Year 1
Multiplication and Division

Objectives

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

Key Skills

Multiplication

- Count in multiples of 10, 5 and 2.
- 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.

Division

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations arrays with the support of the teacher
- Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens.

Vocabulary

Multiplication

groups of, lots of, times, array, altogether, multiply, count

Division

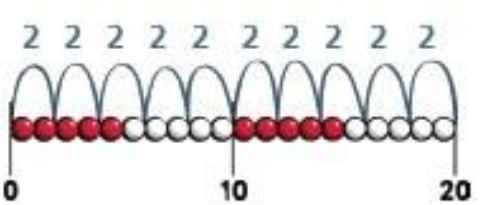
share, share equally, one each, two each…, group, groups of, lots of, array

Year 1 Multiplication

Immerse children in practical opportunities to develop understanding of multiplication and division.

Counting in steps ('clever' counting)

Count in 2s

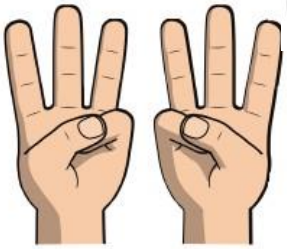


Count in 10s and 5s

1	2	3	4	5	6	7	8	9	
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

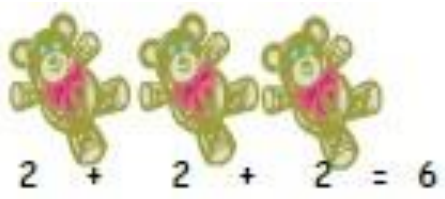
Doubling and halving

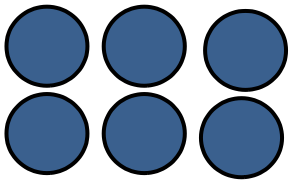
Find doubles to double 5 using fingers



Multiply with concrete objects, arrays and pictorial representations.

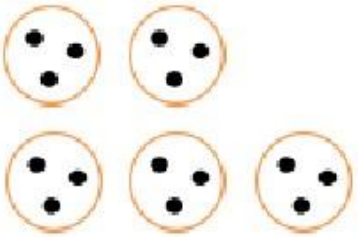
How many legs will 3 teddies have?





There are 3 sweets in one bag. How many sweets are in 5 bags altogether?

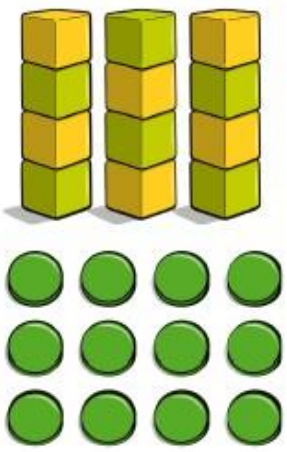
3+3+3+3+3=15



Grouping

Begin to use visual and concrete arrays and sets of objects to find the answer to 'three lots of four' or ' two lots of five' etc

Three lots of four

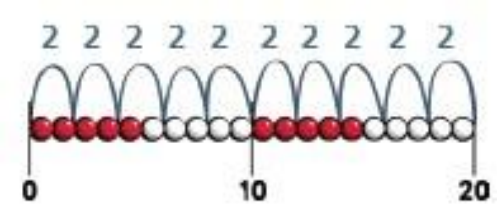


Year 1 Division

Immerse children in practical opportunities to develop understanding of multiplication and division.

Counting in steps ('clever' counting)

Count in 2s

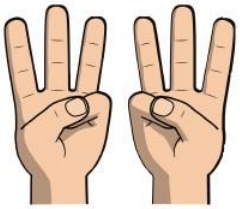


Count in 10s and 5s

1	2	3	4	5	6	7	8	9	
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

Doubling and halving

Find doubles to double 5 using fingers



Group and share small quantities.

Using objects, diagrams and pictorial representations to solve problems involving both **grouping** and **sharing.**

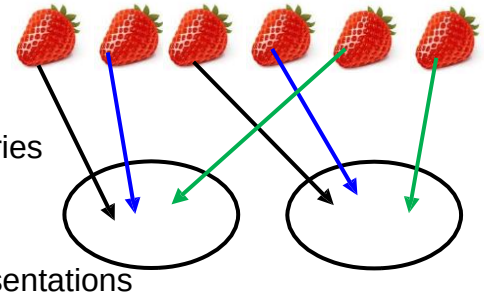
Grouping:

There are 6 strawberries, how many people can have 2 strawberries each?

3 people

Sharing:

There are 6 strawberries shared between 2 people, how many do they each get?



3 strawberries

Children should :

- use lots of practical apparatus, arrays and picture representations
- Be taught to understand the difference between **'grouping'** objects (How many groups of 2 can you make?)

and '**sharing**'
(Share these sweets between 2 people)

- Be able to count in multiples of 2s, 5s and 10s.
- Find **half** of a group of objects by sharing into 2 equal groups.

Example division problem in a familiar context:

There are 5 children on this table and there are 15 pieces of fruit to share between them. If we share them equally, how many will we each get?
Can they work it out and give a division statement… ?
"15 shared between 5 people gives you 3 each."

