Stanton Bridge Primary School

Mathematics Calculation Routeway

Mrs Shelina [DHT]

Times Tables

Please note that it is an expectation that every child knows off by heart up to **their 12x12 tables by the end of year 4.**

It is essential that your child spends time every day practising through constant revision.

Times tables can be found on the school website.

Mrs Shelina [DHT]

1

0+20=20	20+0=20
1+19=20	19+1=20
2+18=20	18+2=20
3+17=20	17+3=20
4+16=20	16+4=20
5+15=20	15+5=20
6+14=20	14+6=20
7+13=20	13+7=20
8+12=20	12+8=20
9+11=20	11+9=20
10+10=20	10+10=20

2

1 x 2 = 2
2 x 2 = 4
3 x 2 = 6
4 x 2 = 8
5 x 2 = 10
6 x 2 = 12
7 x 2 = 14
8 x 2 = 16
9 x 2 = 18
10 x 2 = 20
11 x 2 = 22
12 x 2 = 24

3

1 x 3 = 3
2 x 3 = 6
3 x 3 = 9
4 x 3 = 12
5 x 3 = 15
6 x 3 = 18
7 x 3 = 21
8 x 3 = 24
9 x 3 = 27
10 x 3 = 30
11 x 3 = 33
12 x 3 = 36

4

1 x 4 = 4
2 x 4 = 8
3 x 4 = 12
4 x 4 = 16
5 x 4 = 20
6 x 4 = 24
7 x 4 = 28
8 x 4 = 32
9 x 4 = 36
10 x 4 = 40
11 x 4 = 44
12 x 4 = 48

5

1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
4 x 5 = 20
5 x 5 = 25
6 x 5 = 30
7 x 5 = 35
8 x 5 = 40
9 x 5 = 45
10 x 5 = 50
11 x 5 = 55
12 x 5 = 60

6

1 x 6 = 6
2 x 6 = 12
3 x 6 = 18
4 x 6 = 24
5 x 6 = 30
6 x 6 = 36
7 x 6 = 42
8 x 6 = 48
9 x 6 = 54
10 x 6 = 60
11 x 6 = 66
12 x 6 = 72

7

1 x 7 = 7
2 x 7 = 14
3 x 7 = 21
4 x 7 = 28
5 x 7 = 35
6 x 7 = 42
7 x 7 = 49
8 x 7 = 56
9 x 7 = 63
10 x 7 = 70
11 x 7 = 77
12 x 7 = 84

8

1 x 8 = 8
2 x 8 = 16
3 x 8 = 24
4 x 8 = 32
5 x 8 = 40
6 x 8 = 48
7 x 8 = 56
8 x 8 = 64
9 x 8 = 72
10 x 8 = 80
11 x 8 = 88
12 x 8 = 96

9

1 x 9 = 9
2 x 9 = 18
3 x 9 = 27
4 x 9 = 36
5 x 9 = 45
6 x 9 = 54
7 x 9 = 63
8 x 9 = 72
9 x 9 = 81
10 x 9 = 90
11 x 9 = 99
12 x 9 = 108

10

1 x 10 = 10
2 x 10 = 20
3 x 10 = 30
4 x 10 = 40
5 x 10 = 50
6 x 10 = 60
7 x 10 = 70
8 x 10 = 80
9 x 10 = 90
10 x 10 = 100
11 x 10 = 110
12 x 10 = 120

11

1 x 11 = 11
2 x 11 = 22
3 x 11 = 33
4 x 11 = 44
5 x 11 = 55
6 x 11 = 66
7 x 11 = 77
8 x 11 = 88
9 x 11 = 99
10 x 11 = 110
11 x 11 = 121
12 x 11 = 132

12

1 x 12 = 12
2 x 12 = 24
3 x 12 = 36
4 x 12 = 48
5 x 12 = 60
6 x 12 = 72
7 x 12 = 84
8 x 12 = 96
9 x 12 = 108
10 x 12 = 120
11 x 12 = 132
12 x 12 = 144

3

Addition

Key stage one mathematics calculation focuses on the deeper knowledge and understanding of concepts and mental strategies needed before moving onto written. It is essential to children's mathematical development that they are given the opportunity to access these concepts across the curriculum, showing a mastery level understanding before moving onto full written methods. Key to this development is the natural links from mental to written strategy - allow children to experience the written form alongside the practical.
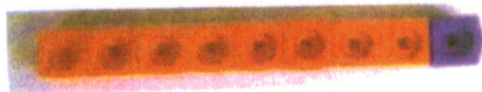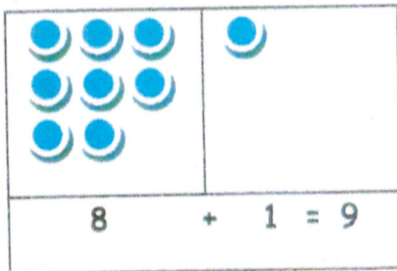
Joining two groups and the recounting all objects using one to one correspondence.

