

MATHS: CURRICULUM CONTENT AND PROGRESSION FRAMEWORK

CPA (concrete, pictorial, abstract) approach.

We believe that the CPA model holds educational merit and the potential to provide a solid learning foundation for understanding in mathematics. The CPA heuristic is underpinned by a Piagetian or Neo-Piagetian premise, proposing that children learn through distinct stages, beginning with concrete, and moving through the stages (pictorial, abstract) in turn. Critics (Wood, 1998; Hughes, 1994) argue that children as young as three years old are able to correctly solve abstract mathematical problems, without any concrete representation, if the question can be applied to their own understanding of life. Bruner (1966) proposed a model, in which he acknowledges that the types of learning do not necessarily occur in a pre-determined, linear progression, and may operate alongside each other, or in various orders.

Navigating through the plethora of views on Piagetian-based thought, we concluded that staff at Monk Fryston and Saxton Federation of Schools will strive to give our learners opportunities to experience different types of learning, but will use our professional judgement to carefully consider the content and child, and assess which style of learning we might employ and when. This professional judgement affords us the ability to choose if and when, for example, a group of children would be asked to use the Numicon equipment, or draw pictorial arrays or solve multi-step word problems in order to gain an understanding of a particular mathematical concept. Reeves says: '[I]f we are to take quality seriously we have to get closer to our learners, their needs, their learning styles and their motivation' (in Dadds, 2001, p.53). Merttens (2012, p.36) asserts: 'It is only when mathematical meaning is grounded in practical activities involving the use of models and images that the process of mapping symbolic meaning onto conceptual understanding is likely to occur.'

White Rose / Maths Hub planning

At Monk Fryston and Saxton Federation of Schools, we aim to use the White Rose Maths planning as a guide, with the acknowledgement that some cohorts may have specific strengths/weaknesses in learning that require adjustments to the order in which mathematical areas are covered. White Rose long term plans follow National Curriculum in a clear and logical order (steadily building on previously-learned skills and understanding) and provide learning activities which cater for a variety of learning styles (using the CPA approach, as above) and stimulating problem-solving and reasoning challenges.

Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
FOUNDATION	
	<p>Number and Place Value: Autumn, Spring & Summer. Count up to three or four objects by saying a number name for each item Count actions or objects which cannot be moved Count objects to 10 and begin to count beyond 10 Count out up to six objects from a larger group Count an irregular arrangement of up to ten objects ELG - count reliably with numbers from one to 20 Use the language of 'more' and 'fewer' to compare two sets of objects ELG - with numbers from one to 20, place them in order Say the number that is one more than a given number ELG - with numbers from 1 to 20 say which number is one more or less than a given number Select the correct numeral to represent 1 to 5, then 1 to 10 objects. Estimate how many objects they can see and check by counting them. Recognise some numerals of personal significance Recognise numerals 1 to 5</p> <p>Addition and Subtraction: Autumn, Spring & Summer. Find the total number of items in two groups by counting all of them In practical activities and discussion, begin to use the vocabulary involved in adding and subtracting Record, using marks that they can interpret and explain ELG - using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer Begin to identify their own mathematical problems based on own interests and fascinations</p> <p>Multiplication and Division: Summer. ELG - they solve problems, including doubling, halving and sharing</p> <p>Measurement: Autumn & Summer.</p>

	<p>Order two or three items by length or height Order two items by weight or capacity Order and sequence familiar events Measure short periods of time in simple ways ELG - children use everyday language to talk about time</p> <p>Geometry: Spring. Use familiar objects and common shapes to create and recreate patterns ELG - They recognise, create and describe patterns Begin to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes, and mathematical terms to describe shapes ELG - They explore characteristics of everyday objects and shapes and use mathematical language to describe them Use familiar objects and common shapes to create and recreate patterns and build models</p>
<p>YEAR 1</p>	
<p>Topics/Themes/Texts: (To be decided by individual schools)</p>	<p>The key things we want children to know/be able to do</p>
	<p>Number and Place Value: Autumn 1 Autumn 4 Spring 2 Summer 4 Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens Given a number, identify one more and one less Use the language of: equal to, more than, less than (fewer), most, least</p>

Identify and represent numbers using objects and pictorial representations including the number line
Read and write numbers from 1 to 20 in numerals and words

