Year 6 Mathematics Parents Information Support Booklet

'be kind, be honest and have courage to live life in all its fullness' John 10:10

Block 1– Place Value to within 10 million—Year 6

Number and Place Value — Knowledge Organiser

Key Vocabulary

- ten million
- millions
- thousands
- hundreds
- tens
- ones
- zero
- place value
- greater than
- less than
- order
- round
- rounded
- negative number
- partition
- digit
- interval
- sequence
- linear sequence

twinkl visit twinkl.com

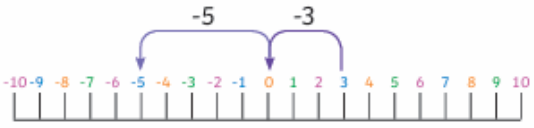
Compare and Order

equals	greater than	less than
26 + 38 = 8 × 8	223 873 > 98 256	901 198 < 1 091 098
Both calculations have the value 64.	The number on the left has 2 hundred thousands and the number on the right has 0 hundred thousands.	The number on the right has 1 million and the number on the left has 0 millions.

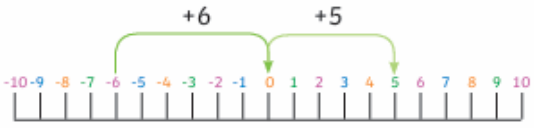
smallest — 81 782 — 127 352 — 127 835 — 137 019 — 200 002 — greatest

Negative Numbers

3 - 8 = -5



-6 + 11 = 5



Number and Place Value — Knowledge Organiser

Numbers to Ten Million

3 926 471

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
3	9	2	6	4	7	1

three million, nine hundred and twenty-six thousand, four hundred and seventy-one

3 926 471	
3 926 000	471

Round Any Number

Rounding to the nearest 1000

2000 ← 2499	2500 → 3000
round down	round up

Rounding to the nearest 100 000

200 000 ← 249 999	250 000 → 300 000
round down	round up

Rounding to the nearest 10 000

20 000 ← 24 999	25 000 → 30 000
round down	round up

Rounding to the nearest 1 000 000

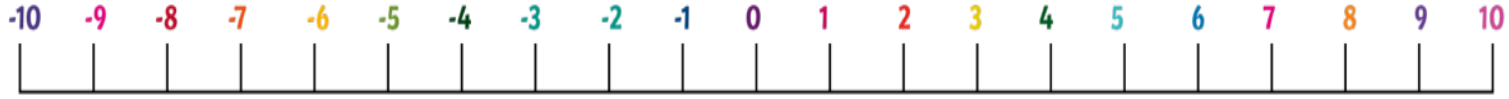
2 000 000 ← 2 499 999	2 500 000 → 3 000 000
round down	round up

Practise reading, writing and building big numbers. Use commas correctly between the thousands and hundreds and millions and hundreds of thousands columns to make the numbers easier to read.

Practise partitioning and recombining numbers using part part whole models and place value number sentences.

Count Forwards and Backwards through 0

Tm	M	Hth	Tth	Th	H	T	O	t	h	th
Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
10 000 000	1 000 000	100 000	10 000	1000	100	10	1	$0.1\ \frac{1}{10}$	$0.01\ \frac{1}{100}$	$0.001\ \frac{1}{1000}$



Negative Numbers | **Positive Numbers**

Rounding to 10

Rounding to the nearest 10

239, 238, 237, 236, 235, 234, 233, 232, 231

Round up to 240

Round down to 230

Remember: The red digit is the one to consider.

Rounding to 100

Rounding to the nearest 100

7399, 7398, ..., 7351, 7350, 7349, 7348, ..., 7302, 7301

Round up to 7400

Round down to 7300

Remember: The red digit is the one to consider.

Rounding to 1000

Rounding to the nearest 1000

5999, 5998, ..., 5501, 5500, 5499, 5498, ..., 5002, 5001

Round up to 6000

Round down to 5000

Remember: The red digit is the one to consider.

Rounding to 10 000

Rounding to the nearest 10 000

29 999, 29 998, ..., 25 001, 25 000, 24 999, 24 998, ..., 20 002, 20 001

Round up to 30 000

Round down to 20 000

Remember: The red digit is the one to consider.

Rounding to 100 000

Rounding to the nearest 100 00

699 999, 699 998, ..., 650 001, 650 000, 649 999, 649 998, ..., 600 002, 600 001

Round up to 700 000

Round down to 600 000

Remember: The red digit is the one to consider.

Block 2– Four Operations- Addition and Subtraction

Four Operations — Knowledge Organiser

Key Vocabulary

- Add
- Total
- Make
- Plus
- Sum
- More
- Altogether
- Difference
- Leave
- Subtract
- Difference between
- Less
- Minus
- Take away
- Mentally, Orally
- Column Addition
- Column Subtraction
- Estimate
- Inverse operation
- Solve problems
- Number facts
- Place Value
- Complex

Add and Subtract Whole Numbers

Column Method

	4	5	8	6	4
+	2	3	4	9	7
	6	9	3	6	1
		1	1	1	

Starting with the ones, add each column in turn. Regroup tens, hundreds, thousands, ten thousands as required.

	3	5	$^{6}\not{7}$	$^{13}\not{4}$	$^{1}\not{2}$
-		3	4	7	6
	3	2	2	6	6

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

Multiply up to 4-digit by 2-digit

1	$\not{3}$	$\not{2}$	
	1	5	4
×		2	6
	9	2	4
3	0	8	0
4	0	0	4
1	1		

Start with the ones.

154 × 6 = 924

154 × 20 = 3080

3080 + 924 = 4004

Order of Operations

B	Brackets	10 × (4 + 2) = 10 × 6 = 60
O	Order	5 + 2^2 = 5 + 4 = 9
D	Division	10 + 6 ÷ 2 = 10 + 3 = 13
M	Multiplication	10 - 4 × 2 = 10 - 8 = 2
A	Addition	10 × 4 + 7 = 40 + 7 = 47
S	Subtraction	10 ÷ 2 - 3 = 5 - 3 = 2

Vocabulary and home learning

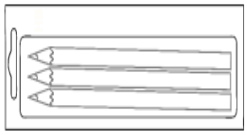
Practise laying out column addition and subtraction.

Use the most significant place value column to approximate an answer.

Use the inverse to check your working . (opposite operation)

Practise word problems and missing number calculations.

1. John buys 12 pencils one week and 7 the following week. He gives 3 pencils to his friend.



How many pencils does he have left?

1.

	6	7	3	1	2
+		2		5	4	2
	6		9	6	6	6

Block 2– Four Operations -Multiplication and Division

Four Operations — Knowledge Organiser

Short Division

Start from the left.

		4	4	0	5
12	5	52	48	6	0

5 ÷ 12 = 0 r5
52 ÷ 12 = 4 r4
48 ÷ 12 = 4
6 ÷ 12 = 0 r6

Common Factors

Factors of 48

1	2	3	4	6	8	12	16	24	48

Factors of 30

1	2	3	5	6	10	15	30

Common factors: 1, 2, 3, 6

Common Multiples

Multiples of 3

3	...	18	21	24	...	39	42

Multiples of 7

7	14	21	28	35	42

Common multiples: 21, 42...

Long Division

		1	2	0	r	3
14	1	6	8	3		
	1	4	0	0		
		2	8	3		
		2	8	0		
				3		

twinkl visit twinkl.com

Primes

A prime number has only 1 and itself as factors: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 33, 37, 41, 43

A composite number has factors other than 1 and itself.