Year 2 Multiplication and Division

Objectives

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Key Skills

Multiplication

- Count in steps of 2, 3 and 5 from zero, and in 10s from any number.
- Recall and use multiplication facts from the **2, 5 and 10** multiplication tables, including recognising 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.

Division

- Count in steps of 2, 3, and 5 from 0
- Recall and use multiplication and division facts for the **2, 5 and 10** multiplication tables, including recognising odd and even numbers.
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the x, ÷ and = signs.

Vocabulary

Multiplication

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...

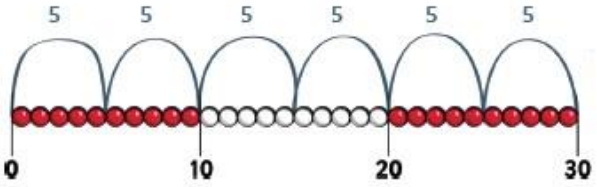
Division

share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over

Year 2 Multiplication

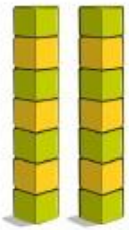
Counting in steps ('clever' counting)

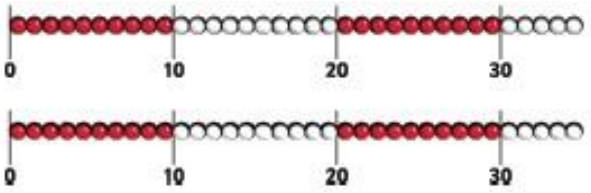
Count in 2s, 5s, 10s



Doubling

Know doubles to double 20





Begin to know doubles of multiples of 5 to 100 E.g. double 35 is 70

Begin to double 2-digits numbers less than 50 with 1s digits of 1, 2, 3, 4, or 5

Multiply using arrays and repeated addition (using at least 2s, 5s and 10s)

Use arrays:

Relate to 'clever' counting

5 x 3 = 15

5 x 3 = 3 + 3 + 3 + 3 + 3 = 15

3 x 5= 5 + 5 + 5 = 15

3 x 5 = 15

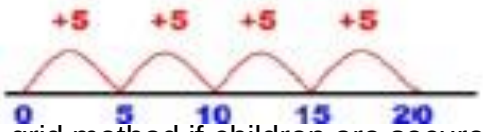
Use arrays to help teach children to understand the commutative law of multiplication and give examples such as 3 x _ = 6

Use repeated addition on a number line:

Starting from zero, make equal jumps on a number line to work out multiplication facts and write multiplication statements using x and = signs

4 lots of 5

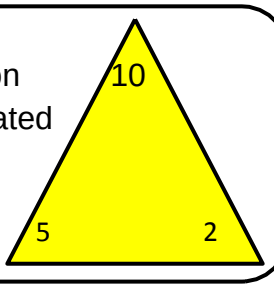
4 x 5 = 20



Move on to the grid method if children are secure, (see Year 3).

Children must be able to recall multiplication facts for 2, 10 and 5 x tables. Through regular practice in school and at home. Children will be questioned on each table – children need to know the facts – in order, randomly and the related division fact.

Begin to know 3 x tables.

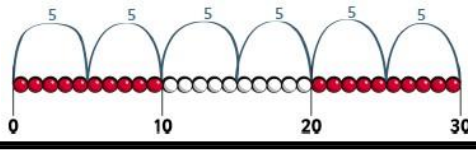


Year 2 Division

Group and share using the ÷ and = sign.

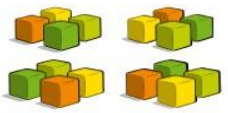
Counting in steps ('clever' counting)

Count in 2s, 10s and 5s. Begin to count in3s



Sharing

Begin to find half or a quarter of a quantity using sharing e.g. find a quarter of 16 cubes by sharing the cubes into four piles.



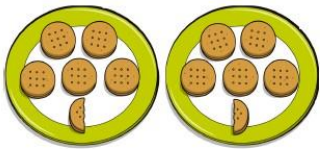
Find 1/4, 1/2, 3/4 of small quantities

Halving

Find half of numbers up to 40, including realising that half of an odd number gives a remainder of 1 or answer containing a ½

e.g. ½ of 11 = 5 ½

Begin to know half of multiples of 10 to 100



Grouping

Relate division to multiplication by using arrays or towers of cubes to find answers to division. E.g. How many towers of 5 cubes can I make from twenty cubes? As _ x 5 = 20 and also as 20÷5 = _. Relate to 'clever counting'

Written methods

Group and share

Using objects, diagrams and pictorial representations and grouping on a number line

How many groups of 4 can be made with 12 stars?

