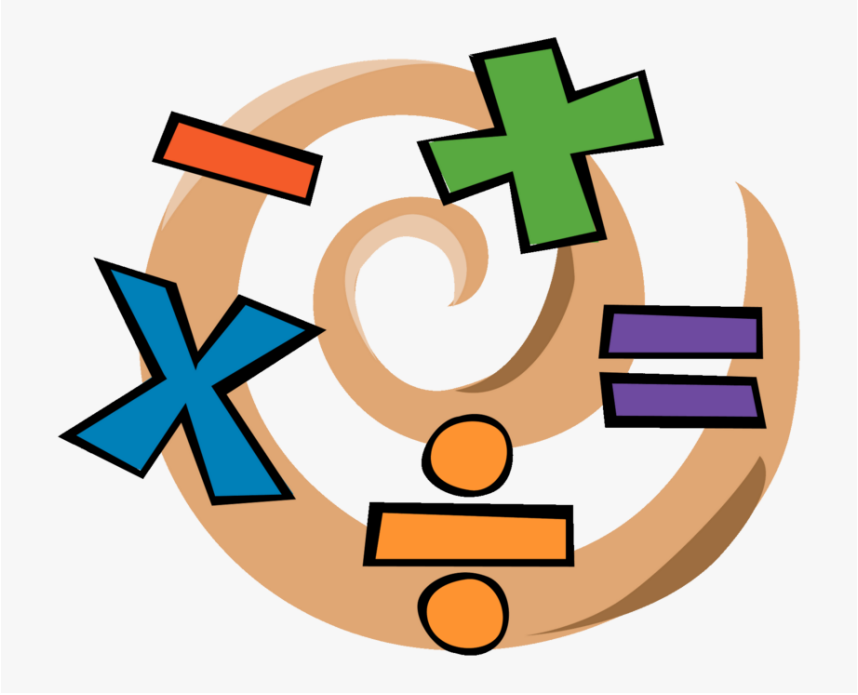
Year 4 Maths



Dear Parents/Carers,

Welcome to this guide to Maths in Year 4. In this booklet you will find knowledge organisers for every Maths topic covered in Year 4 and then some extracts from our calculation policy showing the methods taught. The knowledge organisers include the key vocabulary the children will come across in each topic as well as the key objectives taught and models and images used.

We hope you find these useful and that they will help show you what is being taught in school this year.

Year 4 Team

Place Value

Number and Place Value — Knowledge Organiser

Key Vocabulary

- thousands
- hundreds
- tens
- ones
- zero
- place value
- greater than
- less than
- order
- round
- rounded to
- negative number
- partition
- digit
- Roman numeral

Counting

Counting in 6s

0	6	12	18	24	30	36	42	48	54	60

Counting in 7s

0	7	14	21	28	35	42	49	56	63	70

Counting in 9s

0	9	18	27	36	45	54	63	72	81	90

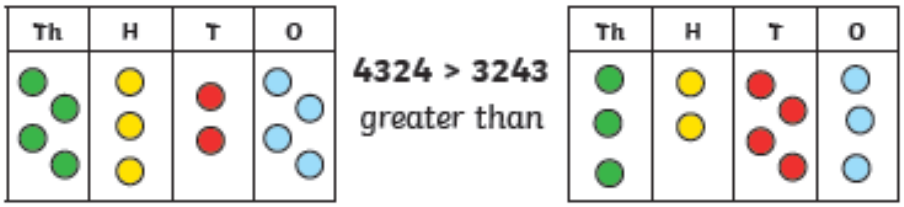
Counting in 25s

0	25	50	75	100	125	150	175	200	225	250

Counting in 1000s

0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10 000

Compare and Order



2497	2508	3012	3521	3530	4002

smallest — greatest

1000 More or 1000 Less

Number and Place Value

Knowledge Organiser

Negative Numbers

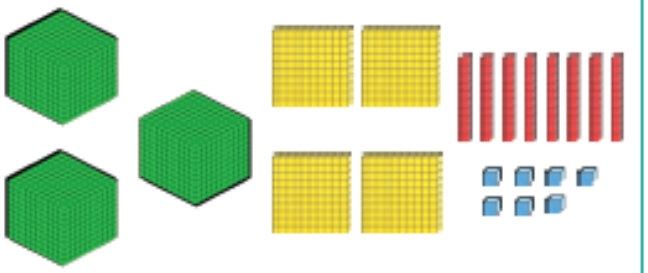
Represent 4-Digit Numbers

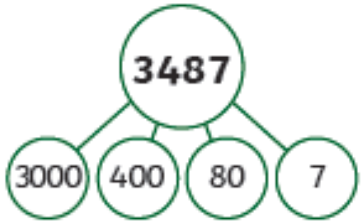
3487

three thousand, four hundred and eighty-seven

1000s	100s	10s	1s
III	IIII	𝍸 III	𝍸 II

Thousands	Hundreds	Tens	Ones
1000 1000 1000	100 100 100 100	10 10 10 10 10 10 10 10	1 1 1 1 1 1 1





Roman Numerals

one	1	I
five	5	V
ten	10	X
fifty	50	L
one hundred	100	C

XVIII = 18

XXIX = 29

LXXXIV = 84

Rounding

Look at the place value column to the right of the value you are rounding to. If this digit is a 4 or less, round down. If the digit is a 5 or more, round up.

Rounding to nearest 10

20	21	22	23	24	25	26	27	28	29	30

round down ← → round up

Rounding to the nearest 100

200	249	250	300

round down ← → round up

Rounding to the nearest 1000

2000	2499	2500	3000

round down ← → round up

Addition and Subtraction

Addition and Subtraction — Knowledge Organiser

Key Vocabulary

- Add
- Total
- Plus
- Sum
- More
- Altogether
- Difference
- Subtract
- Less
- Minus
- Take away
- Mentally, Orally
- Column Addition
- Column Subtraction
- Exchange
- Estimate
- Inverse operation
- Solve problems
- Number facts

Addition and Subtraction Methods

Add 4-digit numbers

No exchange

```
 5162
+3427
------
 8589
```

Starting with the ones, add each column in turn.

One exchange

```
 5162
+3497
------
 8659
------
    1
```

Starting with the ones, add each column in turn. When adding
6 tens + 9 tens = 15 tens
= 1 hundred + 5 tens
Place 1 hundred under the hundreds answer and 5 tens in the answer.

Multiple exchanges

```
 5864
+3497
------
 9361
------
  1 1 1
```

Starting with the ones, add each column in turn. Exchange tens, hundreds and/ or thousands as required.

Subtract 4-digit numbers

No exchange

```
 5789
- 3421
------
 2368
```

Starting with the ones, subtract each column in turn.

One exchange

```
  6 1
 5749
- 3471
------
 2278
```

Starting with the ones, subtract each column in turn. When subtracting 4 tens -7 tens, exchange 1 hundred to make:
14 tens – 7 tens = 7 tens

Multiple exchanges

```
 6131
 5742
- 3476
------
 2266
```

Starting with the ones, subtract each column in turn. Exchange tens, hundreds and/ or thousands as required.

Efficient subtraction

Calculate 6000 – 3617 = 2383

Addition and Subtraction Knowledge Organiser

Add and Subtract 1s, 10s, 100s, 1000s

Here is the number 3124

Add 2 thousands = 5124

Add 5 hundreds = 5624

Subtract 2 tens = 5604

Add 5 ones = 5609

Here is the number 6708

Thousands	Hundreds	Tens	Ones
6	7	0	8

Add 3 thousands = 9708

Subtract 4 hundreds = 9308

Add 5 tens = 9358

Subtract 7 ones = 9351

Crossing ones, tens or hundreds

5**39**2 + **4** tens = 5**43**2 crossing tens

5126 – **6**00 = **45**26 crossing hundreds

When crossing ones, tens or hundreds, more than one digit will change.

Round to Estimate

1635 + 386 = 2021

Round to the nearest ten

1640 + 390 = 2030

Round to the nearest hundred

1600 + 400 = 2000

Both give a reasonable estimate, but rounding the nearest ten is more accurate.

9362 – 5729 = 3622

Round to the nearest hundred

9400 – 5700 = 3700

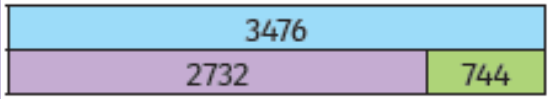
Round to the nearest thousand

9000 – 6000 = 3000

Rounding to the nearest hundred is much more accurate in this case.

