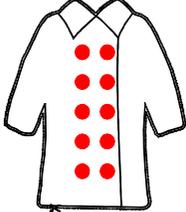
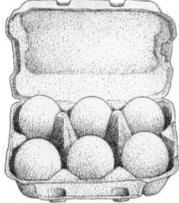


Hillside Primary Calculation Policy: MULTIPLICATION



FS	Calculating strand: MULTIPLICATION	Y1 MUST											
<p>SHOULD End of year expectations</p>	<ul style="list-style-type: none"> Observe number relationships and patterns in the environment and use these to derive facts (FS) Solve problems involving doubling (FS) Recognise, create and describe patterns (FS) 												
<p style="text-align: center;">Methods</p> <p>Sort real objects and pictures into sets of equal number while counting aloud.</p> <p>Use groups of children to count in pairs. For example: encourage children to share small outdoor equipment in pairs.</p> <p>Move along an outdoor number line, for example jumping forward in twos.</p> <p>Use washing lines for group activities or small number lines next to resources.</p> <p>Use puppets to demonstrate counting along a number track or number line.</p>		<p style="text-align: center;">Vocabulary</p> <p>zero, ten, twenty... one hundred, count, count (up) to count on (from, to) count back (from, to) count in ones, twos... tens..., how many times? pattern, estimate, double, sort, equal, sets of</p>											
<table border="1" data-bbox="76 810 1182 842"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td> </tr> </table> <p>22 - 36 Months Recite some number names</p> <p>30 - 50 Months Recite numbers in order to ten</p> <p>40 - 60 + Months Use familiar objects to create and recreate patterns Count objects to ten and beginning to count beyond ten Begins to identify own mathematical problems based on own interest</p> <p>Early Learning goals Solve problems involving doubling Count reliably with numbers from one to twenty</p>		1	2	3	4	5	6	7	8	9	10	<p style="text-align: center;">Test Questions</p> <div data-bbox="1205 646 1691 746"> <p>I will clap where a number is missing. 1 2 3 [one clap] 5 Tell me the missing number.</p> </div> <div data-bbox="1205 751 1691 852"> <p>I will clap where a number is missing. 2 4 6 [one clap] 10 Tell me the missing number.</p> </div> <div data-bbox="1205 863 1691 963"> <p>I will clap where a number is missing. 20 40 60 [one clap] 100 Tell me the missing number.</p> </div> <div data-bbox="1205 975 1691 1075"> <p>How many buttons are there on this coat? Count them in twos. Count them in fives.</p>  </div> <div data-bbox="1205 1321 1691 1358"> <p>Count the pairs of animals on the Ark.</p> </div> <div data-bbox="1706 624 2152 687"> <p>How are the eggs arranged in the egg box?</p> </div> <div data-bbox="1832 692 2018 895">  </div> <div data-bbox="1706 906 2152 970"> <p>How many eggs are there altogether in the box?</p> </div> <div data-bbox="1706 981 2152 1114"> <p>Count these pairs of socks. How many pairs are there? How many socks are there altogether?</p> </div> <div data-bbox="1706 1125 2107 1246">  </div> <div data-bbox="1706 1300 2152 1401"> <p>There are five paintbrushes in each jar. Count the paintbrushes.</p> </div>	
1	2	3	4	5	6	7	8	9	10				

Year 1

Number: MULTIPLICATION

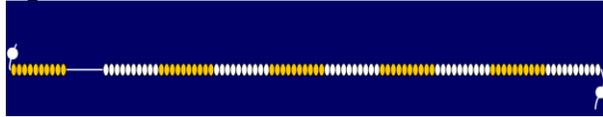
FS COULD / Y2 MUST

SHOULD

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

Methods

Use models and images e.g. beads to count on in 2s, 5s and 10s
 e.g. Count on in 2s from 8 to 20; count from 35 to 50 in 5s; count back in 10s from 80 to 50

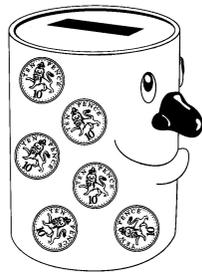


ITP Counting on and back

Count 2p coins, for example by tapping the coin twice on the table to remember that it is worth 2p.