3 + 4 = 7
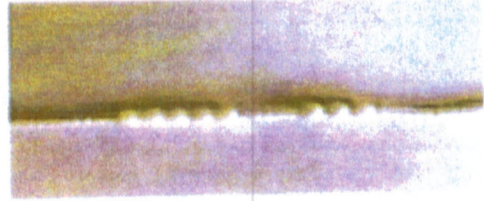
Counting on (Single digit from single digit, single digit from two-digit)

8 + 1 = 9

5 + 12 = 17

8 + 1 = 9

5 6 7 8 9 10 11 12 13 14 15 16 17 18
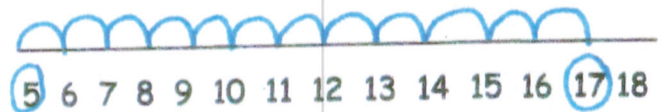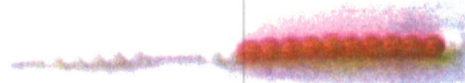
Number bonds to 10 and 20.

Add with numbers up to 20.

Use fingers, number lines and hundred squares to add by counting in ones, starting with the largest number first,

6 + 3 = 9   15 + 4 = 19

* Also use bead strings to help consolidate understanding of bridging through 10.

Add 2 digit numbers and tens

23 + 20 = 43
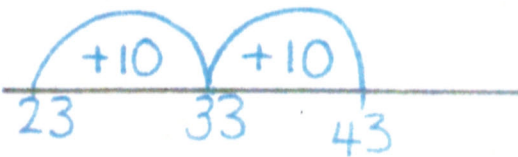
Add two digit numbers and units

17 + 6 = 23

Add two pairs of 2-digit numbers using partitioning

33 + 13 = 46
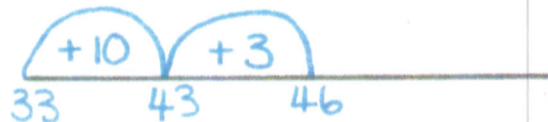
10 3

Note: Only use numbers with units that do not cross the tens boundary until children are secure with the method.

Partitioned column method

58 + 43 = 101

40 3

6

Year 3	Year 4

Add numbers with up to 3 digits, using formal written methods of columnar addition.

Add numbers with up to 4 digits, using formal written methods of columnar addition.

Year 3

Expanded method

73 + 59

$$
\begin{array}{r}
73+ \\
59 \\
\hline
12 \quad (3+9) \\
120 \quad (70+50) \\
\hline
132
\end{array}
$$

Columnar addition - no exchanges.

$$
\begin{array}{r}
341+ \\
226 \\
\hline
567
\end{array}
$$

Columnar addition - one exchange

$$
\begin{array}{r}
347+ \\
215 \\
\hline
562 \\
1
\end{array}
$$

Columnar addition - two exchanges.

$$
\begin{array}{r}
537+ \\
396 \\
\hline
933 \\
1\,1
\end{array}
$$

Adding numbers with differing amounts of digits.

$$
\begin{array}{r}
261+ \\
93 \\
\hline
354 \\
1
\end{array}
\qquad
\begin{array}{r}
679+ \\
154 \\
\hline
833 \\
1\,1
\end{array}
$$

Year 4

Columnar addition - no exchanges.

$$
\begin{array}{r}
5651+ \\
3123 \\
\hline
8774
\end{array}
$$

Columnar addition - one exchange

$$
\begin{array}{r}
5651+ \\
3163 \\
\hline
8814 \\
1
\end{array}
$$

Columnar addition - two exchanges.

$$
\begin{array}{r}
5651+ \\
3169 \\
\hline
8820 \\
1\,1
\end{array}
$$

Columnar addition - three exchanges.

$$
\begin{array}{r}
5651+ \\
3569 \\
\hline
9220 \\
1\,1\,1
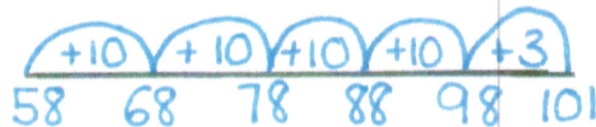\end{array}
$$

