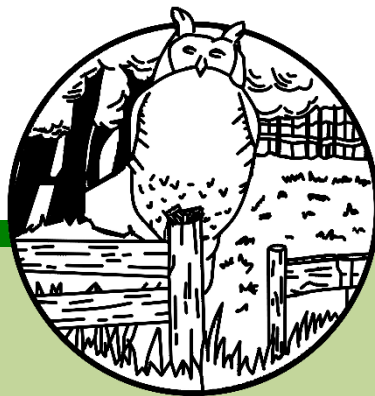


Multiplication Curriculum



Woodland Grange Primary School

Aiming high to achieve excellence and success by working together.

MULTIPLICATION: Y1

Understanding the operation and related vocabulary.

Understanding the operation

Begin to understand multiplication by using concrete objects, pictorial representations and arrays to solve problems; make connections between the different representations.

begin to use the vocabulary involved in multiplying

Vocabulary

ones, groups, lots of, doubling repeated addition array, row, column, groups of, lots of, times, columns, rows longer, bigger, higher etc times as (big, long, wide ...etc)

Generalisations

Understand 6 counters can be arranged as 3+3 or 2+2+2

Understand that when counting in twos, the numbers are always even.

Some Key Questions

Why is an even number an even number?

What do you notice?

What's the same? What's different?

Can you convince me?

How do you know?

Mental Calculations

Number facts

Count in multiples of twos, fives and tens

0 2 4 6 8 10...



How many legs have 5 teddies got altogether?



How much money have I got in my purse? 5,10,15,20



How many 10ps do I need to buy a chocolate bar for 30p?

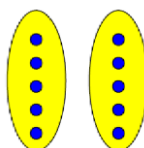
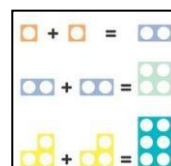
Know doubles of all numbers to 10

Double 3 is

8+8=

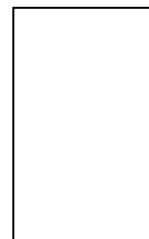
Double 5 is

6+6=



2 groups of 5
How many altogether?

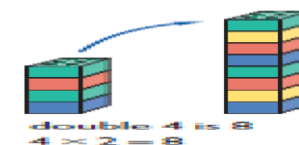
and
Double 5



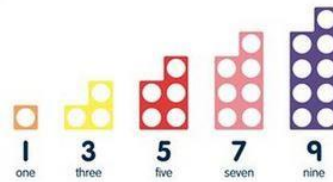
Written Calculations

No formal written layout.

Children will be recording their mathematics using pictorial representations, arrays, number lines and mathematical statements.



Begin to recognise odd and even numbers
 Use cubes to make 9 and recognise it is odd (as the cubes cannot be paired)
 Sort Numicon into odd and even numbers



What happens if we put two odd numbers together?

Mental Methods and jottings

Counting

Count a set of objects by grouping in 2s, 5s or 10s
 Count these marbles (2 at a time)



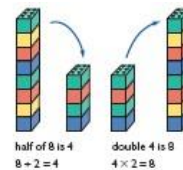
Solve problems involving doubling and equal groups
 I need 5 eggs to bake a cake. How many eggs will I need to bake 2 cakes?

Counting on

There are 3 pots. Each pot has 2 seeds in. How many seeds are planted?
 (by counting on in twos using objects or pictures to keep track)

Doubling and halving

A ladybird has 6 spots on each wing. How many spots are there altogether? (by recognising $6+6=12$)



MULTIPLICATION: Y2

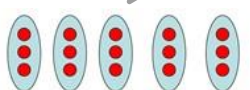
Understanding the operation and related vocabulary.

Understanding the operation

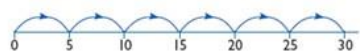
Understand multiplication as

- repeated addition
- describing an array
- scaling (to compare 2 items) e.g. twice as long
- correspondence problems – one to many

Show that multiplication of two numbers can be done in any



5 groups of 3
 $3+3+3+3+3=15$



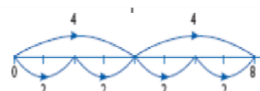
$5+5+5+5+5+5=30$
 $5 \times 6 = 30$
5 multiplied by 6
6 groups of 5