Squares and Cubes

Square numbers result from a number being multiplied by itself (e.g. 5 × 5 = 25):

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

Cube numbers result from a number being multiplied by itself twice (2 × 2 × 2 = 8):
1, 8, 27, 64, 125

Mental Calculations and Estimation

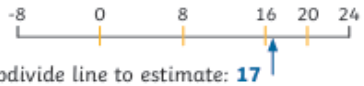
Order of calculations:

50 × 34 × 2 = 50 × 2 × 34 = 100 × 34 = 3400

Money: £8.99 + £3.49 = £12.48

Use £9 + £3.50 = £12.50 and subtract 2p

Estimate on a number line



Subdivide line to estimate: **17**

Reason from Known Facts

90 ÷ 10 = 9 **so 90 ÷ 20 = 4.5 and 90 ÷ 5 = 18**

16 × 9 = 144 **so 1.6 × 9 = 14.4**

4352 ÷ 17 = 256
so 256 × 18 = 4352 + 256 = 4608

3786 + 2850 = 6636
so 4786 + 2850 = 7636
and 2786 + 3850 = 6636
and 8636 – 3786 = 4850

Vocabulary and home learning

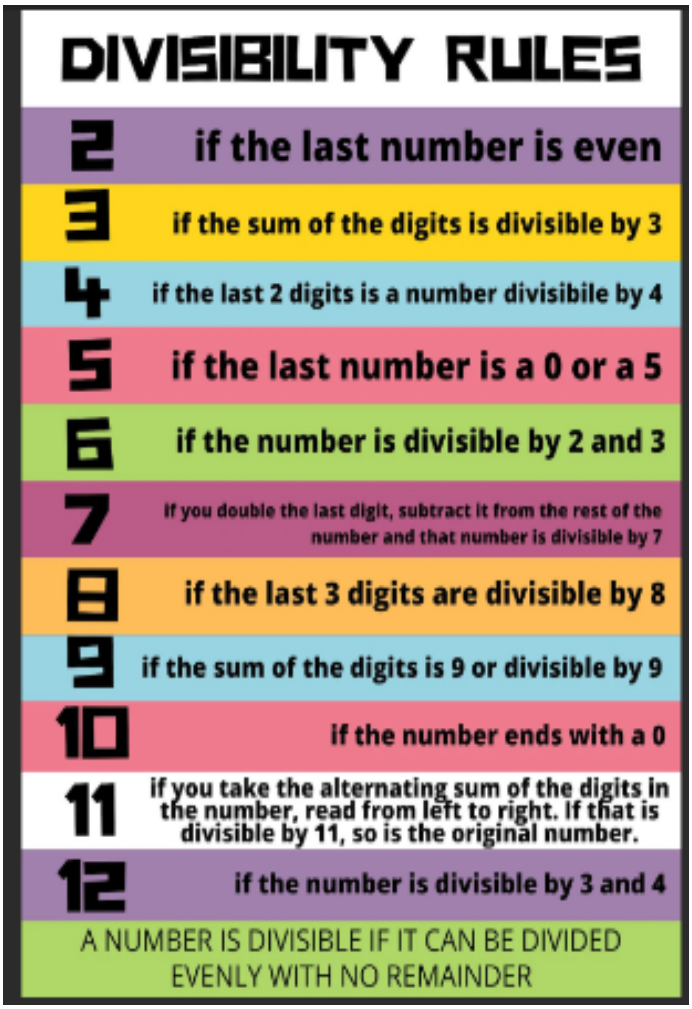
Learn divisibility rules off by heart.

Learn prime numbers up to 100 by heart.

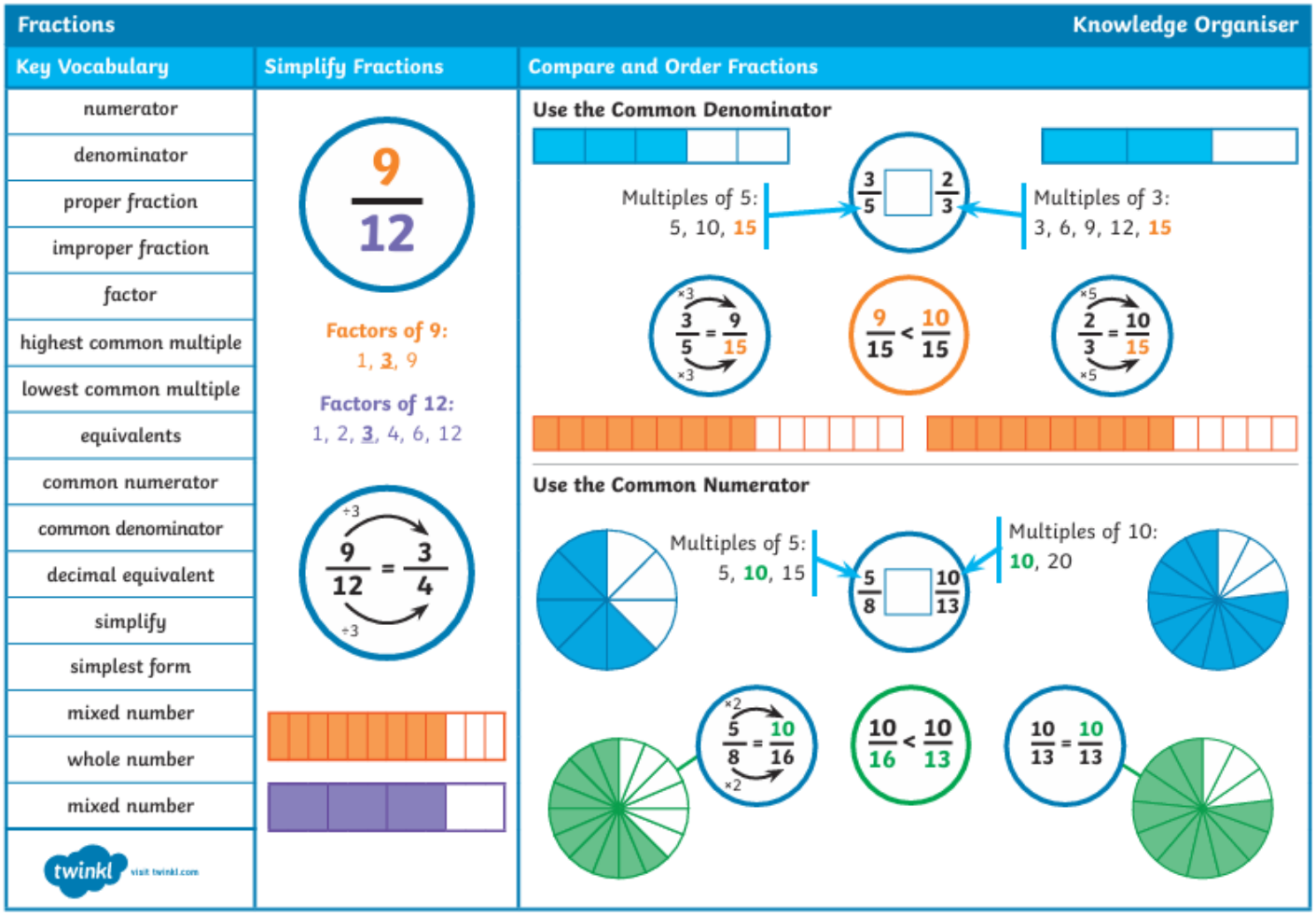
Practise finding factors and multiples including common factors and multiples of numbers up to 100.

Weblink including activities

- Factors, multiples and primes - KS2 Maths - BBC Bitesize



Block 3– Fractions A



Vocabulary and home learning

Practise simplifying fractions down to most basic form. E.g. 25/100 = 1/4 Using knowledge of tables facts and multiples.

Revise Year 5 fractions knowledge including vocabulary.

Weblink Comparing fractions - Maths - Learning with BBC Bitesize

Autumn Block 4 Fractions B

Fractions — Knowledge Organiser

Adding and Subtracting Proper Fractions

Same Denominators

$\frac{4}{7}+\frac{2}{7}=\frac{6}{7}$

$\frac{8}{11}-\frac{3}{11}=\frac{5}{11}$

Different Denominators

$\frac{2}{7}+\frac{3}{5}$

Multiples of 7: 7, 14, 21, 28, **35**
Multiples of 5: 5, 10, 15, 20, 25, 30, **35**

$\frac{2}{7}=\frac{10}{35}, \frac{3}{5}=\frac{21}{35}$

$\frac{10}{35}+\frac{21}{35}=\frac{31}{35}$

$\frac{9}{10}-\frac{1}{4}$

Multiples of 10: 10, **20**
Multiples of 4: 4, 8, 12, 16, **20**

$\frac{9}{10}=\frac{18}{20}, \frac{1}{4}=\frac{5}{20}$

$\frac{18}{20}-\frac{5}{20}=\frac{13}{20}$

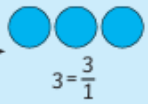
Multiplying Proper Fractions

Multiplying Fractions by Fractions

$\frac{1}{2}\times\frac{1}{3}=\frac{1}{2}\times\frac{1}{3}=\frac{1}{6}$

Multiplying Fractions by Whole Numbers

$\frac{2}{5}\times 3 \rightarrow$



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

$\frac{2}{5}\times\frac{3}{1}=\frac{6}{5}=1\frac{1}{5}$

Adding and Subtracting Mixed Numbers

Add or subtract the whole numbers and fractions separately.

