Mathematics Curriculum at Oakthorpe

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims

The National Curriculum for mathematics aims to ensure that all pupils:

> become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
>
> reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
>
> can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

At Oakthorpe maths is taught in ability groups most of the time. Because of our high staffing levels, we are able to split each year group into 4 flexible groups. This increases the amount of support each child receives and helps ensure that support meets the needs of each child.

We encourage children to use and apply their mathematical knowledge, understanding and skills in their maths lessons and in other subjects. In addition, we focus on investigations during Investigation Fridays which are held each half term.

On the following pages is an overview of what is taught each term in each year group. This is in line with the new National Curriculum.

Mathematics in Year 1

Please note, while these are age related expectations, not all children will be progressing at the same pace and children may follow the programme or objectives of a different year group depending on their needs and ability.

Learning Objectives

Autumn

- Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- Read and write numbers from 1 to 20 in numerals and words
- Say what is one more and one less of a given number

- Recognise and name common 2-D shapes [for example, rectangles (including squares) circles and triangles]
- Read, write and understand statements involving addition(+), subtraction(-) and equals(=) signs
- Add and subtract one-digit and two-digit numbers to 20, including zero
- Know which pairs of numbers add together to make numbers up to 20 eg 1+9, 2+8, 3+7, 4+6, 5+5 all equal 10
- Recognise, find and name a half as one of two equal parts of an object or quantity
- Solve one-step problems that involve addition using objects and pictures and missing numbers problems such as 7 = __ + 3.
- Sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening].
- Recognise and use language relating to dates, including days of the week, weeks, months and years
- Tell the time to the hour and draw the hands on a clock face to show these times.

Spring

Revision and consolidation of above Learning Objectives and…

- Count, read and write numbers to 100 in numerals.
- Count in 2s, 5s and 10s
- Recognise and know the value of different coins and notes.
- Solve one step problems that involve addition (+) and subtraction (-), using objects and pictures and missing number problems such as 7 = ? – 9
- 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.
- Recognise and name common 3-D shapes including cuboids (including cubes), pyramids and spheres.
- Identify and represent numbers using objects and pictorial representations including the number line and use the language of equal to , more than, less than (fewer), most and least
- Recognise, find and name a half as one of two equal parts of an object, shape or quantity
- Measure and begin to record lengths & heights
- Compare, describe and solve practical problems for lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]

Summer

Revision and consolidation of above Learning Objectives and…

- Measure and begin to record mass/weight
- Compare, describe and solve practical problems for: mass (weight) for example, heavy/light, heavier than, lighter than.
- Measure and begin to record capacity and volume
- Compare, describe and solve practical problems for: capacity and volume [for example, more than, less than, half, half full, quarter]
- Represent and use number bonds and related subtraction facts within 20.
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

- Compare, describe and solve practical problems for: Time [for example, quicker, slower, earlier, later]
- Measure and begin to record time (hours, minutes, seconds)
- Describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Mathematics in Year 2

Please note, while these are age related expectations, not all children will be progressing at the same pace and children may follow the programme or objectives of a different year group depending on their needs and ability.

Learning Objectives

Autumn

- Assess & review (to include ordering numbers up to 100)
- Given a number, identify one more or one less. (Yr 1 obj)
- Counting to and across 100 forward & backward. (Yr 1 obj)
- Count in steps of 2, and 5 from 0 (forward and backward).
- 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)
- Recall and use addition facts to 20 fluently, and derive and use related facts up to 100.
- Add numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones
- Show that addition of two numbers can be done in any order (commutative)
- Solve problems with addition:
    - Using concrete objects and pictorial representations, including those involving numbers
    - Applying their increasing knowledge of mental and written methods
- Recall and use multiplication for the 2,5 and 10 multiplication tables (including recognising odd and even numbers)
- Calculate mathematical statements for multiplications within the multiplication tables and write them using the multiplication sign (x) and equals (=)
- Tell the time to the hour and half past & draw the hands on a clock face to show these times (Yr 1 obj - Mental Starter)
- Compare and sequence intervals of time.
- Tell and write the time to 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
- Count in steps of 10 from any number forwards and backwards in 10.
- Compare and order numbers from 0 up to 100.
- Identify, represent and estimate numbers using different representations, including the number line.
- Use place value and number facts to solve problems.

