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partitioning, grid method, multiple, product, inverse, square, factor, integer, decimal, shot/long multiplication 'carry'

How many pots were taken?

KEY SKILLS

- Identify multiples and factors, using knowledge of multiplication tables to 12 x 12
- Solve problems where larger numbers are decomposed into their factors
- Multiply and divide integers and decimals by 10, 100 and 1000
- Recognise and use square and cube numbers and their notation
- Solve problems involving combinations of operations, choosing and using calculations and methods appropriately

MULTIPLICATION

SUMMARY –

Identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 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 up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
•recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
•solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes

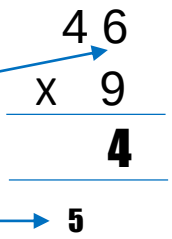
IMAGES

Introducing short multiplication

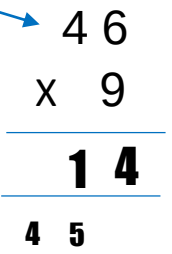
multiplying any whole number by a single digit numbe

4 6 x 9 =

Step 1: Multiply ONES/UNITS 6 x 9 = 54
Any new TENS add to the tens column

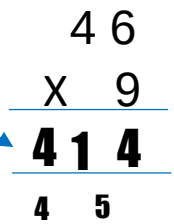


Step 2: Multiply the TENS 4 x 9 = 36
Add in any new TENS to the answer
36 + 5 = 41



Step 3: If you have more that 9 TENS then these must be changed into HUNDREDS

Step 4: Add the correct number of HUNDREDS into the Hundreds column



This method will initially be taught alongside the partitioning approach however it is both more economical and quicker than a partitioning method.
If asked a child should be able to explain this 5 represents 5 TENS

RESOURCES

Children should still have access to wide range of resources such as, numicon, Hundred square, place value cards, Abacus. etc.

STAGE 6

VOCABULARY

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, inverse, square, factor, integer, decimal, shot/long multiplication 'carry' tenths, hundredths, decimels.

KEY SKILLS

- Recall multiplication facts for all times tables up to 12 x 12 (as Y4 and Y5)
- Multiply multi-digit numbers, up to 4-digit x 2- digit using long multiplication
- Perform mental calculations with mixed operations and large numbers
- Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods
- Estimate answers using round and approximation and determine levels of accuracy
- Round any integer to a required degree of accuracy

MULTIPLICATION

SUMMARY –

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.

IMAGES

Multiplying decimals using the grid method

24 x 1.3 = _

X	20	4
1	20	4
0.3	6	1.2

T U .tenths
= 24
= 7 . 2
= 3 1 . 2

If I know 3 x 2 = 6,
I know, 0.3 x 2 = 0.6
and
0.3 x 20 = 6.

By multiplying by 10, 100, 1000 first (easier)

To help those children cope with the decimal numbers, an alternative approach still using the Grid Method would look like this:

Step 1: Turn the decimal into a whole number by multiplying it by 10, 100 or 1000

eg. 1.3 13 (multiplied by 10)

Step 2: Use the grid method 24 x 13 =

X	20	4	
10	200	40	= 240
3	60	12	= 72
			= 312

Step 3: Now do the opposite of step 1 (the inverse)
312 ÷ 10 = 31.2

STAGE 7 VOCABULARY

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, inverse, square, factor, integer, decimal, shot/long multiplication 'carry' tenths, hundredths, decimels.

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