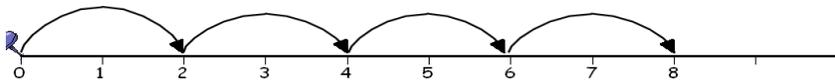
Ask questions such as: how many 2ps make 12p? What is the value of 4 2ps?



Listen as 10p coins are dropped in a tin one by one, keeping a count and saying how much money is in the tin.

There is 20p in the tin, listen as 5p coins are dropped in one by one. How much money is in the tin altogether?

Use a fully marked number line to represent multiplication as repeated addition, working towards an empty number line as children become more successful
 $2+2+2+2=8$



Use the 100 square to count on in 2s, 5s and 10s

What number comes next?
 Describe the pattern. Will 45 be in the pattern?

Why?

Vocabulary

problem, solution, calculate, calculation, number sentence, answer, method, explain, money, coin, pence, penny, pound, pay, change, buy, sell, price, spend

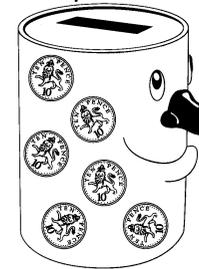
number sequences, zero, ten, twenty... one hundred count (up) to ,count on (from, to), count in ones, twos... tens... more, many, odd, even, how many times? pattern, pair, multiple

Test Questions

Count five hops of two along this number line.

What number will you reach?
 [oral question]

How much money is in the money box?



KS1 2001 level 2c

Write the next number in this sequence:

Five, ten, fifteen, twenty ...

KS1 2001 level 2c [oral]

How many  coins make 20p?

KS1 2005 level 2b

The numbers in the shaded squares make a sequence. Continue the sequence by shading more squares.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35

KS1 2001 level 2c

There are 10 crayons in each box.



How many crayons are there altogether?

KS1 2000 level 2c

How many pairs of socks are there?



KS1 2000 level 2b

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Year 2	Number: MULTIPLICATION	Y1 COULD / Y3 MUST
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SHOULD End of year expectations in bold	<p>Recall multiplication facts for the 2, 5, 10 times tables, including recognising even and odd numbers</p> <p>Calculate mathematical statements for multiplication and write them using the multiplication (x) sign and the equals(=) sign</p> <p>Show that multiplication can be done in any order</p> <p>Solve problems involving multiplication, including problems in contexts</p>
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Methods

Strategies to support Knowing and Using Number Facts Objectives

Establish multiplication and division facts for the **2, 5 and 10 times-tables** by counting in twos, fives and tens. If necessary, use practical apparatus, counting or drawing to support pupils.

Respond to questions such as: *Count on seven twos. Where do you finish? What are eight fives?*

Chant the tables in unison, using rhythm and the patterns of words to help them to commit facts to memory. Children say: *One five is five. Two fives are ten. Three fives are fifteen ...so that the answer to How many 5s make 30? relates closely to the wording.*

Support chanting of tables with a counting stick or number line. This helps to establish the relationship between the increasing steps and corresponding products.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	15	20	25	30	35	40	45	50

Written Methods

Use an **empty** number line or an array to represent multiplication as repeated addition

$5 \times 3 =$ "5 multiplied by three" or "5 times 3" or "5, three times"

Vocabulary

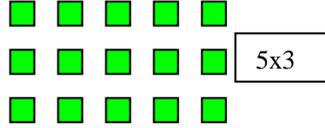
calculate, calculation, inverse, answer, explain, method, sign, operation, symbol, number sentence, number line, mental calculation, written calculation, informal method, jottings, diagrams, pictures, images