- Recall and use and subtraction facts to 20 fluently, and derive and use related facts up to 100.
- Subtract numbers using concrete objects, pictorial representations, and mentally, including: a two digit number and ones.
- Show subtraction of one number from another cannot be done in any order.
- Solve problems with subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures.
- applying their increasing knowledge of mental and written methods.
- Recall and use the division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
- Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs
- Identify and describe the properties of 2-D, including the number of sides.
- Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.
- Order and arrange combinations of mathematical object in patterns and sequences

Spring

Revision and consolidation of above Learning Objectives and…

- Count in steps of 2, 3 and 5 from 0, and in tens from any number, forwards and backwards.
- Compare and order numbers from 0 up 100; use <,>and signs =
- Identify, represent and estimate numbers using different representations including the number line.
- 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
- Add numbers using concrete objects, pictorial representations including those involving numbers and quantities.
- Add 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
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- Solve problems including multiplication & division using materials, arrays, repeated addition, mental methods, and multiplication & division facts including problems in context
- Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value.
- Find different combinations of coins to equal the same amounts of money;
- Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
- Subtract numbers using concrete objects, pictorial representations and mentally including:

    Two-digit numbers and ones

Two-digit number and tens

Two two-digit numbers

- Recognise, find, name and write fractions 1/3,1/4,2/4 and ¾ of a length, shape, set of objects or quantity
- Write simple fractions for example, ½ 0f 6= 3 and recognise the equivalence of 2/4 and ½
- Identify and describe the properties of 2D shapes including the number of sides and 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).
- Compare and sequence intervals of time.
- 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.
- Choose and use standard units to estimate and measure length/height (m/cm) in any direction to the nearest appropriate unit, using rulers.
- Choose and use standard units to estimate and measure mass (g/kg) in any direction to the nearest appropriate unit, using scales
- Compare and order lengths and mass and record the results using >,< and =

Summer

Revision and consolidation of above Learning Objectives

Mathematics in Year 3

Please note, while these are age related expectations, not all children will be progressing at the same pace and children may follow the programme or objectives of a different year group depending on their needs and ability.

Learning Objectives

Autumn

- Identify, represent and estimate numbers using different representations
- 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)
- Compare and order numbers up to 1000
- Solve number problems and practical problems involving these ideas
- Count from 0 in multiples of 4, 8, 50 and 100 find 10 or 100 more or less than a given number
- Pupils should be taught to 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
- Interpret and present data using bar charts, pictograms and tables
- Solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables
- Draw 2-D shapes
- Measure the perimeter of simple 2D shapes
- Recognise angles as a property of a shape or a description of a turn
- Identify right angles, recognize 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 & vertical lines and pairs of perpendicular and parallel lines.
- 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 x one-digit numbers, using mental and progressing to formal written methods
- 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
- Add and subtract amounts of money to give change, using both £ and p in practical contexts
- Count up and down in tenths; recognize that tenths arise from dividing an object into 10 equal parts and in dividing one digit numbers or quantities by 10
- Tell and write the time from an analogue clock including using roman numerals form 1 to X11 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 and midnight
- Know the number of seconds in a minute and the number of days in each month, year and leap year
- Make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them

Spring

Revision and consolidation of above Learning Objectives and…

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for ÷ using the x tables that they know, including 2 digit no's, I digit no using mental (and informal) methods

- Write and calculate mathematical statements for ÷ using the x tables that they know, including 2 digit no's, I digit no using mental and progressing onto formal written methods.
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- Recognise and use fractions as numbers: unit fractions and non- unit fractions with small denominators
- Recognise & show, using diagrams, equivalent fractions with small denominators.
- Compare & order unit fractions, and fractions with the same denominators.
- Solve problems that involve all of the above (fraction work)
- Count up & down in tenths, recognize the tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.
- Add and subtract fractions with the same denominator within one whole (for example 5/7 + 1/7 = 6/7)
- Solve problems that involve all of the above (fraction work).
- measure, compare, add and subtract:
- lengths, (m/cm/mm):
- volumes and capacity
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction
- Add and subtract amounts of money to give change, using both £ and p in practical contexts
- Compare durations of events [for example to calculate the time taken by particular events or tasks]
- Measure, compare, add and subtract, lengths, (m//cm/mm): mass (kg/g): volume/capacity (l/ml)

Summer

Revision and consolidation of above Learning Objectives and…

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

Mathematics in Year 4

Please note, while these are age related expectations, not all children will be progressing at the same pace and children may follow the programme or objectives of a different year group depending on their needs and ability.