$2\frac{2}{5}+1\frac{3}{10}$

$2+1=3$

$\frac{2}{5}+\frac{3}{10}=\frac{4}{10}+\frac{3}{10}=\frac{7}{10}$

$3+\frac{7}{10}=3\frac{7}{10}$

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

$2-1=1$

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

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

Convert the mixed numbers to improper fractions.

$2\frac{2}{5}+1\frac{3}{10}$

$2\frac{2}{5}=\frac{12}{5}$ $\quad 1\frac{3}{10}=\frac{13}{10}$

$\frac{12}{5}+\frac{13}{10}=\frac{24}{10}+\frac{13}{10}=\frac{37}{10}$

$\frac{37}{10}=3\frac{7}{10}$

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

$2\frac{1}{2}=\frac{5}{2}$ $\quad 1\frac{1}{4}=\frac{5}{4}$

$\frac{5}{2}-\frac{5}{4}=\frac{10}{4}-\frac{5}{4}=\frac{5}{4}$

$\frac{5}{4}=1\frac{1}{4}$

Dividing Fractions by Whole Numbers

$\frac{2}{5}\div 2=\frac{1}{5}$

Multiplication and division are the inverse of one another so:

$\div 2$ is the same as $\times\frac{1}{2}$

$\frac{2}{5}\times\frac{1}{2}=\frac{2}{10}$

twinkl visit twinkl.com

Vocabulary and home learning

KS2 Maths - How to add and subtract fractions - BBC Bitesize

Please do come and ask the Year 6 teachers if you need further guidance or some suitable resources for this block of learning.

Block 4 Converting Units Weblink [Converting metric units - Maths -]

Converting Units — Knowledge Organiser

Key Vocabulary

mass
gram
kilogram
capacity
volume
mililitre
litre
millimetre
centimetre
kilometre
foot
inch
ounce
pound
stone
pint
gallon

Converting Mass

1 tonne = 1000kg

1000g = 1kg

$\frac{1}{10}$ kg = 0.1kg = 100g

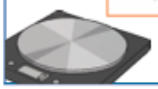
$\frac{1}{4}$ kg = 0.25kg = 250g

$\frac{1}{2}$ kg = 0.5kg = 500g

$\frac{3}{4}$ kg = 0.75 = 750g

grams (g) ⇄ kilograms (kg) ⇄ tonnes (t)

÷ 1000 / × 1000



Converting Capacity

1000ml = 1l

$\frac{1}{10}$ l = 0.1l = 100ml

$\frac{1}{4}$ l = 0.25l = 250ml

$\frac{1}{2}$ l = 0.5l = 500ml

$\frac{3}{4}$ l = 0.75l = 750ml

$\frac{1}{100}$ l = 0.01l = 10ml

millilitre (ml) ⇄ litres (l)

÷ 1000 / × 1000

Converting Length

1000m = 1km

100cm = 1m

10mm = 1cm

$\frac{1}{2}$ m = 0.5m = 50cm

$\frac{1}{4}$ m = 0.25m = 25cm

$\frac{3}{4}$ m = 0.75m = 75cm

$\frac{1}{10}$ m = 0.01m = 10cm

millimetres (mm) ⇄ centimetres (cm) ⇄ metres (m) ⇄ kilometres (km)

÷ 10 / ÷ 100 / ÷ 1000

× 10 / × 100 / × 1000

Converting Units — Knowledge Organiser

Miles to Kilometres

You might measure the length of a road or the distance between two cities in miles or kilometres.

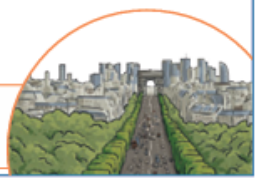
miles (m) ⇄ kilometres (km)

÷ 5 / × 8

× 5 / ÷ 8

5 miles = 8 kilometres

= means approximately equal to



Time

Minute 1 minute = 60 seconds

Hour 1 hour = 60 minutes

Day 1 day = 24 hours

Week 1 week = 7 days

Year 1 year = 12 months = 52 weeks = 365 days

Imperial Measures

Things that could be measured using imperial units:

- Someone's height in feet and inches
- The mass of a bag of sugar in ounces
- The mass of a sack of potatoes in pounds
- A person's mass in stones
- A carton of milk in pints
- The amount of water in a bath in gallons

1 foot = 12 inches

1 pound = 16 ounces

1 stone = 14 pounds

1 gallon = 8 pints

Metric to Imperial Conversions

metric (new)	imperial (old)
2.5 centimetres	1 inch
1 kilogram	2.2 pounds
4.5 litres	1 gallon

centimetres ⇄ inches

÷ 2.5 / × 2.5

litres ⇄ gallons

÷ 4.5 / × 4.5

kilograms ⇄ pounds

÷ 2.2 / × 2.2

Spring Block 1—Ratio [Ratio - KS2 Maths - BBC Bitesize]

Ratio — Knowledge Organiser

Key Vocabulary

- ratio
- proportion
- "for every... there are..."
- part
- whole
- scale factor
- enlargement
- similar shapes
- length
- width
- perimeter

twinkl visit twinkl.com

Ratio Language

For every 1 circle, there are 2 triangles.

For every 2 bananas, there are 3 apples.

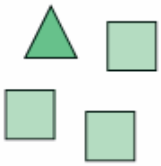
For every 1 football, there are 3 rugby balls.

Ratio and Fractions

For every 1 rugby ball, there are 2 footballs.

Ratio of rugby balls to footballs: 1:2

$\frac{1}{3}$ of the balls are rugby balls.



For every 1 triangle, there are 3 squares.

Ratio of triangles to squares: 1:3

$\frac{1}{4}$ of the shapes are triangles.

The Ratio Symbol

The ratio of footballs to rugby balls: 1:4

The ratio of rugby balls to footballs: 4:1

The ratio of circles to triangles: 2:3

The ratio of triangles to circles: 3:2

The ratio of apples to bananas: 1:2

The ratio of bananas to oranges: 2:3

The ratio of apples to bananas to oranges: 1:2:3

The ratio of oranges to bananas to apples: 3:2:1

Ratio — Knowledge Organiser

Ratio and Proportion Problem-Solving

To use the ingredients for 1 person, you divide all the quantities by 10 (÷ 10).

To use the ingredients for 5 people, you halve all the quantities (÷ 2).

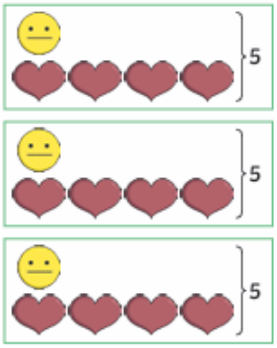
Ingredients for Fruit Smoothie
(serves 10 people)

- 800g of bananas
- 500g of strawberries
- 200g of raspberries
- 700ml of milk
- 300ml of natural yogurt

To use the ingredients for 20 people, you double all the quantities (× 2).

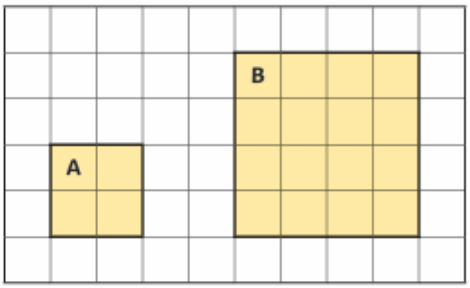
In a bag of 15 sweets, there is 1 smiley face sweet for every 4 love heart sweets.