Checking Strategies

Using Inverse



3476 – 744 = 2732 can be checked using

2732 + 744 = 3476

This part whole shows the inverse calculations using these three numbers.

1549 + 2688 = 4237	2688 + 1549 = 4237
4237 – 1549 = 2688	4237 – 2688 = 1549

Adding in a different order

420 + 372 + 280 =

Change to

420 + 280 + 372 =

As 420 + 280 = 700

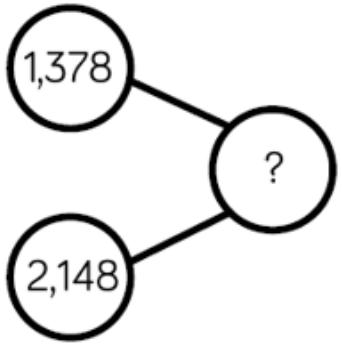
(because 42 + 28 = 70)

420 + 280 + 372 = 700 + 372 = 1072

Written Methods and Visuals

Skill: Add numbers with up to 4 digits

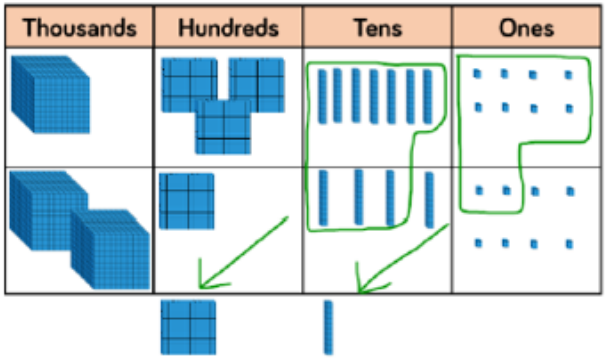
Year: 4

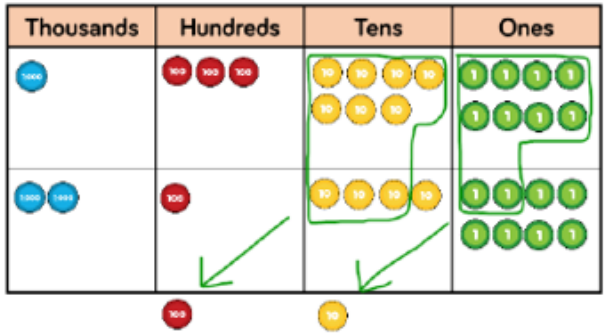


3,526	
2,138	1,378

	1	3	7	8
+	2	1	4	8
	3	5	2	6
		1	1	

$$1{,}378 + 2{,}148 = 3{,}526$$

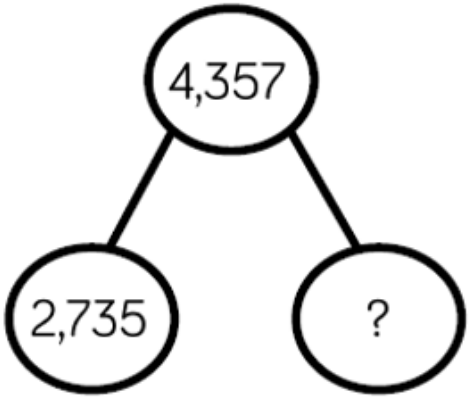




- Dienes and place value counters are the most effective manipulatives when adding numbers with up to 4 digits.
- Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method.
- Plain counters on a place value grid can also be used

Skill: Subtract numbers with up to 4 digits

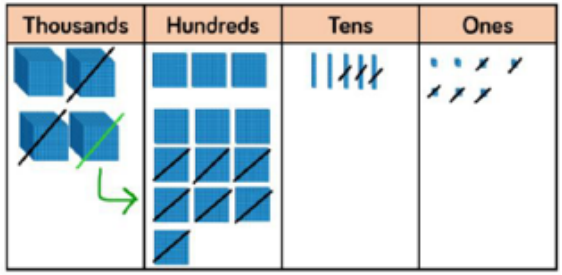
Year: 4

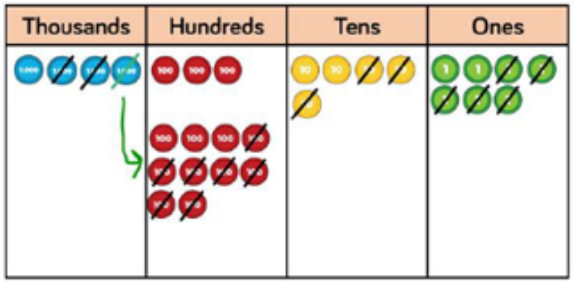


4,357	
2,735	1,622

$$\begin{array}{r} {}^{3}\cancel{4}^{1}357 \\ -\ 2735 \\ \hline 1622 \end{array}$$

4,357 − 2,735 = 1,622





- Dienes and place value counters are the most effective manipulatives when subtracting numbers with up to 4 digits.
- Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method.
- Plain counters on a place value grid can also be used

Multiplication and Division

Multiplication and Division — Knowledge Organiser

Key Vocabulary

- multiply
- groups of
- lots of
- times
- divide
- share
- remainder
- factor
- multiple
- product

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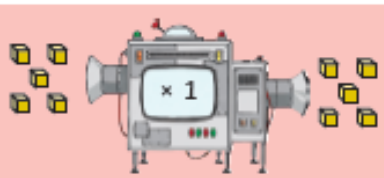
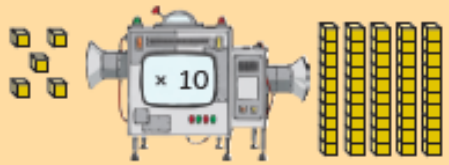
Multiplication and Division Facts

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

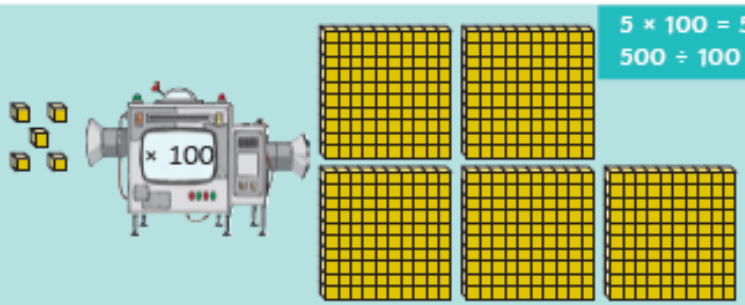
Use Place Value to Multiply and Divide Mentally



5 × 1 = 5
5 ÷ 1 = 5



5 × 10 = 50
50 ÷ 10 = 5



5 × 100 = 500
500 ÷ 100 = 5

Factor pairs and Commutativity

The factors of 20 are 1, 2, 4, 5, 10 and 20.

The factor pairs are:

1 and 20 | 2 and 10 | 4 and 5

5 × 4 = 20

4 × 5 = 20

Multiply Using Formal Written Methods

Th	H	T	O	
	5	4	3	
×			4	
		1	2	(4 × 3)
	1	6	0	(4 × 40)
2	0	0	0	(4 × 500)
2	1	7	2	

Th	H	T	O
	5	4	3
×			4
2	1	7	2
	1	1	

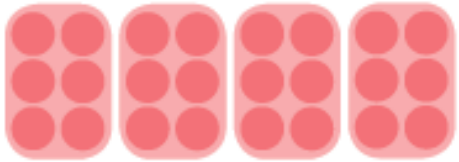
Remember to move any regrouped numbers into the next column. After the next multiplication, add the regrouped number to the answer.