3 groups of 10 pencils
 $10+10+10=30$
 $10 \times 3 = 30$

order

recognise that 5×3
to 3×5



is equal



5 groups of
 $3=15$
3 groups of
 $5=15$
 $3+3+3+3+3=15$
 $5+5+5=15$
 $3 \times 5 = 15$
 $5 \times 3 = 15$

Recognise
the inverse
relationship
between

2 groups of $4=8$
4 groups of $2=8$
 $4 \times 2 = 8$
 $2 \times 4 = 8$

multiplication and division

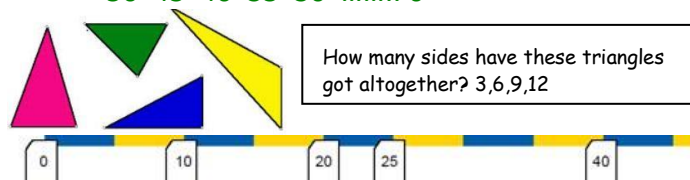
Mental Calculations

Number facts

Count in steps of 2, 3, and 5 from 0

0 3 6 9 12 15 1830

50 45 40 35 30 0



How many sides have these triangles
got altogether? 3,6,9,12

Which numbers do you need to add to the counting stick?

Recall doubles of all numbers to 15 and doubles of
multiples of 5 to 50

Double 13 is \square $11+11=\square$

Double 25 is \square $45+45=\square$

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

3 groups of 10 multiply 7 by 2 5 multiplied by 4

Recognise odd and even numbers

Explain why 27 is an odd number

Mental Methods and Jottings

Calculate mathematical statements for multiplication
within the multiplication tables

$3 \times 5 = \square$

$7 \times \square = 14$

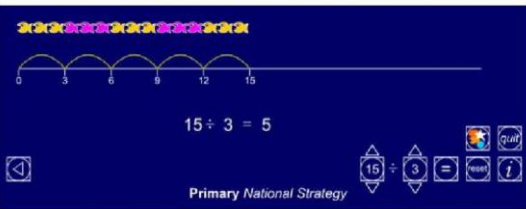
$4 \times 5 = \square \times 2$

Written Calculations

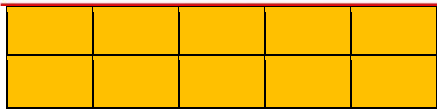
No formal written layout.

Children will be recording their mathematics using
pictorial representations, arrays, number lines and
mathematical statements.

See jottings in other columns.



ITP Grouping



Write the related number sentences

$$5 \times 2 = 10 \quad 2 \times 5 = 10 \quad 10 = 5 \times 2 \quad 10 = 2 \times 5$$

$$10 \div 2 = 5 \quad 10 \div 5 = 2 \quad 2 = 10 \div 5 \quad 5 = 10 \div 2$$

Write mathematical statements using the multiplication (\times), and equals (=) signs

$$5 \times 4 = 20 \quad 16 = 8 \times 2$$

$$3 \times \square = 15 \quad \square = 2 \times 7 \quad 20 = \square \times \square$$

Vocabulary

multiple, multiply, multiplication array, multiplication tables / facts, groups of, lots of, times, columns, rows, once, twice, three, ten...times a big, repeated addition

Generalisation

Repeated addition can be shown mentally on a number line

Inverse relationship between multiplication and division. Use an array to explore how numbers can be organised into groups.

Some Key Questions

What do you notice?

What's the same? What's different?

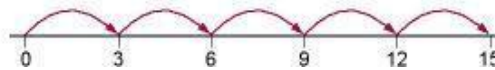
Can you convince me?

How do you know?

Counting on

7x5 (by counting on in fives using fingers to keep track)

With jottings 3x5 (by counting on in threes using a number line to keep track)

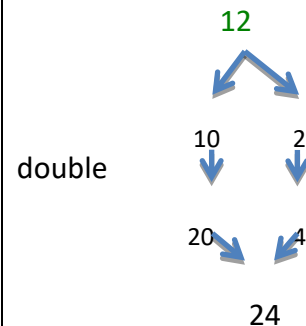


Doubling and halving

7x2 (by recalling the doubles fact)

With jotting

12x2 (by doubling 10, doubling 2 and recombining)



Estimating and Checking

Begin to use equivalent calculations to check answers

MULTIPLICATION: Y3

Understanding the operation and related vocabulary.