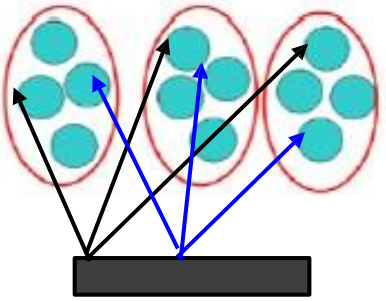
Grouping:

4 **4** **4**

12 sweets shared between 3 people

Sharing:

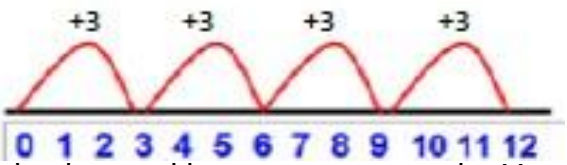
4 **4** **4**



Grouping using a number line

Children to use a beadstring or practical apparatus to workout problems like 'A CD cost £3. How many CDs can I buy with £12?' This develops understanding of grouping

Move towards recording this on a number line. Group from zero in equal jumps of the divisor find out '*how many groups of _ in *_?*' Use Grouping ITP



If children are secure counting in equal jumps move on to the Year 3 method using groups of the divisor. See Y3 method.

Year 3
Multiplication and Division

Objectives

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Key Skills

Multiplication

- Recall and use multiplication facts for the **2, 3, 4, 5, 8 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 commutativity (e.g. 4 x 12 x 5 = 4 x 5 x 12 = 20 x 12 = 240)
- Solve simple problems in contexts, deciding which operations and methods to use.
- Develop efficient mental methods to solve a range of problems e.g using commutativity (**4 × 12 × 5** = 4 x 5 × 12 **= 20 × 12** = 240) and for missing number problems x 5 = 20, 3 x = 18, x = 32

Division

- Recall and use multiplication and division facts for the 2, 3, 4, 5, 8 and 10 multiplication tables (through doubling, connect the 2, 4 and 8s).
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.
- Solve problems, in contexts, and including missing number problems, involving multiplication and division.
- Pupils develop efficient mental methods, for example, using multiplication and division facts
- (e.g. using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (30 × 2 = 60, so 60 ÷ 3 = 20 and 20 = 60 ÷ 3).
- Pupils develop reliable written methods for division, starting with calculations of 2-digit numbers by 1-digit numbers and progressing to the formal written method of short division

Vocabulary

Multiplication

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

Division

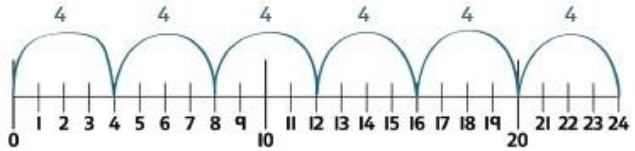
share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, 'carry', left over, inverse**,** short division, 'remainder, multiple

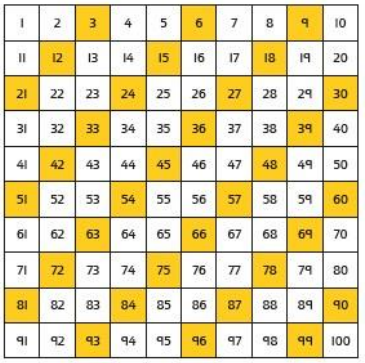
Year 3 Multiplication

Mental Strategies

Counting in steps ('clever' counting)

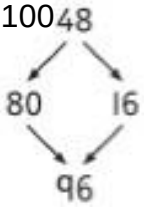
Count in 2s, 3s, 4s, 5s, 8s, and 10s





Doubling

Know doubles to double 20.
Know doubles of multiples of 5 to 100
Find doubles of numbers to 50
using partitioning e.g. double 48



Grouping

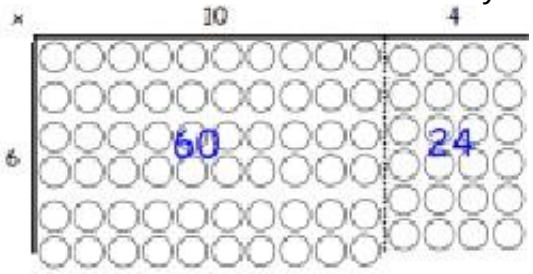
Recognise that multiplication is commutative e.g. 4x8=8x4

Multiply multiples of 10 by 1-digit numbers using known number facts e.g. 3 x 8=24 so I know 30 x 8 = 240 as 30 is 10 times bigger.

Written methods

Multiply 2-digits by a single digit number

Introduce the grid method for multiplying 2 digit by single-digits with children physically making an array to represent the calculation then translate this to the grid method.
Make the link between an array and the grid method



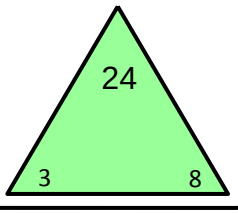
x	20	3
8	160	24

160 + 24 = 184

In order to carry out this method, children must be able to:

- Partition numbers into tens and units
- Multiply multiples of ten by a single digit (e.g. 20 x 4) using their knowledge of multiplication facts and place value
- Recall and work out multiplication facts in the **2, 3, 4, 5, 8 and 10** times tables.
- Work out multiplication facts not known by repeated addition or other taught mental strategies (e.g. by commutative law, working out near multiples and adjust-ing, using doubling etc.) Strategies to support this are repeated addition using a number line, bead bars and arrays:

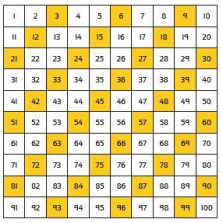
Children must be able to recall multiplication facts for 2, 3, 4, 5, 8 and 10 times tables. Children will be questioned on each table – children need to know the facts – in order, randomly and the related division fact.