Learning Objectives

Autumn

- Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- Order and compare numbers beyond 1000
- Find 100 more or less than a given number

- 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
- Use place value, known and derived facts to multiplying and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- Count in multiples of 6 and 7
- Recall multiplication and division facts for multiplication tables up to 12x12
- Multiply two digit and three digit numbers by a one digit number using formal written lay out.
- Divide using the short division method with exact answers
- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- Identify lines of symmetry in 2D shapes presented in different orientations
- Complete a simple symmetric figure with respect to a specific line of symmetry
- Count in multiples of 9, 25 and 1000
- 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
- Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten
- Recognise and show, using diagrams, families of common equivalent fractions
- Solve simple measure and money problems involving fractions
- Recognise and write decimal equivalents to ¼, ½, 3/4
- Recognise and write decimal equivalents of any number of 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
- Convert between different units of measure (for example, kilometer to meter; hour to minute)
- Estimate, compare and calculate different measures, including money in pounds and pence
- 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
- Solve comparisons, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Spring

- Revision and consolidation of above Learning Objectives and…
- Count in multiples of 6,7,9,25 and 1000
- Count backwards through zero to include negative numbers
- Round decimals with one decimal place to the nearest whole number
- Compare numbers with the same number of decimal places

- Identify, represent and estimate numbers using different representations
- 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 calculation
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- Divide using formal written method of short division
- Solve problems involving multiplying and adding, including using the disruptive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects
- Identify acute and obtuse angles and compare and order angles up to two right angles by size
- Describe positions on a 2D grid as coordinates in the first quadrant
- Describe movements between positions as translations of a given unit to the left/right and up/down
- Plot specified points and draw sides to complete a given polygon
- Find 1000 more or less than a given number
- Add and subtract fractions with the same denominator
- Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- Recognise and write decimal equivalents of any number of tenths or hundredths
- Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten
- Round decimals with one decimal place to the nearest whole number
- Compare numbers with the same number of decimal places up to two decimal places
- Solve simple measure and money problems involving fractions and decimals to two decimal places
- Convert between different units of measure (for example, kilometre to meter; hour to minute)
- Estimate, compare and calculate different measures, including money in pounds and pence
- Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and meters
- Find the area of rectilinear shapes by counting squares
- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

Summer

Revision and consolidation of above Learning Objectives and…

- 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
- Identify, represent and estimate numbers using different representations
- Solve number and practical problems that involve increasingly big numbers
- 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 lines of symmetry in 2D shapes presented in different orientations
- Complete a simple symmetrical figure with respect to a specific line of symmetry
- Describe movements between positions as translations of a given unit to the left/right and up/down
- 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
- Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days
- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs (from Y5)
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Mathematics in Year 5

Please note, while these are age related expectations, not all children will be progressing at the same pace and children may follow the programme or objectives of a different year group depending on their needs and ability.

Learning Objectives

Autumn

- Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- Round any number up to 1 000 000 to the nearest 10,100,1000, 10 000 and 100 000
- Add whole numbers with more than 4 digits, including using columnar addition
- Add numbers mentally with increasingly large numbers
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Subtract numbers mentally with increasingly large numbers
- 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
- Solve addition multi-step problems in contexts, deciding which operations and methods to use and why
- Multiply numbers mentally drawing upon known facts.
- 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
- Multiply whole numbers and those involving decimals by 10, 100 and 1000

- 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.
- Divide whole numbers and those involving decimals by 10, 100 and 1000
- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles
- Identify 3D shapes, including cubes and other cuboids, from 2D representations
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.
- Solve number problems and practical problems that involve all of the above
- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.
- Compare and order fractions whose denominators are all multiples of the same number.
- Read and write decimal numbers as fractions (for example, 0.71 = 71/100)
- Round decimals with two decimal places to the nearest whole number and to one decimal place
- Solve real life problems involving the above
- Recognise the per cent symbol (%) and understand that per cent relates to “number of parts per hundred”, and write percentages as a fraction with the denominator 100, and as a decimal.
- Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of multiple of 10 or 25.
- Solve problems involving converting between units of time.
- Complete, read and interpret information in tables, including timetables.

Spring

Revision and consolidation of above Learning Objectives and…

- Add and subtract numbers mentally with increasingly hard numbers
- Add and subtract whole numbers with more than 4 digits using columnar addition and subtraction
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- 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.
- Problem solving involving all 4 operations in context of money and time.
- Use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling.
- Estimate volume [for example, using 1cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]
- Convert between different units of measure (to include mm/cm/m/km; g/kg; ml/l)

- Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- Know angles are measured in degrees: estimate and compare acute, obtuse, and reflex angles.
- Draw given angles, and measure them in degrees (^{o})
- Identify:

    Angles at a point and one whole turn (total 360^o)

    Angles at a point on a straights line and ½ a turn (total 180^o)

