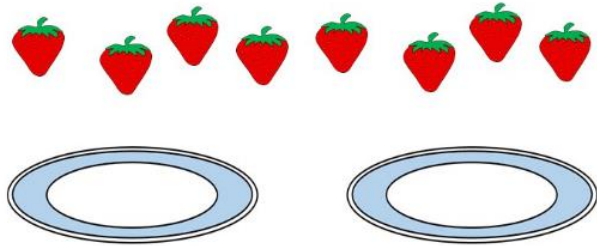
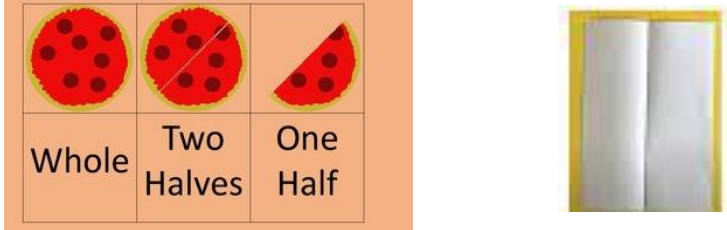


Reception: Spring - Summer term	Division	
Vocabulary: Share, divide, equally, group in pairs, half/halve, quarter, equals		
Concrete	Pictorial	Abstract
<p><b><u>Daily routines and mathematical discussions</u></b> Children will solve problems in a practical way in the context of real life. They need to see and hear representations of division as sharing and grouping. Pictorial representations are used alongside concrete apparatus.</p>	<p><b><u>Number talk</u></b> Plan number talk opportunities and take advantage of incidental opportunities for number talk when looking at books and images.</p>	<p><b><u>No formal written method.</u></b></p>
<p><b><u>Sharing</u></b> Share real objects (e.g. fruit) equally between a number of children, teddy bears etc. The objects are shared, one per set, until the total is exhausted.</p>	<p>Share the strawberries equally between the 2 plates and complete the sentence below.</p> 	<p><b><u>Begin to explore with own symbols and marks (jottings)</u></b> Children to be given a mathematical concept and asked to make marks to represent this (mathematical jottings)</p>
<p><b><u>Grouping</u></b> Grouping. Repeatedly subtract equal groups of objects until the total is exhausted</p>		<p><b><u>Begin to explore with own symbols and marks (jottings)</u></b></p>
<p><b><u>Halving</u></b> -Find and recognise halves using concrete apparatus (e.g. pizza slices, apple fractions) and corresponding pictorial representations. -Halve paper shapes by folding.</p>		

**YEAR 1**

**Division**

Vocabulary: ones, group, groups, equal groups of, lots of, halving, array, row, column, lots of, pattern, share, share equally, one each, two each etc....

**Concrete**

**Pictorial**

**Abstract**

See Year 1 multiplication for counting in equal groups of 2, 5 and 10 and counting on and back in these groups.

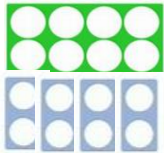
**Making equal groups:**

Start with recognising when groups are equal.

**Numicon**

Equal groups of 2, 5 and 10

$8 \div 2 = 4$



There are 4 groups of 2.

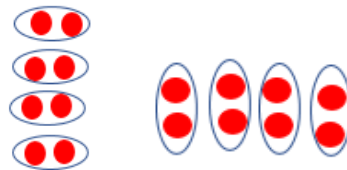
**Objects**



**Making equal groups:**

$8 \div 2 = 4$

**Arrays**



Rows

Columns

**Making equal groups:**

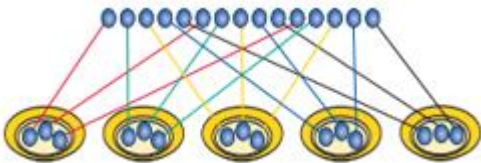
No formal written method.

**Sharing:**

$15 \div 5 = 3$

15 shared between 5

**Counters/objects**

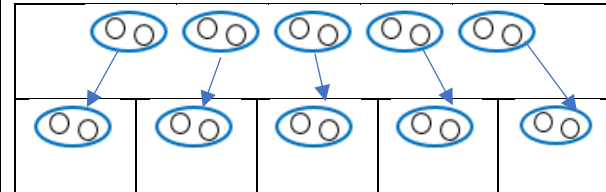


Encourage one to one correspondence.

