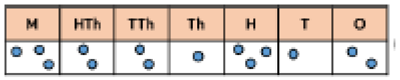
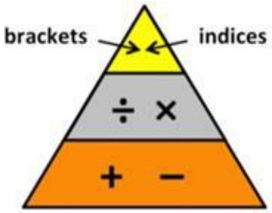
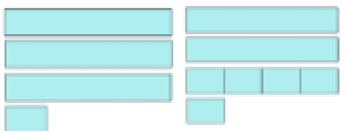
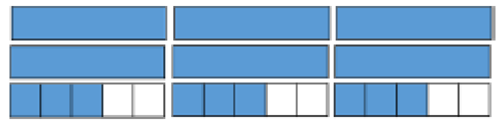
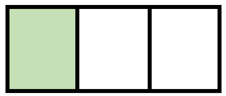
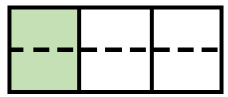
Godmanchester Community Academy Maths Progression

Year 6

Place Value	4 operations (+, -, x, ÷)	Number: Vocabulary
Read, write, order and compare numbers to at least 10,000,000 and determine the value of each digit e.g. 27,564,839 The value of the 2 is twenty million The value of the 7 is seven million The value of the 5 is five hundred thousand The value of the 6 is sixty thousand etc. Represent numbers in different ways e.g. 2,221,312 Two million, two hundred and twenty one thousand, three hundred and twelve  Round any whole number up to a required degree of accuracy Use negative numbers in context Calculate intervals across 0 e.g. 4 – 6 = -2 5 more than -2 is 3	Perform mental calculations, including with mixed operations and large numbers Know the order in which to perform operations e.g.  Identify common factors and common multiples and prime numbers. Multiply multi-digit numbers up to four-digit by a two-digit number **(More details on calculation policy)** e.g. 3792 x 28 = Divide numbers up to 4 digits by a two-digit number using the formal written method of short or long division and interpret remainders as whole number remainders, fractions or by rounding as appropriate for the context **(More details on calculation policy)**	**Multiple:** 25 is a multiple of 5 **Common Multiples** A number which is multiple of two or more given numbers e.g. common multiples of 12 and 20 are 2 and 4 **Factor:** factors of a number can multiply to give that number. 5 is a factor of 25 5 x 3 = 15 (factor x factor = product) **Factor Pairs:** 2 numbers that multiplied to give that number. Factors pairs of 12 are: 1 x 12, 2 x 6, 3 x 4 Know, understand and use the following words: **Prime Numbers:** Prime numbers are only divisible by 1 and themselves **Prime Factors:** Factors that are **also** prime numbers. E.g. prime factors of 15 are 3 and 5 because 3 x 5 = 15 **and** 3 and 5 are **both** prime numbers **Common Factors:** Factors that are the same for 2 numbers. Common factors of 12 and 15 are 1 and 3 as both 12 and 15 are multiples of 1 and 3 **Composite Numbers:** Whole numbers that are not prime numbers **Square Numbers:** A number x by itself twice. E.g. 4x4 4 squared is 16. This is recorded as 4^2 = 16 **Cube Numbers:** A number x by itself three times. E.g.4x4x4 4 cubed is 16. This is recorded as 4^3 = 16