Therefore, there will be 3 smiley face sweets and 12 love heart sweets in the bag.



twinkl visit twinkl.com

Scale Factors

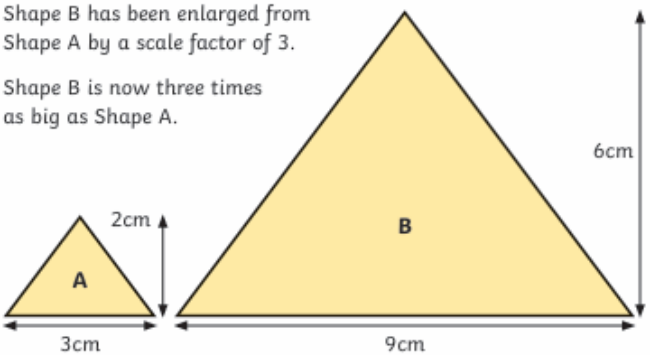


Shape A has been enlarged by a scale factor of 2 to make Shape B.

Shape B is now two times as big as Shape A.

Shape B has been enlarged from Shape A by a scale factor of 3.

Shape B is now three times as big as Shape A.



Spring Block 2 Algebra Web link and activity [Algebra - KS2 Maths - BBC]

Algebra — Knowledge Organiser

Key Vocabulary

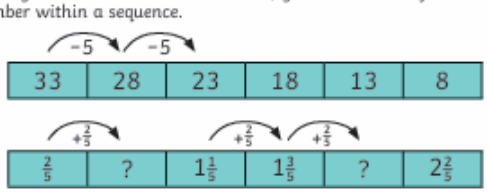
- term to term rule
- variable
- unknown
- expression
- equation
- formula
- one-step equation
- two-step equation
- substitution
- pairs of unknowns
- enumerate

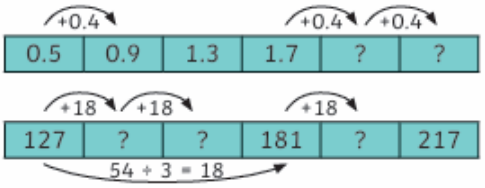
twinkl visit twinkl.com

Linear Number Sequences

A linear number sequence is a sequence where each value increases or decreases by the same amount each time. Each number in a linear number sequence is called a **term**. The constant change between each number is called the term to term rule. To identify the **term to term rule**, find the difference between two adjacent terms.

When you know the term to term rule, you can use it to find the next number in the sequence. It can also be used to find a missing number within a sequence.





Forming Expressions

An expression is a group of numbers, letters and operation symbols.

Add 14 to a	$a + 14$
Subtract 20 from b	$b - 20$
Multiply c by 4	$4c$
12 more than d	$d + 12$
Multiply e by 3 and subtract 5	$3e - 5$
Add 12 to f and then multiply by 2	$2(f + 12)$

Forming Equations

$a + 14 = 20$
$b - 20 = 15$
$4c = 28$
$d + 12 = 30$
$3e - 5 = 10$
$2(f + 12) = 44$

An equation is a number statement with an equal sign (=). Expressions on either side of the equal sign are of equal value.

Formulas / Formulae

(The word formula has two possible plural forms, formulae and formulas.)

A formula is a special type of equation that shows the relationship between different substituted variables. Formulas are often used in geometry to find area and volume.

- Area of triangle = (base × height) ÷ 2
- Area of rectangle = length × width
- (12.5 × hours worked) + 25 = cost of job

Algebra — Knowledge Organiser

Equations with Pairs of Unknowns

In an equation with two unknown numbers, there may be **several** possible values for the unknowns that will balance the equation.

$ab = 18$

a	b
1	18
2	9
3	6
6	3
9	2
18	1

$2a + b = 10$

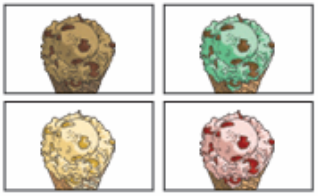
a	b
2	6
3	4
4	2
5	0

Enumerating Possibilities

Enumerating means making a complete list of answers to a problem.

- Use a system for finding the possibilities.
- Organise your findings in an ordered list or table.
- Have a way of deciding when all possibilities have been found.

There are four ice cream flavours.



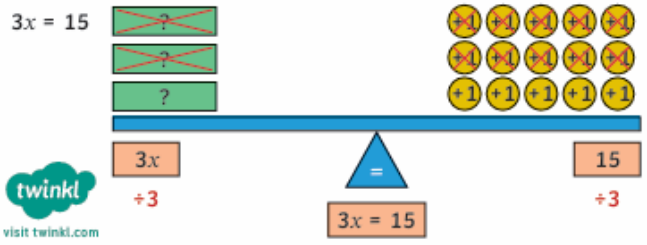
Two scoops of two different flavours give six possible combinations.

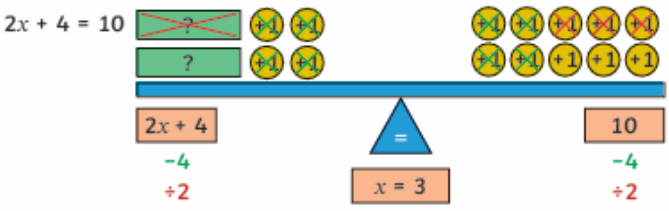
- chocolate and strawberry
- chocolate and vanilla
- chocolate and mint
- strawberry and vanilla
- strawberry and mint
- vanilla and mint

Solving One-Step and Two-Step Equations

In algebra, missing numbers in equations are represented by letters. Any letter can be used but often the letter x is used. An algebraic x is written to look different to a normal letter 'x' to avoid confusion.

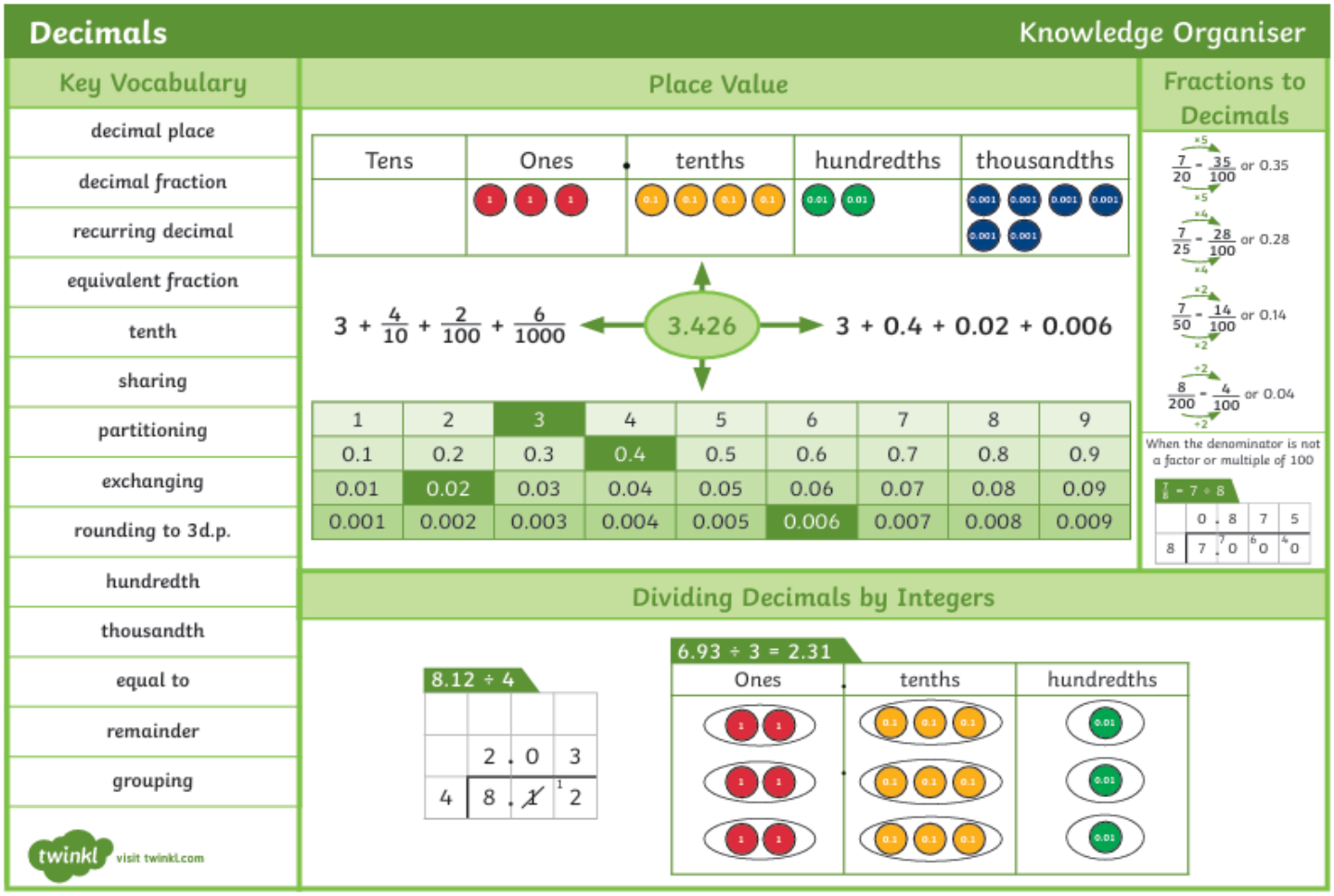
The multiplication sign is not used in algebra to avoid confusing it with the algebraic x used to show a missing number. Inverse operations are used to isolate the letter on one side of the equation.





