

# DIVISION

## YEAR 2

Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs.

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in context.

Children will develop their understanding of division and use their knowledge of multiplication to make links.

### Smiley face method

#### Example 1

$$22 \div 2 = 11 \quad \boxed{11} \times 2 = 22$$

☺	☺	<u>Given away</u>	<u>Left</u>
5	5	10	12
3	3	6	6
3	3	6	0
(11)	(11)		

NB: Teacher will write this out, but child will calculate mentally.

- 1) Read  $22 \div 2$  as 22 shared between 2.
- 2) Draw the number of circles you are sharing between.
- 3) Think of the biggest amount (out of 10, 5, 2 or 1) you could give each group
- 4) Write how many you've given each group under its circle.
- 5) Work out how many are left.
- 6) Keep repeating steps 3 to 5 until there is nothing left to give away.
- 7) Add up how many you have given to one group and write it in the circle.

### Smiley face method

#### Example 2

$$25 \div 5 = 5 \quad \boxed{5} \times 5 = 25$$

☺	☺	☺	☺	☺	<u>Given away</u>	<u>Left</u>
1	1	1	1	1	5	20
2	2	2	2	2	10	10
2	2	2	2	2	10	0
(5)	(5)	(5)	(5)	(5)		

### Halving

Children should understand that halving is the same as dividing by 2. They should know half of even numbers up to 24.

#### Example

Half of 14

$$14 = 10 + 4$$

$\swarrow$   
5

+

$\searrow$   
2

= (7)

## YEAR 3

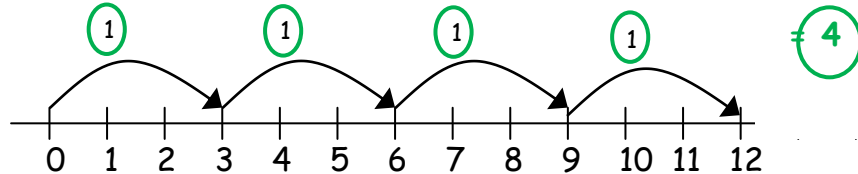
Write and calculate mathematical statements for division using the multiplication tables that they know, using mental and progressing to formal written methods.

Children will begin to use chunking on a number line. They will also continue to make links with multiplication.

### Example 1

$$12 \div 3 = 4$$

$$\boxed{4} \times 3 = 12$$



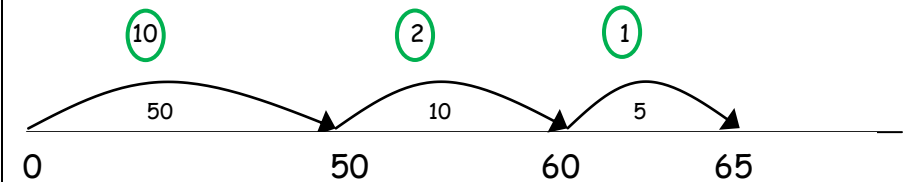
- 1) Draw a number line with 0 at the beginning and the 'target' number at the end.
- 2) Make repeated jumps of the divisor recording as above until they reach the target number.
- 3) Total the numbers above the jumps.

Using times table knowledge, children will begin to count up in bigger jumps.

### Example 2

$$65 \div 5 = 13$$

$$\boxed{13} \times 5 = 65$$



### Halving

Children should understand that halving is the same as dividing by 2. They should know half of even numbers up to 100 using partitioning. Children should then be able to use their halving knowledge to mentally divide by 4; halve and halve again. They will also be able to mentally divide by 8; halve, halve and halve again.

### Example

$$48 \div 4 = 12$$

$$\begin{array}{r} 48 = 40 + 8 \\ \swarrow \quad \searrow \\ 20 \quad + \quad 4 = 24 \\ \swarrow \quad \searrow \\ 10 \quad + \quad 2 = 12 \end{array}$$

Now halve again.

## YEAR 4

Children will begin to use extended division.

### Example 1

$$48 \div 3 = 16$$

$$\begin{array}{r}
 16 \\
 3 \overline{) 48} \\
 \underline{- 30} \\
 18 \\
 \underline{- 15} \\
 3 \\
 \underline{- 3} \\
 0
 \end{array}$$

(10)

(5)

(1)

Children may do this in 1 step, depending on tables knowledge.

- 1) Draw a 'bus stop' and put the divisor outside and the dividend inside.
- 2) Try subtracting 10 lots of the divisor (if not possible, then subtract 5 lots) and write this in brackets next to the number.
- 3) Subtract that answer from the dividend to see what is left.
- 4) Continue subtracting lots of until you have nothing remaining.
- 5) Add up the numbers in the circle and record above bus stop in correct place value columns.

Children will then be given division calculations which are not multiples of the divisor and have remainders.

As the numbers increase, the children should write a bank of useful facts.

### Example 2

$$155 \div 4 = 38 \text{ r}3$$

$$\begin{array}{r}
 38 \text{ r}3 \\
 4 \overline{) 155} \\
 \underline{- 120} \\
 035 \\
 \underline{- 32} \\
 3
 \end{array}$$

(30)

(8)

<u>Bank</u>
$10 \times 4 = 40$
$20 \times 4 = 80$
$30 \times 4 = 120$

### Example 3

$$196 \div 6 = 32 \text{ r}4$$

$$\begin{array}{r}
 32 \text{ r}4 \\
 6 \overline{) 196} \\
 \underline{- 180} \\
 16 \\
 \underline{- 12} \\
 4
 \end{array}$$

(30)

(2)

<u>Bank</u>
$10 \times 6 = 60$
$20 \times 6 = 120$
$30 \times 6 = 180$

## YEAR 5

Divide numbers up to four digits by a one-digit number, using the formal written method of short division and interpret remainders appropriately for the context.