Fractions	Fractions: Addition and Subtraction	Fractions: Multiplication and Division
Use common factors to simplify fractions $\div 4$ $\frac{8}{12} = \frac{2}{3}$ $\div 4$ Use common multiples to express fractions in the same denomination Compare and order fractions including fractions > (greater than) 1	Add and subtract fractions with the different denominators and mixed numbers, using the concept of equivalent fractions e.g. adding fractions with different denominators $\frac{5}{8} + \frac{3}{16} =$ The lowest common multiple of 8 and 16 is 16 so $\frac{5}{8}$ becomes $\frac{10}{16}$ and the calculation becomes $\frac{10}{16} + \frac{3}{16} = \frac{13}{16}$ e.g subtracting fractions with different denominators $\frac{7}{9} - \frac{1}{2} =$ The lowest common multiple of 9 and 2 is 18 so $\frac{7}{9}$ becomes $\frac{14}{18}$ and $\frac{1}{2}$ becomes $\frac{9}{18}$ and the calculation becomes $\frac{14}{18} - \frac{9}{18} = \frac{5}{18}$ Adding mixed numbers e.g. $1\frac{1}{2} + 2\frac{1}{6} = 1\frac{3}{6} + 2\frac{1}{6} = 3\frac{4}{6} = 3\frac{2}{3}$ Subtracting mixed numbers e.g. $3\frac{1}{4} - 1\frac{3}{4} =$  Exchange 1 whole for $\frac{4}{4}$ so the calculation becomes $2\frac{5}{4} - 1\frac{3}{4}$ and this = $1\frac{2}{4}$ and simplifying this answer= $1\frac{1}{2}$ $3\frac{1}{4} - 1\frac{3}{4} = 2\frac{5}{4} - 1\frac{3}{4} = 1\frac{2}{4} = 1\frac{1}{2}$	Multiply fractions by whole numbers e.g. $2\frac{3}{5} \times 3 = 7\frac{4}{5}$  $2 \times 3 = 6$ $\frac{3}{5} \times 3 = \frac{9}{5} = 1\frac{4}{5}$ $6 + 1\frac{4}{5} = 7\frac{4}{5}$ Multiply simple pairs or proper fractions, writing the answer in its simplest form e.g. $\frac{1}{4} \times \frac{1}{2}$ is the same as $\frac{1}{4}$ of $\frac{1}{2}$ so $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ Divide proper fractions by whole numbers When the numerator can be divided by the whole number , the denominator stays the same and the numerator is divided by the whole number e.g. $\frac{2}{5} \div 2$ The numerator can be divided by the whole number so $\frac{2}{5} \div 2 = \frac{1}{5}$ When the numerator is not a multiple of the whole number by divided by diagrams can help. e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$ one third  divided by 2 

FDP: Equivalence, and Place Value

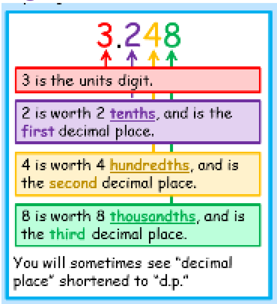
Recall and use equivalences between simple fractions, decimals and percentages

e.g.

Fraction	Decimal	Percentage
1	1.0	100%
$\frac{1}{2}$	0.50	50%
$\frac{1}{3}$	0.333	33.3%
$\frac{1}{4}$	0.25	25%
$\frac{1}{5}$	0.20	20%
$\frac{1}{8}$	0.125	12.5%
$\frac{1}{10}$	0.10	10%

Know the value of each digit in numbers given to three decimal places

e.g.



Solve problems involving the calculation of percentages

e.g. 15% of £200

Compare percentages

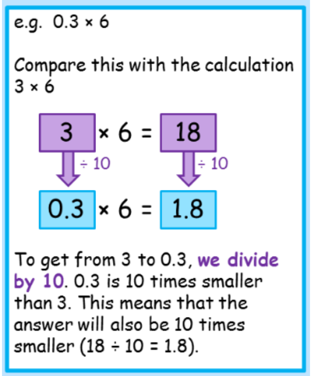
e.g. 25% of 300 < (is less than) 10% of 1000

FDP: Multiplication and Division

Multiply and divide numbers by 10, 100, and 1000 giving answers up to three decimal places

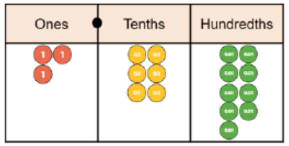
Multiply one-digit numbers with up to two decimal places by whole numbers

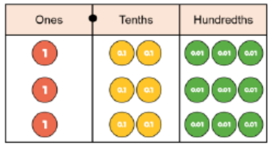
e.g. 0.3 x 6



Divide decimals by whole number

e.g. 3.69 ÷ 3 =





Ratio and Proportion

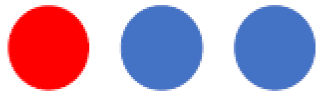
Use and understand the language of '**for every …, there are …'**

e.g For every 1 red dot there are 2 blue dots

This is recorded as 1:2

A common misconception is that this is the same as $\frac{1}{2}$

but as the image illustrates, 1:2 is not the same as $\frac{1}{2}$.



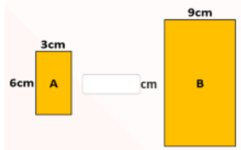
The fraction of blue dots is $\frac{2}{3}$

The fraction of red dots is $\frac{1}{3}$

Solve problems involving similar shapes where the scale factor is known or can be found

Scale Factor - Enlarging an object to make them larger by 2 or 3 times etc.