twinkl visit twinkl.com

Spring Block 3 Decimals



Home learning

Practise reading and writing decimals

Compare and order decimals.

Calculate with decimals using standard column methods and short division

Web link and activity Decimals - BBC Bitesize

Spring Block 4 Fractions, Decimals and Percentages

Decimals — Knowledge Organiser

Multiplying and Dividing by 10, 100 and 1000

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
			2	0	8	
		2	0	8		
			2	0	8	

× 10 ÷ 10

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
		4	3	5		
4	3	5	0			
		4	3	5		

× 100 ÷ 100

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
			1	3	5	1
1	3	5	1			
			1	3	5	1

× 1000 ÷ 1000

Multiplying Decimals by Integers

	3	.	4	5
×				3
1	0	.	3	5
	1		1	

3.21 × 3 = 9.63

Ones	tenths	hundredths
1 1 1	0.1 0.1	0.01
1 1 1	0.1 0.1	0.01
1 1 1	0.1 0.1	0.01

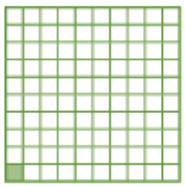
Decimal Numbers as Fractions

0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

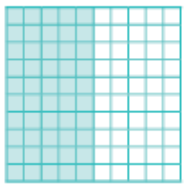
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

$\frac{1}{10}$ $\frac{2}{10}$ $\frac{3}{10}$ $\frac{4}{10}$ $\frac{5}{10}$ $\frac{6}{10}$ $\frac{7}{10}$ $\frac{8}{10}$ $\frac{9}{10}$ 1

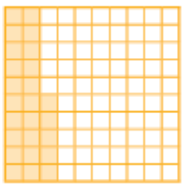
$\frac{1}{5}$ $\frac{2}{5}$ $\frac{1}{2}$ $\frac{3}{5}$ $\frac{4}{5}$



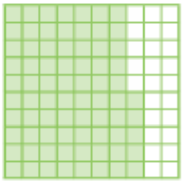
$\frac{1}{100} = 0.01$



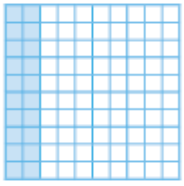
$\frac{50}{100} = \frac{1}{2} = 0.5$



$\frac{25}{100} = \frac{1}{4} = 0.25$



$\frac{75}{100} = \frac{3}{4} = 0.75$



$\frac{20}{100} = \frac{1}{5} = 0.2$

$\frac{1}{3} = 0.33$ $\frac{1}{8} = 0.125$ $\frac{1}{1000} = 0.001$

twinkl visit twinkl.com

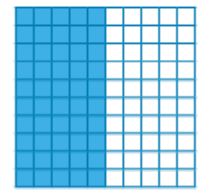
Percentages — Knowledge Organiser

Key Vocabulary

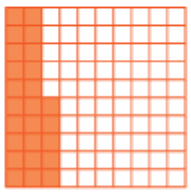
- per cent (%) = 'out of 100'
- percentage
- discount
- equivalent fraction
- equivalent decimal
- convert
- compare
- order
- the whole

twinkl visit twinkl.com

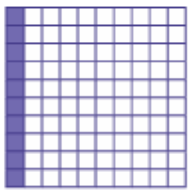
Equivalent Fractions, Decimals and Percentages



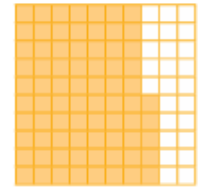
$\frac{50}{100} = \frac{1}{2} = 0.5 = 50\%$



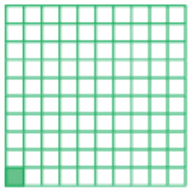
$\frac{25}{100} = \frac{1}{4} = 0.25 = 25\%$



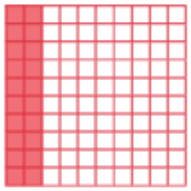
$\frac{10}{100} = \frac{1}{10} = 0.1 = 10\%$



$\frac{75}{100} = \frac{3}{4} = 0.75 = 75\%$



$\frac{1}{100} = 0.01 = 1\%$



$\frac{20}{100} = \frac{2}{10} = 0.2 = 20\%$

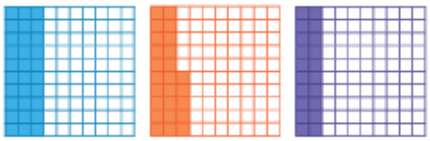
Fractions to Percentages

$\frac{15}{50} \xrightarrow{\times 2} \frac{30}{100} = 0.3 = 30\%$

$\frac{60}{200} \xrightarrow{\div 2} \frac{30}{100} = 0.3 = 30\%$

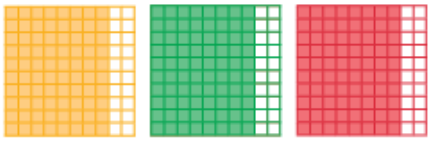
Order Fractions, Decimals and Percentages