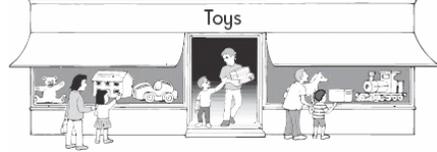
lots of, groups of ,x sign, times, multiply, multiplied by ,multiple of, once, twice, three times ,four times, five times... ten times... times as (big, long, wide and so on) ,repeated addition, array ,row , column

double,

Test Questions

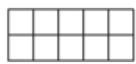
<p>There are 4 apples in each pack. Mrs Pullen buys 3 packs of apples. How many apples does she buy? KS1 2001 level 2b</p> <p>----- -----</p> <p>Ella's dad washes some cars. He uses 12 buckets of water. Each bucket has 5 litres of water.</p> <p>How many litres of water does he use altogether? KS1 2004 level 2a</p>	<p>Draw rings around all the multiples of 5. 45 20 54 17 40 KS1 2005 level</p> <p>----- -----</p> <p>Write the missing number in the box. <input type="text"/> $\times 5 = 50$ KS1 2001 level 2b</p> <p>----- -----</p> <p>Circle two numbers that add to make a multiple of 10. 11 12 13 14 15 16 17 18 19 KS2 2005 level 3 [adapted]</p>
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 <p style="margin-left: 20px;">to</p> <p style="margin-left: 100px;">Recognise the use of symbols such as \square or \triangle</p> <p style="margin-left: 100px;">\triangle stand for unknown numbers or signs.</p> <p style="margin-left: 100px;">$\times 5 = 25$ $5 \square \times =$</p>	<p style="text-align: center;">-----</p> <p style="text-align: center;">$4 + 4 + 4 + 4 + 4 = 20$</p> <p style="text-align: center;">Write this addition fact as a multiplication fact.</p> <p style="text-align: center;">_____ \times _____ = _____</p> <p style="text-align: center;">TIMSS Grade 4 1995</p> <p style="text-align: center;">-----</p> <p style="text-align: center;">-----Write the missing number in the box.</p> <p style="text-align: center;">$5 \times 4 = 10 \times \square$ (KS1 2002 level 3)</p>																		
	<p style="text-align: center;">-----</p> <p style="text-align: center;">Match each addition to a multiplication.</p> <p style="text-align: center;">One is done for you</p> <table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; padding: 2px;">$4 + 4 + 4 + 4 + 4$</td> <td style="padding: 0 10px;">-----</td> <td style="padding: 2px;">3×4</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">$3 + 3 + 3$</td> <td style="padding: 0 10px;">-----</td> <td style="padding: 2px;">6×5</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">$6 + 6 + 6 + 6 + 6$</td> <td style="padding: 0 10px;">-----</td> <td style="padding: 2px;">3×3</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">$6 + 6 + 6 + 6$</td> <td style="padding: 0 10px;">-----</td> <td style="padding: 2px;">6×4</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">$6 + 6 + 6$</td> <td style="padding: 0 10px;">-----</td> <td style="padding: 2px;">4×5</td> </tr> <tr> <td></td> <td style="padding: 0 10px;">-----</td> <td style="padding: 2px;">6×3</td> </tr> </table> <p style="text-align: right;">KS1 2004 level 3</p>	$4 + 4 + 4 + 4 + 4$	-----	3×4	$3 + 3 + 3$	-----	6×5	$6 + 6 + 6 + 6 + 6$	-----	3×3	$6 + 6 + 6 + 6$	-----	6×4	$6 + 6 + 6$	-----	4×5		-----	6×3
$4 + 4 + 4 + 4 + 4$	-----	3×4																	
$3 + 3 + 3$	-----	6×5																	
$6 + 6 + 6 + 6 + 6$	-----	3×3																	
$6 + 6 + 6 + 6$	-----	6×4																	
$6 + 6 + 6$	-----	4×5																	
	-----	6×3																	