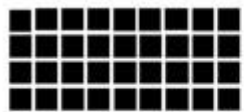
Understanding the operation

Understand multiplication as

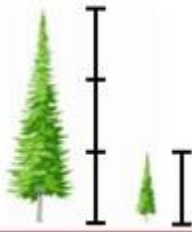
- repeated addition
- describing an array
- Scaling – comparison and enlargement
- correspondence problems – one to many and many-to-many

$$9+9+9+9=36$$

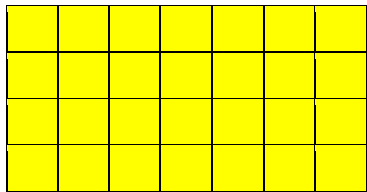
$$4+4+4+4+4+4+4+4+4=36$$



$$9 \times 4 = 36$$



Understand commutativity and associativity
recognise that 7×4 is equal to 4×7



recognise that if calculating $2 \times 3 \times 10$ the numbers
can be combined in any order

Understand the inverse relationship between
multiplication and division

write the related number sentences

$$6 \times 3 = 18 \quad 3 \times 6 = 18 \quad 18 = 6 \times 3 \quad 18 = 3 \times 6$$

$$18 \div 3 = 6 \quad 18 \div 6 = 3 \quad 3 = 18 \div 6 \quad 6 = 18 \div 3$$

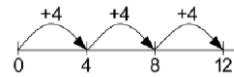
Mental Calculations

Number facts

Count from 0 in multiples of 4, 8, 50 and 100

$$0 \quad 8 \quad 16 \quad 24 \quad 32 \quad \dots$$

$$500 \quad 450 \quad 400 \quad 350 \quad \dots$$



50, 100, 150, 200, 250

Recall doubles of all numbers to 20, doubles of
multiples

of 5 to 100 and doubles of multiples of 100 to 500

$$\text{Double } 17 \text{ is } \square \quad 19 \times 2 = \square$$

$$\text{Double } 65 \text{ is } \square \quad 85 \times 2 = \square$$

$$\text{Double } 300 \text{ is } \square \quad 400 + 400 = \square$$

Recall and use multiplication facts for the 3, 4 and 8
multiplication tables and begin to use knowledge of
place value to derive related facts

3 groups of 8 multiply 9 by 4
the product of 8 and 4 50 multiplied by 4

Th	H	T	U
		5	3
5	3	0	0

Place value cards Use digit cards to
make numbers in the grid. Show how
each digit in a number moves one
column to the left when a number is
multiplied by 10 and two columns to the
left when a number is multiplied by
100.

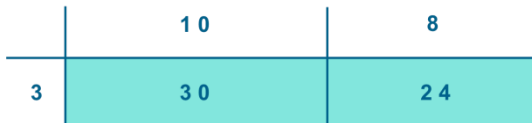
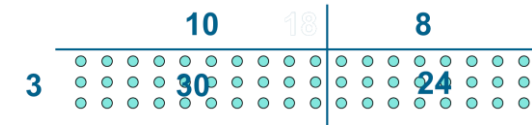
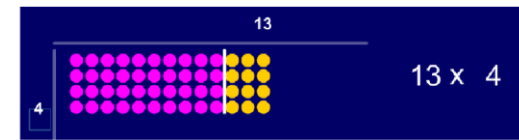
Mental Methods and Jottings

Calculate mathematical statements for multiplication

Written Calculations

Begin to use formal written methods for two-digit
numbers multiplied by one-digit numbers (
multiplication facts)

Use models and images to demonstrate grid method



Give children opportunities for children to explore
this and deepen understanding using manipulatives
such as Dienes apparatus and place value counters

38x5

x	30	8
5	150	40

190

*Children to use grid method by the end of year 3



$$\begin{aligned} 5 \times 6 &= 30 \\ 6 \times 5 &= 30 \\ 30 \div 6 &= 5 \\ 30 \div 5 &= 6 \end{aligned}$$

Trio cards

Solve missing numbers problems involving multiplication

$$\begin{aligned} 3 \times \square &= 15 & \square &= 2 \times 7 & 20 &= \square \times \square \\ 25 + 10 &= 5 \times \square & 15 &< \square \times 2 & \square \times \square > 20 \end{aligned}$$

Vocabulary

partition, grid method, inverse, product

Generalisations

Connecting x2, x4 and x8 through multiplication facts

Comparing times tables with the same times tables which is ten times bigger. If $4 \times 3 = 12$, then we know $4 \times 30 = 120$. Use place value counters to demonstrate this.