$\frac{3}{10} > 25\% > 0.2$



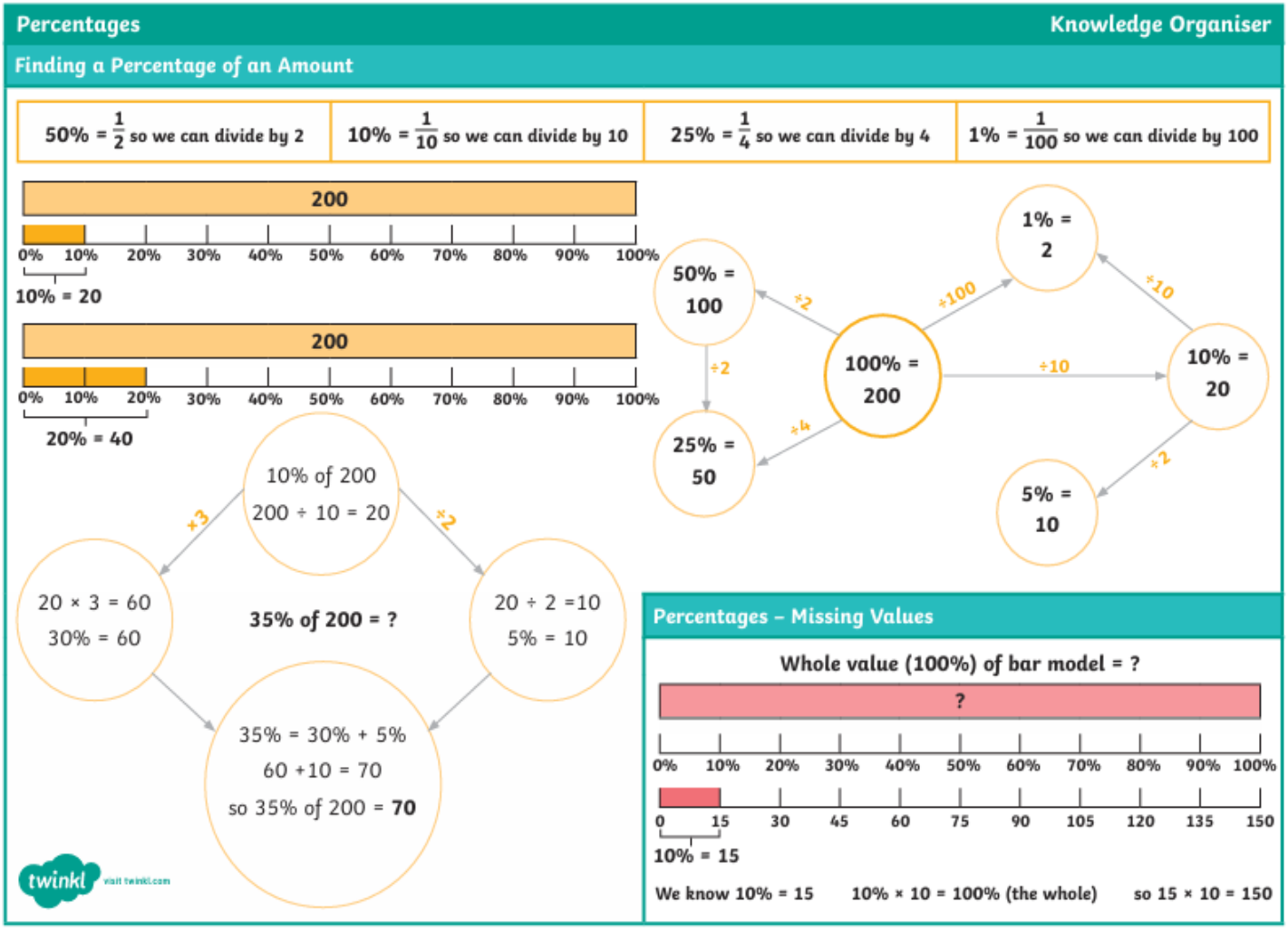
$\frac{30}{100} = 30\%$ $\frac{25}{100} = 25\%$ $\frac{20}{100} = 20\%$

$80\% = 0.8 = \frac{4}{5}$



$\frac{80}{100} = 80\%$ $\frac{80}{100} = 80\%$ $\frac{80}{100} = 80\%$

Spring Block 4 Fractions, Decimals, Percentages ctd



Home learning

Please ask teachers for most suitable support work for this unit.

Spring Block 5 Area, Perimeter and Volume

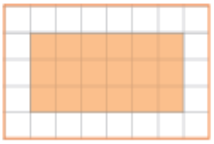
Perimeter, Area and Volume — Knowledge Organiser

Key Vocabulary

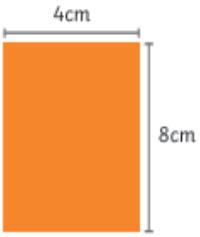
- perimeter
- area
- volume
- cubic units (e.g. cm^3)
- cuboid
- width
- length
- rectangle
- rectilinear
- parallelogram
- perpendicular height

Area of Rectangles

length × width = area of a rectangle



Counting squares:
area = $18cm^2$
Use formula:
6cm × 3cm
area = $18cm^2$

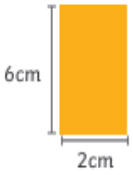


8cm × 4cm area = $32cm^2$

Perimeter of Rectangles

perimeter = length + width + length + width or (length + width) × 2

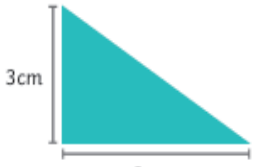
5cm + 4cm + 5cm + 4cm
area = $18cm^2$



(6 + 2) × 2
area = $16cm^2$

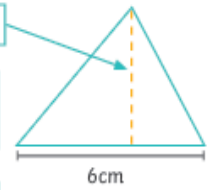
Area of Triangles

base × perpendicular height ÷ 2 = area of a triangle

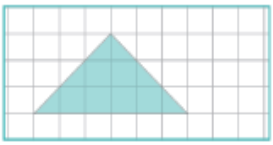


8cm × 3cm ÷ 2
area = $12cm^2$

perpendicular height = 5cm



6cm × 5cm ÷ 2
area = $15cm^2$



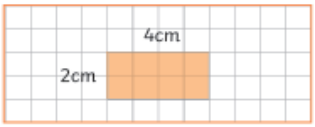
Counting squares:
6 whole squares = $6cm^2$
6 half squares = $3cm^2$
$6cm^2 + 3cm^2 = 9cm^2$
area = $9cm^2$

Using formula:
6cm × 3cm
÷ 2 = $9cm^2$

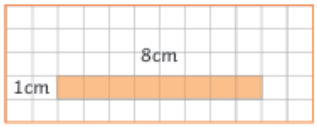
Perimeter, Area and Volume — Knowledge Organiser

Perimeter and Area

Shapes with the same area can have different perimeters.

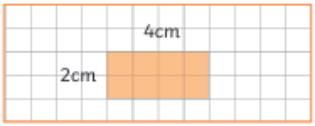


area = $8cm^2$ perimeter = 12cm

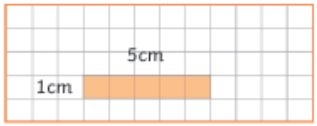


area = $8cm^2$ perimeter = 18cm

Shapes with the same perimeter can have different areas.

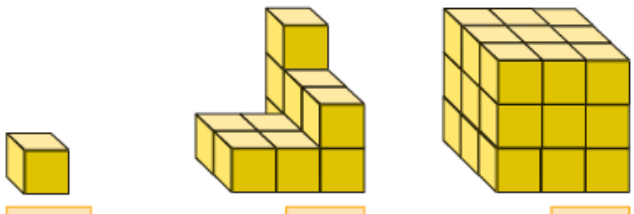


area = $8cm^2$ perimeter = 12cm



area = $5cm^2$ perimeter = 12cm

Volume - Counting Cubes

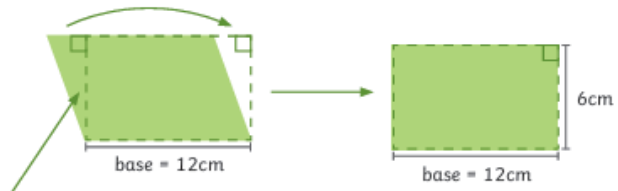


= $1cm^3$ $11cm^3$ $27cm^3$

Area of Parallelograms

base × perpendicular height = area of a parallelogram

A parallelogram can be transformed into a rectangle.

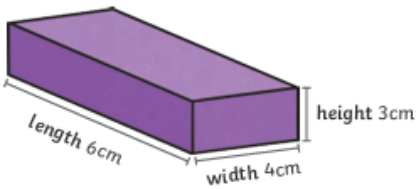


perpendicular height = 6cm

12cm × 6cm = $72cm^2$

Volume of Cuboids

length × width × height = volume of a cuboid



Multiply dimensions in **any** order:
3cm × 6cm × 4cm
volume = $72cm^3$

Spring Block 6 Statistics

Statistics — Knowledge Organiser

Key Vocabulary

- bar chart
- pictogram
- frequency table
- tally chart
- pie chart
- discrete data
- continuous data
- line graph
- sum
- difference
- comparison
- interpret
- mean average

twinkl visit twinkl.com

Interpreting Data

Information can be show in tables, charts or graphs.