Year 3 Division

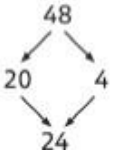
Group and share using the ÷ and = sign.

Counting in steps ('clever' counting)
Count in 2s,10s,5s,3s,4s,8s



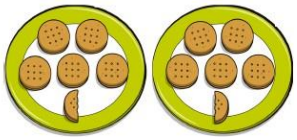
Using number facts
Know half of even numbers to 40
Know half of multiples of 10 to 200
e.g. *half of 170 is 85*
Know ×2, ×3, ×4, ×5, ×8, ×10 division facts

Halving
Find half of even numbers to 100 using partitioning e.g. find half of 48



Using halving as a strategy in dividing by 2 e.g. 36 ÷ 2 is half of 36 = 18

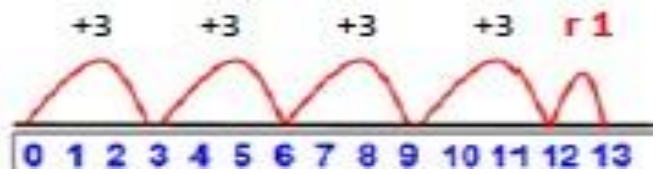
Find half of odd numbers



Grouping

Recognise that division is not commutative e.g. *16 ÷ 8 does not equal 8 ÷ 16*
Relate division to multiplications 'with holes in' e.g. _ × *5 = 30 is the same calculation as 30 ÷ 5 =* _ *thus we can count in 5s to find the answer*
Divide multiples of 10 by 1-digit numbers e.g. *240 ÷ 8 = 30*
Begin to use subtraction of multiples of 10 of the divisor to divide numbers above the 10th multiple e.g. *52 ÷ 4 is 10 × 4 (40) and 3 × 4 (12) = 13*

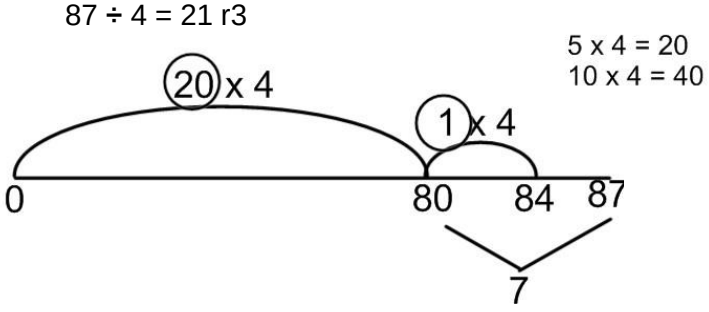
Written methods
Divide 2-digit numbers by a single digit



Step 1: Grouping on a number line Children continue to work out unknown division facts by grouping on a number line from zero. They are also now taught the concept of **remainders,** as in the example. This should be introduced practically and with arrays, as well as being translated to a number line. Children should work towards calculating some basic division facts with remainders mentally for the 2s, 3s, 4s, 5s, 8s and 10s.

Step 2: Grouping on a number line
Divide on a number line using multiple groups of the divisor.
Model jotting down useful multiplication facts e.g. 5x 10 x.
Children to make the first jump the largest possible using known facts e.g. 'I know there are two 4's in 8 so there are twenty 4's in 80.' The 'chunking' method.
Then calculate what is left to make the final jump. e.g. how many 4's are in 7? I know there is one 4 in 7 and 3 left over.
Children to circle the 'lots of' and total.

87 ÷ 4 = 21 r3



Year 4
Multiplication and Division

Objectives

- 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 three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Key Skills

Multiplication

- Count in multiples of 6, 7, 9, 25 and 1000
- Recall multiplication facts for **all multiplication tables up to 12 x 12.**
- Recognise place value of digits in up to 4-digit numbers
- Use place value, known facts and derived facts to multiply mentally, e.g. multiply by 1, 10, 100, by 0, or to multiply 3 numbers.
- Use commutativity and other strategies mentally 3 x 6 = 6 x 3 , 2 x 6 x 5 = 10 x 6 , 39x7 = 30 x 7 + 9 x 7.
- Solve problems with increasingly complex multiplication in a range of contexts.
- Count in multiples of 6, 7, 9, 25 and 1000
- Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)

Division

- **Recall multiplication and division facts for all numbers up to 12 x 12.**
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying and dividing by 10 and 100 and 1.
- Pupils practise to become fluent in the formal written method of short division with exact answers when dividing by a one-digit number
- Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example 200 × 3 = 600 so 600 ÷ 3 = 200
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as three cakes shared equally between 10 children.