Adding numbers with differing amounts of digits.

$$
\begin{array}{r}
5651+ \\
569 \\
\hline
6220 \\
1\,1\,1
\end{array}
\qquad
\begin{array}{r}
3578+ \\
319 \\
\hline
3897 \\
1
\end{array}
$$

Adding 3 numbers.

$$
\begin{array}{r}
261+ \\
319 \\
104 \\
\hline
684 \\
1
\end{array}
\qquad
\begin{array}{r}
261+ \\
564 \\
109 \\
\hline
934 \\
1\,1
\end{array}
$$

7

Year 5	Year 6

Add whole numbers with more than 4 digits using columnar addition.

Pupils practice addition for larger numbers, using the efficient written methods of columnar addition.

Columnar addition – three exchanges.

```
  5 6 5 1 +
  3 5 6 9
  9 2 2 0
   ' ' '
```

Columnar addition – various exchanges.

```
  6 3 4 1 9 +
  3 6 9 7 3
1 0 0 3 9 2
     ' '   '
```

Columnar addition – various exchanges.

```
  6 3 4 1 9 +
  3 6 9 7 3
1 0 0 3 9 2
     ' '   '
```

Numbers with differing decimal places.

```
    5 . 3 1 6 +
  2 3 . 0 1 0
3 9 6 . 0 5 1
4 2 4 . 3 7 7
       ' '
```

Adding numbers with differing amounts of digits and decimals.

```
2 3 1 9 +          2 3 . 6 4 +
    5 3          1 9 4 . 0 6
  6 2 1          2 1 7 . 7 0
2 9 9 3 '          '       '
```

Subtraction

Key stage one mathematics calculation focuses on the deeper knowledge and understanding of concepts and mental strategies needed before moving onto written. It is essential to children's mathematical development that they are given the opportunity to access these concepts across the curriculum, showing a mastery level understanding before moving onto full written methods. Key to this development is the natural links from mental to written strategy - allow children to experience the written form alongside the practical.

Separating one group from the larger and counting what is left over.

7 - 3 = 4
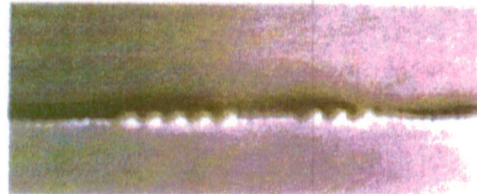
Counting back (Single digit from single digit, single digit from two-digit)

9 - 1 = 8

9 - 1 = 8

17 - 5 = 12

10 11 12 13 14 15 16 17 18 19 20
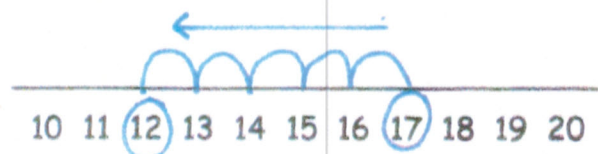
Number bonds to 10 and 20.

Subtract with numbers up to 20.

Use fingers, number lines and hundred squares to subtract by counting back in ones.

9 - 6 = 3

15 - 4 = 11

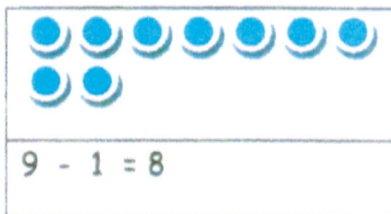| 1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

* Also use bead strings to help consolidate understanding of bridging through 10.

Subtract 2 digit numbers and tens

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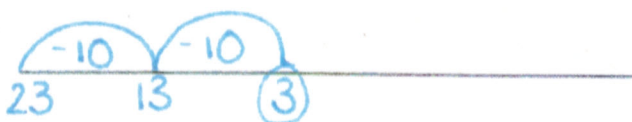
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Subtracting two digit numbers and units

23 - 7 = 16
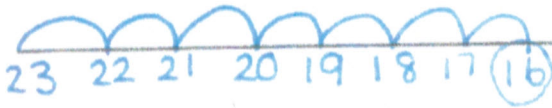
23 22 21 20 19 18 17 (16)

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

Subtract two pairs of 2-digit numbers using partitioning

33 - 12 = 21

$$\begin{array}{r} 30 + 3 \\ -\ 10 + 2 \\ \hline 20 + 1 \end{array} = 21$$

* Note: Only use numbers with units that do not cross the tens boundary until children are secure with the method.

