Dane Ghyll Community Primary School Non-Negotiables

Mathematics skills should be taught when linked to project where possible to ensure real world application.

Key Skills
To be able to solve problems using a range of strategies.
To reason mathematically, following a line of enquiry.
Mathematical language and targets to be used throughout.

At Dane Ghyll Community Primary School we follow the White Rose Maths curriculum

Mathematics

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value	Count objects, actions and sounds. Subitise. Link the number symbol (numeral) with its cardinal number value. Count beyond ten. Compare numbers. Understand the 'one more than/one less than' relationship between	Given a number, identify one more and one less. Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. Count numbers to 100 in numerals. Count in multiples of twos, fives and tens. Identify and represent numbers using objects and pictorial representations. Read and write numbers to 100 in numerals. Read and write numbers from 1 to 20 in numerals and words.	Count in steps of 2, 3 and 5 from 0 and in tens from any number, forward and backward. Read and write numbers to at least 100 in numerals and in words. Identify, represent and estimate numbers using different representations, including the number line. Recognise the place value of each digit (tens, ones). Compare and order numbers from 0 up to 100; use <,> and = signs.	Count from 0 in multiple of 4, 8, 50 and 100; find 10 or 100 more or less than a given number. 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 (hundred, tens, ones). Compare and order numbers up to 1000.	Count in multiples of 6, 7, 9, 25 and 1000. Count backwards through zero to include negative numbers. 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. Find 1000 more or less than a given number.	Count forwards or backwards in steps of power of 10 for any given number up to 1,000,000. Count forwards and backwards with positive and negative whole number, including through zero. Read, write, order and compare numbers to at least 1,000, 000 and determine the value of each digit. Interpret negative numbers in context. Round any number up to 1000,000 to the nearest 10, 100, 1000, 10,000 and 100, 000.	Read, write, order and compare numbers up to 10, 000,000 and determine the value of each digit. Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit. Round any whole number to a required degree of accuracy. Use negative numbers in context, and calculate intervals across zero. Solve number and practical problems that involve all of the above.

	consecutive numbers.		Use place value and number facts to solve problems.	Solve number problems and practical problems involving these ideas.	Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones). Order and compare number beyond 1000.	Solve number problems and practical problems that involve all the above.	
Addition and Subtraction	Explore the composition of numbers to 10. Automatically recall number bonds from numbers 0-5 and some to 10.	Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. Represent and use number bonds and related subtraction facts within 20. Add and subtract one-digit and two-digit number to 20, including zero. Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems.	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. 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 calculation and solve missing number problems.	Estimate the answer to a calculation and use inverse operations to check answers.	Estimate and use inverse operations to check answers to a calculation.	Use rounding to check answers to calculation and determine, in the context of a problem, levels of accuracy.	
Multiplication and Division	N/A	N/A	Recall and use multiplication and division facts from the 2, 5, and 10 multiplication	Recall and use multiplication and division facts for the 3, 4 and 8	Recall multiplication and division facts for multiplication	Identify multiples and factors, including finding all factor pairs of a number, and	Identify common factors, common multiples and prime numbers.

			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, division and equals signs. Solve problems involving multiplication and division, using materials, arrays repeated addition, mental methods and multiplication and division facts, including problems in contexts.	multiplication tables. Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers multiplying 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.	tables up to 12 x 12. 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 two-digit and three-digit numbers by a one-digit number using formal written layout. 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 and connected to m objects.	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 and cubed. Multiply numbers up to 4 digits by a one- or two-digit number using a formal method, including multiplication for two-digit numbers, Multiply and divide numbers mentally drawing upon known facts. 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.	Use estimation and check answer to calculations and determine, in the context of a problem, an appropriate degree of accuracy. 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 long division, and interpret remainders as whole number remainder, fractions or by rounding, as appropriate for the context. Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. Perform mental calculations, including with mixed

						Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	operations and large numbers. Solve problems involving addition, subtraction, multiplication and division. Use their knowledge of the order of operations to carry out calculations involving the four operations.
Fractions	N/A	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. Recognise the equivalence of 2 quarters and one half. Write simple fractions.	Recognise, find, name and write fractions third, quarter, 2 quarter and 3 quarters of a length, shape set of objects or quantity. Recognise and show using diagrams equivalent fractions with small denominators. Compare and order unit fractions and fraction with the same denominator. Add and subtract fractions with the	Count up and down in tenths, recognise that tenths arise from dividing an object into 10 equal part and in dividing one-digit numbers or quantities by 10. Recognise, find and write fractions of a discrete set of objects; unit fractions and non-unit fraction with small denominators. Recognise and use fractions as numbers: unit	Count up and down in hundredths; recognise that hundredths arise when dividing by one hundred and dividing tenth by ten. Recognise and show using diagrams families of common equivalent fractions. Add and subtract fractions with the same denominators that are multiples	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenth and hundredths. Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number. Compare and order fractions whose denominators are all	Use common factors to simplify fractions. Use common multiples to express fractions in the same denomination. Compare and order fractions, including fractions >1.

			same denominator within one whole. Solve problems that involve the above.	fractions and non-unit fractions with small denominators. Add and subtract fractions with the same denominator. Solve problems involving increasingly harder fractions to calculate quantities, and factions to divide quantities including non-unit fractions where the answer is a whole number.	of the same number. Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	multiples of the same number. 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. Divide proper formation by whole numbers.	
Decimals	N/A	N/A			Recognise and write decimal equivalents of any number of tenth or hundredths. Recognise and write decimals equivalents to a quarter, a half and three quarters. 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.	Read and write decimal numbers as fractions. Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. Round decimals with two decimal places to the nearest whole number and to one decimal place. Read, write, order and compare number with up to three decimal places.	Identify the value of each digit in numbers given to three decimal places. 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. Use written division methods in cases where the answer has up to two decimal places.

						Solve problems involving number up to three decimal places.	Solve problems which require answers to be rounded to specified degrees of accuracy.
Fractions, Decimals and Percentages	N/A	N/A			Solve simple measure and money problems involving fractions and decimals to two decimal places.	Recognise the percent symbol and understand that percent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100 and as a decimal. Solve problems which require knowing percentage and decimal equivalents of a half, a quarter, a fifth, two fifths and four fifths and those fractions with a denominal of a multiple of 10 or 25.	Associate a fraction with division and calculate decimal fraction equivalents. Recall and use equivalence between simple fractions, decimals and percentages, including in different contexts.
Ratio and proportion	N/A	N/A	N/A	N/A	N/A	N/A	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 calculation of percentages and the use of percentages for comparison. Solve problems involving similar

							shapes where the scale factor is known or can be found. Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
Algebra	N/A	N/A	N/A	N/A	N/A	N/A	Use simple formulae. Generate and describe linear number. Express missing number problems algebraically. Find pairs of numbers that satisfy an equation with two unknowns. Enumerate possibilities of combinations of two variables.
Using Measures	Compare length, weigh and capacity. Start to use some mathematical vocabulary to explain to world around them. E.g., long, short, tall, small, big etc	Compare, describe and solve practical problems for: • Length and height (for example long/short, longer/shorter, tall/short, double/half) • Mass/weight (for example, heavy/light,	Choose and use appropriate standard units to estimate and measure length/height in any direction, mass, temperature, capacity to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels.	Measure, compare, add and subtract: lengths, mass; volume/capacity.	Convert between different units of measure. Estimate, compare and calculate different measures.	Convert between different units of metric measure. Understanding and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.	Solve problems involving the calculations and conversion of units of measure, using decimal notation up to three decimal places where appropriate. Use, read, write and convert between standard units, converting

	Make comparisons between objects relating to size, length, weight and capacity.	heavier than, lighter than) • Capacity and volume (for example, full/empty, more than, less than, half, half full, quarter) • Time (for example, quicker, slower, earlier, later) Measure and begin to record the following: • Lengths and heights • Mass/weight • Capacity and volume • Time (hours, minutes, seconds)	Compare and order lengths, mass, volume/capacity and record the results using <,> and =.			Use all four operations to solve problems involving measure using decimal notation including scaling.	measurements of length, mass, volume and time from a smaller unit of measure to a larger unit and vice versa, using decimal notation to up to three decimal places. Convert between miles and kilometres.
Money	N/A	Recognise and know the value of different denominations of coins and notes.	Recognise and use symbols for pounds and pence; combine amounts to make a particular value. Find different combinations of coins that 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.	Add and subtract amounts of money to give change, using both £ and p in practical contexts.	Estimate, compare and calculate different measures, including money in pounds and pence.	Use all four operations to solve problems involving measure.	