Multiplication and Division

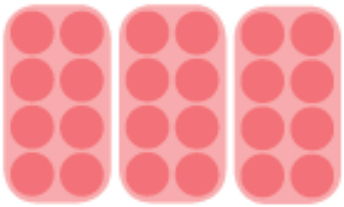
Knowledge Organiser

Mental Calculations for Solving Problems

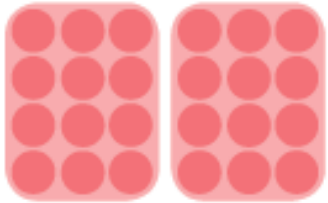
$(2 \times 3) \times 4 = 24$

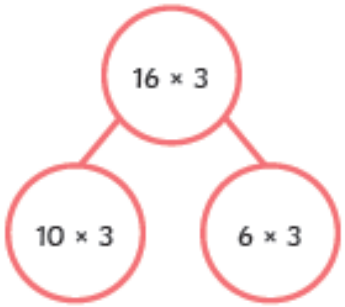


$(2 \times 4) \times 3 = 24$



$(3 \times 4) \times 2 = 24$



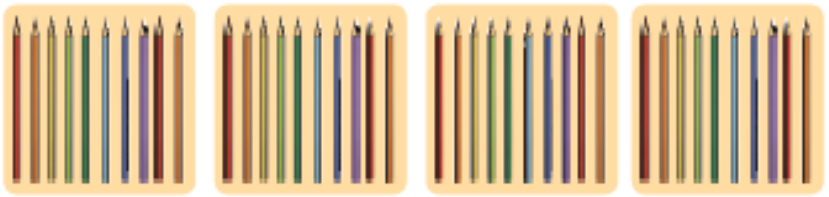


30 + 18 = 48

Integer Scaling Problems

10 pencils

10 x 4 = 40 pencils



75g

75g × 2 = 150g

Short Division with Exact Answers

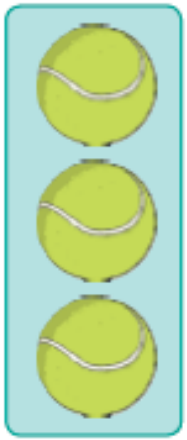
There are 69 tennis balls packed in tubes of 3.

There are 23 tubes altogether.

69 ÷ 3 = 23

$$\begin{array}{r} 23 \\ 3 \overline{)\,69} \end{array}$$

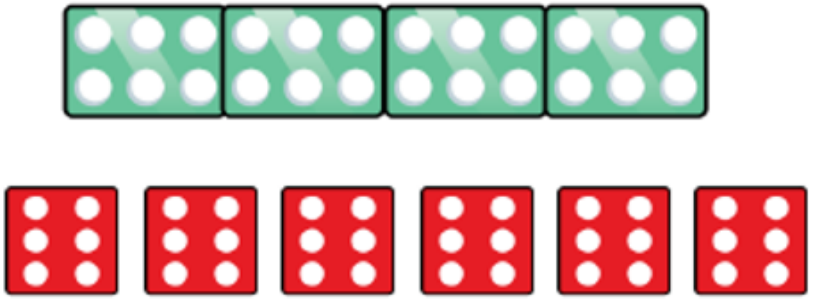
69		
23	23	23



Written Methods and Visuals

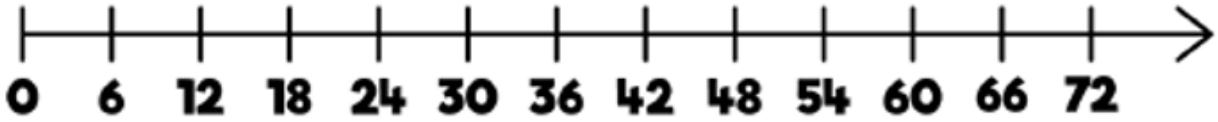
Skill: 6 times table

Year: 4



6	12	18	24	30
36	42	48	54	60
66	72	78	84	90

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



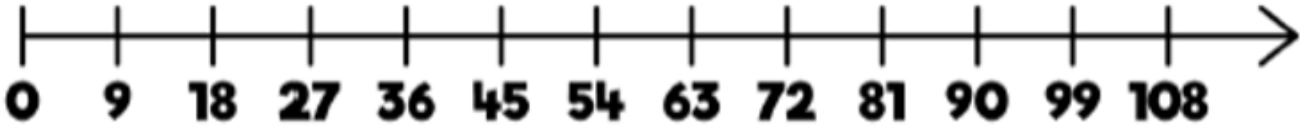
- Encourage daily counting in multiples both forwards and backwards. This can be support using a number line, counting stick or hundred square.
- Look for patterns in the six times table, using manipulatives to support. Make links to the 3 times table seeing how each multiple is double the threes. Notice the pattern in the ones within each group of five multiples. Highlight that all the multiples are even using number shapes to support.

Skill: 9 times table

Year: 4

9	18	27	36	45
54	63	72	81	90

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



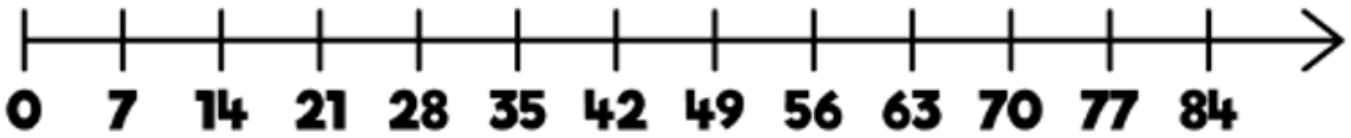
- Encourage daily counting in multiples both forwards and backwards. This can be support using a number line, counting stick or hundred square.
- Look for patterns in the nine times table, using manipulatives to support. Notice the pattern in the tens and ones using the hundred square to support as well as noting the odd, even pattern within the multiples.

Skill: 7 times table

Year: 4

7	14	21	28	35
42	49	56	63	70

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



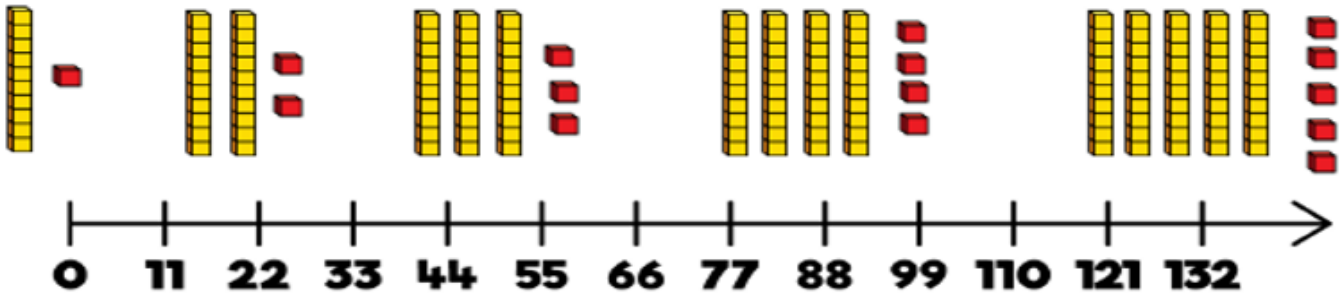
- Encourage daily counting in multiples both forwards and backwards. This can be support using a number line, counting stick or hundred square.
- The seven times table can be trickier to learn due to the lack of obvious pattern in the numbers, however they already know several facts due to commutativity. Children can still see the odd, even pattern in the multiples using number shapes to support.

Skill: 11 times table

Year: 4

11	22	33	44	55	66
77	88	99	110	121	132

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



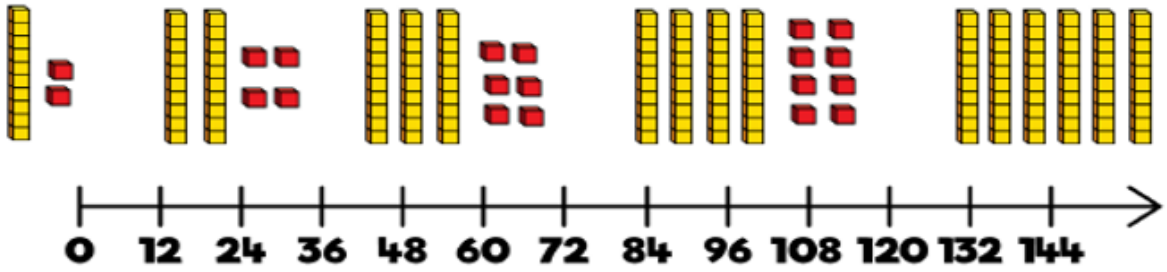
- Encourage daily counting in multiples both forwards and backwards. This can be support using a number line, counting stick or hundred square.
- Look for patterns in the eleven times table, using manipulatives to support. Notice the pattern in the tens and ones using the hundred square to support. Also consider the pattern after crossing 100.

Skill: 12 times table

Year: 4

12	24	36	48	60
72	84	96	108	120
132	144			

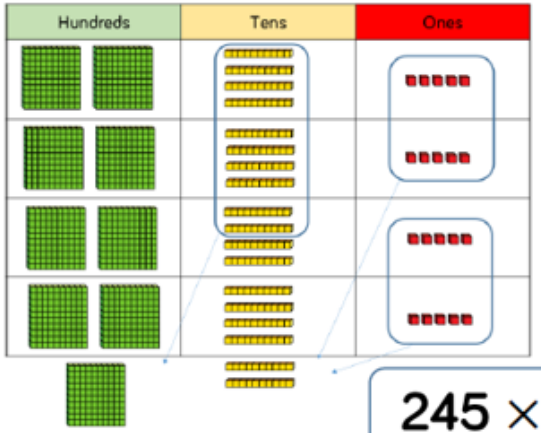
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



- Encourage daily counting in multiples both forwards and backwards. This can be support using a number line, counting stick or hundred square.
- Look for patterns in the twelve times table, using manipulatives to support. Make links to the 6 times table seeing how each multiple is double the sixes. Notice the pattern in the ones within each group of five multiples. The hundred square can support in highlighting this pattern.