Vocabulary

Multiplication

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

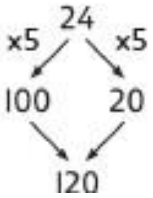
Division

share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, „carry", remainder, multiple, divisible by, factor

Mental Strategies # Year 4 Multiplication

Grouping

Use partitioning to multiply 2-digit numbers by 1-digit numbers e.g. 24 x 5

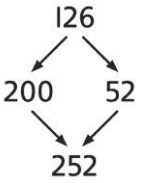


Multiply multiples of 100 and 100 by 1-digit numbers using tables facts
e.g. 4x8=32 so make it 100 times bigger,
400 x 8 = 3200

Th	H	T	O
3	2	0	0

Doubling and halving

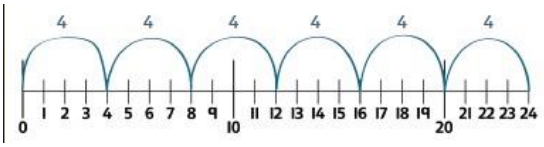
Find doubles to 100 and beyond using partitioning e.g. double 126



Begin to double amounts of money
e.g. £3.50 doubled
Is £7

Counting in steps (sequences)

Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12, 25s, 50s, 100s and 1000s



Written methods

Multiply 2 and 3 digits by a single digit number, using all multiplication tables up to 12x12

Developing the grid method, encouraging column addition to add accurately:
136 x 5 =680

X	100	30	6
5	500	150	30

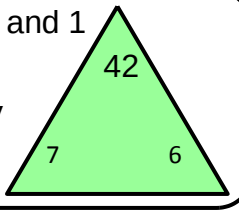
500
150
+30
680

Move onto **short multiplication** (see Y5) if and when children are confident and accurate multiplying 2 and 3-digit numbers by a single digit this way, **and** are already confident in "carrying" for written addition.

In order to carry out this method, children must be able to:

- A**pproximate before they calculate**, and make this a regular part of their calculating, going back to the approximation to check the reasonableness of their answer. e.g:
- **346 x 9** is approximately 350 x 10 = **3500**
- Record an approximation to check the final answer against.
- Multiply multiples of ten and one hundred by a single-digit, using their multiplication table knowledge.
- Recall all times tables **up to 12 x 12**

Children must be able to recall multiplication facts for 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 times tables. Through regular practice in school and at home. Children will be questioned on each table – children need to know the facts – in order, randomly and the related division fact.

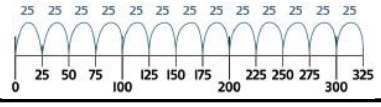


Year 4 Division

Group and share using the ÷ and = sign.

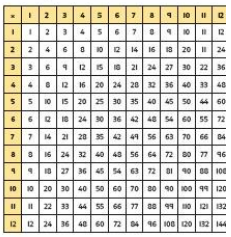
Counting in steps ('clever' counting)

Count in 2s,3s,4s,5s,6s,7s,8s,9s,10s,11,12s, 25s,50s,100a and 1000s



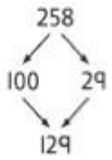
Using number facts

Know times-tables up to 12 × 12 and all related division facts.



Halving

Find half of even numbers to 200 and beyond using partitioning e.g. find half of 258



Begin to halve amounts of money e.g. £9 halved £4.50

Using halving as a strategy in dividing by 2, 4 and 8 e.g. 164 ÷ 4 is half of 164 =82 halved again 41

Grouping

Use multiples of 10 times the divisor to divide by 1-digit numbers above the tables facts

e.g. *45 ÷ 3 as 10 × 3 (30) and 5 × 3 (15)*

Divide multiples of 100 by 1-digit numbers using division facts

e.g. *3200 ÷ 8 = 400*

Written methods

Divide up to 3-digit numbers by a single digit

Step 1: Grouping on a number line

Divide on a number line using multiple groups of the divisor.

Model jotting down useful multiplication facts e.g. 10 x. 50x 100x

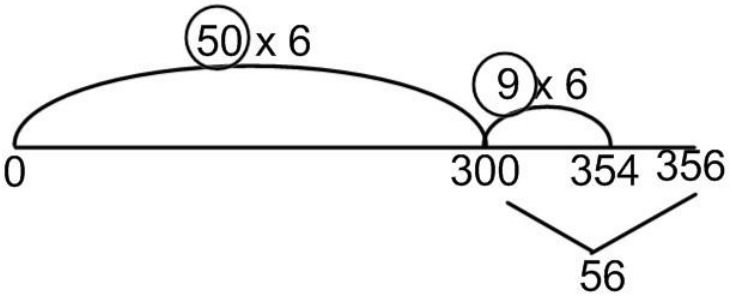
Children to make the first jump the largest possible using known facts e.g. 'I know there are five 6's in 30 so there are fifty 6's in 300.'

Then calculate what is left to make the final jump. e.g. how many 6s are in 56? I know there are nine 6's in 54 and then 2 left over

Children to circle the 'lots of' and total.