    Other multiples of 90^o

- 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 another and write mathematical statements> 1 as a mixed number (eg 2/5 + 4/5=6/5=1 1/5)
- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.
- Read, write, order and compare numbers with up to three decimal places
- Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.
- Solve comparison, sum and difference problems using information presented in a line graph

Summer

Revision and consolidation of above Learning Objectives and…

- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
- Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).
- Solve problems involving multiplication and division including using their knowledge of factors and multiples squares and cubes.
- Multiply numbers up to 4 digits by a one or two digit number using short and long multiplication
- Divide numbers up to 4 digits using short division and interpret remainders appropriately for the context
- Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
- Convert between different units of metric measure
- Measure and calculate the perimeter of composite rectilinear shapes in cm and m
- Calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes

- Use all four operations to solve problems involving measure using decimal notation, including scaling
- Draw given angles and measure them in degrees
- Use the properties of rectangles to deduce related facts and find missing lengths and angles.
- Add and subtract numbers mentally with increasingly hard numbers
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Complete, read and interpret information in tables, including time tables

Mathematics in Year 6

Please note, while these are age related expectations, not all children will be progressing at the same pace and children may follow the programme or objectives of a different year group depending on their needs and ability.

Learning Objectives

Autumn

- Explain reasoning and conclusions, using words, symbols or diagrams as appropriate
- Find the difference between a positive and a negative integer, or two negative integers, in context
- Use decimal notation for tenths, hundredths and thousandths; partition, round and order decimals with up to three places, and position them on the number line
- I can round large numbers to the nearest multiple of 10, 100 or 1000
- Use knowledge of place value and multiplication facts to 10 10 to derive related multiplication and division facts involving decimals (e.g. 0.8 7, 4.8 6)
- Calculate mentally with integers and decimals: U.t U.t, TU U, TU U, U.t U, U.t U
- Use a calculator to solve problems involving multi-step calculations
- Use approximations, inverse operations and tests of divisibility to estimate and check results
- Represent and interpret sequences, patterns and relationships involving numbers and shapes; suggest and test hypotheses; construct and use simple expressions and formulae in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence)
- Use knowledge of multiplication facts to derive quickly squares of numbers to 12 12 and the corresponding squares of multiples of 10
- Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit numbers
- Use approximations, inverse operations and tests of divisibility to estimate and check results
- Describe, identify and visualise parallel and perpendicular edges or faces; use these properties to classify 2-D shapes and 3-D solids
- Make and draw shapes with increasing accuracy and apply knowledge of their properties
- Suggest, plan and develop lines of enquiry; collect, organise and represent information, interpret results and review methods; identify and answer related questions
- Solve problems by collecting, selecting, processing, presenting and interpreting data, using ICT where appropriate; draw conclusions and identify further questions to ask
- Construct and interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts

- Describe and interpret results and solutions to problems using the mode, range, median and mean
- Select and use standard metric units of measure and convert between units using decimals to two places (e.g. change 2.75 litres to 2750 ml, or vice versa)
- Read and interpret scales on a range of measuring instruments, recognising that the measurement made is approximate and recording results to a required degree of accuracy; compare readings on different scales, for example when using different instruments
- Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use
- Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by a one-digit integer, and to multiply two-digit and three-digit integers by a two-digit integer
- Select and use standard metric units of measure and convert between units using decimals to two places (e.g. change 2.75 litres to 2750 ml, or vice versa)
- Solve problems by measuring, estimating and calculating; measure and calculate using imperial units still in everyday use; know their approximate metric values
- Read and interpret scales on a range of measuring instruments, recognising that the measurement made is approximate and recording results to a required degree of accuracy; compare readings on different scales, for example when using different instruments
- Calculate the perimeter and area of rectilinear shapes; estimate the area of an irregular shape by counting squares
- Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy
- Explain reasoning and conclusions, using words, symbols or diagrams as appropriate
- Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use
- Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by a one-digit integer, and to multiply two-digit and three-digit integers by a two-digit integer
- Express a larger whole number as a fraction of a smaller one (e.g. recognise that 8 slices of a 5-slice pizza represents or 1 pizzas); simplify fractions by cancelling common factors; order a set of fractions by converting them to fractions with a common denominator
- Relate fractions to multiplication and division (e.g. 6 2 of 6 6); express a quotient as a fraction or decimal (e.g. 67 5 13.4 or 13); find fractions and percentages of whole-number quantities (e.g. of 96, 65 of 260)
- Solve simple problems involving direct proportion by scaling quantities up or down

Spring

Revision and consolidation of above Learning Objectives and…

- Explain reasoning and conclusions, using words, symbols or diagrams as appropriate
- Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use