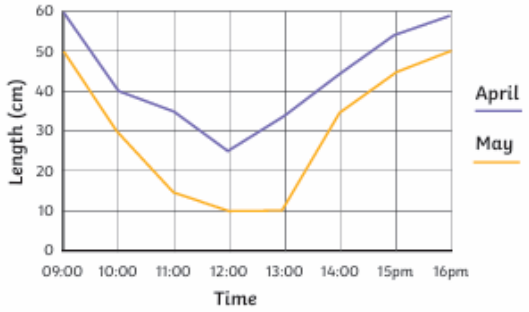
Interpreting data simply means understanding or working out what is being shown by a table, graph or chart and being able to answer questions about that information.

Line Graph

Line graphs are used to show changes to a measurement over time.

Data shown in a line graph is continuous.
Sets of points are joined together to make the line.

A line graph to show the length of shadows over time

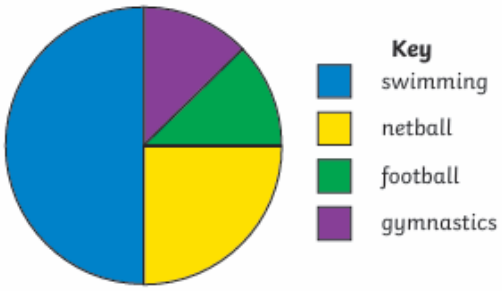


Pie Charts

Pie charts represent discrete data.

A circle is divided into segments, where each segment represents a data category. The size of each segment matches its proportion of the total amount.

A pie chart to show children's favourite sports



24 children were asked in total.

Swimming = $\frac{1}{2}$ so $\frac{1}{2}$ of 24 = 12 children

Netball = $\frac{1}{4}$ so $\frac{1}{4}$ of 24 = 6 children

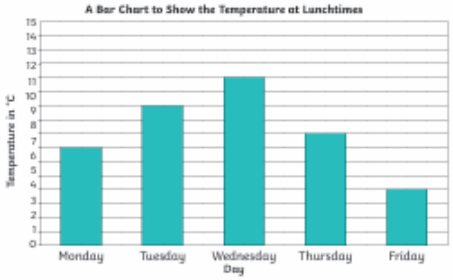
Football = $\frac{1}{8}$ so $\frac{1}{8}$ of 24 = 3 children

Gymnastics = $\frac{1}{8}$ so $\frac{1}{8}$ of 24 = 3 children

Statistics — Knowledge Organiser

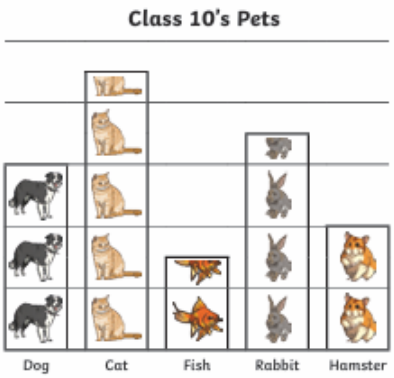
Bar Chart

A bar chart has a horizontal axis and a vertical axis. Bars show the data value of each category. There must be a gap between each bar. The scale of the bar chart is chosen based on the data range.



Pictogram

This graph uses pictures or symbols to represent the data. The pictogram uses one picture or symbol to represent a value.



☐ = 4 Children

Frequency Table

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

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.

twinkl visit twinkl.com

Mean Average

The mean is the average of a set of data.

To find the mean or average, add up all of the values to find the total. Divide the total by the number of values that you added together. This will give you the mean.

12	15	10	8	15

12 + 15 + 10 + 8 + 15 = 60

60 ÷ 5 = 12

The mean of this data is 12.

Summer Block 1 Shape

Properties of Shapes — Knowledge Organiser

Key Vocabulary

- angle
- right angle
- acute
- obtuse
- reflex
- protractor
- horizontal
- vertical
- parallel
- perpendicular
- polygon
- regular
- irregular
- two-dimensional
- three-dimensional
- flat face
- curved surface
- edge
- curved edge
- vertex
- vertices
- apex
- radius
- diameter
- circumference

twinkl visit twinkl.com

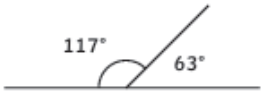
Angle Types

Acute Angles
Any angle that measures less than 90° is called an **acute** angle.

Obtuse Angles
Any angle that measures greater than 90° and less than 180° is called an **obtuse** angle.

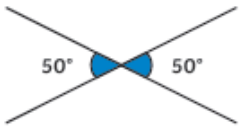
Reflex Angles
Any angle that measures greater than 180° is called a **reflex** angle.

Calculating Angles

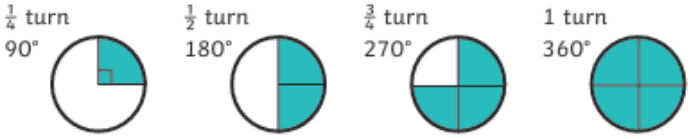


Angles on a straight line always total 180°.

Angles around a point always total 360°.

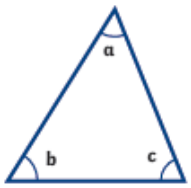


Opposite angles that share a vertex are equal.



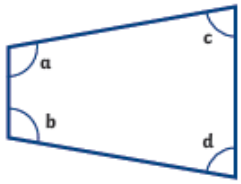
Multiples of 90° can be used as descriptions of a turn.

Angles in a Triangle



a + b + c = 180°

Angles in a Quadrilateral



a + b + c + d = 360°

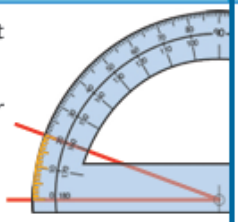
Properties of Shapes — Knowledge Organiser

Using a Protractor

Place the cross or circle at the point of the angle you are measuring.

Read from the zero on the outer scale of your protractor.

Count the degree lines carefully.

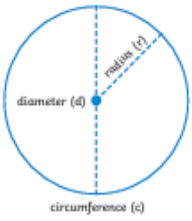


Parts of Circles

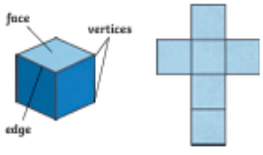
A circle is a 2D shape. The perimeter of a circle is called the **circumference** (c). The distance across the circle, passing through the centre, is called the **diameter** (d).

The distance from the centre of the circle to the circumference is called the **radius** (r).

$r \times 2 = d$ $\quad \frac{d}{2} = r$



Nets of 3D Shapes



A shape net shows which 2D shapes can be folded and joined to make a 3D shape. When you are drawing a net, or solving a problem involving a shape net, think carefully about where the edges of the faces meet.

twinkl visit twinkl.com

Angles in Regular Polygons

As the number of sides of a polygon increases by one, the total of the interior angles increases by 180°. When n = number of sides, this formula can be used to find the size of each angle in a **regular polygon**:

Sum of Interior Angles = (n − 2) × 180°

Each Angle = $\frac{(n-2) \times 180^\circ}{n}$

Pentagon
n = 5
(5 - 2) × 180° = 540°
540° ÷ 5 = 108°

Hexagon
n = 6
(6 - 2) × 180° = 720°
720° ÷ 6 = 120°

Properties of 3D Shapes

3D shapes have three dimensions – **length**, **width** and **depth**.

A **polyhedron** is a 3D shape with flat faces. Spheres, cylinders and cones are not polyhedrons as they have curved surfaces.