Skill: multiply 3-digit numbers by 1-digit numbers

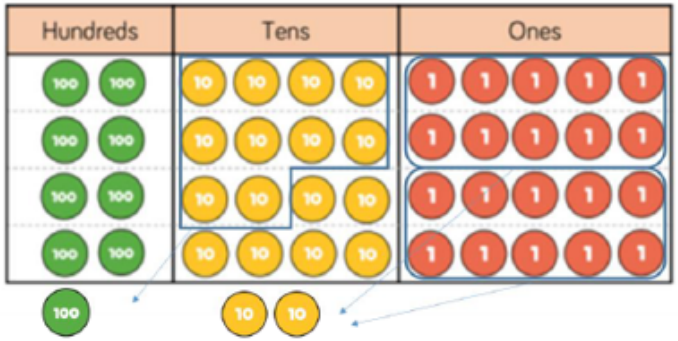
Year: 4



	H	T	O
	2	4	5
×			4
	9	8	0
	1	2	

$245 \times 4 = 980$

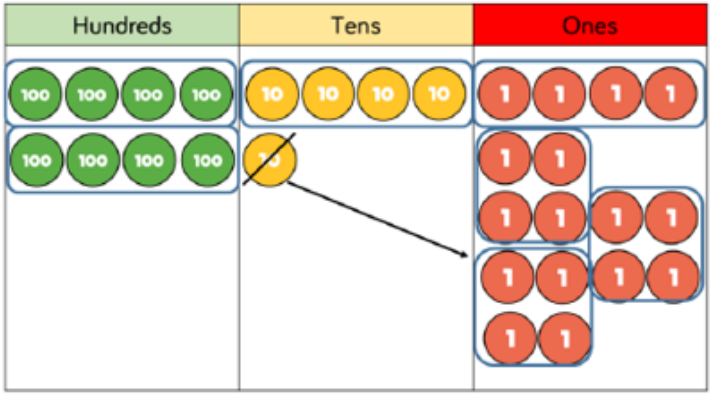
	2	4	5
X			4
		2	0	(5x4)
	1	6	0	(40x4)
+	8	0	0	(200x4)
	9	8	0	



- Start by using the expanded column method before moving onto the short, formal written method.
- Base 10 and place value counters continue to support the understanding of the written method. Limit the number of exchanges needed in the questions and move children away from resources when multiplying larger numbers.

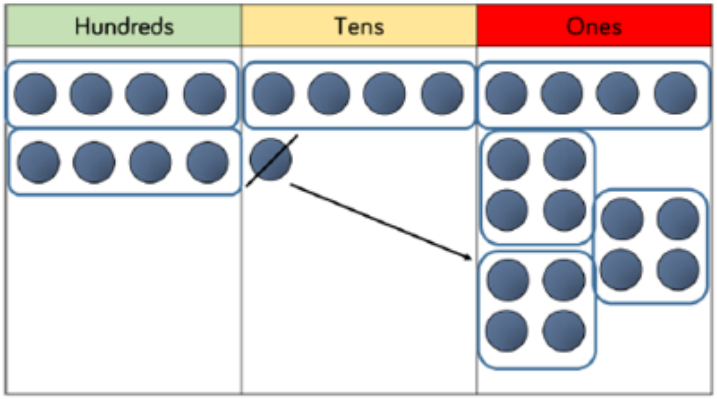
Skill: Divide 3-digits by 1 digits (grouping)

Year: 4/5



		2	1	4
	4	8	5	$^{1}6$

856			
?	?	?	?



$856 \div 4 = 214$

- Children can continue to use grouping to support their understanding of short division when dividing a 3-digit number by a 1-digit number.
- Place value counters of plain counters can be used on a place value grid to support this understanding. Children can also draw their own counters and group then through a more pictorial method.

Money

Money — **Knowledge Organiser**

Key Vocabulary
amount
change
combinations
estimate
decimal
pence
penny
pounds
round
value
convert

UK Coins

£0.01	£0.02	£0.05	£0.10	£0.20	£0.50	£1.00	£2.00
one penny coin	two pence coin	five pence coin	ten pence coin	twenty pence coin	fifty pence coin	one pound coin	two pound coin

UK Notes

£5
five pound note

£10
ten pound note

£20
twenty pound note

£50
fifty pound note

Pounds and Pence

£3 and 25 pence **£3.25**

£52 and 13 pence **£52.13**

463 = £4.63

705p = £7.05

92p = £0.92

Ordering Money

We can compare or order amounts by changing all amounts to either pounds or pence.

£4.82 ☐ 428p

£4.82 = 482p

482p > 428p

£4.82 > 428p

Order in ascending order:

516p 156p £1.65 £6.51

£1.65 = 165p and £6.51 = 651p

156p, £1.65, 516p, £6.51

Estimating Money

That's about £8.

That's about £4.

We can use estimates when calculating.

They are about £3 and £7 so will be about £10 in total.

They are about £4 and £3 so will be about £7 in total. I will have about £3 left.

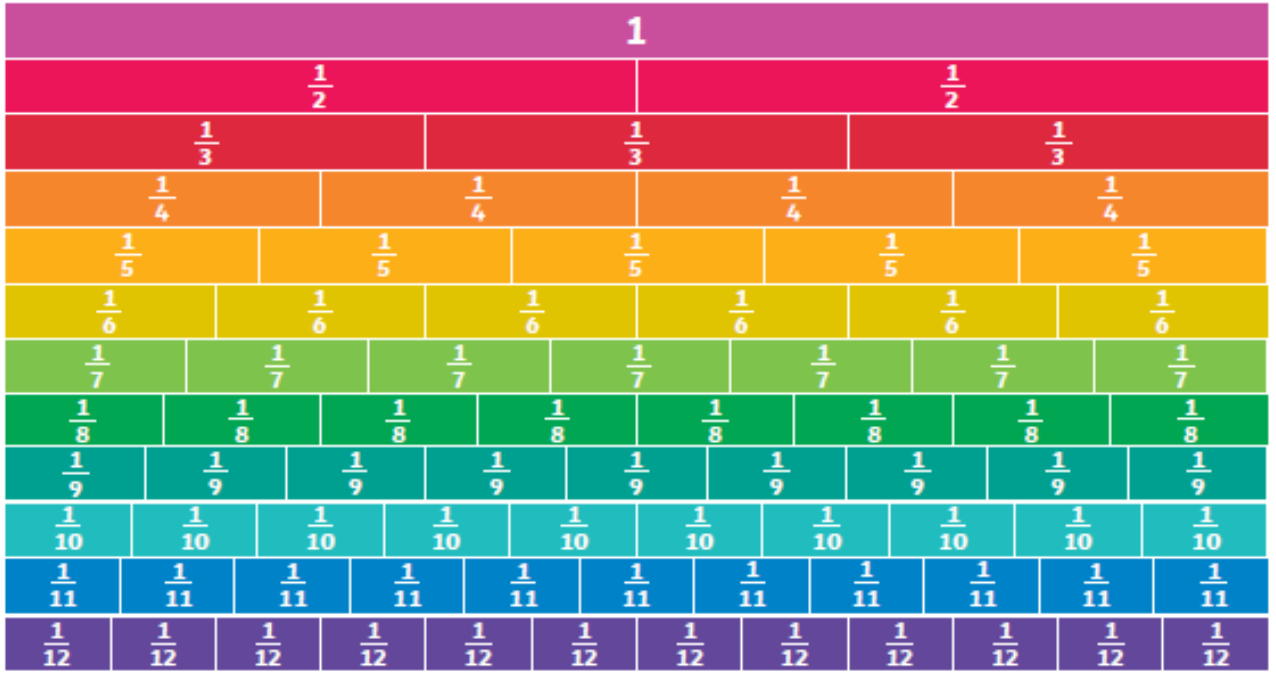
Fractions

Fractions — **Knowledge Organiser**

Key Vocabulary

- numerator
- denominator
- unit fraction
- non-unit fraction
- equivalent
- quantities
- whole
- halves
- thirds
- quarters
- fifths
- sixths
- sevenths
- eighths
- ninths
- tenths
- elevenths
- twelfths
- quantities

Fraction Families



Fractions of Quantities

To find a fraction of a number, divide by the denominator and multiply by numerator.