Children will continue using extended division when dividing by a 2 digit number.

When dividing by a 1 digit number, children will begin to use short division.

### Example 1

$$\begin{array}{r} 321 \\ 3 \overline{)963} \end{array}$$

- 1) Draw a 'bus stop' and put the divisor outside and the dividend inside.
- 2) Look at the first digit, (children can cover the other 2 digits with their finger) how many 3s are in 9? 3, the 3 digit then goes in the hundreds place value position.
- 3) How many 3s are in 6? 2, the 2 digit then goes in the tens place value position.
- 4) How many 3s are in 3? 1, so the 1 digit goes in the 1s place value position.

N.B: when teaching short division, children should have a secure knowledge of place value. Therefore, the digits in each calculation should be treated as ones.

### Example 2

$$\begin{array}{r} 24 \\ 4 \overline{)96} \end{array}$$

- 1) Draw a 'bus stop' and put the divisor outside and the dividend inside.
- 2) How many 4s are in 9? 2, but there is 1 left over. This 1 is then 'carried' to the 1s digit. The 2 digit then goes in the tens place value position.
- 3) How many 4s are in 16? 4, so the 4 digit goes in the 1s place value position.

### Example 3

This example is similar to the first 2 examples, but it has remainders.

$$\begin{array}{r} 1223 \text{ r}5 \\ 6 \overline{)7343} \end{array}$$

## YEAR 6

Divide numbers up to four 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 written division methods in cases where the answer has up to two decimal places.

Pupils divide numbers with up to two decimal places by one-digit and two-digit whole numbers.

Children will continue to use the extended division method when dividing 3 and 4 digit numbers by a 2 digit number.

$$977 \div 36 = 27 \text{ r}5$$

$$\begin{array}{r}
 \phantom{36} \overline{27} \text{ r}5 \\
 36 \overline{) 977} \\
 \underline{- 360} \quad (10) \\
 \phantom{36} \overline{617} \\
 \underline{- 360} \quad (10) \\
 \phantom{36} \overline{257} \\
 \underline{- 180} \quad (5) \\
 \phantom{36} \overline{077} \\
 \underline{- 72} \quad (2) \\
 \phantom{36} \overline{5}
 \end{array}$$

<u>Bank</u> $10 \times 36 = 360$ $20 \times 36 = 720$ $5 \times 36 = 180$
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They may also use the short division method when dividing 3 and 4 digit numbers by a 2 digit number.

$$432 \div 15 = 28 \text{ r} 12$$

$$\begin{array}{r}
 \phantom{15} \overline{28} \text{ r} 12 \\
 15 \overline{) 432}
 \end{array}$$

<u>Bank</u> $1 \times 15 = 15$ $2 \times 15 = 30$ $3 \times 15 = 45$ $4 \times 15 = 60$ $5 \times 15 = 75$ $6 \times 15 = 90$ $7 \times 15 = 105$ $8 \times 15 = 120$ $9 \times 15 = 135$
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When dividing numbers to 2 decimal places by a whole number children will use short division.

$$\begin{array}{r}
 \phantom{5} \overline{7.43} \\
 5 \overline{) 37.15}
 \end{array}$$

Children will then move onto using one of two formal long division method interpreting remainders as decimals.

Example 1

$435 \div 25 = 17.4$

$$\begin{array}{r}
 017.4 \\
 25 \overline{) 435.0} \\
 \underline{0} \phantom{0} \phantom{0} \phantom{0} \\
 4 \phantom{0} \phantom{0} \phantom{0} \\
 \underline{25} \phantom{0} \phantom{0} \\
 185 \phantom{0} \\
 \underline{175} \phantom{0} \\
 100 \\
 \underline{100} \\
 0
 \end{array}$$

<p><u>Bank</u>  <math>2 \times 25 = 50</math>  <math>3 \times 25 = 75</math>  <math>4 \times 25 = 100</math>  <math>6 \times 25 = 150</math></p>
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Example 2

$432 \div 15 = 28.8$

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

<p><u>Bank</u>  <math>1 \times 15 = 15</math>  <math>2 \times 15 = 30</math>  <math>3 \times 15 = 45</math>  <math>4 \times 15 = 60</math>  <math>5 \times 15 = 75</math>  <math>6 \times 15 = 90</math>  <math>7 \times 15 = 105</math>  <math>8 \times 15 = 120</math>  <math>9 \times 15 = 135</math></p>
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Instructions for example 1

- 1) How many 25s are in 4? 0, so record above bus stop in correct place value position.
- 2) Record what has been 'used' (0) and complete the subtraction (4).
- 3) Bring down the next digit making 43.
- 4) How many 25s are in 43? 1, so record above bus stop in correct place value position.
- 5) Record what has been 'used' (25) and complete the subtraction (18).
- 6) Bring down the next digit making 185.
- 7) How many 25s are in 185? 7, so record above bus stop in correct place value position.
- 8) Record what has been 'used' (175) and complete the subtraction (10).
- 9) Put decimal point in correct place value position above the bus stop.
- 10) Bring down the next digit making 100 - N.B. This ignores that it is a decimal.
- 11) How many 25s are in 100? 4, so record above bus stop in correct place value position.
- 12) You have nothing remaining so the calculation is completed.