KS2 – Year 5		
National Curriculum	**Key Performance Indicators**	**Working at Greater Depth**
Number and Place Value		
Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	• Can explain the place value in numbers up to 1 000 000 • Can order a set of numbers to 1 000 000 • Understands how a number can be partitioned into different amounts *e.g. 45000 is 45 thousands, 450 hundreds, 4500 tens or 45000 ones.* NPV–2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning.	• Can solve problems involving number that involving reasoning *e.g. given the digit cards 0-9 what is the largest/smallest number that you can make? Including with decimals* • Can investigate 1 000 000 *e.g. will I ever sleep for 1 000 000 hours? How high would 1 000 000 pieces of paper be?*
Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	• Can count forwards and backwards in 10s and 100s and explain how to find numbers 10 and 100 bigger or smaller than any number to 1 000 000. • Can count forwards and backwards in 1 000s and 10 000s and explain how to find numbers 1 000 and 10 000 bigger or smaller than any number to 1 000 000.	• Can explain reasoning questions linked to counting *e.g. When I count in multiples of 1000 the HTH digits will never change, is this sometimes, always or never true?*
Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	• Understands how to bridge through zero when counting forwards and backwards with positive and negative numbers • Can solve problems linked to temperature involving negative numbers	• Can solve open ended problems involving negative numbers

Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	• Understands the rules for rounding numbers and round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 NPV–3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.	• Can solve problems involving rounding, including linked to measures • Can investigate rounding decimal numbers
Solve number problems and practical problems that involve all of the above	• Can solve problems involving place value, including word problems and problems linked to money and measure	• Can solve complex multi-step problems involving place value, including word problems and problems linked to money and measure *e.g. How long would it take to count to 1 000 000?*
Read Roman numerals to 1000 (m) and recognise years written in roman numerals.	• Can use Roman numerals to 100 to begin to derive Roman numerals to 1000 • Can recognise years written in Roman Numerals	• Can solve problems involving Roman numerals

Addition and Subtraction		
Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	• Can solve THTU + THTU (bridging 10 and 100) • Can solve THTU – THTU (bridging 10 and 100) • Can use a formal written method to add money and measure using decimal notation to tenths • Use a formal written method to add money and measure using decimal notation to hundredths • Use a formal written method to add units of measure using decimal notation to hundredths	• Can use mental strategies to solve an addition or subtraction calculation involving THTU where appropriate • Use a number calculation to write three more calculations from it
Add and subtract numbers mentally with increasingly large numbers	• Can add and subtract increasing large numbers using a variety of strategies • Doubling, Partitioning, Reordering, Bridging through a multiple of 10 • Can add and subtract simple decimals mentally *e.g. 0.25 + 0.5* NF–2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth)	• Reason about mental addition and subtraction *calculation e.g. Answer questions such as: How would the answer change if.., Why does the answer change and how?*
Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	• Can estimate the answer up to 4 digits by rounding	• Can reason about addition and subtraction calculations *e.g. Discuss why calculations are correct or not*
Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	• Can use addition and/or subtraction strategies to solve a complex problem • Use the inverse to check the answer • Solve problems including those with more than one step • Can use appropriate methods to solve calculations	• Explain reasoning about calculations and methods in addition and subtraction word problems *e.g. What's the same what's different about the calculations?* • Solve open-ended investigations using a variety of units of measure.

Multiplication and Division		
Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers	• Can identify multiples of a number • Can systematically find all factor pairs of a 2 digit number • Can identify common factors in two 2 digit numbers • Can explain the relationship between a factor and a multiple 5MD–2 Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.	• Can explain reasoning about factors and multiples *e.g. Why do square numbers have an odd number of factors?*
Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	• Understands the definition of prime number • Can break a number down into prime factors • Understands the definition of a composite number	• Can apply divisibility tests to larger numbers and explain why a 3 digit number would be composite or prime
Establish whether a number up to 100 is prime and recall prime numbers up to 19	• Can identify prime numbers to 100 • Can recall prime numbers to 19 • Can explain why a number is prime	• Can investigate open-ended problems involving prime numbers e.g. can two prime numbers make a square number?
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	• Can use a formal written method to multiply ThHTU by U • Can use a formal written method to multiply TU by TU • Can use a formal written method to multiply HTU by TU • Can use a formal written method to multiply ThHTU by TU 5MD–3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.	• Can identify errors in a multiplication calculation and explain reasoning • Can solve missing box calculations involving a multiplication calculation