Cube	6 square faces 12 edges 8 vertices	**Tetrahedron**	4 triangular faces 6 edges 4 vertices	**Sphere**	1 curved surface 0 edges 0 vertices
Cuboid	6 faces 12 edges 8 vertices	**Octahedron**	8 faces 12 edges 6 vertices	**Triangular prism**	5 faces 9 edges 6 vertices
Square-based pyramid	5 faces 8 edges 5 vertices	**Cone**	1 circular face 1 curved surface 1 curved edge 1 apex	**Cylinder**	2 circular faces 1 curved surface 2 curved edges 0 vertices

Summer Block 2 Position and Direction

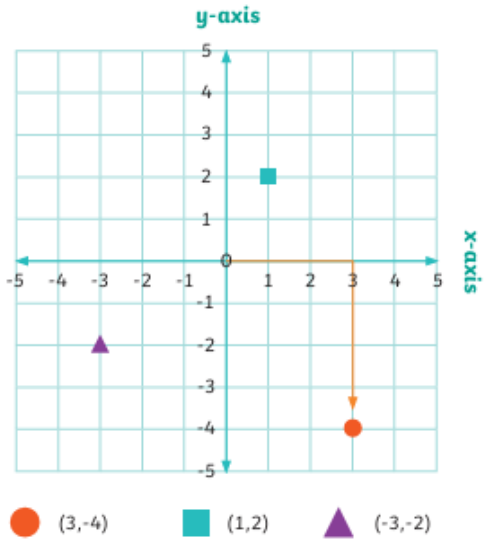
Position and Direction — **Knowledge Organiser**

Key Vocabulary

- translate
- translation
- reflect
- reflection
- up
- down
- right
- left
- coordinates
- quadrant
- x-axis
- y-axis
- horizontal
- vertical

Four Quadrants

Coordinates can use positive and negative numbers. Whether positive or negative, the x-axis coordinate is written first, followed by the y-axis coordinate.

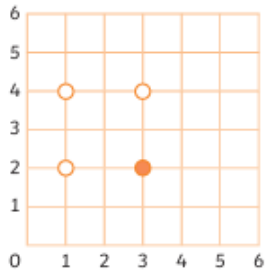


Look at the circle. It is 3 units along the x-axis and 4 down the y-axis. Its coordinates are (3,-4).

Completing Shapes

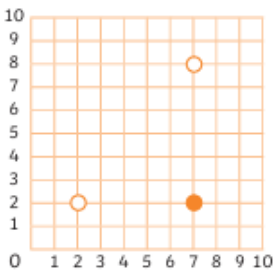
Using the properties of a shape, a polygon can be completed on a grid.

To make a square, think of the square's properties.



All of a square's sides are the same length. If the completed sides are 2 units in length, the missing point must complete two more sides of 2 units.

To make a right-angled triangle, think of the triangle's properties.



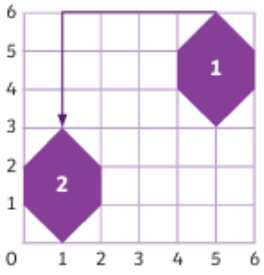
A right-angled triangle should have three sides with one 90° angle.

Position and Direction — **Knowledge Organiser**

Translation

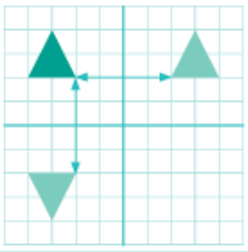
A shape is translated when it is moved without being rotated or resized. Every point of the shape moves the same distance and in the same direction.

Shape 1 has been translated 4 units left and 3 units down.



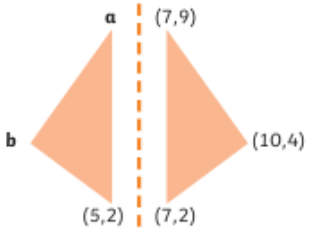
Reflections

A shape is reflected when it is flipped over a line which acts as a mirror. Every point on the original shape is the same distance from the mirror line as the same point on the reflected shape. The original triangle has been reflected in the x-axis and in the y-axis.



Missing Coordinates

Shapes can be shown on unmarked grids.



Point a is in the same position along the x-axis as (5,2) and in the same position on the y-axis as (7,9).

Point a (5,9)

Point b is in the same position on the y-axis as (10,4). Both triangles will have the same width. The width of the right-hand triangle is 3. This means that the width of the left-hand triangle is also 3.

Point b (2,4)

Place Value

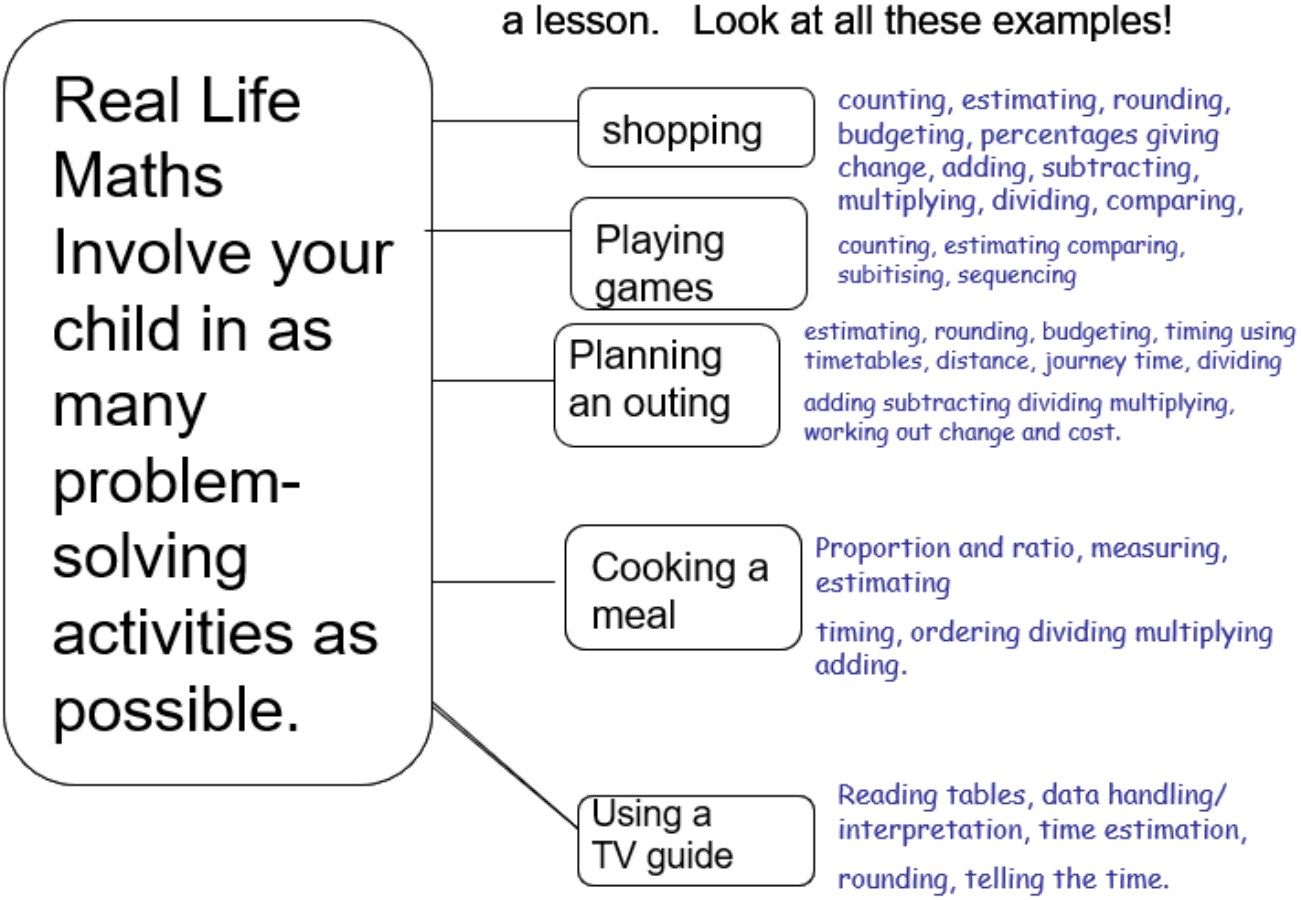
Tm	M	Hth	Tth	Th	H	T	O	t	h	th
Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
10 000 000	1 000 000	100 000	10 000	1000	100	10	1	0.1 $\frac{1}{10}$	0.01 $\frac{1}{100}$	0.001 $\frac{1}{1000}$

10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

Keep tables facts snappy practise everyday– they underpin so much of all of the maths curriculum right up to GCSE and beyond!

Real Life Maths!

Encourage your child to see Maths as skills essential to life, not just a lesson. Look at all these examples!



Decimal place value grid

Tens	Ones	•	Tenths	Hundredths

Real Life Maths!

Encourage your child to see Maths as skills essential to life, not just a lesson. Look at all these examples!