**Sharing:**

**Bar model (using jottings):**

$10 \div 5 = 2$



**Sharing:**

No formal written method.

**Halving:**

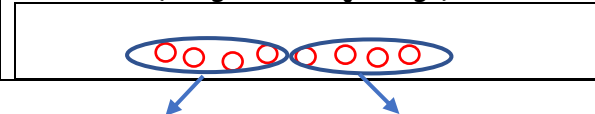
Making the link between  $\div 2$  and the fraction  $\frac{1}{2}$ .

**Concrete objects**

$10 \div 2 = 5$

**Halving:**

**Bar model (using diennes jottings)**



Leads on to instant mental recall.



10 divided into 2 groups equals 5 in each group.

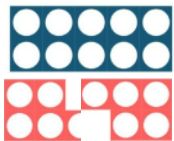
**Beads**

$$6 \div 2 = 3$$



**Numicon:**

$$10 \div 2 = 5$$



4



4

**Circles**

## Mental

### Number facts:

Experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10.

Count a set of objects by grouping in 2s, 5s or 10s

*Count these pennies (2 at a time)*

### Using doubling and halving:

Know corresponding halves of doubles to 10.

Half of 6 is

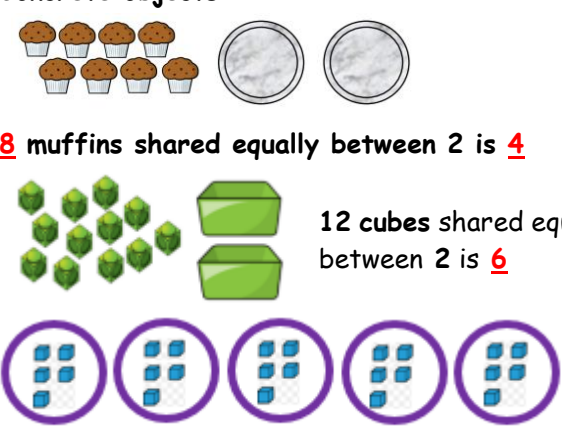
Half of 10 is

**Vocabulary:**

Division, divided by, share, shared between, equal, groups, same, number sentence, calculation, number, numeral, digit, pattern, inverse, jottings.

Concrete	Pictorial/jottings	Abstract
----------	--------------------	----------

**Equal groups - sharing ( $\div 2, 5$  and  $10$ )**  
**Concrete objects:**



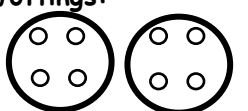
**8** muffins shared equally between **2** is **4**

**12** cubes shared equally between **2** is **6**

**25** divided by **5** equals **5** in each group.

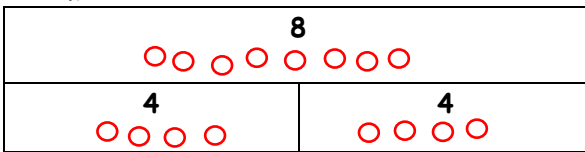
**Equal groups - sharing**

**Jottings:**



8 shared between 2 is 4       $8 \div 2 = 4$

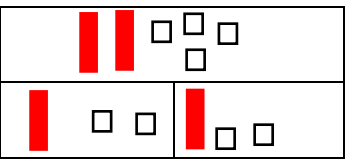
**Bar model:**



No formal written method

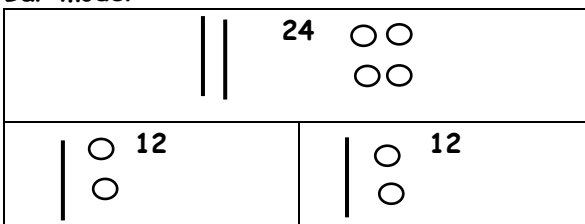
**Halving:**  
 $24 \div 2 = 12$  (link to fractions)

**Diennes**



**Halving:**  
 $24 \div 2 = 12$

**Bar model:**



No formal written method

**Equal groups - grouping**

$10 \div 2 = 5$

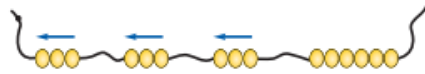
**Cubes**



There are 2 groups of 5 sweets.