- Use decimal notation for tenths, hundredths and thousandths; partition, round and order decimals with up to three places, and position them on the number line
- Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by a one-digit integer, and to multiply two-digit and three-digit integers by a two-digit integer
- Use a calculator to solve problems involving multi-step calculations
- Represent and interpret sequences, patterns and relationships involving numbers and shapes; suggest and test hypotheses; construct and use simple expressions and formulae in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence)
- Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy
- Use knowledge of multiplication facts to derive quickly squares of numbers to 12 12 and the corresponding squares of multiples of 10
- Use knowledge of place value and multiplication facts to 10 10 to derive related multiplication and division facts involving decimals (e.g. 0.8 7, 4.8 6)
- Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit numbers
- Use approximations, inverse operations and tests of divisibility to estimate and check results
- Describe, identify and visualise parallel and perpendicular edges or faces; use these properties to classify 2-D shapes and 3-D solids
- Solve problems by collecting, selecting, processing, presenting and interpreting data, using ICT where appropriate; draw conclusions and identify further questions to ask
- Select and use standard metric units of measure and convert between units using decimals to two places (e.g. change 2.75 litres to 2750 ml, or vice versa)
- Read and interpret scales on a range of measuring instruments, recognising that the measurement made is approximate and recording results to a required degree of accuracy; compare readings on different scales, for example when using different instruments
- Describe and predict outcomes from data using the language of chance or likelihood
- Construct and interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts
- Describe and interpret results and solutions to problems using the mode, range, median and mean
- Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy
- Explain reasoning and conclusions, using words, symbols or diagrams as appropriate
- Use a calculator to solve problems involving multi-step calculations
- Express a larger whole number as a fraction of a smaller one (e.g. recognise that 8 slices of a 5-slice pizza represents or 1 pizzas); simplify fractions by cancelling common factors; order a set of fractions by converting them to fractions with a common denominator
- Relate fractions to multiplication and division (e.g. 6 2 of 6 6); express a quotient as a fraction or decimal (e.g. 67 5 13.4 or 13); find fractions and percentages of whole-number quantities (e.g. of 96, 65 of 260)
- Express one quantity as a percentage of another (e.g. express 400 as a percentage of 1000); find equivalent percentages, decimals and fractions
- Solve simple problems involving direct proportion by scaling quantities up or down

Summer

Revision and consolidation of above Learning Objectives and…

- Explain reasoning and conclusions, using words, symbols or diagrams as appropriate
- Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use
- Use decimal notation for tenths, hundredths and thousandths; partition, round and order decimals with up to three places, and position them on the number line
- Calculate mentally with integers and decimals: U.t U.t, TU U, TU U, U.t U, U.t U
- Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by a one-digit integer, and to multiply two-digit and three-digit integers by a two-digit integer
- Use a calculator to solve problems involving multi-step calculations
- Use approximations, inverse operations and tests of divisibility to estimate and check results
- Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy
- Represent and interpret sequences, patterns and relationships involving numbers and shapes; suggest and test hypotheses; construct and use simple expressions and formulae in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence)
- Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit numbers
- Use approximations, inverse operations and tests of divisibility to estimate and check results
- Describe, identify and visualise parallel and perpendicular edges or faces; use these properties to classify 2-D shapes and 3-D solids
- Make and draw shapes with increasing accuracy and apply knowledge of their properties
- Describe and predict outcomes from data using the language of chance or likelihood
- Construct and interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts
- Describe and interpret results and solutions to problems using the mode, range, median and mean
- Select and use standard metric units of measure and convert between units using decimals to two places (e.g. change 2.75 litres to 2750 ml, or vice versa)
- Read and interpret scales on a range of measuring instruments, recognising that the measurement made is approximate and recording results to a required degree of accuracy; compare readings on different scales, for example when using different instruments
- Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use
- Calculate the perimeter and area of rectilinear shapes; estimate the area of an irregular shape by counting squares

- Express a larger whole number as a fraction of a smaller one (e.g. recognise that 8 slices of a 5-slice pizza represents or 1 pizzas); simplify fractions by cancelling common factors; order a set of fractions by converting them to fractions with a common denominator.
- Relate fractions to multiplication and division (e.g. 6 2 of 6 6); express a quotient as a fraction or decimal (e.g. 67 5 13.4 or 13); find fractions and percentages of whole-number quantities (e.g. of 96, 65 of 260)
- Express one quantity as a percentage of another (e.g. express 400 as a percentage of 1000); find equivalent percentages, decimals and fractions
- Solve simple problems involving direct proportion by scaling quantities up or down