When they know multiplication facts up to x12, do they know what x13 is? (i.e. can they use 4x12 to work out 4x13 and 4x14 and beyond?)

Some Key Questions

What do you notice?

What's the same? What's different?

Can you convince me?

How do you know?

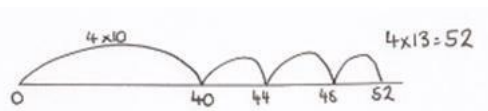
using the multiplication tables that they know, including for two-digit numbers times one-digit numbers
Use doubling to connect 2, 4 and 8 multiplication tables

Counting on

5x14 (by counting on in fives from 50)

with jottings

4x13 (by counting on in fours from 4x10 using a number line to keep track)



Partitioning (with distributive law)

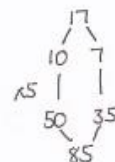
Without crossing the tens boundary

$$\begin{aligned} 32 \times 3 &= (30 \times 3 = 90, 2 \times 3 = 6, \\ 90 + 6 &= 96) \end{aligned}$$

with jottings

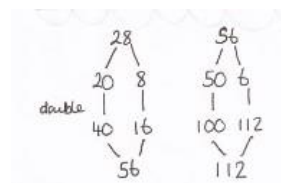
Crossing the tens boundary

$$\begin{aligned} 17 \times 5 &= (10 \times 5 = 50, 7 \times 5 = 35, \\ 50 + 35 &= 85) \end{aligned}$$



Doubling and halving

9x20 (multiply by 10 and then double)
9x10=90 Double 90 is 180



with jottings

28x4 (double and double again)
Double 28 is 56, double 56 is 112

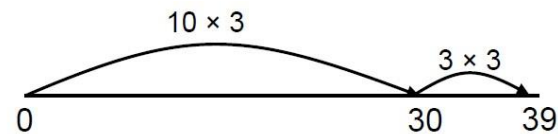
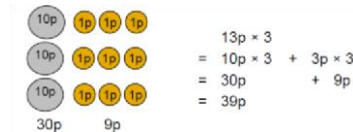
Using known facts and place value

Use manipulatives to demonstrate this.

$$4 \times 11$$

$$4 \times 10 = 40 \text{ so } 4 \times 11 = 44$$

$$13 \times 3$$



$$30 \times 5$$

$$3 \times 5 = 15 \text{ so } 30 \times 5 = 150$$

Estimating and checking

Estimate the answer to a calculation

$$38 \times 5 \text{ is approximately } 40 \times 4$$

Use inverse operations and equivalent calculations to check answers.

28×4 by doubling ($28 \times 2 \times 2$) or using partitioning (20×4 and 8×4)

MULTIPLICATION: Y4

Understanding the operation and related vocabulary.

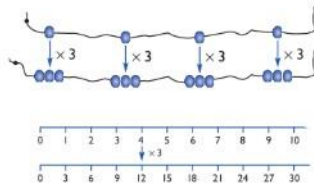
Understanding the operation

Continue to understand multiplication as

- repeated addition
- describing an array
- scaling – comparison and enlargement
- correspondence problems – one to many and many-to-many

$$11+11+11+11=44$$

$$7+7+7+7+7+7+7=49$$



Understand the distributive law

recognise that 14×5 is the same as 10×5 added to 4×5

$$19 \times 5 = (9 \times 5) + (10 \times 5) = 45 + 50 = 95$$

$$36 \times 9 = (30 \times 9) + (6 \times 9) = 270 + 54 = 324$$

continue to understand commutativity and associativity

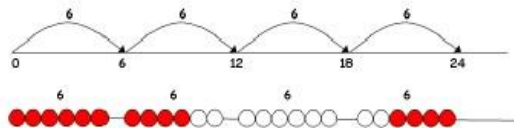
Mental Calculations

Number facts

Count in multiples of 6, 7, 9, 25 and 1000

0 7 14 21 28 ...

300 275 250 225 200 ...