**Bead string**

$15 \div 3 = 5$



**Concrete**

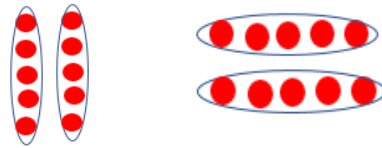


There are 3 groups of 5 sweets.

**Equal groups - grouping**

$10 \div 2 = 5$

**Arrays:**



As columns

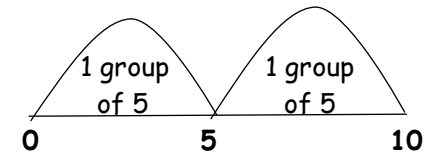
OR

as rows

**Equal groups - grouping**

$10 \div 2 = 5$

**Number line:**



**Mental**

**Number facts**

Count regularly, on and back, in steps of 2, 3, 5 and 10 from 0.

Instantly recall the 2, 5 and 10 times tables.

Understand, **show** and **use** the **inverse** relationship between **multiplication** and **division** e.g.

$4 \times 10 = 40$	$4 \times \square = 40$
$10 \times 4 = 40$	$\square \times 10 = 40$
$40 \div 10 = 4$	$40 \div \square = 40$
$40 \div 4 = 10$	$\square \div 4 = 40$

**Using doubling and halving:**

Know corresponding halves of doubles of all numbers to 15 and doubles of all numbers of multiples of 5 to 50.

$14 \div 2 = 7$  (by recalling the doubles first)

**Using known facts and place value:**

If  $4 \div 2 = 2$   
Then  $40 \div 2 = 20$

**Recognize odd and even numbers:**

Explain why 15 is an odd number

YEAR 3

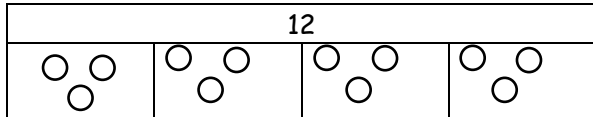
Division (by 3, 4 and 8)

Vocabulary: share, share equally, one each, two each..., group, groups of, lots of, array, row, column, equal groups of, group in pairs, 3s ... 10s, equal groups of, divide, ÷, divided by, divided into, remainder, left over, inverse, in every,

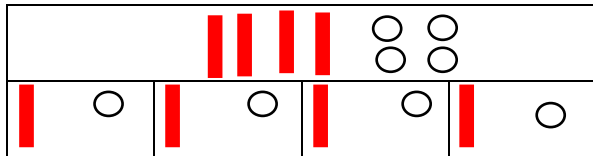
Concrete

Sharing (using dienes/place value counters/ numicon and bar model)

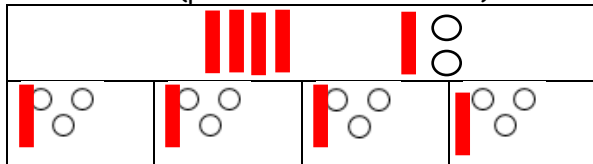
$12 \div 4 = 3$



$44 \div 4 = 11$



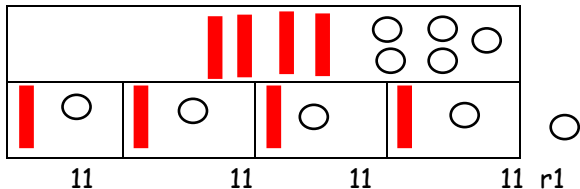
$52 \div 4 = 13$  (partition into 40 and 12)



Remainders:

Sharing

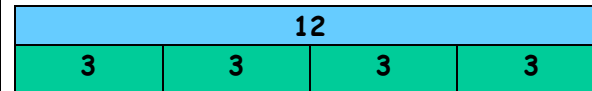
$45 \div 4 = 11r1$



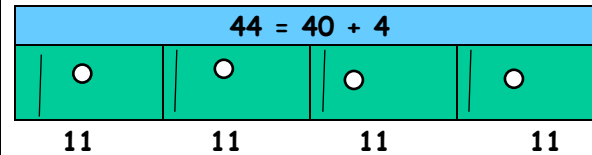
Pictorial

Sharing (using jottings moving onto numbers)

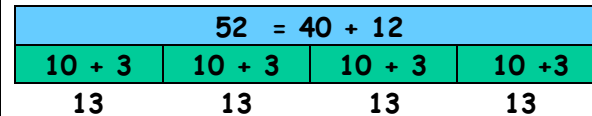
$12 \div 4$



$44 \div 4$



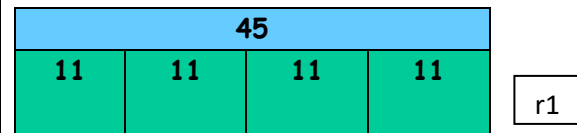
$52 \div 4$



Remainders:

Sharing

$45 \div 4 = 11r1$



Abstract

Written

No written method.

Sharing method eventually links with fractions.

**Grouping**

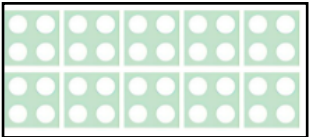
$30 \div 6 = 5$



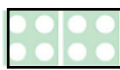
Link with  $5 \times 6 = 30$

$48 \div 4 = 12$

$10 \times 4$



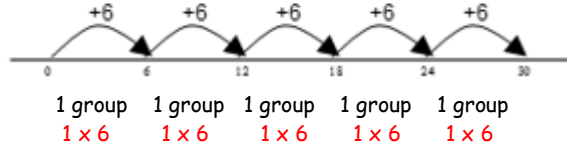
$2 \times 4$



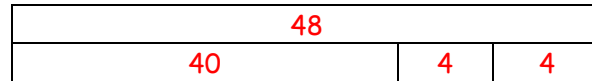
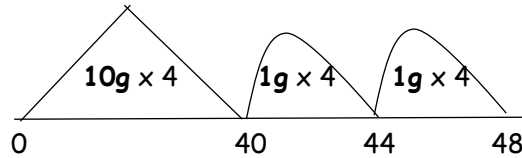
**Grouping**

$30 \div 6 = 5$

How many 6's are in 30?  
 $30 \div 6$  can be modelled as:



$48 \div 4 = 12$



**Remainders:**

**Grouping**

$49 \div 4 = 12r1$

$10 \times 4$



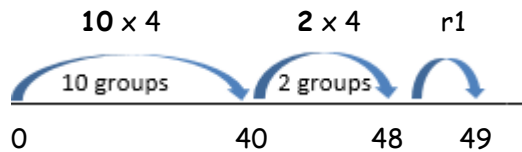
$2 \times 4$



**Remainders:**

**Grouping**

$49 \div 4 = 12r1$


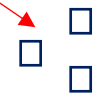


**Written**

No written method.

**÷10 and ÷100**

$$30 \div 10 = 3$$

H	T	O
		
		

(also multiple of  $100 \div 10$  and  $\div 100$ )

**÷10 and ÷100**

$$40 \div 10 = 4$$

H	T	O
	4	0
		4

(also multiple of  $100 \div 10$  and  $\div 100$ )

**÷10 and ÷100:**

**Mentally**

$$50 \div 10 = 5$$

$$200 \div 10 = 20$$

$$200 \div 100 = 2$$

## Mental

**Using known facts and place value:**

$$\text{If } 6 \div 2 = 3$$

$$\text{Then } 60 \div 2 = 30; 600 \div 2 = 300$$

**Halving:**

$$44 \div 2 = 22$$

**Halve and halve again:**

$$44 \div 4 =$$

$$44 \div 2 = 22$$

$$22 \div 2 = 11$$

**Using the inverse:**

$$\text{If } 4 \times 8 = 32$$

$$32 \div 4 = 8$$

$$32 \div 8 = 4$$

**Partitioning:**

No exchanging

$$69 \div 3 = 23$$

$$60 \div 3 = 20$$

$$9 \div 3 = 3$$

$$20 + 3 = 23$$

**Partitioning in different ways:**

$$42 \div 3$$

Partition into different tens and ones to support division.