Year 3	Number: MULTIPLICATION	Y2 COULD / Y4 MUST
<p>SHOULD</p> <p>End of year expectations in bold</p>	<p style="color: red;">Recall and use the multiplication facts for the 3, 4, 8 times tables</p> <p style="color: red;">Calculate mathematical statements for multiplication using the tables that they know, including for two digit numbers times one digit numbers, using mental and progressing to formal written methods</p> <p style="color: red;">Solve problems including missing number problems, involving multiplication</p>	
	<p style="text-align: center;"><u>Written Methods</u></p> <p style="color: red;"><u>Knowing and using Number Facts</u></p> <p style="color: red;">Know by heart the 2, 3, 4, 5, 6, 8 and 10 multiplication facts and use them to solve questions like: If I have three 5p coins, how much money do I have? How many sides do six triangles have? There are 20 legs. How many zebras is this?</p> <p style="color: red;">Count on and back from zero in steps of 2, 3, 4, 5, 6, 8 and 10 to answer questions like: What is 4 multiplied by 6? How many 3s make 21?</p> <p style="color: red;">Generate tables such as the 6 times-table from the 3 times-table by doubling, and generate other tables, in this case the 12 times-table, by doubling again. Use facts in the 2 times-table to derive the 20 times-table by multiplying by 10.</p> <p style="color: red;">Recognise multiples of 2, 5 and 10 up to 1000.</p> <p style="color: red;">Research questions such as: <i>What digits can multiples of 2 end in? What about multiples of 3, multiples of 4?</i> Investigate by joining the last digits of each multiple in order on a digit wheel. For example, the last digits of the multiples of 2 (2 , 4 , 6 , 8 , 10 , 12 , 14 , 16 , 18 , 20 , 22) form this pentagon:</p> <div style="text-align: center;">  </div> <p style="color: red;">Record the outcomes of this enquiry by recording in a table the number, the last digits of its multiples and the shape that they form on the digit wheel. Use the results to answer</p>	<p style="text-align: center;"><u>Vocabulary</u></p> <p style="color: green;">problem, solution, calculate, calculation, inverse, answer, method, explain, predict, estimate, reason, operation, symbol, number sentence, equation, mental calculation, written calculation, informal method, jottings, number line, pound (£), penny/pence (p), note, coin, units of measurement and their abbreviations</p> <p style="color: green;">lots of, groups of ,x sign, times, multiplication multiply, multiplied by, multiple of, product, once, twice, three times, four times, five times... ten times...</p> <p style="color: green;">times as (big, long, wide and so on) ,repeated addition</p> <p style="color: green;">array , row, column, double</p>
	<p style="text-align: center;"><u>Test Questions</u></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%; padding: 5px;">  <p>The shop is open for 6 days each week. It is open for 8 hours each day. How many hours is the shop open each week? Show how you work it out.</p> </div> <div style="width: 35%; padding: 5px;"> <p>Write the answer.</p> <p>$24 \times 4 =$</p> <p>KS1 2005 level 3</p> <p>-----</p> <p>-----</p> <p>A bus ticket costs 25p. How much will 5 of these tickets cost?</p> </div> </div>	

questions such as: Can 113 be a multiple of 5? How do you know? Can a multiple of 4 ever end in a 7?

Understand the relationship between multiplication and division. For Example state two multiplication sentences and two division sentences that relate to a particular array, for example:

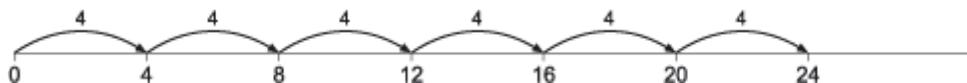


$5 \times 2 = 10, 2 \times 5 = 10$

$10 \div 2 = 5, 10 \div 5 = 2$

Written Methods

Review multiplication as repeated addition by counting hops on a number line. For example, find 6 fours by making 6 hops of 4.



Use practical and informal methods to solve simple $TU \times U$ calculations. For example, to find 12×5 understand that 10 fives are 50 and add on another 2 fives to make 60.