To find quarters of 20:

20			
5	5	5	5

$\frac{1}{4}$ of 20 = 5 $\frac{2}{4}$ of 20 = 10 $\frac{3}{4}$ of 20 = 15 $\frac{4}{4}$ of 20 = 20

To find eighths of 56:

56							
7	7	7	7	7	7	7	7

$\frac{1}{8}$ of 56 = 7 $\frac{2}{8}$ of 56 = 14 $\frac{3}{8}$ of 56 = 21 $\frac{4}{8}$ of 56 = 28

$\frac{5}{8}$ of 56 = 35 $\frac{6}{8}$ of 56 = 42 $\frac{7}{8}$ of 56 = 49 $\frac{8}{8}$ of 56 = 56

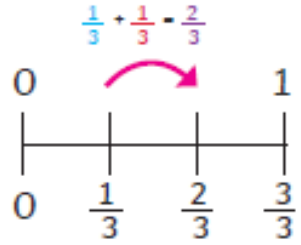
Fractions

Knowledge Organiser

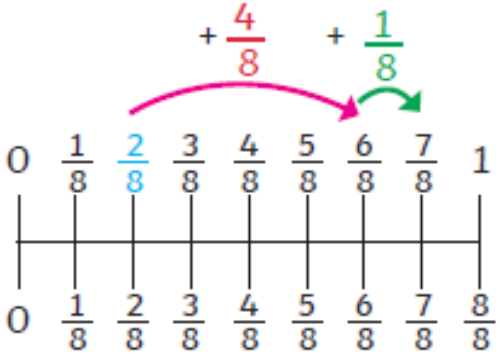
Adding Fractions

Fractions can be added when the denominators are the same.

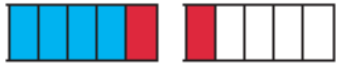
$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$

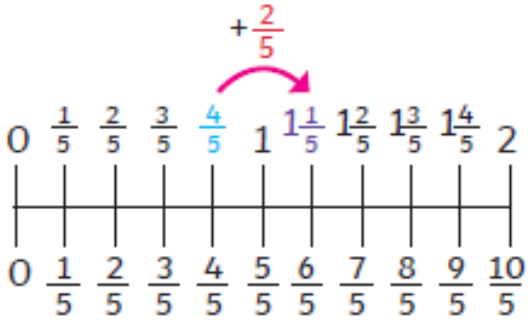


$\frac{2}{8} + \frac{4}{8} + \frac{1}{8} = \frac{7}{8}$



$\frac{4}{5} + \frac{2}{5} = \frac{6}{5}$ or $1\frac{1}{5}$





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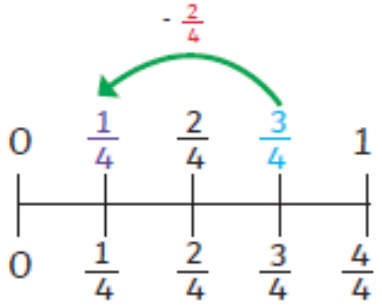
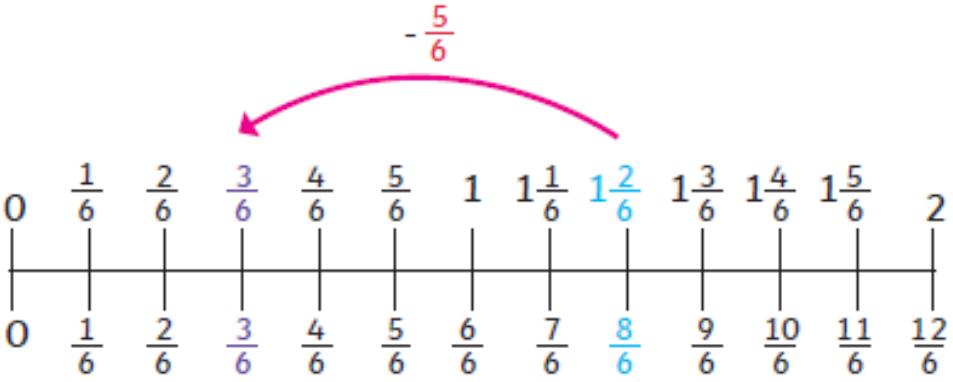
Subtracting fractions

Fractions can be subtracted when the denominators are the same.

$\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$



$\frac{8}{6} - \frac{5}{6} = \frac{3}{6}$



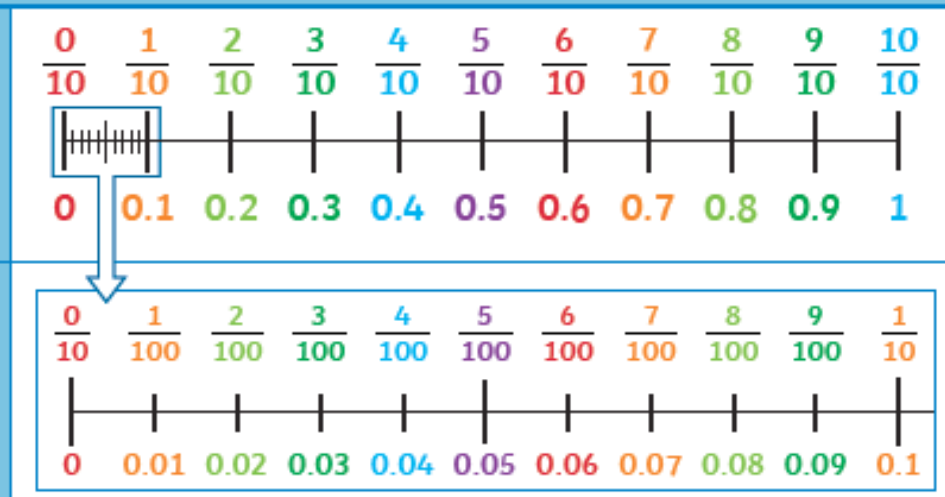
Decimals

Decimals — Knowledge Organiser

Key Vocabulary

- tenths
- hundredths
- decimal tenths
- decimal hundredths
- decimal equivalents
- part-whole model
- rounding
- decimal point
- place value

Tenths and Hundredths



Fraction and Decimal Equivalents

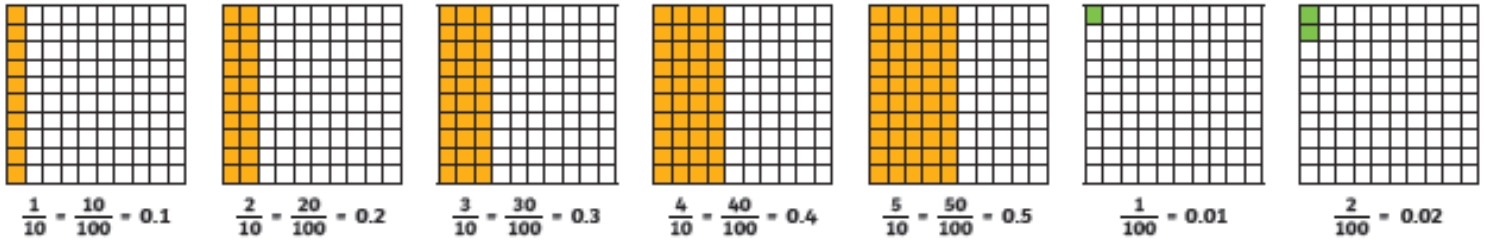
 = $\frac{1}{2}$ = 0.5

 = $\frac{1}{4}$ = 0.25

 = $\frac{3}{4}$ = 0.75

 = $\frac{1}{10}$ = 0.1

Tenth and Hundredth Decimal Equivalents



Decimals

Knowledge Organiser

Dividing by 10

Tens	Ones
8	5

÷ 10

÷ 10

Tens	Ones	Tenths
	8 •	5

÷ 10

Dividing by 100

Tens	Ones
8	5

÷ 100

÷ 100

Tens	Ones	Tenths	Hundredths
	0 •	8	5

÷ 100

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Rounding Decimals

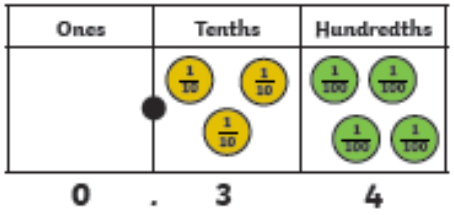
If the tenths digit is **1, 2, 3 or 4,** we round **down** to the nearest whole number.