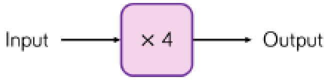
e.g Rectangle A has been enlarged by a scale factor of 3



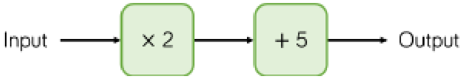
Algebra

Find a rule using a function machine

e.g. a one-step function machine



e.g. a two-step function machine



Use simple formulae

e.g. 3y +10 = n where y = 10 what does n =

n = 40 as 3 x 10 (y) = 40 (n)

Generate and describe linear number sequences

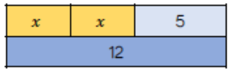
Express missing number problems algebraically

Words	Concrete	Algebra
I think of a number		x
Add 3		$x + 3$
My answer is 5	=	$x + 3 = 5$

Solve 2 step equations

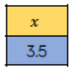
e.g.

$2x$+5 = 12



So to calculate $2x$ is 12- 5

And to calculate x is 7 ÷ 2 so x =3.5



Find pairs of numbers that satisfy an expression with two unknowns or pairs of values

e.g. $a + b = 6$

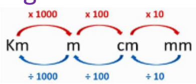
Find pairs of values

e.g. $ab + b = 18$

Measurement

Convert units of measure using decimal notation up to three decimal places

e.g

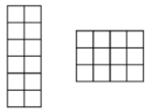


Convert between miles and kilometres

5miles = 8 kilometres

Recognise that shapes with the same area can have different perimeters and vice versa

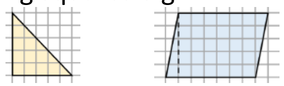
e.g. both of these shapes have an area of 12cm² but the perimeters are different (16cm and 14cm)



Recognise when it is possible to use formulae for area and volume of shapes

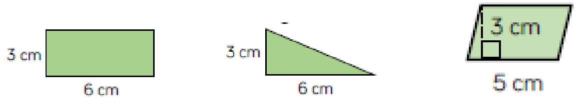
e.g. length x width for regular 4 sided shapes

Calculate the area of parallelograms and triangles either by counting squares e.g.

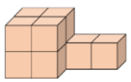


Area of a triangle formula is base x height ÷ 2

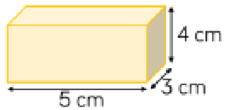
Area of a parallelogram formula is base x perpendicular height



Calculate, estimate and compare volume of cubes and cuboids using cm³, m³ and then mm³and km³



volume = 10cm³



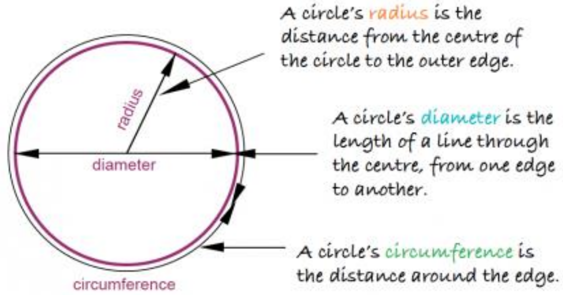
5cm x 4cm x 3cm = 60cm³

Shape

Draw 2d shapes using given dimensions and angles

Compare and classify geometric shapes based on their properties and sizes

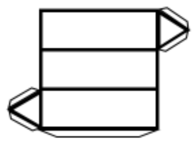
Illustrate and name parts of a circle including radius diameter and circumference

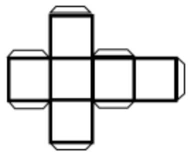


Know that diameter is twice the radius

Recognise, describe and build simple 3d shapes, including making nets

e.g.