Explain how to multiply a number by 10 or 100. Extend this to multiply one-digit numbers by multiples of 10, recording methods informally, for example:

$3 \times 50 = 3 \times 5 \times 10$
 $= 15 \times 10$
 $= 150$

Record working using informal methods: number line and grid method. Eg. 13×3

KS1 2005 level 3

Circle three numbers that add to make a multiple of 10.

11 12 13 14 15 16 17 18 19

KS2 2005 Paper A level 3

Calculate 13×3 .

Y3 optional test 2003 Paper A level 3

Write a number in each box to make this correct.

$\xrightarrow{\times 2}$ $\xrightarrow{\div 2}$ KS1 '05 L3

KS1 1998 level 3

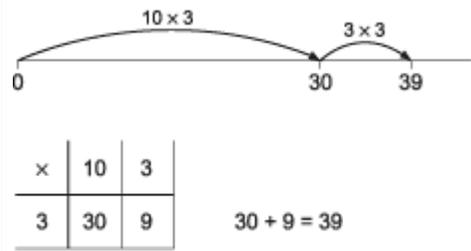
What is four multiplied by nine?

KS2 2005 Mental test level 4

Multiply seven by six.
KS2 2003 Mental test level 4

Write what the missing numbers could be.

$\square \times \square = 150$
Y4 optional test 2003 Paper A level 3



During year 3 children should be introduced to the formal written method of short multiplication, see appendix to the programme of study p46 2 digit by 1 digit

$$\begin{array}{r}
 24 \\
 \times 6 \\
 \hline
 144 \\
 2
 \end{array}$$

Answer 144

Year 4	Number: MULTIPLICATION	Y3 COULD / Y5 MUST
SHOULD End of year expectations in bold	<ul style="list-style-type: none"> • Recall multiplication facts up to 12x12 • Use place value and known and derived facts to multiply mentally • Multiply two-digit and three-digit numbers by a 1 digit number using the formal written layout • Solve problems involving multiplying 	
<u>Written Methods</u>		<u>Vocabulary</u> calculate, calculation, equation, operation, symbol, invrecognise factor pairs erse, answer, method, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius 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)
<u>Knowing and Using Number Facts</u> Count on and back from zero in steps of 2, 3, 4, 5, 6 and 10 to answer questions like: <i>What is 6 multiplied by 8?</i> and <i>How many 4s make 36?</i> Derive and recall multiplication facts for the 2, 3, 4, 5, 6 and 10 times-tables and state corresponding division facts. Use these facts to answer questions like: <i>A box holds 6 eggs.</i>		

How many eggs are in 7 boxes? Leila puts 4 seeds in each of her pots. She uses 6 pots and has 1 seed left over. How many seeds did she start with?

Develop knowledge of multiples of 7. Respond to problems such as: There are exactly 7 weeks until my birthday. How many days is that? There are 56 days until my holiday. How many weeks do I have to wait? Recognise that previously learned facts can help to remember multiples, e.g. a multiple of 7 is the sum of a multiple of 3 and a multiple of 4.

Investigate patterns and relationships. For example, add together the digits of any multiple of 3 and generalise to help recognise two-and three-digit multiples of 3.

Using the 'Number dials' ITP use knowledge of number facts and place value to derive new facts; for example, by knowing $8 \times 4 = 32$ derive the answers to 80×4 and $320 \div 4$.

Multiply and divide numbers up to 1000 by 10 and then 100. Understand and can explain that when a number is divided by 100 the digits of the number move two places to the right and when a number is multiplied by 100 the digits move two digits to the left..

Apply knowledge of multiplying by 10 and 100 to solve problems involving scaling, such as: *A giant is 100 times bigger than you. How wide is the giant's hand span? How long is the giant's foot?*

Written Methods

Children in year 4 will be taught the short method for multiplication to multiply 2 and 3 digit numbers by 1 digit

$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \\ 2 \end{array}$	$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ 21 \end{array}$
------------------------------------------------------------------	---------------------------------------------------------------------

Answer 144

answer 2394

repeated addition ,array row, column double, factor inverse

Test Questions

Sita worked out the correct answer to 16×5 .