Partitioned column method

64 - 35 = 29

$$\begin{array}{r} \overset{50}{\cancel{60}} + {}^{1}4 \\ -\ 30 + 5 \\ \hline 20 + 9 \end{array} = 29$$

Year 3	Year 4

Subtract numbers with up to 3 digits, using formal written methods of columnar addition.

Subtract numbers with up to 4 digits, using formal written methods of columnar addition.

Expanded method

$634 - 219$

$$
\begin{array}{r}
600 + \overset{20}{\cancel{30}} + \overset{14}{\cancel{4}} \\
- 200 + 10 + 9 \\
\hline
400 + 10 + 5 = 415
\end{array}
$$

Columnar subtraction no exchanges.

$$
\begin{array}{r}
5837 \\
- 1324 \\
\hline
4513
\end{array}
$$

Columnar subtraction – no exchanges.

$$
\begin{array}{r}
635 - \\
213 \\
\hline
422
\end{array}
$$

Columnar subtraction – one exchange

$$
\begin{array}{r}
4\,\overset{6}{\cancel{7}}\,{}^{1}67 \\
- 2392 \\
\hline
2375
\end{array}
$$

Columnar subtraction – one exchange

$$
\begin{array}{r}
\overset{6}{\cancel{7}}{}^{1}84 - \\
391 \\
\hline
393
\end{array}
$$

Columnar subtraction – two exchanges.

$$
\begin{array}{r}
\overset{6}{\cancel{7}}{}^{1}5\overset{4}{\cancel{5}}{}^{1}3 \\
- 3729 \\
\hline
3825
\end{array}
$$

Columnar subtraction – two exchanges.

$$
\begin{array}{r}
\overset{6}{\cancel{7}}{}^{17}\cancel{8}{}^{1}4 - \\
396 \\
\hline
388
\end{array}
$$

Columnar subtraction – three exchanges.

$$
\begin{array}{r}
\overset{5}{\cancel{6}}{}^{12}\cancel{6}{}^{1}2\overset{1}{}5 \\
- 1536 \\
\hline
4789
\end{array}
$$

Columnar subtraction – including zero

$$
\begin{array}{r}
\overset{3}{\cancel{4}}{}^{1}03 - \\
261 \\
\hline
142
\end{array}
$$

Columnar subtraction – including zero

$$
\begin{array}{r}
\overset{5}{\cancel{6}}{}^{1}0\overset{\cancel{9}}{}43 \\
- 4781 \\
\hline
1262
\end{array}
$$

Subtracting numbers with differing amounts of digits.

$$
\begin{array}{r}
649 - \\
31 \\
\hline
618
\end{array}
\qquad
\begin{array}{r}
\overset{5}{\cancel{6}}\overset{13}{\cancel{4}}8 - \\
69 \\
\hline
579
\end{array}
$$

Subtracting numbers with differing amounts of digits.

$$
\begin{array}{r}
1\overset{4}{\cancel{5}}{}^{1}34 \\
- 254 \\
\hline
1280
\end{array}
$$

12

Year 5	Year 6
Subtract whole numbers with more than 4 digits using formal written methods (columnar).	Pupils practice subtraction, for larger numbers, using the efficient written methods of columnar subtraction

Columnar subtraction - three exchanges.

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{\prime}3\,{}^{\prime}\cancel{2}5 \\ -\ 1\ 5\ 3\ 6 \\ \hline 4\ 7\ 8\ 9 \end{array}$$

Columnar subtraction – various exchanges.

$$\begin{array}{r} 7\,{}^{4}\cancel{8}\,3\,{}^{5}\cancel{6}5 \\ -\ 3\ 2\ 5\ 3\ 9 \\ \hline 4\ 2\ 8\ 2\ 6 \end{array}$$

Columnar subtraction – various exchanges.

$$\begin{array}{r} 7\,{}^{4}\cancel{8}\,3\,{}^{5}\cancel{6}5 \\ -\ 3\ 2\ 5\ 3\ 9 \\ \hline 4\ 2\ 8\ 2\ 6 \end{array}$$

Numbers with differing decimal places.

$$\begin{array}{r} {}^{2}\cancel{3}\,{}^{12}\cancel{2}\,{}^{6}\cancel{7}\,{}^{\prime}\cancel{5}0 \\ 6\ 2\ .\ 6\ 3 \\ \hline 2\ 6\ 4\ .\ 8\ 7 \end{array}$$