$$30 + 12 \text{ (both divisible by 3)}$$



# YEAR 4

# Division

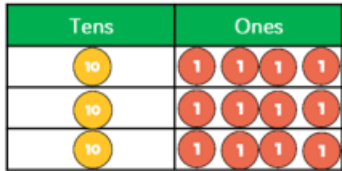
Vocabulary: divide, divided by, divisible by, divided into, share between, groups of, factor, factor pair, multiple, times as (big, long, wide ...etc), for every, equals, remainder, quotient, divisor, inverse

## Concrete

Divide a 2 digit number by a 1 digit number

Start with simple partitioning ( $36 \div 3$ ) then:

$42 \div 3$



$= 14$

1 ten has been exchanged for 10 ones.

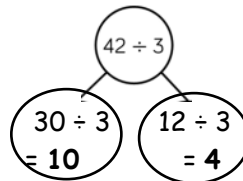
Extend to include remainders.

## Pictorial

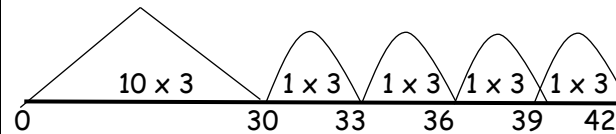
Divide a 2 digit number by a 1 digit number

Start with simple partitioning ( $36 \div 3$ ) then:

$42 \div 3$



OR



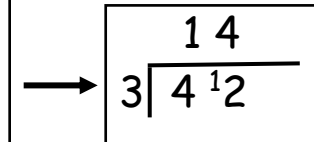
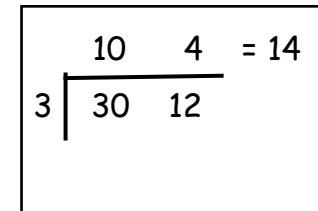
$10 + 4 = 14$  (moving on to jumps of  $4 \times 3$ )

## Abstract

Divide a 2 digit number by a 1 digit number

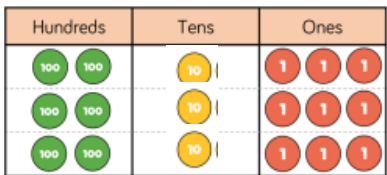
Start with simple partitioning ( $36 \div 3$ ) then:

$42 \div 3$

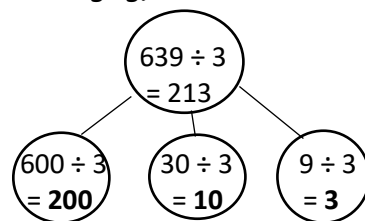


Divide a 3 digit number by a 1 digit number (no exchanging)

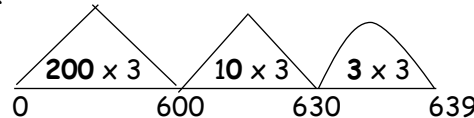
$639 \div 3$



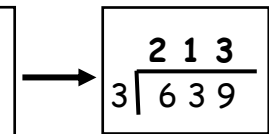
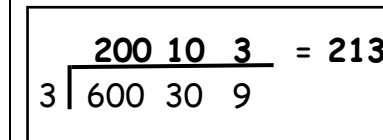
Divide a 3 digit number by a 1 digit number (no exchanging)  $639 \div 3$



OR



Divide a 3 digit number by a 1 digit number (no exchanging)  $639 \div 3$



## Mental Methods

### Number facts:

Count on and back in multiples of 6, 7, 9, 25 and 1000.

### Doubling and halving

Derive corresponding halves of doubles of multiples of 50 to 1000 and multiples of 1000.

### Partitioning:

Continue to partition 2 and 3 digit numbers in different ways:

0 7 14 21 28 ...  
300 275 250 225 200 ...