356 ÷ 6 = 59 r2

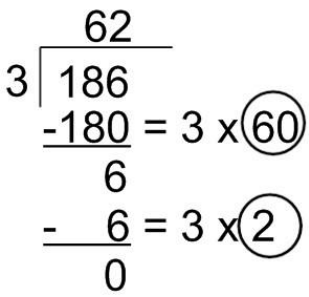
10 x 6 = 60
50 x 6 = 300
100 x 6 = 600



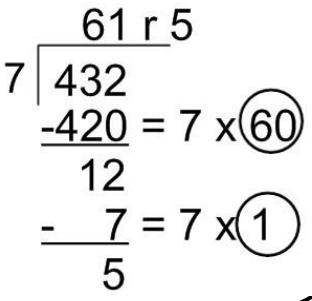
Step 2: Long division (chunking)

When children are secure dividing using a number line, introduce long division (chunking). Children must be secure using multiplication facts and subtracting. Model the link between division on the number line and long division. Ensure children make the largest first 'chunk' possible by writing down a useful list. Then using known facts, 'look at 186, what 3x facts do I know about the first 2-digits 18 ,3 x 6= 18, I know 180 is 10 x bigger so 3 x 60 = 180.

186 ÷ 3 = 62



432 ÷ 7 = 61 r 5



Year 5
Multiplication and Division

Objectives

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two 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 numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

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
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

Key Skills

Multiplication

- Identify multiples and factors, using knowledge of **multiplication tables to 12x12.**
- 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.

Division

- Recall multiplication and division facts for all numbers up to 12 x 12 (as in Y4).
- Multiply and divide numbers mentally, drawing upon known facts.
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two number.
- Solve problems involving multiplication and division where larger numbers are decomposed into their factors.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
- Work out whether a number up to 100 is prime, and recall prime numbers to 19.
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- Use multiplication and division as inverses.
- Interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (e.g. 98 ÷ 4 = 24 r 2 = 241/2 = 24.5 ≈ 25).
- Solve problems involving combinations of all four operations, including understanding of the equals sign, and including division for scaling by different fractions and problems involving simple rates.

Year 5
Multiplication and Division

Vocabulary

Multiplication

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, **carry‘** , total, multiple, product, inverse, square, factor, integer, decimal, short/long multiplication,

Division

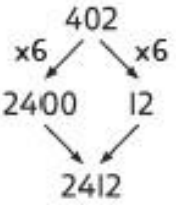
share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, „carry“, remainder, multiple, divisible by, factor, inverse, **quotient, prime number, prime factors, composite number (non-prime)**

Mental Strategies

Year 5 Multiplication

Grouping

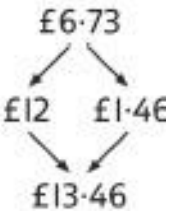
Multiply whole numbers and decimals by 10, 100, 1000 e.g. 3.4 x 100= 340
Use partitioning to multiply 'friendly' 2 and 3-digit numbers by 1-digit numbers
Use partitioning to multiply decimal numbers by 1-digit numbers
e.g. 4.5 x 3 as 4 x3 =12 and 0.5 x3 = 1.5 12 + 1.5 = 13.5



Children must be able to recall and apply multiplication facts up to 12 x 12

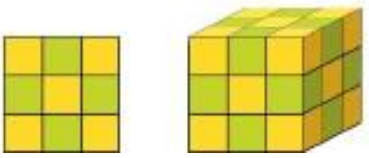
Doubling and halving

Double amounts of money using partitioning.
Use doubling and halving as a strategy in multiplying by 2, 4, 8, 5 and 20



Using number facts

Use times-tables facts up to 12 × 12 to multiply multiples of 10/100 of
the multiplier
e.g. *4 × 6 = 24 so 40 × 6 = 240 and 400 × 6 = 2400*
Use knowledge of factors and multiples in multiplication
e.g. *43 × 6 is double 43 × 3*
e.g. 28 × 50 is half of 28 × 100 (2800) = 1400
Know square numbers and cube numbers

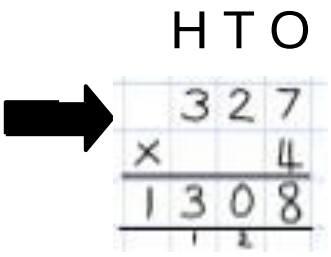


Written Methods

Multiply up to 4-digits by 1 or 2-digits

- **Step 1 - short multiplication for multiplying by 1 digit**

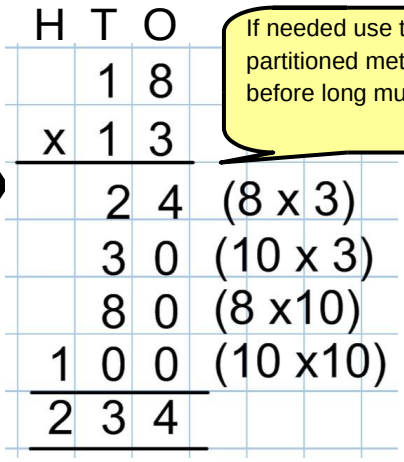
X	300	20	7
4	1200	80	28



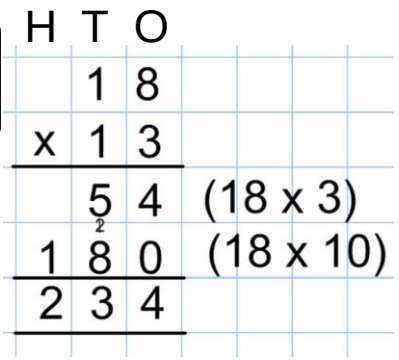
Children should be asked to complete a calculation using the grid method and then the teacher models short multiplication. What are the similarities and differences? Unpick the steps and show how it reduces them.