Her answer was 80.

Show how she could have worked out her answer.

KS1 2004 level 3

What is fifty-six multiplied by ten?

KS2 1997 Mental test level 3

What is four multiplied by nine?

KS2 2005 Mental test level 4

Multiply seven by six.

KS2 2003 Mental test level 4

Circle all the multiples of 8 in this list of numbers.

18 32 56 68 72

KS2 2002 Paper A level 4

Calculate 58×6 .

KS2 1998 Paper A level 4

Write in the missing numbers.

$4 \times \square = 200$

KS2 2002 Paper A level 3

Here is a number sentence.

$4 \times \square < 17$

Which number could go in the box to make the sentence true?

A 4

B 5

C 12

D 13

TIMSS 1995 Grade 4

Write a calculation that you could do to check that the answer to 53×4 is 212.

Write in the missing digit.

$\square 7 \times 9 = 333$

KS2 1996 Paper A level 4

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Year 5	Number: MULTIPLICATION	Y4 COULD / Y6 MUST
<p>SHOULD</p> <p>End of year expectations in bold</p>	<ul style="list-style-type: none"> • multiply numbers mentally drawing upon known facts • multiply numbers up to 4 digits by a one digit number using the a formal written method, including long multiplication for 2 digit numbers • Multipliy whole numbers by 10 100 • Recognise square and cube numbers • Solve problems involving all four operations • Solve problems involving scaling 	
<u>Written Methods</u>		<u>Vocabulary</u>
<p><u>Knowing and Using Number Facts</u></p> <p>Continue to secure speed of recall of multiplication tables to 12×12. Use this knowledge to recall, for example, 8 squared or the seventh multiple of 8. Derive families of calculations such as 8×3, 80×3, 800×3, 80×30, 80×300.</p> <p>Identify the factors of a two-digit number such as 56 by listing its factor pairs: 1 and 56, 2 and 28, 4 and 14, 8 and 7. Establish that 70 and 8, and 7 and 80, are factor pairs of 560. Use lists of factors to find common factors of two numbers such as 36 and 54. Find common multiples of two numbers such as 8 and 12, identifying 24, 48 and 72 as numbers in a sequence of common multiples.</p> <p>Multiply and divide whole numbers and decimals by 10, 100 and 1000, describing the effects. Recognise, for example, that 3400 is 100 times larger than 34 and that 0.4 is 10 times smaller than 4. Round whole numbers to the nearest 10, 100 or 1000 and decimals to the</p>		<p>calculate, calculation, equation, operation, symbol, inverse, answer, method, strategy, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, estimate, approximate, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius</p> <p>lots of, groups of, times, multiply, multiplication, 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, factor, inverse</p>
		<u>Test Questions</u>

nearest whole number, and use this to find approximate answers to calculations.

Written Methods

Children in year 5 will continue to use the short method for multiplication to multiply 2, 3 and 4 digit numbers by 1 digit

$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \\ 2 \end{array}$	$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ 21 \end{array}$	$\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \\ 42 \end{array}$
------------------------------------------------------------------	---------------------------------------------------------------------	-----------------------------------------------------------------------

Answer 144 answer 2394 answer 16 446

Children will be taught the long method for multiplication during year 5, to multiply numbers up to 4 digits by 2 digits (least significant digit first)

24 x16

$\begin{array}{r} 24 \\ \times 16 \\ \hline 144 \\ 480 \\ \hline 384 \end{array}$	$\begin{array}{r} 12 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ 12 \end{array}$
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Answer 384 answer 3224

Here are five digit cards.