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

25	50			
100				
	325		375	

ITP Number Grid

Derive doubles of multiples of 50 to 1000 and multiples of 1000

Double 950 is $750 \times 2 = \square$

Double 8000 is $6000 + 6000 = \square$

Recall multiplication facts for multiplication tables up to 12×12 , and use place value to derive related facts

7 groups of 8 multiply 9 by 6
the product of 8 and 11 60 multiplied by 4

Recognise factor pairs
list the factors pairs of 32

Written Calculations

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Children to embed and deepen their understanding of the grid method to multiply. Ensure this is still linked back to their understanding of arrays and place value counters.

$$36 \times 4 = 144$$

X	30	6
4	120	24

$$120 + 24 = 144 \text{ (add the partial products)}$$

$$127 \times 6 = 762$$

x	100	20	7
6	600	120	42

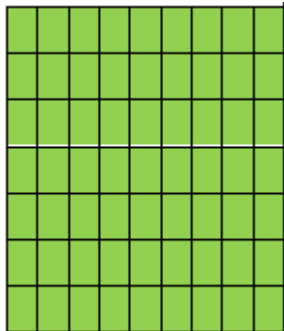
$$600 + 120 + 42 = 762 \text{ (add the partial products)}$$

recognise that 7×9 is equal to 9×7 recognise that if calculating $4 \times 8 \times 10$ the numbers can be combined in any order

$$4 \times 8 \times 10 = 320$$

$$8 \times 10 \times 4 = 320$$

$$10 \times 4 \times 8 = 320$$



Continue to understand multiplication and division write the related number sentences

$$6 \times 7 = 42 \quad 7 \times 6 = 42 \quad 42 = 6 \times 7 \quad 42 = 7 \times 6$$

$$42 \div 7 = 6 \quad 42 \div 6 = 7 \quad 7 = 42 \div 6 \quad 6 = 42 \div 7$$

Solve missing numbers problems involving multiplication

$$3 \times \square = 15 \quad \square = 2 \times 7 \quad 20 = \square \times \square$$

$$25 + 10 = 5 \times \square \quad 15 < \square \times 2 \quad \square \times \square > 20$$

Vocabulary

Factor

Generalisations

When they know multiplication facts up to $\times 12$, do they know what $\times 13$ is? (i.e. can they use 4×12 to work out

4×13 and 4×14 and beyond?)

Some Key Questions

What do you notice?

Mental Methods and Jottings

Multiply mentally using place value, known and derived facts, including: multiplying by 0 and 1; multiplying together three numbers

Counting on

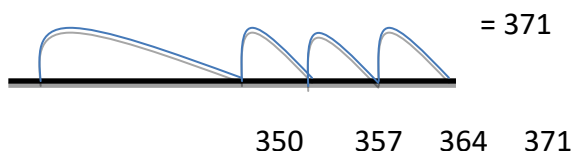
3×42 (by counting on in threes from 120)

With jottings

7×53 (by counting on in sevens from 7×50 using a number line to keep track)

$$3 \times 50$$

$$3 \times 53$$



Partitioning (using the distributive Law)

$$53 \times 6 \quad (50 \times 6 = 300 \quad 3 \times 6 = 18 \quad 300 + 18 = 318)$$

with jottings

$$86 \times 7 \quad (80 \times 7 = 560 \quad 6 \times 7 = 42 \quad 560 + 42)$$

Using doubling and halving

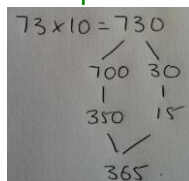
35×8 (double, double and double again)

Double 35 is 70, double 70 is 140, double 140 is 280

With jottings

73×5 (multiply by 10 and then halve)

$73 \times 10 = 730$ Half of 730 is 365 (Some children may need to partition 730 in a different way)



Using factors

$$15 \times 6 = 15 \times 3 \times 2$$

$$15 \times 3 = 45 \quad 45 \times 2 = 90$$

What's the same? What's different?

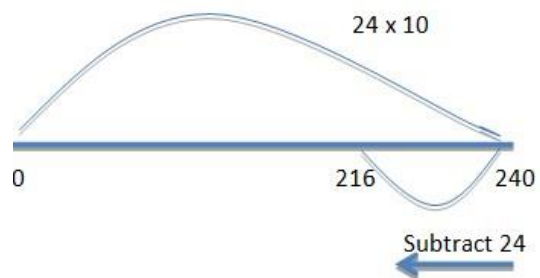
Can you convince me?

How do you know?