Multiply and divide numbers mentally drawing upon known facts	• Quickly recall multiplication and division facts to 12 x 12 • Use knowledge of times tables to multiply and divide by multiples of 10 • Use knowledge of times tables to multiply and divide by multiples of 100 • Use knowledge of times tables to multiply and divide by multiples of 1000 • Can multiply multiples of 10 by multiples of 10 • Can multiply multiples of 10 by multiples of 100 • Can use rounding to estimate answers to larger multiplication or division calculations • Can use factors to calculate other multiplication facts *e.g. 17 x 6 = 17 x 3 x 2* 5NF–1 Secure fluency in multiplication table facts, and corresponding division facts, through continued practice 5NF–2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth) 5MD–1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.	• Can explain reasoning about different methods for multiplication and division and justify their choice of method • Can solve inverse problems involving multiplication and division e.g. *the product is 400 what 2 numbers have been multiplied together?* • Can investigate equivalence statements for multiplication and division calculations
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	• Can use a formal written method to divide TU by U • Can use a formal written method to divide HTU by U • Can use a formal written method to divide ThHTU by U • Can explain what a remainder is • Understands the meaning of a remainder in a context and interpret appropriately 5MD–4 Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.	• Can identify errors in a division calculation and explain reasoning • Can solve missing box calculations involving a division calculation • Can convert a reminder into a decimal using knowledge of fractions
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	• Understand the effect of multiplying by 10, 100 and 1000 • Understand the effect of dividing by 10, 100 and 1000	• Can solve missing box calculations involving multiplication and division inverses including with larger numbers • Can solve problems involving reasoning about multiplication and division

Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	• Understand how to square a number and the notation for squared • Can recognise square numbers • Can link knowledge of square numbers to area • Understands how to cube a number and the notation for cubed • Can recognise cube numbers • Can link knowledge of cube numbers to volume	• Can consider the range of measurements for the length and width of the shape when given the area of a shape, • Can consider the range of measurements for the length, breadth and height of the shape when given the volume of a cube
Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	• Can solve problems that link children's understanding of prime numbers, composite numbers, factors and multiples *e.g. complete partial multiplication pyramid using knowledge of factors and multiples* • Can solve multiplication and division problems linked to measurement using children's knowledge of squared and cubed numbers	• Can solve open ended problems that link to understanding of prime numbers, composite numbers, factors and multiples. • Can solve reasoning problems linked to square and cube numbers
Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	• Can decide on which operations and methods are needed to solve a given problem • Can use appropriate strategies to solve a problem • Can recognise the equals sign as a balancing symbol *e.g. 3 x 8 = 5 + ?*	• Can solve word problems linked to measures that require conversion of values in order to calculate the answer
Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple ratio.	• Can solve problems that involve scaling *e.g. reducing a recipe for more/less people* • Can solve simple ratio problems e.*g. making paint to a given formula*	• Can solve scaling problems linked to measure *e.g. When given the total length of a path that has been made of square and rectangular slabs what combination of each could have been used?*

Fractions, Decimals & Percentages		
Compare and order fractions whose denominators are all multiples of the same number	• Can convert fractions using multiples to have the same denominator. • Understands the effect of a denominator increasing in multiples. • Compare and order mixed and improper fractions	• Can order lengths when only given a fraction of the total.
Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	• Understands that numbers can have a different representation but have generally the same meaning. 5F–2 Find equivalent fractions and understand that they have the same value and the same position in the linear number system.	• Can write down two fractions where the denominator of one is a multiple of the denominator of the other. • Can solve problems where equivalence is included *e.g. Would you rather?*
Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number	• Understands a fraction can be more than one • Understands that when the numerator is more than the denominator it is more than one whole. • Understands fractions can be represented as a mixed number and an improper fraction.	• Can compare mixed and improper fractions. *e.g. can say who has more pizza.* • Can apply their knowledge of mixed and improper fractions to remainders.
Add and subtract fractions with the same denominator and denominators that are multiples of the same number	• Can use common multiples to convert fractions to have the same denominator. • Can add and subtract fractions • Can convert answers using mixed and improper fractions. • Can mentally add and subtract $\frac{1}{10}$s	• Can use given digits to make two fractions where the total is a whole number. • Can use given digits to make two fractions where the total is a fraction.

Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	• Can multiply together fractions with common denominators • Can use a number line to represent multiplying a fraction as repeated addition. • Understands when multiplying by a fraction the answer is smaller.	• Can solve problems where fractions need to multiplied *e.g. If each guest eats ¾ of a pizza, will 10 pizzas be enough for 15 guests?*
Read and write decimal numbers as fractions	• Can convert decimals to fractions • Can explain the value of each part of a decimal and explain the fraction equivalence. 5F–3 Recall decimal fraction equivalents for $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}$, and $\frac{1}{10}$, and for multiples of these proper fractions.	• Solve problems that involve converting fractions to decimals. • Convert remainders into decimals
Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	• Can identify and calculate $\frac{1}{1000}$ as a decimal • Can identify the pattern when finding other thousandths • Can compare thousandths to tenths and hundredths. 5NPV–1 Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01.	• Can use thousandths when recoding lengths and weights.
Round decimals with two decimal places to the nearest whole number and to one decimal place	• Understands the rules of rounding up and down. • Can apply the rules of rounding to a whole number • Can apply the rules of rounding to 1dp. • Can identify which value is closer to a given number. 5NPV–3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.	• Consider when rounding is appropriate in problems involving capacity, weight and length. • Can round answers to a specified degree of accuracy and checking the reasonableness of their answers.