- **Step 2 - long multiplication for multiplying by 2-digits**

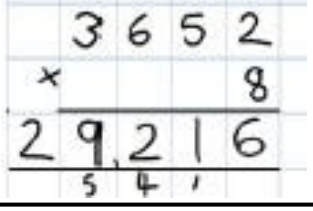
X	10	8
10	100	80
3	30	24

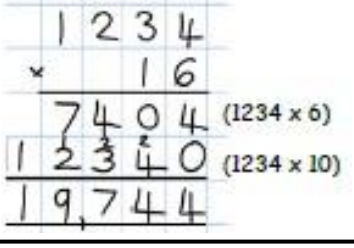


If needed use this partitioned method before long multiplication



- **Step 3 - moving towards more complex numbers**

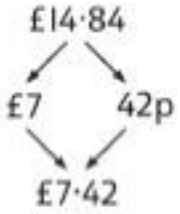




Year 5 Division

Halving

Half amounts of money using partitioning *eg half of £14.84 is half of £14 (£7) plus half of 84p (42p)*

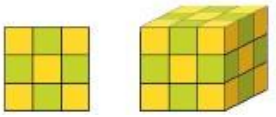


Using halving as a strategy for dividing by 2, 4 , 8

Using number facts

Use division facts from the times tables up to 12 x 12 to divide multiples of powers of 10 of the divisor *e.g 3600 ÷9* using *36 ÷ 9*

Know square numbers and cube numbers.



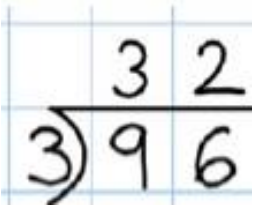
Grouping

Divide numbers by 10, 100, 1000, to obtain decimal answers with up to 3 decimal place**s**

***e**.g 340 ÷ 100 = 3.4*

Written methods

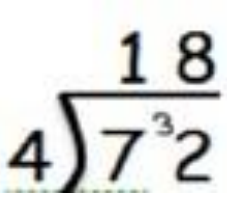
Divide up to 4-digits by a single digit, including those with remainders



Step 1: Introduce short division when children are secure with long division (chunking) dividing by a single digit . Start with carefully selected examples requiring no calculating of remainders at all.

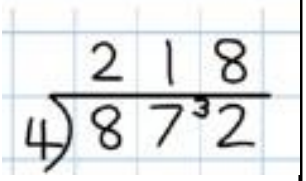
Remind children of correct place value, that 96 is equal to 90 and 6, but in short division, pose:

- How many 3's in 9? = 3, and record it above the **9 tens**.
- How many 3's in 6? = 2, and record it above the **6 units**.



Step 2: Short division (2-digits) with remainders within the calculation

Move on to using this method when remainders occur within the calculation (e.g. 96 ÷ 4), and be taught to "carry" the remainder onto the next digit.

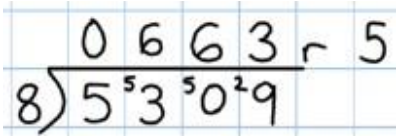


Step 3: Short division (3-digits) with remainders within the calculation

Pupils move onto dividing numbers with up to **3-digits** by a single digit,

Step 4: Short division (4-digits) with remainders within the calculation

Now that pupils are introduced to examples that give rise to remainder answers, division needs to have a real life problem solving context, where **pupils consider the meaning of the remainder and how to express it,** ie. as a fraction, a decimal, or as a rounded number or value , depending upon the context of the problem.



Long Division

When children are secure with short division, progress long division to dividing any number by a 2-digit number e.g. 4356 ÷ 17. This is a Y6 expectation. See Y6 for method.

Year 6
Multiplication and Division

Objectives

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Key Skills

Multiplication

- 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.

Division

- Recall and use multiplication and division facts for all numbers to 12 x 12 for more complex calculations
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Use short division where appropriate.
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Use estimation to check answers to calculations and determine accuracy, in the context of a problem.
- Use written division methods in cases where the answer has up to two decimal places.
- Solve problems which require answers to be rounded to specified degrees of accuracy.