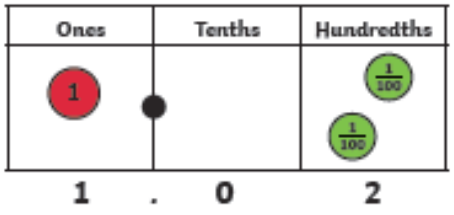
If the tenths digit is **5, 6, 7, 8 or 9,** we round **up** to the nearest whole number.

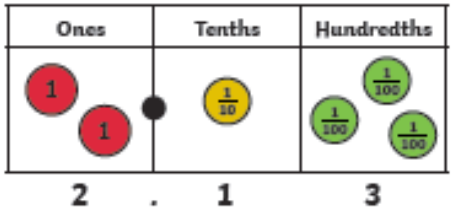
Make a Whole

Partitioning Tenths and Hundredths

Comparing Numbers with Two Decimal Places







Time

Time — Knowledge Organiser

Key Vocabulary

- 12-hour time
- 24-hour time
- Roman numerals
- analogue
- digital
- hours
- minutes
- seconds
- o'clock
- half past
- quarter past
- quarter to
- midday
- midnight
- noon
- a.m.
- p.m.

Analogue and Digital Clocks

Minute Hand
The long hand points to the minutes past the hour.

Hour Hand
The short hand points to the hour. If this hand is pointing between the hours, it is the earlier hour of the two.

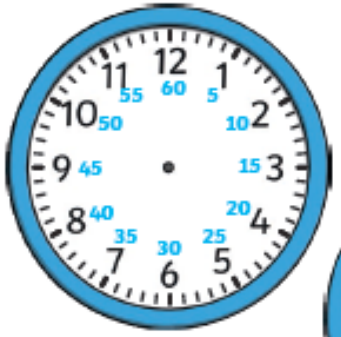

twelve o'clock


quarter past twelve


half past twelve

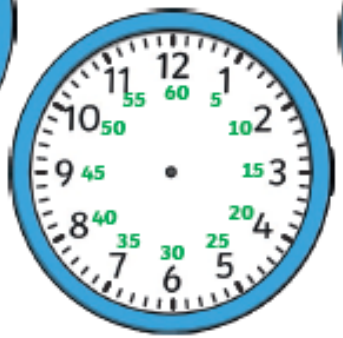

quarter to one

Durations of Time



There are **60 seconds** in a minute.

There are **60 minutes** in an hour.



There are **24 hours** in a day

There are **7 days** in a week.

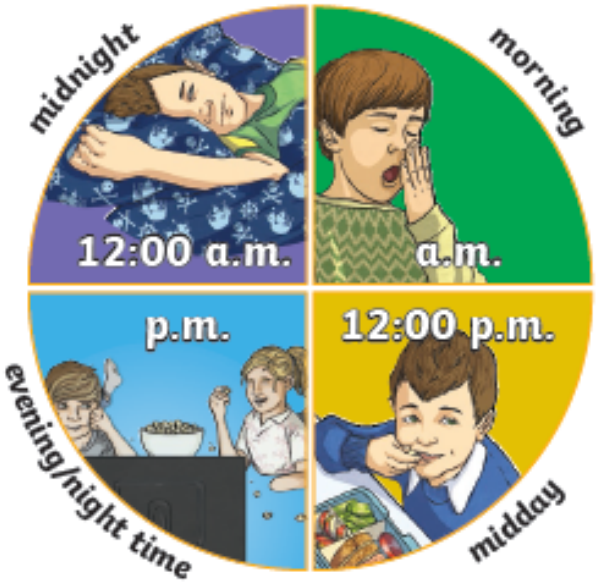
There are **12 months** in a year.

Time

Knowledge Organiser

24-Hour Time

There are 24 hours in a day.



01:00	1 a.m.	1 o'clock	
02:00	2 a.m.	2 o'clock	
03:00	3 a.m.	3 o'clock	
04:00	4 a.m.	4 o'clock	
05:00	5 a.m.	5 o'clock	
06:00	6 a.m.	6 o'clock	
07:00	7 a.m.	7 o'clock	
08:00	8 a.m.	8 o'clock	
09:00	9 a.m.	9 o'clock	
10:00	10 a.m.	10 o'clock	
11:00	11 a.m.	11 o'clock	
12:00	12 p.m.	12 o'clock	

13:00	1 p.m.	1 o'clock	
14:00	2 p.m.	2 o'clock	
15:00	3 p.m.	3 o'clock	
16:00	4 p.m.	4 o'clock	
17:00	5 p.m.	5 o'clock	
18:00	6 p.m.	6 o'clock	
19:00	7 p.m.	7 o'clock	
20:00	8 p.m.	8 o'clock	
21:00	9 p.m.	9 o'clock	
22:00	10 p.m.	10 o'clock	
23:00	11 p.m.	11 o'clock	
00:00	12 a.m.	12 o'clock	

Area and Perimeter

Area and Perimeter — **Knowledge Organiser**

Keywords

- area
- perimeter
- centimetres
- metres
- squares
- distance
- millimetres
- kilometres
- length
- width
- rectilinear
- right angle

Area and Perimeter

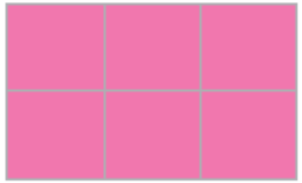
Area is the amount of space inside a 2D shape.

Perimeter is the total **distance** around the outside of a 2D shape.

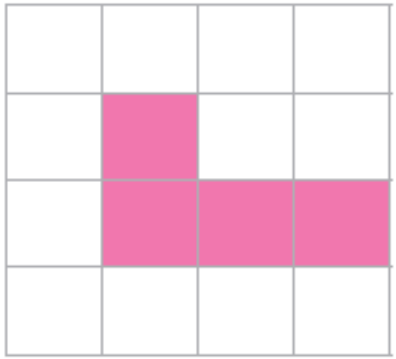
Measuring Area

We can count **squares** to find the **area** of a **rectilinear** shape.

Area = 1 square



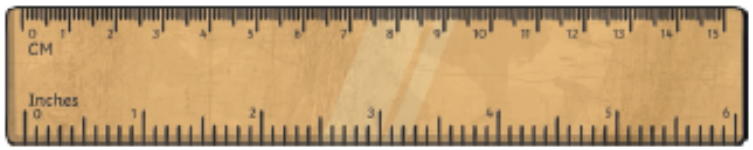
Area = 6 squares



Area = 4 squares

Units of Measure for Perimeter

km	1 **kilometre** = 1000 **metres**
m	1 **metre** = 100 **centimetres**
cm	1 **centimetre** = 10 **millimetres**
mm	



Rectilinear Figures

A **rectilinear** figure is a 2D shape whose sides all meet at **right angles** (90°).

Statistics

Statistics — Knowledge Organiser

Key Vocabulary

- bar chart
- pictogram
- frequency table
- tally chart
- discrete data
- continuous data
- time graph
- sum
- difference
- comparison
- interpret

Discrete and Continuous Data

Data that is counted in whole numbers is discrete. In **discrete data**, values between whole numbers cannot be counted.

Data that is measured and therefore can take on infinite values is continuous. In **continuous data**, values between whole numbers can be counted.

Frequency Tables

Tally marks are used to help count things. Each vertical line represents one unit. The fifth tally mark goes down across the first four to make it easier to count.

The frequency column is completed after all the data has been collected.

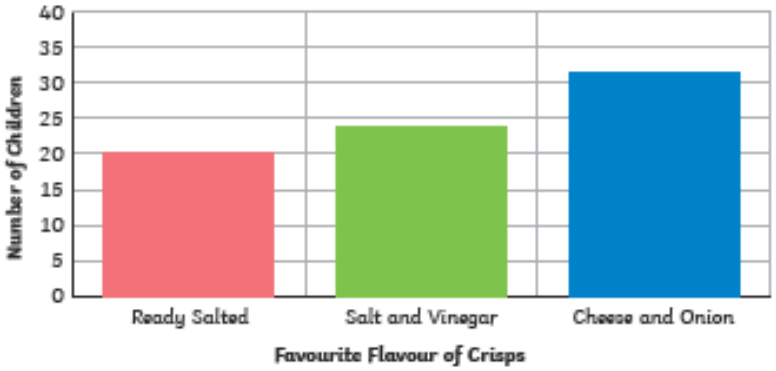
Eye Colour	Tally	Frequency
brown	𝍸 |	6
blue	𝍸 |||	8
green	|||	3
grey	||||	4
hazel	𝍸	5

Bar Charts

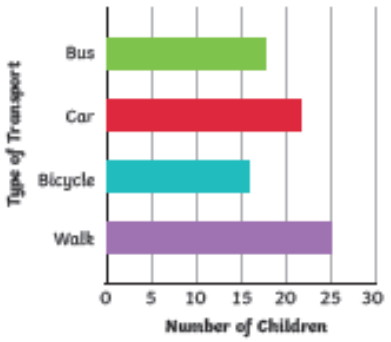
A bar chart has a horizontal axis and a vertical axis. Bars are used to show the data of each category. There must be a gap between each bar.