Learn the multiplication facts to  $12 \times 12$  and use place value to derive related facts.

$$6 \times 7 = 42 \quad 70 \times 6 = 420$$

$$42 \div 6 = 7 \quad 420 \div 6 = 70$$

How many sixes in 54?

Divide 63 by 7

350 divided by 5

108  $\div$  12, what is the quotient?

**Inverse:**

Write the related number sentences

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

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

Half of 150 is \_\_\_  $700 \div 2 =$  \_\_\_  $6000 \div 2 =$  \_\_\_

**$600 \div 4$**  (halve & halve again)

Half of 600 is 300, half of 300 is **150**

**$112 \div 8$**  (halve, halve and halve again)

Half of 112 = 56, half of 56 = 28, half of 28 = **14**

**Using known facts and place value:**

If  $6 \div 2 = 3$

Then:

$60 \div 20 = 3$ ,  $600 \div 3 = 200$  etc.

**Using factors**

Recognise and use factor pairs

List the factor pairs of 32

$500 \div 20$  (Divide 500 by 10 then divide by 2)

$90 \div 6$  (Divide 90 by 3 then divide by 2)

$$762 = 700 + 60 + 2$$

$$762 = 600 + 120 + 42 \text{ etc}$$

**Without crossing the tens boundary:**

$$78 \div 6 = 13$$

Partition in to multiples of the divisor

$$60 \div 6 = 10; 18 \div 6 = 3$$

$$10 + 3 = 13$$

**Crossing the tens boundary:**

$$185 \div 5 = 37$$

$$150 \div 5 = 30; 35 \div 5 = 7$$

$$30 + 7 = 37$$

With remainders:  $187 \div 5$

(using jottings - see above)

**YEAR 5**

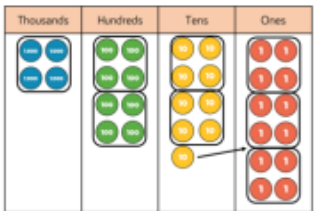
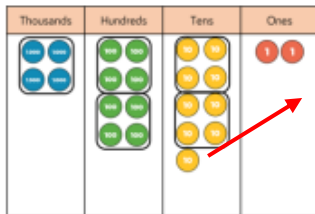
**Division**

Vocabulary: common factors, prime number, prime factors, composite numbers, short division, square number, cube number, inverse, power of. (see previous year groups)

**Concrete**

Divide numbers up to 4 digits by a one-digit number (no remainders)  
(start with 4d ÷ 1d no exchanging e.g. 4848 ÷ 4)

$4892 \div 4 = 1223$



1 2 2 3

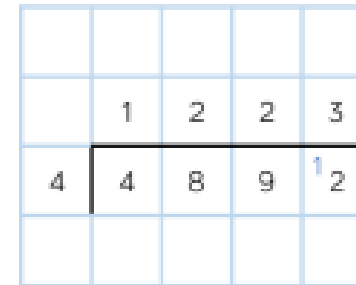
**Pictorial**

Divide numbers up to 4 digits by a one-digit number (no remainders)

**Abstract**

Divide numbers up to 4 digits by a one-digit number (no remainders)

$4892 \div 4$



Divide numbers up to 4 digits by a one-digit number (with remainders)

Display remainder in different ways e.g. r 4 or  $\frac{4}{5}$   
In some examples, recognise some simple decimals e.g. if quotient is  $23\frac{3}{4}$ , recognise it can also be expressed as 23.75

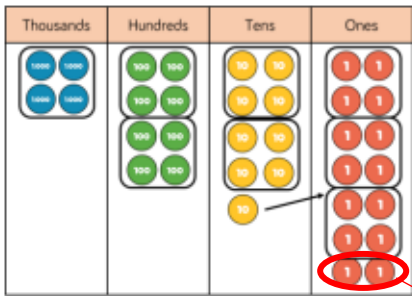
$4892 \div 4 = 1223$

Divide numbers up to 4 digits by a one-digit number (with remainders)

Divide numbers up to 4 digits by a one-digit number (with remainders)

Divide numbers up to 4 -digits by a 1-digit number using a formal written method (short division) and interpret remainders appropriately for the context