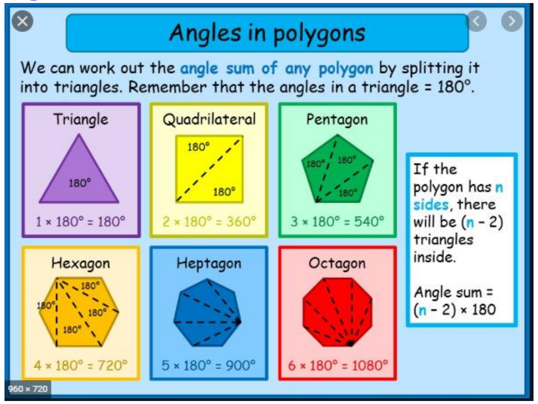


Triangular Prism | Square Based Pyramid | Cube

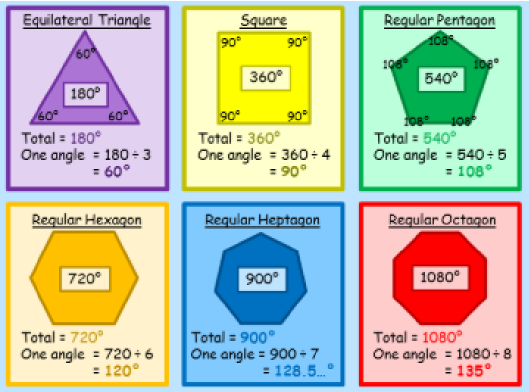
Angles

Find unknown angles in triangles, quadrilaterals and regular polygons

e.g.

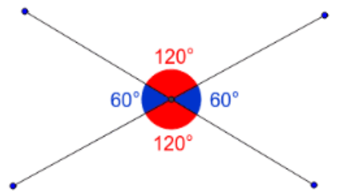


So



Recognise angles where they meet at a point, on a straight line or are vertically opposed and find missing angles

e.g.



Position and Direction

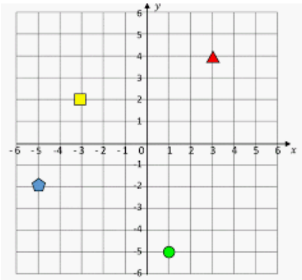
Describe positions on a full coordinate grid (all 4 quadrants)

The red triangle is in the first quadrant and the coordinates are 3,4 (+,+)

The yellow square is in the second quadrant and the coordinates are -3,2 (-,+)

The blue pentagon is in the third quadrant and the coordinates are -5,-2 (-,-)

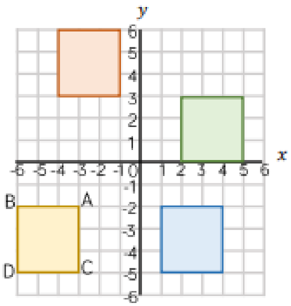
The green circle is in the fourth quadrant and the coordinates are 1,-5 (+,-)



Draw and translate simple shapes on the coordinate plane

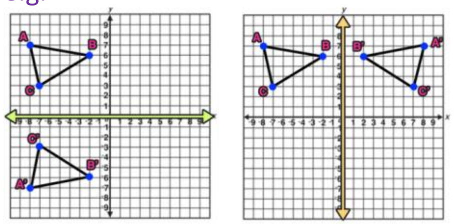
e.g. ABCD is moved 2 units to the right and 8 units up

It has been translated to the orange square



Reflect simple shapes in the x axis and the y axis

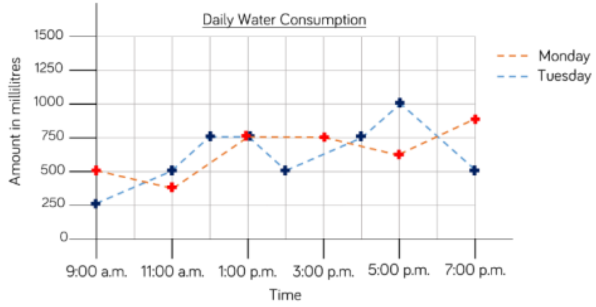
e.g.



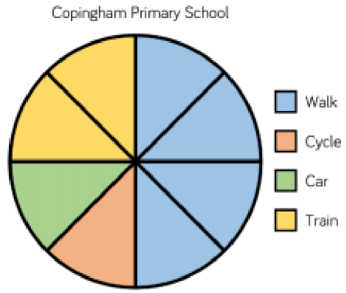
Statistics

Interpret and construct pie charts and line graphs and use these to solve problems

Line Graphs



Pie Charts



There are 600 pupils at Copingham Primary School. Work out how many ...

600 ÷ 2 (the blue part is a half) = 300 walked

600 ÷ 4 (the green part is a quarter) = 150 got the train

600 ÷ 8 (the green part is an eighth) = 75

Calculate the mean as an average

Mean = Total ÷ number of items

e.g. 4 + 3 + 2 ÷ 3 = 3