$24 \times 10 = 240$ so $24 \times 9 = 216$ (by subtracting 24 from 240)

800×6

$8 \times 6 = 48$ so $800 \times 6 = 4800$



MULTIPLICATION: Y5

Understanding the operation and related vocabulary.

Understanding the operation

Continue to develop understanding of multiplication to include:

- scaling by simple fractions
- simple rates



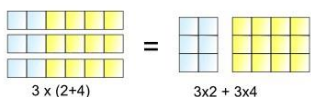
Continue to understand the distributive, commutative and associative laws

recognise that 37×6 is the same as 30×6 added to 7×6

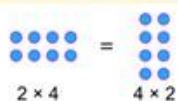
(distributive) recognise that 25×7 is equal to 7×25

(commutative) recognise that if calculating $18 \times 4 \times 10$ the numbers can be combined in any order

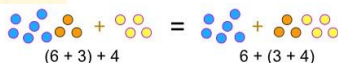
(associative)



$$a \times b = b \times a$$



$$(a + b) + c = a + (b + c)$$



Mental Calculations

Number facts

Use knowledge of counting in multiples to count in decimal steps (one decimal place) 0.6

$1.2 \ 1.8 \ 2.4 \ \dots$

$8.4 \ 7.7 \ 7.0 \ 6.3 \ \dots$

Derive doubles of decimals (to one decimal place) using knowledge of place value

Double 0.4 is \square $0.7 \times 2 = \square$

Double 3.8 is \square $5.6 + 5.6 = \square$

Continue to recall multiplication facts for multiplication tables up to 12×12 fluently, and derive and use related facts

7 groups of 8

multiply 12 by 9

the product of 80 and 40 0.6 multiplied by 4

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Identify multiples and factors, and common factors of two numbers.

list the factors of 96

identify the common factors of 30 and 36 by listing factor pairs

give a number that is a multiple of 3 and a multiple of 2

(and recognise these are multiples of 6)

list the multiples of 9 between 150 and 180 (using tests of divisibility)

Written Calculations

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 numbers with up to one decimal place by one digit whole number.

Use grid method, progressing to short and long multiplication for numbers with more digits only when children have secure understanding of multiplication facts and place value. Continue to embed understanding through the use of manipulatives and grid method. **Grid method**

46×82

43.2×7

x	30	5
20	600	100
6	180	30

$$600 + 100 = 700$$

$$180 + 30 = 210$$

$$700 + 210 = 910$$

x	6
2.0	12.0
0.3	1.8

13.8

Short multiplication

$$36 \times 4 = 144$$

$$\begin{array}{r} 30 + 6 \\ \times 4 \\ \hline 24 \\ + 120 \\ \hline 144 \end{array}$$

Include an addition symbol when adding partial products.

$$36 \times 4 =$$

$$\begin{array}{r} 36 \\ \times 4 \\ \hline \end{array}$$

1 4 4

Short multiplication for multiplying by a single digit

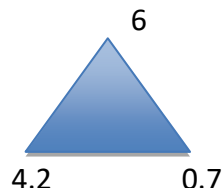
x	300	20	7
4	1200	80	28

$$\begin{array}{r} 327 \\ \times 4 \\ \hline 1308 \end{array}$$

Pupils could be asked to work out a given calculation using the grid, and then compare it to 'your' column method. What are the similarities and differences? Unpick the steps and show how it reduces the steps.

Continue to understand the inverse relationship between multiplication and division

write the related number sentences
 $6 \times 0.7 = 4.2$ $0.7 \times 6 = 4.2$ $4.2 = 6 \times 0.7$ $4.2 = 0.7 \times 6$
 $4.2 \div 0.7 = 6$ $4.2 \div 6 = 0.7$ $0.7 = 4.2 \div 6$ $6 = 4.2 \div 0.7$



Continue to solve missing number problems

$6 \times \square = 540$ $\square = 0.4 \times 8$ $480 = \square \times \square$
 $90 \times 40 = 6 \times \square$ $2.5 < \square \times 5$ $\square \times \square > 700 \times 8$

begin to use brackets

$(10+3) \times 7 = \square$ $\square = 10 + (0.4 \times 8)$

Vocabulary cube

numbers prime

numbers square

numbers

common factors

prime number, prime factors

composite numbers

Generalisation

Relating arrays to an understanding of square numbers and making cubes to show cube numbers.