$4892 \div 4 = 1223$

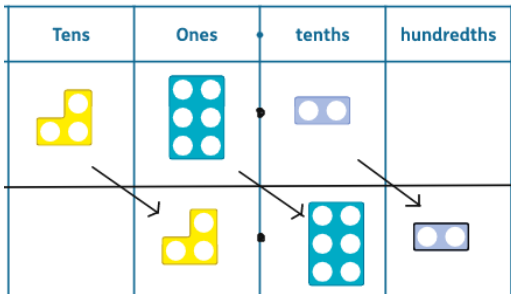


1      2      2      3      → r2

Divide whole numbers and those involving decimals by 10, 100 and 1000

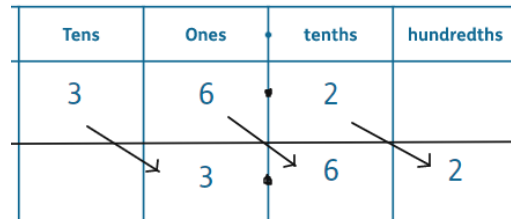
Numicon/place value counters:

$$36.2 \div 10 = 3.62$$



Divide whole numbers and those involving decimals by 10, 100 and 1000

$$36.2 \div 10 = 3.62$$



	1	2	2	3	
4	4	8	9	4	r2

Divide whole numbers and those involving decimals by 10, 100 and 1000

No written method - mental method only.

**Number facts**

Count regularly using a range of multiples, and powers of 10, 100 and 1000, building fluency.

Practice and apply the multiplication facts to 12 x 12.

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

0.6 1.2 1.8 2.4 ....

Derive corresponding halves of doubles of decimals (to 1 place) using knowledge of place value.

Half of 0.4 = 0.2     $3.6 \div 2 = 1.8$

Continue to recall division facts for multiplication tables to 12 x 12 fluently and derive and use related facts:

*560 divided by 7    divide 2.1 by 7*

*4500 ÷ 5, what is the quotient?*

*3.2 divided by 4*

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

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

**Using known facts and place value**

$8.4 \div 7$  (multiply dividend by 10, then divide quotient by 10)  $84 \div 7 = 12$ ,  $12 \div 10 = 1.2$

**Mental methods and jottings**

Divide mentally drawing upon known number facts.

Use factors to construct equivalence statements.

Begin to divide tenths and 1-digit whole numbers and tenths by 1-digit whole numbers.

**Partitioning**

Using distributive law:

$546 \div 6$

( $540 \div 6 = 90$ ;  $6 \div 6 = 1$  so  $90 + 1 = 91$ )

**With Jottings**

$24.5 \div 7$

$21 \div 7 = 3$ ;  $3.5 \div 7 = 0.5$

so  $3 + 0.5 = 3.5$

Continue to partition number in different ways:

$762 = 700 + 60 + 2$ ;

$762 = 600 + 120 + 42$  etc

**Doubling and halving**

$14.8 \div 4$  (halve and halve again)

*Half of 14.8 = 7.4; half of 7.4 = 3.7*

**With jottings:**

$3800 \div 50$  (divide by 100 then double)

$3800 \div 100 = 38$ ; double 38 = 76.

**Factors**

$84 \div 20$  (halve and divide by 10)

$84 \div 2 = 42$  then  $42 \div 10 = 4.2$

**With jottings**

$150 \div 6$

( $150 \div 3 = 50$  then  $50 \div 2 = 25$ ).

**Estimating**

Use rounding to check answers to calculation and determine, in the context of a problem, levels of accuracy:

$256 \div 12$  is approximately  $2560 \div 10$ .

Continue to use appropriate strategies to check answers:

Check  $860 \div 9$  by using the inverse.