Time	N/A	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, month and years. Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	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. Know the number of minutes in an hour and the number of hours in a day.	Tell and write the time from an analogue clock, including using Roman numerals from I and XII, and 12-hour clock 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. Compare durations of events.	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 problems involving converting between units of time.	Use, read, write and convert between standard units converting measurements of time from a smaller unit of measure to a larger unit, and vice versa.
Perimeter, Are and Volume	N/A	N/A	N/A	Measure the perimeter of simple 2-D shapes.	Measure and calculate the perimeter of the rectilinear figure (including squares) in centimetres and metres.	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. Calculate and compare the area of rectangles (including	Recognise that shapes with the same areas can have different perimeters and vice versa. Recognise when it is possible to use formulae for area

						squares) and including using standard units, square centimetres and square metres and estimate the area of irregular shapes. Estimate volume and capacity.	and volume of shapes. Calculate the area of parallelograms and triangles. Calculate, estimate and compare volume of cubes and cuboids using standard units including cubic centimetres and cubic metres and extending to other units.
Geometry: Shape	Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. Continue, copy and create repeating patterns.	Recognise and name common 2-D shapes. For example: rectangles (including squares) circles and triangles. Recognise and name common 3-D shapes. For example: cuboids, (including cubes) pyramids and spheres.)	Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. Identify 2-D shapes on the surface of 3-D shapes. Compare and sort common 2-D shape and everyday objects.	Draw 2-D shapes. Make 3-D shapes using modelling material; recognise 3- D 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	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. Identify acute and obtuse angles and compare and order angels up to two right angles by size. Identify lines of symmetry in 2-D shapes presented in different orientations.	Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. Use the properties of rectangles to deduce related facts and find missing lengths and angles. Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles. Draw given angles, and measure them in degrees.	Draw 2-D shapes using given dimensions and angles. Compare and classify geometric shapes based on their properties and sizes. Illustrate and name parts of circles including radius, diameter and circumference and know that the diameter is twice the radius. Recognise, describe and build simple 3-D shapes, including making nets. Find unknown angles in any triangles,

				than or less than a right angle. Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.	Complete a simple symmetric figure with respect to a specific line of symmetry.	Identify: • Angles at a point and one whole turn • Angles at a point on a straight line and half a turn. • Other multiples of 90 degrees.	quadrilaterals and regular polygons. Recognise angles where they meet at a point, are on a straight line, or are vertically opposite and find missing angles.
Geometry: Position & Direction	Describe a familiar route. Understand position through words alone. Discuss routes and locations using words like 'in front of' and 'behind'.	Describe position, direction and movement, including whole, half, quarter and three-quarter turns.	Order and range combinations of mathematical objects in patterns and sequences. 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).		Describe positions on a 2-D grid as coordinated 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.	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.	Describe positions on the full coordinated grid (all four quadrants) Draw and translate simple shapes on the coordinated quadrant, and reflect them in the axes.
Statistics	N/A	N/A	Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. Ask and answer simple question by	Interpret and present data using bar charts, pictograms and tables. Solve one step and two step questions using information	Interpret and present discrete and continuous data using appropriate graphical methods, including bar	Complete, read and interpret information in tables, including timetables. Solve comparison, sum and difference problems using information	Interpret and construct pie charts and line graphs and use these to solve problems. Calculate and interpret the mean as an average.

			counting the number of objects in each category and sorting the categories by quantity.	presented in scaled bar charts and pictograms and tables.	charts and time graphs. Solve comparison, sum and difference problems using information presented in bar charts, pictograms, table and other graphs.	presented in a line graph.	