Use all five digit cards to make this correct.

$$\square\square \times 2 = \square\square\square$$

KS2 2004 Paper B level 3

-----This relationship connects the number of pencils and the number of boxes.

number of pencils = number of boxes
× 12

How many pencils are in 18 boxes?
Y5 optional test 1998 Paper B level 4-

John says: 'Multiples of 4 always end in 2, 4, 6 or 8.'
Is he correct? Write YES or NO.
Explain how you know.

Use the digits 2, 3 and 4 once to make the multiplication which has the greatest product.

$$\square\square \times \square$$

KS2 2004 Paper B level 4

An apple costs seventeen pence.
How much will three cost?
Y4 optional test 1999 Mental test L4

Year 6	Number: MULTIPLICATION	Y5 COULD
SHOULD End of year expectations in bold	<ul style="list-style-type: none"> • multiply multi digit numbers up to 4 digits by 2 digits whole number using the formal method of long multiplication • Perform mental calculations, including with mixed operations and large numbers • Use knowledge of the order of operations to carry out calculations using the four operations • Solve multi step problems in contexts, deciding which operations and methods to use and why 	

Written Methods

Knowing and Using Number Facts

Continue to consolidate knowledge of multiplication facts. For example work out numbers in the 13 times-table by combining multiplication facts from the 10 and 3 times-tables.

Work out products and quotients involving decimals (e.g. 0.6×8 and $5.6 \div 8$) using facts from the 8 times-table. Given a fact such as $17 \times 14 = 238$, work out $18 \times 14 = 252$ by adding a further 14. Similarly, multiplying by a near-multiple of 10, such as 51 or 49, multiply by the multiple of 10 and adjust by adding or subtracting the appropriate number.

Derive quickly the square numbers to 12×12 and squares of multiples of 10, such as 40×40 .

Recognise that prime numbers have only two factors. Use knowledge of multiplication and division facts to determine, say, that 47 is prime and that 51 is not prime. Find the prime factors of a two-digit number and use tests of divisibility to decide whether a number such as 342 is divisible by 2, 3, 4, 5, 6, 9 or 10. Use knowledge of inverse operations and estimation skills to check results.

Apply knowledge of multiplication and division facts to multiplication and division of two-digit numbers, including decimals such as 5.6 or 0.56. Use knowledge of place value to multiply and divide whole numbers and decimals by 1000, 100 or 10, and by multiples of these, and explain the effect. Recognise, for example, that 25×0.3 is equivalent to $25 \times 3 \div 10$.

Use calculators to explore, for example, the effect of multiplying and dividing whole numbers by a positive number greater than 1 and a positive number less than 1.

Written Methods

Children in year 6 will continue to use the short method for multiplication to multiply 2, 3 and 4 digit numbers by 1 digit

$$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \\ 2 \end{array}$$

Answer 144

$$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ 21 \end{array}$$

answer 2394

$$\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \\ 42 \end{array}$$

answer 16 446

Vocabulary

calculate, calculation, equation, operation, symbol, inverse, answer, method, strategy, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, estimate, approximate, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius

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, double, factor, inverse, integer

Test Questions

Some children do a sponsored walk. Jason is sponsored for £3.45 for each lap.

He does 23 laps. How much money does he raise?

Lynne wants to raise £100.

She is sponsored for £6.50 for each lap. What is the least number of whole laps she must do? KS2 1997 Paper B level 4

Four biscuits cost twenty pence altogether.

How much do twelve biscuits cost? KS2 2005 Mental test level 4

Explain why 16 is a square number.

Y5 optional test 1998 L3

Multiply seven by nought point six.

KS2 2003 Mental test L4

What is the next square number after thirty-six?