Addition and Subtraction: Autumn 2 Spring 1

Represent and use number bonds and related subtraction facts within 20

Add and subtract one-digit and two-digit numbers to 20, including zero

Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods);

Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs

Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$

Multiplication and Division: Summer 1

Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

Fractions, Decimals and Percentages: Summer 1 Summer 2

Recognise, find and name a half as one of two equal parts of an object, shape or quantity

Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Measurement: Spring 3 Spring 4 Summer 5 Summer 6

Compare, describe and solve practical problems for:

- lengths & heights [e.g. long/short, longer/shorter, tall/short, double/half]

- mass/weight [e.g. heavy/light, heavier than, lighter than]

- capacity & volume [e.g. full/empty, more than, less than, half, half full, quarter]

- time [e.g. quicker, slower, earlier, later]

Sequence events in chronological order using language [e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]

Measure and begin to record the following:

- lengths and heights

- mass/weight

- capacity and volume

- time (hours, minutes, seconds)

Recognise and know the value of different denominations of coins and notes

Geometry: Autumn 3 Summer 3

Recognise and name common 2D and 3D shapes, including:

- 2D shapes [e.g. rectangles (including squares), circles and triangles]

- 3D shapes [e.g. cuboids (including cubes), pyramids and spheres]

	Describe position, direction and movement, including half, quarter and three-quarter turns
YEAR 2	
Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
	<p>Number and Place Value: Autumn 1 Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward Compare and order numbers from 0 up to 100; use <, > and = signs Compare and order numbers from 0 up to 100; use <, > and = signs Identify, represent and estimate numbers using different representations, including the number line Read and write numbers to at least 100 in numerals and in words Recognise the place value of each digit in a two-digit number (tens, ones) Use place value and number facts to solve problems</p> <p>Addition and Subtraction: Autumn 2 Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and ones - a two-digit number and tens - two two-digit numbers - adding three one-digit numbers Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems Solve problems with addition and subtraction: - using concrete objects and pictorial representations, including those involving numbers, quantities and measures - applying their increasing knowledge of mental and written methods</p> <p>Multiplication and Division: Autumn 4 Spring 1 Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs</p>

Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Fractions, Decimals and Percentages: Spring 4

Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
Write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$
Write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$

Measurement: Autumn 3 Spring 5 Summer 3 Summer 4

Compare and order lengths, mass, volume/capacity and record the results using >, < and =
Compare and sequence intervals of time
Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ($^{\circ}$ C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
Find different combinations of coins that equal the same amounts of money
Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.
Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
Know the number of minutes in an hour and the number of hours in a day

Geometry: Spring 3 Summer 1

Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line
Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces
Identify 2D shapes on the surface of 3D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]
Compare and sort common 2D and 3D shapes and everyday objects
Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)
Order and arrange combinations of mathematical objects in patterns and sequences

Statistics: Spring 2

	<p>Interpret and construct simple pictograms, tally charts, block diagrams and simple tables Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity Ask and answer questions about totalling and comparing categorical data</p>
<p>YEAR 3</p>	
<p>Topics/Themes/Texts: (To be decided by individual schools)</p>	<p>The key things we want children to know/be able to do</p>
	<p>Number and Place Value: Autumn 1 Count from 0 in multiples of 4, 8, 50 and 100 Find 10 or 100 more or less than a given number Compare and order numbers up to 1000 Compare and order numbers up to 1000 Read and write numbers up to 1000 in numerals and in words Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) Solve number problems and practical problems involving these ideas</p> <p>Addition and Subtraction: Autumn 2 Add and subtract numbers mentally, including: - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction Estimate the answer to a calculation and use inverse operations to check answers Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction</p> <p>Multiplication and Division: Autumn 3 Spring 1 Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (appears also in Written Methods) Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (appears also in Mental Methods)</p>

Estimate and use inverse operations to check answers to a calculation
Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Fractions, Decimals and Percentages: Spring 5 Summer 1

Count up and down in tenths

Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators

Recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10

Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators

Compare and order unit fractions, and fractions with the same denominators

Recognise and show, using diagrams, equivalent fractions with small denominators

Add and subtract fractions with the same denominator within one whole (e.g. $5/7 + 1/7 = 6/7$)

Solve problems that involve all of the above

Measurement: Spring 2 Spring 4 Summer 2 Summer 4

Compare durations of events, for example to calculate the time taken by particular events or tasks

Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight (appears also in Telling the Time)

Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)

Measure the perimeter of simple 2D shapes

Add and subtract amounts of money to give change, using both £ and p in practical contexts

Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks

Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight

Know the number of seconds in a minute and the number of days in each month, year and leap year

Geometry: Summer 3

Draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them

Recognise angles as a property of shape or a description of a turn

Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle

Identify horizontal and vertical lines and pairs of perpendicular and parallel lines

Statistics: Spring 3

Interpret and present data using bar charts, pictograms and tables

	Solve one-step and two-step questions [e.g. 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables
YEAR 4	
Topics/Themes/Texts: (To be decided by individual schools)	The key things we want children to know/be able to do
	<p>Number and Place Value: Autumn 1 Count backwards through zero to include negative numbers Count in multiples of 6, 7, 9, 25 and 1000 Find 1000 more or less than a given number Order and compare numbers beyond 1000 Identify, represent and estimate numbers using different representations Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) Round any number to the nearest 10, 100 or 1000 Solve number and practical problems that involve all of the above and with increasingly large positive numbers</p> <p>Addition and Subtraction: Autumn 2 Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate Estimate and use inverse operations to check answers to a calculation Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p> <p>Multiplication and Division: Autumn 4 Spring 1 Recall multiplication and division facts for multiplication tables up to 12x12 Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers Recognise and use factor pairs and commutativity in mental calculations Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 Multiply two-digit and three-digit numbers by a one-digit number using formal written layout</p>

Recognise and use factor pairs and commutativity in mental calculations (appears also in Mental Calculation)
Estimate and use inverse operations to check answers to a calculation
Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

Fractions, Decimals and Percentages: Spring 3 Spring 4 Summer 1

Count up and down in hundredths

Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten

Compare numbers with the same number of decimal places up to two decimal places

Round decimals with one decimal place to the nearest whole number

Recognise and show, using diagrams, families of common equivalent fractions

Recognise and write decimal equivalents of any number of tenths or hundredths

Recognise and write decimal equivalents to $\frac{1}{4}$; $\frac{1}{2}$; $\frac{3}{4}$

Add and subtract fractions with the same denominator

Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths

Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths

Solve simple measure and money problems involving fractions and decimals to two decimal places

Measurement: Autumn 3 Spring 2 Summer 2 Summer 3

Estimate, compare and calculate different measures, including money in pounds and pence (appears also in Measuring)

Estimate, compare and calculate different measures, including money in pounds and pence (appears also in Comparing)

Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres

Find the area of rectilinear shapes by counting squares

Read, write and convert time between analogue and digital 12- and 24-hour clocks

Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days

Convert between different units of measure (e.g. kilometre to metre; hour to minute)

Read, write and convert time between analogue and digital 12- and 24-hour clocks

Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days

Geometry: Summer 5 Summer 6

Identify lines of symmetry in 2D shapes presented in different orientations

Complete a simple symmetric figure with respect to a specific line of symmetry

Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes

Identify acute and obtuse angles and compare and order angles up to two right angles by size

Identify acute and obtuse angles and compare and order angles up to two right angles by size

	<p>Describe positions on a 2D grid as coordinates in the first quadrant Plot specified points and draw sides to complete a given polygon</p> <p>Statistics: Summer 4 Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs</p>
<p>YEAR 5</p>	
<p>Topics/Themes/Texts: (To be decided by individual schools)</p>	<p>The key things we want children to know/be able to do</p>
	<p>Number and Place Value: Autumn 1 Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero Count forwards or backwards in steps of powers of 10 for any given number up to 1000000 Read, write, order and compare numbers to at least 1000000 and determine the value of each digit (appears also in Reading and Writing Numbers) Read, write, order and compare numbers to at least 1000000 and determine the value of each digit (appears also in Comparing Numbers) Read Roman numerals to 1000 (M) and recognise years written in Roman numerals Read, write, order and compare numbers to at least 1000000 and determine the value of each digit Round any number up to 1000000 to the nearest 10, 100, 1000, 10000 and 100000 Solve number problems and practical problems that involve all of the above</p> <p>Addition and Subtraction: Autumn 2 Add and subtract numbers mentally with increasingly large numbers Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p> <p>Multiplication and Division: Autumn 4 Spring 1 Summer 1 Multiply and divide numbers mentally drawing upon known facts</p>

Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
 Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
 Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
 Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
 Establish whether a number up to 100 is prime and recall prime numbers up to 19
 Recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)
 Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
 Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
 Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
 Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Fractions, Decimals and Percentages: Spring 2 Spring 3 Summer 1

Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (appears also in Equivalence)
 Compare and order fractions whose denominators are all multiples of the same number
 Read, write, order and compare numbers with up to three decimal places
 Round decimals with two decimal places to the nearest whole number and to one decimal place
 Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
 Read and write decimal numbers as fractions (e.g. $0.71 = \frac{71}{100}$)
 Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
 Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
 Add and subtract fractions with the same denominator and denominators that are multiples of the same number
 Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1 \frac{1}{5}$)
 Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
 Solve problems involving numbers up to three decimal places
 Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those with a denominator of a multiple of 10 or 25

Measurement: Autumn 5 Summer 1 Summer 4 Summer 5

Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes (appears also in Measuring)
 Estimate volume (e.g. using 1cm³ blocks to build cubes and cuboids) and capacity (e.g. using water)
 Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling

Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
 Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes
 Solve problems involving converting between units of time
 Convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
 Convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
 Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints

Geometry: Summer 2 Summer 3

Identify 3D shapes, including cubes and other cuboids, from 2D representations
 Draw given angles, and measure them in degrees (°)
 Distinguish between regular and irregular polygons based on reasoning about equal sides and angles
 Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles
 Identify:
 - angles at a point and one whole turn (total 360°)
 - angles at a point on a straight line and ½ a turn (total 180°)
 - other multiples of 90°
 Use the properties of rectangles to deduce related facts and find missing lengths and angles

Statistics: Autumn 3

Complete, read and interpret information in tables, including timetables
 Solve comparison, sum and difference problems using information presented in a line graph

YEAR 6

Topics/Themes/Texts: (To be decided by individual schools)

The key things we want children to know/be able to do

Number and Place Value: Autumn 1

Use negative numbers in context, and calculate intervals across zero

Read, write, order and compare numbers up to 10000000 and determine the value of each digit (appears also in Reading and Writing Numbers)

Read, write, order and compare numbers up to 10000000 and determine the value of each digit (appears also in Understanding Place Value)

Read, write, order and compare numbers up to 10000000 and determine the value of each digit

Round any whole number to a required degree of accuracy

Solve number and practical problems that involve all of the above

Addition and Subtraction: Autumn 2

Perform mental calculations, including with mixed operations and large numbers

Use their knowledge of the order of operations to carry out calculations involving the four operations

Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Multiplication and Division: Autumn 2

Perform mental calculations, including with mixed operations and large numbers

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

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of short division where appropriate for the context divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

Identify common factors, common multiples and prime numbers

Use their knowledge of the order of operations to carry out calculations involving the four operations

Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

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

Solve problems involving addition, subtraction, multiplication and division.

Fractions, Decimals and Percentages: Autumn 3 Spring 1 Spring 2 Spring 6

Compare and order fractions, including fractions >1

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

Solve problems which require answers to be rounded to specified degrees of accuracy

Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $\frac{3}{8}$)
Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$);
multiply one-digit numbers with up to two decimal places by whole numbers
Divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)
Multiply one-digit numbers with up to two decimal places by whole numbers
Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
Use written division methods in cases where the answer has up to two decimal places
Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.

Algebra: Spring 3

Express missing number problems algebraically
Find pairs of numbers that satisfy number sentences involving two unknowns
Enumerate all possibilities of combinations of two variables
Use simple formulae
Generate and describe linear number sequences

Measurement: Spring 4 Spring 5 Summer 4

Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3
Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
(appears also in Converting)
Recognise that shapes with the same areas can have different perimeters and vice versa
Calculate the area of parallelograms and triangles
Calculate the area of parallelograms and triangles; calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [e.g. mm^3 and km^3].
Recognise when it is possible to use formulae for area and volume of shapes

Geometry: Autumn 4 Summer 1

Recognise, describe and build simple 3D shapes, including making nets
Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.
Draw 2D shapes using given dimensions and angles
Recognise, describe and build simple 3D shapes, including making nets (appears also in Identifying Shapes and Their Properties)

Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
Describe positions on the full coordinate grid (all four quadrants)
Draw and translate simple shapes on the coordinate plane, and reflect them in the axes

Statistics: Summer 3

Interpret and construct pie charts and line graphs and use these to solve problems
Calculate and interpret the mean as an average