Subtracting numbers with differing amounts of digits and decimals.

$$\begin{array}{r} 1\,{}^{4}\cancel{5}\,{}^{\prime}3\,4 \\ -\ \ 2\ 5\ 4 \\ \hline 1\ 2\ 8\ 0 \end{array}$$

$$\begin{array}{r} {}^{5}\cancel{6}1\ .\ 3 \\ -\ 1\ 2\ .\ 1 \\ \hline 4\ 8\ .\ 2 \end{array}$$

13

Multiplication

Key stage one mathematics calculation focuses on the deeper knowledge and understanding of concepts and mental strategies needed before moving onto written. It is essential to children's mathematical development that they are given the opportunity to access these concepts across the curriculum, showing a mastery level understanding before moving onto full written methods. Key to this development is the natural links from mental to written strategy - allow children to experience the written form alongside the practical.

Multiply with concrete objects, arrays and pictorial representations.

How many legs will 3 teddies have?

2 + 2 + 2 = 6
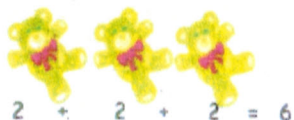
There are 3 sweets in one bag. How many sweets are in 5 bags altogether?
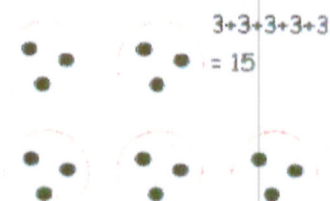
3+3+3+3+3
= 15

Counting in groups of 2's, 5's and 10's.

How many eyes?

2 + 2 + 2 = 6

5 + 5 + 5 = 15

14

Multiply using arrays and repeated addition.

Using a number line:

Starting with zero, make equal jumps up on a number line.

$$4 \times 5 = 20$$

Using arrays:

5 x 3 = 15

$$5 \times 3 = 3 + 3 + 3 + 3 = \underline{15}$$

$$3 \times 5 = 5 + 5 + 5 = \underline{15}$$

3 x 5 = 15

* Note: Use arrays to help teach children the commutative law of multiplication and give examples such as 3 x ____ = 15

Year 3	Year 4

Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers time one-digit numbers, using mental and progressing to formal written methods.

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

Grid Method

23 x 4

X	20	3
4	80	12	= 92

42 x 6

X	40	2
6	240	12	= 252

Grid method

134 x 5

X	100	30	4
5	500	150	20

$$500$$
$$+150$$
$$\underline{20}$$
$$670$$

Expanded Method.

24 x 3

$$
\begin{array}{r}
24 \\
\times 3 \\
\hline
12 \ (4 \times 3) \\
60 \ (20 \times 3) \\
\hline
72
\end{array}
$$

Formal written layout.

42 x 3

$$
\begin{array}{r}
42 \times \\
3 \\
\hline
126
\end{array}
$$

36 x 4

$$
\begin{array}{r}
36 \times \\
4 \\
\hline
144 \\
2
\end{array}
$$

Formal written layout.

312 x 6

$$
\begin{array}{r}
312 \times \\
6 \\
\hline
1872 \\
1
\end{array}
$$

276 x 4

$$
\begin{array}{r}
276 \times \\
4 \\
\hline
1104 \\
3\,2
\end{array}
$$

16

Year 5	Year 6

Year 5

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.

Formal written method

2513 × 7

```
  2 5 1 3 ×
        7
  1 7 5 9 1
      3   2
```

Long multiplication

27 × 34

```
    2 7 ×
    3 4
  1 0 8
  8 1 0
    2
  9 1 8
```

Long multiplication

124 × 26

```
  1 2 4 ×
    2 6
  7 4 4
    1 2
  2 4 8 0
  3 2 2 4
    1 1
```

Year 6

Multiply multi digit numbers up to 4 digits by a two digit whole number using the formal written method of long multiplication.

Multiply one digit numbers with up to two decimal places by whole numbers.

Formal written method.

6027 × 24

```
  6 0 2 7 ×
      2 4
  2 4 1 0 8
1 2 0 5 4 0
1 4 4 6 4 8
```

Formal written method using decimals.

8.7 × 6

```
  8 · 7 ×
      6
  5 2 · 2
    4
```

243.6 × 6

```
  2 4 3 · 6 ×
          6
  1 4 6 1 · 6
    2   2 3
```

Formal written method using decimals.