The scale of the bar chart is based on the range of data.

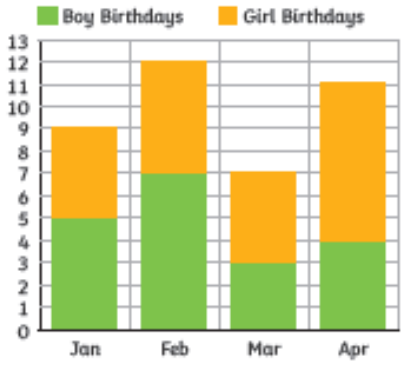
The scale on this bar chart counts in fives.



The bars are horizontal on this bar chart.



Two sets of data are shown on this stacked bar chart.

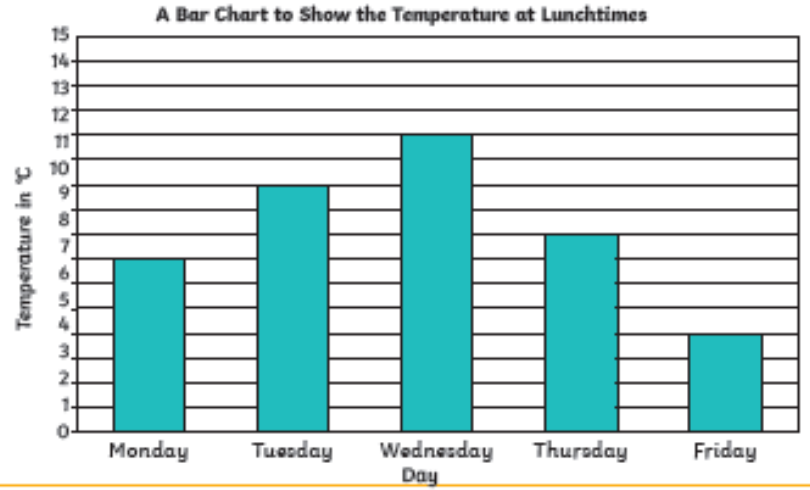


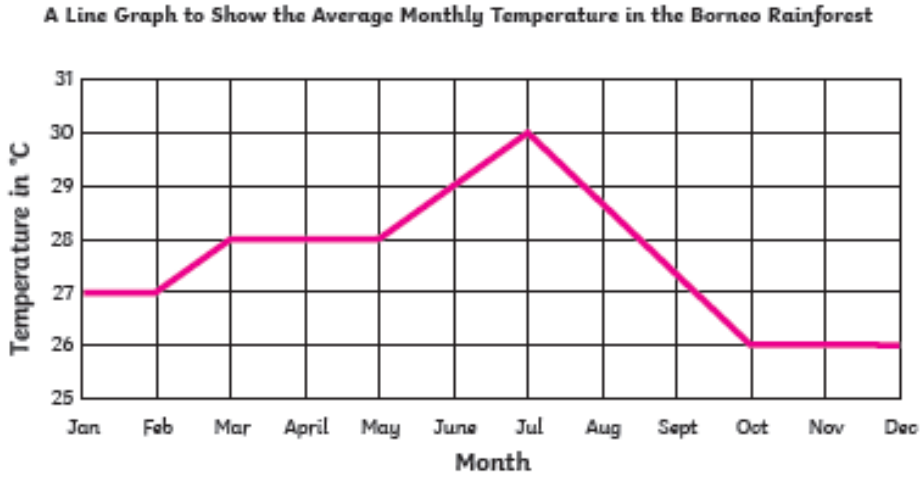
Statistics

Knowledge Organiser

Time Graphs

Time graphs show how data changes over time.



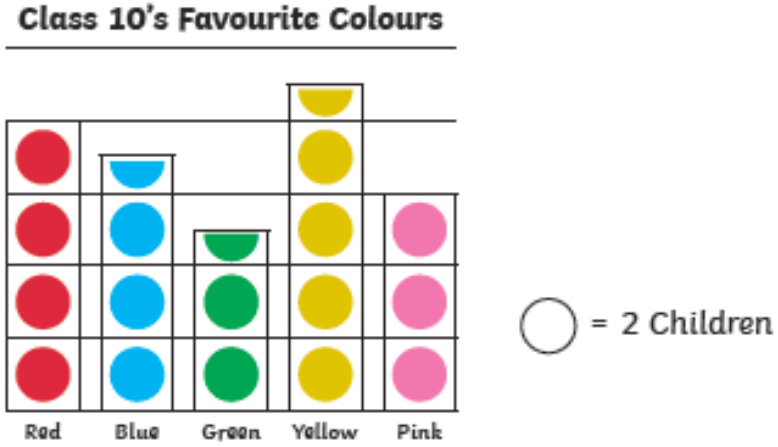


Pictograms

Pictograms use symbols or pictures to represent data.

This pictogram uses one symbol to represent two children.

Using this key, we can see that seven children prefer the colour blue.



This pictogram uses one picture to represent four children. Using this key, we can see that six children have a pet fish.

Properties of shape

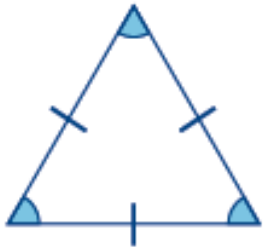
Properties of Shape — Knowledge Organiser

Key Vocabulary

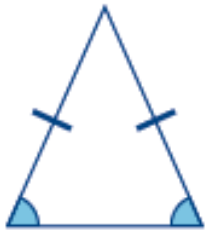
- angle
- right angle
- acute
- obtuse
- horizontal
- vertical
- diagonal
- parallel
- perpendicular
- two-dimensional
- polygon
- line of symmetry
- reflection
- mirror line
- isosceles
- equilateral
- scalene
- quadrilateral
- rhombus
- parallelogram
- trapezium

Triangles

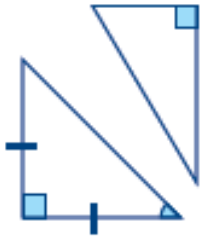
Triangles have 3 sides and 3 vertices. The total of the angles in a triangle is 180°.



An equilateral triangle is a regular polygon. It has sides of equal length and each angle is 60°.

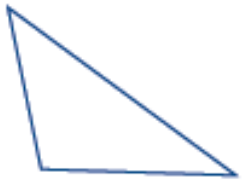


An isosceles triangle has two sides of equal length and two angles of equal size.



A right-angled triangle always has one 90° angle.

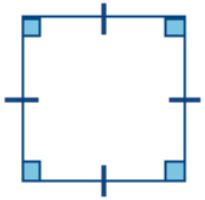
It can be isosceles or scalene.



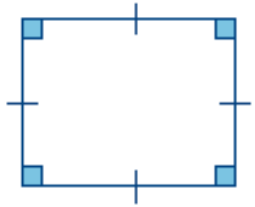
A scalene triangle has no equal sides or angles.

Quadrilaterals

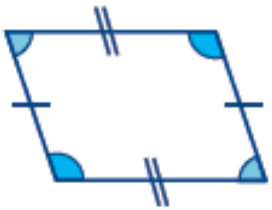
A quadrilateral is a polygon with four sides.



A square has four sides of equal length and four right angles (90°). A square is also a rectangle, a rhombus and a parallelogram.

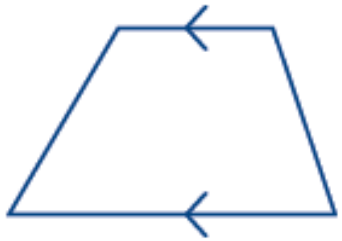


A rectangle has two pairs of parallel, equal sides and four right angles. A rectangle is also a parallelogram.