Understanding that the use of scaling by multiples of 10 can be used to convert between units of measure

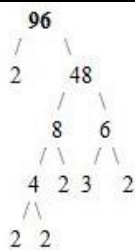
(e.g.

metres to kilometres means to times by 1000)

Some Key Questions

What do you notice?

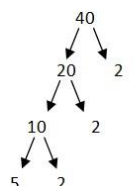
What's the same? What's different?



Establish whether a number up to 100 is prime and recall primes up to 19; find prime factors

explain why 23 is a prime number

list the prime factors of 20 ($20 = 2 \times 10 = 2 \times 2 \times 5$)



$5 \times 2 \times 2 \times 2$

Recognise and use square and cube numbers

What is... 8^2 ? 3^3 ?

Mental Methods and Jottings

Multiply numbers mentally drawing upon known facts

use factors to construct equivalence statements

$4 \times 35 = 2 \times 2 \times 35$

$3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$

begin to multiply tenths, and one-digit whole numbers and tenths by one-digit whole numbers

$0.2 \times 3 = 0.6$

Partitioning (using the distributive law)

1.2×7 ($1 \times 7 = 7$ $0.2 \times 7 = 1.4$ $7 + 1.4 = 8.4$)

With jottings

3.5×7 ($3 \times 7 = 21$ $0.5 \times 7 = 3.5$ $21 + 3.5 = 24.5$)

Doubling and halving

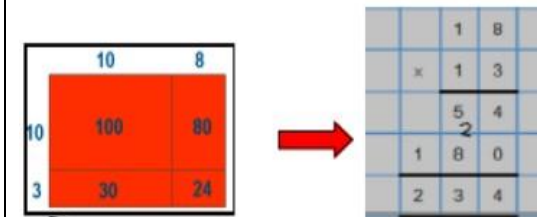
3.7×4 (Double and double again)

Long multiplication – expanded method

31
 $\times 25$
 5 (5x1)
 150 (5x30)
 20 (20x1)
 600 (20x30)
 775

Long multiplication

31 Initially, some children may need to break this
 $\times 25$ down further (See NCETM website)
 155 31 31 155
 620 $\times 5$ $\times 20$ + 620 775
 155 620 775



<p>Can you convince me? How do you know? How do you know this is a prime number?</p>	<p>Double 3.7 is 7.4, double 7.4 is 14.8 with jottings 76x50 (multiply by 100 and halve) 76x100=7600 Half of 7600 is 3800</p> <p><u>Using factors</u> 25x12=25x2x6 25x2=50 50x6=300 with jottings 3x270=3x3x9x10 3x3x9=9²9²=81 81x10=810</p> <p><u>Using Known facts and place value</u> 13x19 13x20=260 so 13x19=247 (subtract 26 from 260)</p> <p>3x14 recognise 3x14 is equivalent to 6x7</p> <p><u>Estimating and Checking</u> Check 86x9 by using an equivalent calculation Multiply by 10 and adjust (860-86) or partition (80x9 added to 6x9)</p>	
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MULTIPLICATION: Y6