31.26 × 32

```
  3 1 · 2 6 ×
        3 2
    6 2 · 5 2
  9 3 7 · 8 0
1 0 0 0 · 3 2
        1   1
```

17

Division

Key stage one mathematics calculation focuses on the deeper knowledge and understanding of concepts and mental strategies needed before moving onto written. It is essential to children's mathematical development that they are given the opportunity to access these concepts across the curriculum, showing a mastery level understanding before moving onto full written methods. Key to this development is the natural links from mental to written strategy - allow children to experience the written form alongside the practical.
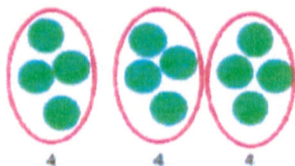
Group and share small quantities

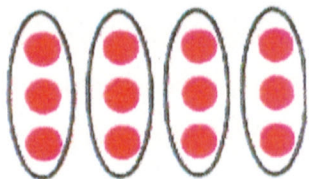How many groups of 4 can be made with 12 stars?

Grouping:

Sharing:

What is 12 shared between 3?

* Note: Use lots of practical apparatus, arrays and pictorial representation. Ensure children understand the difference between grouping and sharing.

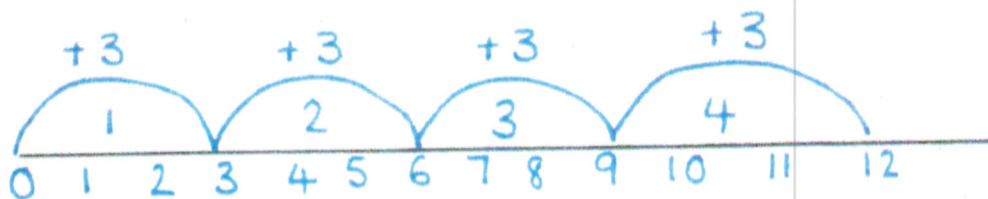Group and share, using the ÷ and = signs.

How many groups of 3 are in 12?

Children should also recognise that

$$12 ÷ 4 = 3$$

$$12 ÷ 3 = 4$$

Grouping using a number line

How many groups of 3 are in 12?

(A CD costs £3. How many CDs can I buy for £12?)

+3   +3   +3   +3

1   2   3   4

0 1 2 3 4 5 6 7 8 9 10 11 12

$$12 ÷ 3 = 4$$

Year 3	Year 4

Pupils develop reliable written methods for division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short division.

Pupils practice to become fluent in the formal written method of short division with exact answers.

Partitioning

$39 \div 3$

$$3 \overline{\smash{)}\,30 + 9} \quad \frac{10 + 3 = 13}{}$$

$64 \div 4$

$$4 \overline{\smash{)}\,40 + 24} \quad \frac{10 + 6 = 16}{}$$

Partitioning

$119 \div 7$

$$7 \overline{\smash{)}\,70 + 49} \quad \frac{10 + 7 = 17}{}$$

Short Division

$63 \div 3$

$$3 \overline{\smash{)}\,6\ 3} \quad \frac{2\ 1}{}$$

$84 \div 6$

$$6 \overline{\smash{)}\,8\ {}^2 4} \quad \frac{1\ 4}{}$$

Year 5	Year 6

Year 5

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

Short division

161 ÷ 7   1446 ÷ 6

$$7)\overline{16^21} = 23 \qquad 6)\overline{14^26} = 241$$

There are 421 children at sports day. How many teams of 9 can we make?

$$9)\overline{42^61} = 46\,r\,7 = 46 \text{ teams}$$

206 tickets were sold for a school concert; there are 7 seats per row. How many rows are needed?

$$7)\overline{20^66} = 29\,r\,3 = 30 \text{ rows}$$

Year 6

Divide numbers up to 4 digits by a two digit number using the formal written method of short division.

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division.

Use written division methods in cases where the answer has up to two decimal places.

Long division.

3432 ÷ 26

```
        1 3 2
  26) 3 4 3 2
    -2 6 0 0  (x100)
      8 3 2
     - 7 8 0  (x 30)
         5 2
       -  5 2  (x 2)
            0
```

396.0 ÷ 15

```
       2 6 · 4
  15) 3 9 6 · 0
    - 3 0 0 · 0 (x 20)
        9 6 · 0
      -  9 0 · 0 (x 6)
            6 · 0
          -  6 · 0 (x 0·4)
               0
```

343.56 ÷ 6

```
       5 7 · 2 6
  6) 3 4 3 ·⁴5⁶3 6
```

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