Vocabulary

Multiplication

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

Division

share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, „carry", remainder, multiple, divisible by, factor, inverse, **quotient, prime number, prime factors, composite number (non- prime), common factor**

Year 6 Multiplication

Mental Strategies

Grouping

Use partitioning as a strategy in mental, as appropriate

E.g. 3060 x 4 as 3000 x 4 = 12,000 and 60 x 4 = 240, 12,00+240 = 12,240

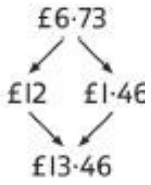
E.g. 8.4 x 8 as 8 x 8 = 64, and 0.4 x 8 = 3.2, 64 +3.2 = 67.2

Use factors in mental multiplication

E.g. 421 x 6 as 421 x 3 = 1263 doubled = 2526

Doubling and halving

Double decimal numbers with up to 2 places using partitioning



Using number facts

Use times tables facts up to 12x12 in mental multiplication of large numbers or with numbers with up to 2 decimal places

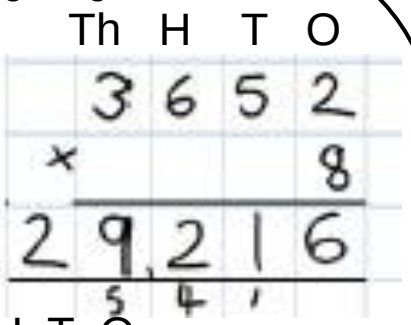
E.g. 6 x 4 = 24, 0.06 x 4 = 0.24

Written methods

Short and multiplication with up to 2 decimal places by a single digit

- **Short multiplication for multiplying by 1 digit**

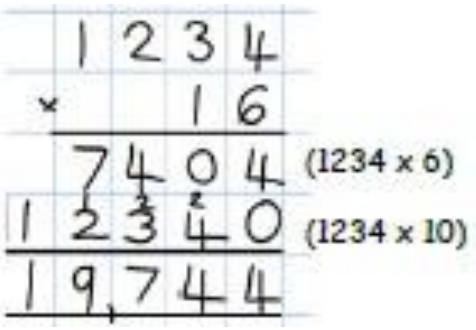
Use **short multiplication** to multiply numbers with **more than 4 -digits by a single digit**; to multiply money and measures, and to **multiply decimals with up to 2d.p. by a single digit.**



- **Long multiplication for multiplying by 2-digits**

Use **long multiplication** to multiply numbers with **at least 4 digits by a 2-digit number.**

Th H T O



- **Multiplication of numbers with up to 2 decimal places**

Step 1 - Grid method

X	3	0.1	0.09
8	24	0.8	0.72

TO.th

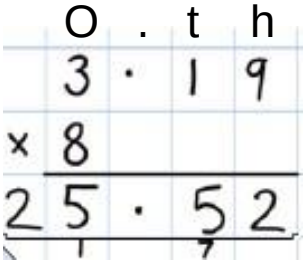
24.00

0.80

0.72

25.52

Step 2 - Short multiplication

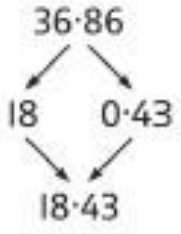


Year 6 Division

Halving

Halve decimal numbers with up to 2 places using partitioning

e.g. *half of 36·86 is half of 36 (18) plus half of 0·86 (0·43)*



Using number facts

Use division facts from the times-tables up to 12 × 12 to divide decimal numbers by 1-digit numbers e.g. *1·17 ÷ 3 is* 1/100 of 117 ÷ 3 (39)

Know tests of divisibility for numbers divisible by 2, 3, 4, 5, 9, 10 and 25

Grouping

Divide numbers by 10, 100, 1000, to obtain decimal answers with up to 3 decimal places

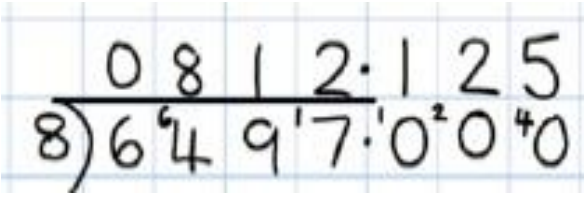
***e**.g 340 ÷ 100 = 3.4*

Written methods

Divide at least 4-digits by both single digit and 2-digit numbers (including decimal numbers)

Short division for dividing by a single digit

6497 ÷ 8



Short division with remainders: Children should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, decimals, whole number remainders, or rounded numbers. Real life problem solving contexts need to be the starting point, where children have to consider the most appropriate way to express the remainder.

Calculating a decimal remainder: In this example, rather than expressing the remainder as **r 1**, a decimal point is added after the units because there is still a remainder, and the one remainder is carried onto zeros after the decimal point (to show there was no decimal value in the original number). Keep dividing to an appropriate degree of accuracy for the problem being solved.

Long division for dividing by 2-digits

Find out 'How many 36s are in 972?"'by subtracting 'chunks' of 36, until zero is reached (or until there is a remainder).

Teach children to write a **useful list** first at the side that will help them decide what chunks to use, e.g.: **Useful list:** 1x is 36
10x is 360
100x is 3600

,

```
   27
36 | 972
   -720   = 36 x (20)
   252
   -180   = 36 x (5)
   72
   - 72   = 36 x (2)
   0
```

```
   28 r 12 or 12/15 or 4/5
15 | 432
   -300   = 15 x (20)
   132
   -120   = 15 x (8)
   12
```