Understanding the operation and related vocabulary.	Mental Calculations	Written Calculations										
<p>Understanding the operation</p> <p>Continue to understand</p> <ul style="list-style-type: none">Scaling by fractions Of the 90 students on a field trip to the zoo, two ninths want to go to see the bears. How many students want to see the bears? 90÷ 2/9 90 ÷9 = 10 10 X 2 = 20Rate A car travels 60 miles per hour. How far will it travel in 2 and a quarter hours? <p>Use their knowledge of the order of operations - BODMAS Understand that when there are no brackets in an expression, do multiplication or division before addition or subtraction Understand that if the operations are at the same level of priority, work out the example from left to right</p> <p>Continue to solve missing number problems 6x□=0.54 □=0.06x8 4.8=□x□ 0.9x4 = 6x□ 0.63<□ x0.09 □x□>0.07x8</p> <p>Explore the order of operations using brackets compare 14 ÷ (2 x 5) with (14 ÷ 2) x 5</p> <p>Vocabulary common factor/multiple</p> <p>Generalisations</p>	<p>Number facts Use knowledge of counting in multiples to count in decimal steps (two decimal places) 0.09 0.18 0.27 0.36 0.48 0.44 0.4 0.36 ...</p> <p>Derive doubles of decimals (to two decimal places) using knowledge of place value Double 0.47 is □ 0.73x2=□ Double 3.08 is □ 2.59+2.59=□</p> <p>Continue to recall multiplication facts for multiplication tables up to 12 × 12 fluently, and derive and use related facts 30 multiplied by 800 multiply 0.12 by 6 the product of 0.08 and 4 0.4 multiplied by 0.5</p> <p style="text-align: right;">+</p> <p>identify common factors, common multiples and prime numbers find the highest common factor of 18 and 24 find the lowest common multiple of 6 and 15 identify whether 87 is a prime number list the prime factors of 84 (84 = 2x42 = 2x2x21 = 2x2x3x7) use the tests of divisibility to identify factors and multiples</p> <p>continue to use square and cube numbers What is...12²? 6³?</p> <p>Mental Methods and Jottings</p>	<p>Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication</p> <p>Multiply numbers with up to two decimal places by onedigit and two-digit whole numbers</p> <p>GRID METHOD 15.76 x 3 E.g. 15.76 x 3 =</p> <table><tr><td>X</td><td>10.00</td><td>5.00</td><td>0.70</td><td>0.06</td></tr><tr><td>3</td><td>30.00</td><td>15.00</td><td>2.10</td><td>0.18</td></tr></table> <p>30.00 15.00 2.10 0.18 <hr/>47.28</p> <p style="text-align: right;">ITP multiplication grid</p> <div><div>click between digits to insert or remove a decimal point</div><div>1.5 x 2.1 = 31.5</div><div>click the hidden buttons to increase or decrease this digit</div><div>click to hide or show the number above this button</div></div> <p>Children should not be taught the following method shown below until they are thoroughly secure with mental calculation strategies, recall of multiplication tables and the application of Place Value (see year 5) Develop year 5 methods with more complex calculations such as</p>	X	10.00	5.00	0.70	0.06	3	30.00	15.00	2.10	0.18
X	10.00	5.00	0.70	0.06								
3	30.00	15.00	2.10	0.18								

Order of operations: brackets first, then multiplication and division (left to right) before addition and subtraction (left to right). Children could learn an acrostic to remember this or could be encouraged to design their own ways of remembering. Understanding the use of multiplication to support conversions between units of measurement.

Some Key Questions What do you notice?
What's the same? What's different?
Can you convince me?
How do you know?

Perform mental calculations, including with mixed operations, large numbers and decimals

Partitioning (using distributive law)

6.04×3 ($6 \times 3 = 18$ $0.04 \times 3 = 0.12$ $18 + 0.12 = 18.12$)
With jottings
 0.43×6 ($0.4 \times 6 = 2.4$ $0.03 \times 6 = 0.18$ $2.4 + 0.18 = 2.58$)

Doubling and halving

0.24×40 (double and double again, then multiply by 10)
Double 0.24 is 0.48, double 0.48 is 0.96, $0.96 \times 10 = 9.6$

With jottings
 68×25 (multiply by 100, then halve and halve again)
 $68 \times 100 = 6800$ Half of 6800 is 3400 Half of 3400 is 1700

Using factors

$1.5 \times 16 = 1.5 \times 2 \times 8$
 $1.5 \times 2 = 3$ $3 \times 8 = 24$

with jottings
 $32 \times 24 = 32 \times 3 \times 8$
 $32 \times 3 = 96$ $96 \times 8 = 800 - (4 \times 8) = 768$

Using known facts and Place value

17×98
 $17 \times 100 = 1700$ so 17×98 is 1666 (subtract 17×2 from 1700)

15×18
recognise 15×18 is equivalent to 30×9

Estimating and checking

$$\begin{array}{r} 1234 \\ \times 16 \\ \hline 7404 \\ 12340 \\ \hline 19744 \end{array} \quad \begin{array}{l} (1234 \times 6) \\ (1234 \times 10) \end{array}$$

$$\begin{array}{r} 3652 \\ \times 8 \\ \hline 29216 \end{array}$$

	<p>Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p> <p>5872x54 is approximately 6000x50</p> <p>Continue to use appropriate strategies to check answers</p> <p>Check 496x5 by using an equivalent calculation</p> <p>Multiply by 10 and halve or use a known fact and adjust (500x5) –(4x5)</p>	
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