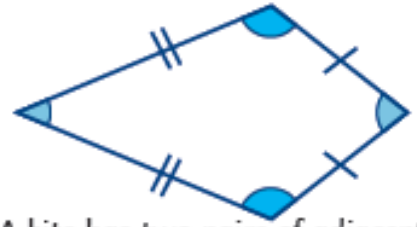


A parallelogram has two pairs of parallel, equal sides and opposite equal angles.

A rhombus has four sides of equal length and opposite equal angles. A rhombus is also a parallelogram.



A trapezium only has one pair of opposite parallel sides.



A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.

Properties of Shape

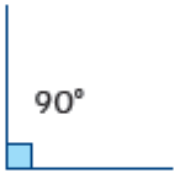
Knowledge Organiser

Angles

An angle is created when two straight lines meet at a point or intersect.

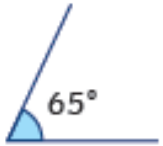
Right angle

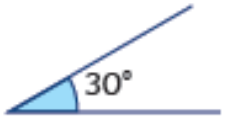
The intersection of perpendicular lines creates a right angle.



Acute angle

Any angle measuring more than 0 degrees and less than 90 degrees is acute.





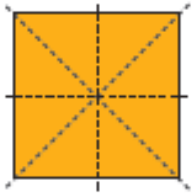
Obtuse angle

Any angle measuring more than 90 degrees but less than 180 degrees is obtuse.

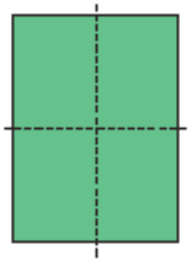
Lines of Symmetry

Lines of symmetry may be horizontal, vertical or diagonal. Some 2D shapes will have no lines of symmetry and some 2D shapes will have multiple lines of symmetry.

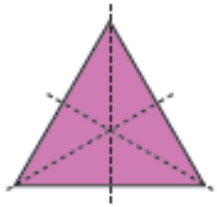
A square has four lines of symmetry.



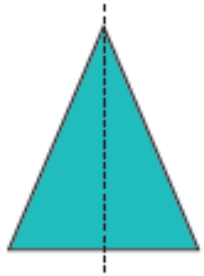
A rectangle has two lines of symmetry.



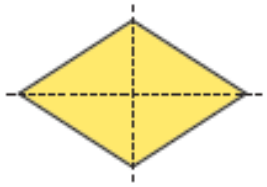
An equilateral triangle has three lines of symmetry.



An isosceles triangle has one line of symmetry.

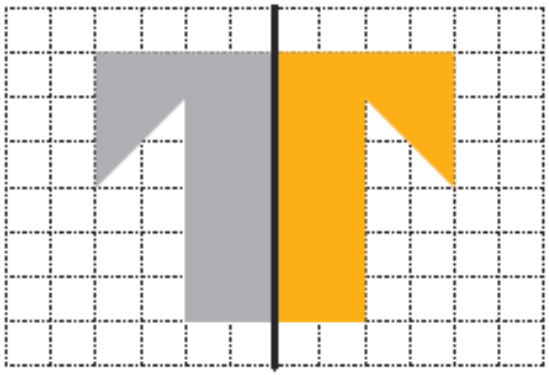


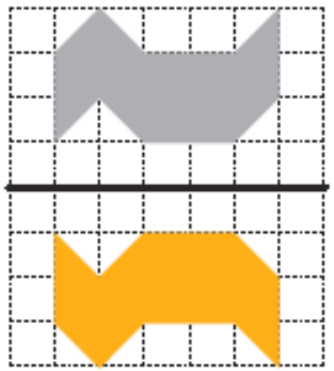
A rhombus has two lines of symmetry.

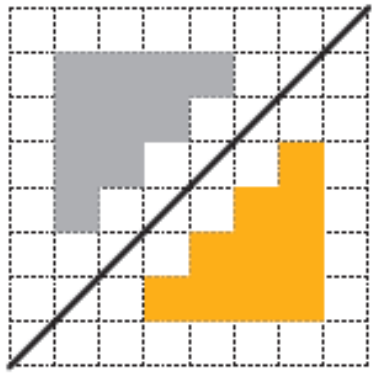


Symmetric Figures

Patterns and shapes can be reflected in a mirror line. Mirror lines can be vertical, horizontal or diagonal.







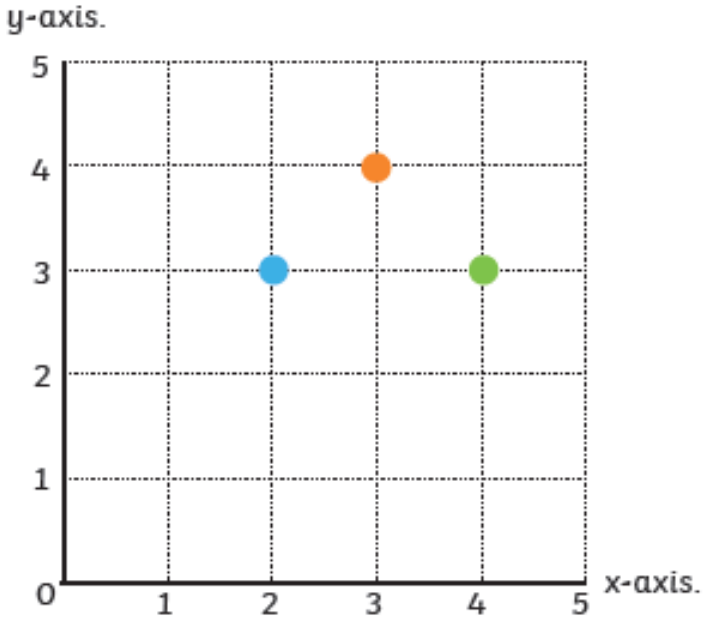
Position and Direction

Position and Direction — Knowledge Organiser

Key Vocabulary

- coordinate
- quadrant
- x-axis
- y-axis
- translation
- vertex
- vertices

Position in the First Quadrant



Coordinates are a useful way to locate a position on a map or grid.

The numbers across the horizontal line of the grid are on the **x-axis**.

The numbers on the vertical line of the grid are on the **y-axis**.

We always read or write the number on the x-axis before the **y-axis**.

The x and y position are written in brackets with a comma.

The coordinate of the blue spot is **(2, 3)**.

To help you remember which point to read or write first, simply remember to move 'along the corridor and up the stairs'.

In other words, move on the x-axis and then move on the y-axis.

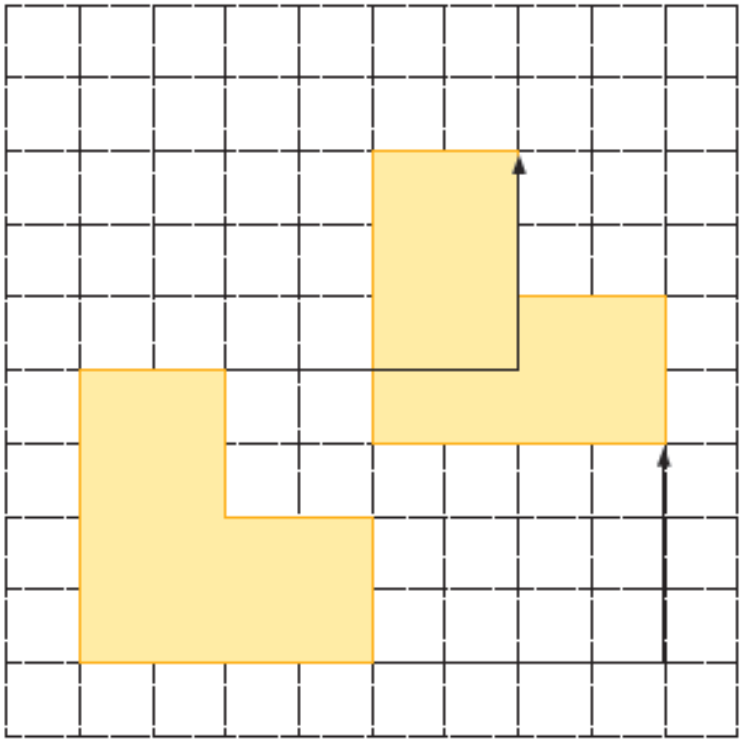
Position and Direction

Knowledge Organiser

Translation

In maths, translation means moving an object on a grid. The object is moved without changing the size, turning or reflecting it.

When translating an object on a grid, it can move up or down, left or right.



Plotting 2D Shapes

Each vertex (corner) of a 2D polygon can be represented as a coordinate on a 2D grid.