Y7 progress test 2005 L4

What is nought point four multiplied by nine? KS2

2005 Mental test level 4

And long multiplication

24 x16

$\begin{array}{r} 2 \\ 24 \\ \hline \times 16 \\ \hline 240 \\ 144 \\ \hline 384 \end{array}$	$\begin{array}{r} 12 \\ 124 \\ \hline \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ 11 \end{array}$
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Answer 384

answer 3224

Year 6+	Number: MULTIPLICATION
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|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COULD End of year expectations | <ul style="list-style-type: none"> • Recognise the square roots of perfect squares to 12 × 12 (Y6/7) • Recognise and use multiples, factors, divisors, common factors, highest common factors and lowest common multiples in simple cases(Y6/7) • Understand how the commutative, associative and distributive laws, and the relationships between operations, including inverse operations, can be used to calculate more efficiently; use the order of operations, including brackets(Y6/7) • Consolidate and extend mental methods of calculation to include decimals, fractions and percentages(Y6/7) |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Rules & Laws of arithmetic summary - see guidance paper 'methods of calculation' for more detail			<u>Test Questions</u>
Rules of arithmetic	Instructions	Examples	
Brackets	Always carry out first any calculations that are within brackets	$40 - (3 + 2) = 40 - 5 = 35$ $20 \div (18 - 13) = 20 \div 5 = 4$	Six times a number is three thousand. What is the number? KS2 2005 Mental test level 5 ----- Write in the two missing digits. $\square 0 \times \square 0 = 3000$ KS2 2002 Paper A level 5
Multiplication and division	After working out those calculations in the brackets do the multiplication and division calculations next before addition and subtraction. If the expression involves only multiplication and division calculations work from left to right or reorder moving a number with its associated operation.	$5 \times 2 - 8 \div 2 = 10 - 4 = 6$ $9 \times 8 \div 3 = 72 \div 3 = 24$ $9 \times 8 \div 3 = 9 \div 3 \times 8 = 3 \times 8 = 24$	Circle two different numbers which multiply together to make 1 million.

			10 100 1000 10 000 100 000 KS2 2000 Paper A level 5 -----
Addition and subtraction	Finally do the addition and subtraction calculations. If the expression involves only addition and subtraction calculations work from left to right or reorder moving a number with its associated operation.	$25 + 19 - 11 - 18 = 44 - 11 - 19 = 33 - 19 = 14$ $25 + 19 - 11 - 18 = 25 - 11 + 19 - 18 = 13 + 1 = 14$	----- Write the three missing digits. $\square\square \times \square = 371$ KS2 1997 Paper B level 5 -----
Laws of arithmetic	Description	Examples	-----The same number is missing from each box. Write the same missing number in each box. $\square \times \square \times \square = 1331$ KS2 1999 Paper B level 5 -----
Commutative laws for addition and multiplication	When adding two numbers the order of the numbers can be reversed. When multiplying two numbers the order of the two numbers can be reversed.	$4 + 18 = 18 + 4$ $5 \times 7 = 7 \times 5$	----- Estimate the value of nine point two multiplied by two point nine. KS3 2005 Mental test level 6 -----
Associative laws for addition and multiplication	When adding three or more numbers any adjacent pair of numbers can be added first. When multiplying three or more numbers, any pair of adjacent numbers can be multiplied together first.	$3 + 6 + 4 = (3 + 6) + 4 = 3 + (6 + 4)$ $3 \times 4 \times 5 = (3 \times 4) \times 5 = 3 \times (4 \times 5)$	----- Kim knows that $137 \times 28 = 3836$ Explain how she can use this information to work out this multiplication. 138×28 KS2 1997 Paper A level 5
Distributive laws for multiplication and division over addition and subtraction	When a sum or difference is being multiplied by a number, each number in the sum or difference can be multiplied first and the products are then used to find the sum or difference. When a sum or difference is being divided by a number, each number in the sum or difference can be divided first and the dividends are then used to find the sum or difference.	$(30 + 8) \times 7 = (30 \times 7) + (8 \times 7)$ $(30 - 3) \times 9 = (30 \times 9) - (3 \times 9)$ $(20 + 8) \div 4 = (20 \div 4) + (8 \div 4)$ $(60 - 12) \div 3 = (60 \div 3) - (12 \div 3)$	