**YEAR 6**

**Division**

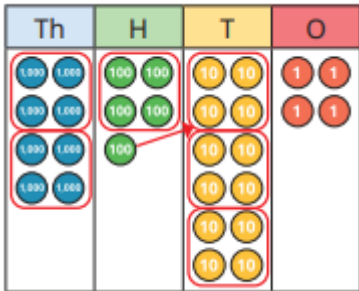
Vocabulary: common factors, prime number, prime factors, composite numbers, short division, square number, cube number, inverse, power of. (See previous year groups)

**Concrete**

**Divide numbers up to 4 digits by two-digit numbers**

Divide numbers up to 4 -digits by a 2-digit number using a formal written method (short division) and interpret remainders appropriately for the context

$8524 \div 4 = 2131$



**Pictorial**

**Divide numbers up to 4 digits by two-digit numbers**

**Abstract**

**Divide numbers up to 4 digits by two-digit numbers**

See below for written methods

**Short Division**

$496 \div 11$  becomes

$$\begin{array}{r} 45 \text{ r}1 \\ 11 \overline{) 496} \\ \underline{44} \phantom{0} \\ 56 \\ \underline{55} \\ 1 \end{array}$$

Answer:  $45 \frac{1}{11}$

**Long Division with remainders as fractions**

$432 \div 15$  becomes

$$\begin{array}{r} 28 \text{ r}12 \\ 15 \overline{) 432} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

Answer:  $28 \frac{12}{15}$

**Long Division with remainders as decimals**

$432 \div 15$  becomes

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Answer: 28.8

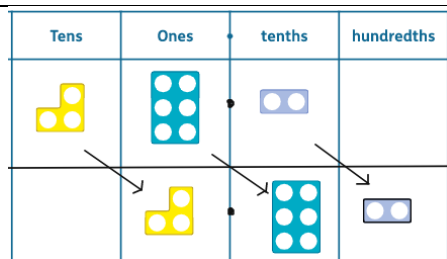
**Divide whole numbers and those involving decimals by 10, 100 and 1000**

$36.2 \div 10 = 3.62$

**Divide whole numbers and those involving decimals by 10, 100 and 1000**

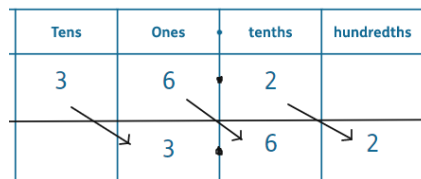
**Divide whole numbers and those involving decimals by 10, 100 and 1000**

No written method - mental method only.



Use of manipulatives (numicon or place value counters) to show movement of digits across the columns.

$$36.2 \div 10 = 3.62$$



## Mental Methods (as with Year 5)

### Number facts

Use knowledge of counting in multiples to counting in decimal steps (two decimal places).

0.09 0.18 0.27 0.36 ...

Continue to recall division facts for multiplication tables to 12 x 12 fluently and derive and use related facts:

3000 divided by 60    divide 0.12 by 6

5800 ÷ 6, what is the quotient?

0.64 divided by 8

### Using known facts and place value:

0.99 ÷ 11 (multiply dividend by 100, then divide quotient by 100)

99 ÷ 11 = 9, 9 ÷ 100 = 0.09

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

Use tests of divisibility to decide whether the answer will have a remainder

### Mental methods and jottings

Divide mentally drawing upon known number facts.

Use factors to construct equivalence statements.

Begin to divide hundredths, tenths and 1-digit whole numbers and tenths by 1 and 2-digit whole numbers.

### Partitioning

Using distributive law:

5466 ÷ 6

(5400 ÷ 6 = 900; 60 ÷ 6 = 10; 6 ÷ 6 = 1

so 900 + 10 + 1 = 911)

### Halving:

Derive corresponding halves of decimals (to 2 places) using knowledge of place value.

Half of 0.48 is     0.74 ÷ 2 =

### Factors

84 ÷ 20 (halve and divide by 10)

84 ÷ 2 = 42 then 42 ÷ 10 = 4.2

### With jottings

888 ÷ 24 = 888 ÷ 8 ÷ 3

### Estimating

Use rounding to check answers to calculation and determine, in the context of a problem, levels of accuracy:

4560 ÷ 19 is almost 4560 ÷ 20

Continue to use appropriate strategies to check answers:

### Inverse

Check by using the inverse.

If 4560 ÷ 19 = 240 then 240 x 19 = 4560