Read, write, order and compare numbers with up to three decimal places	• Understands how thousandths are represented as a decimal. • Can order numbers to 3dp. 5NPV–2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning. 5NPV–4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.	• Can explain why a number is larger or smaller than another • Can compare decimals with a varying number of decimal places
Solve problems involving number up to three decimal places	• Can solve problems involving length	• Can reason about their chosen methods to solve a problem
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	• Understand 1% is 1 part out of 100 • Can write the decimal equivalent to 1% • Understand percentage as a number out of 100. • Can write percentages as a fraction with denominator 100 • Can use 1% to calculate 10%, 5%, 50% and 100% • Can explain which is greater, $\frac{1}{4}$ or 20% and why.	• Understands how to use % to find fractions of a number
Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}$, and $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.	• Can use the pattern to calculate other multiples of known percentages. • Has a good recall of the percentage, fraction and decimal equivalence of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}$, and $\frac{4}{5}$ • Has a good recall of the percentage and decimal equivalence of fractions with a denominator of a multiple of 10 or 25.	• Can apply the knowledge of their equivalence and convert between them when appropriate.

Geometry: Properties of Shape		
Identify 3-D shapes, including cubes and other cuboids, from 2-D representations	• Can name 3D shapes from pictures • Can identify the 3D shapes represented by 2D nets • Can identify nets of open and closed cubes	• Can draw the 2D net for a cuboid with given dimensions
Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	Can explain that angles are measured in degrees • Can identify acute, obtuse and reflex angles • Can estimate the size of acute, obtuse and reflex angles • Can compare and order a set of angles 5G–1 Compare angles, estimate and measure angles in degrees (°) and draw angles of a given size.	• Can use properties of angles to find other angles.
Draw given angles, and measure them in degrees (°)	• Can use a protractor to measure angles accurately in degrees both on their own and within shapes • Can draw given angles using a protractor 5G–1 Compare angles, estimate and measure angles in degrees (°) and draw angles of a given size.	• Can answer questions such as: *If Harry is facing North and wants to face SW how many degrees must he turn? From this position how many degrees must he travel through to face North again?*
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°	• Can recognise that angles at a point make a whole turn and total 360° • Can recognise that angles on a straight line make half a turn and total 180° • Can recognise multiples of 90° within turns • Can calculate missing angles in a range of contexts	• Solve reasoning problems about angles *e.g. Why can't an angle be the given amount?*

Use the properties of rectangles to deduce related facts and find missing lengths and angles	• Can describe that a rectangle has two pairs of equal and parallel sides • Can describe that a rectangle has four right-angles • Can explain why a square is a type of rectangle • Can find missing lengths of rectangles • Can identify the diagonals of rectangles • Can make suggestions about the size of angles formed between the parallel sides of a rectangle and its diagonals • Can use the fact that the angle sum of a quadrilateral is 360° to make suggestions about the size of the angles formed between the sides of quadrilaterals	• Can identify and explain which of these statements is correct: • A square is a rectangle. • A rectangle is a square. • A rectangle is a parallelogram. • A rhombus is a parallelogram.
Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	• Can recognise that a regular polygon has n equal sides and n equal angles • Can identify regular and irregular polygons from a set of shapes and explain why • Can identify a square as the only regular quadrilateral.	• Can use knowledge of angles in regular polygons to work out angles in all polygons
	Geometry: Position & Direction	
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.	• Can describe the position of a shape after it has been reflected in a line that is parallel to an axis. • Can describe the position of a shape after it has been translated across and up. • Understand the difference between a congruent and similar shape.	• Can describe the position of a shape after it has been reflected in a line that is not parallel to an axis.

Measurement		
Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	• Can use their knowledge of place value and multiplication and division by 10, 100 and 1000 to convert between standard units • Can decide on the appropriate measure to record their answer • Can understand the decimal notation of units of measure. 5NPV–5 Convert between units of measure, including using common decimals and fractions.	• Can answer true or false questions involving conversions of measure *e.g.* *True or false?* *1·5 kg + 600 g = 2·1 kg + 300 g*

Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	• Can convert between familiar imperial units of measure and metric measure
	  ○ 1 litre is approximately 2 pints (more accurately, 1 ¾ pints)
	  ○ 4.5 litres is approximately 1 gallon or 8 pints
	  ○ 1 kilogram is approximately 2 lb (more accurately, 2.2 lb)
	  ○ 30 grams is approximately 1 oz
	  ○ 8 kilometres is approximately 5 miles
	• Can compare imperial units to metric units of measure by converting units into the same unit of measure.
		• Can create patterns using imperial and metric measure *e.g. When will pints and litres be whole numbers?*

Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres	• Can divide a composite shape into rectangles and calculate the perimeter of each shape. • Can recombine shapes and calculate the perimeter of shapes. • Can find missing lengths of a shape if given a perimeter.	• Can give possible shapes if given a set perimeter.

Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes	• Can use the formula, L x W to calculate area. • Understands why the answer is the unit squared. • Can find shapes that have a set area. • Can calculate area from scaled drawings G–2 Compare areas and calculate the area of rectangles (including squares) using standard units.	• Can give possible shapes if given a set area.
Estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water]	• Can find volumes of regular and irregular 3D shapes using cubes. • Can identify shapes /containers with a similar volume. • Can record volume using cm^3	• Can create a cuboid to fit a given volume.
Solve problems involving converting between units of time	• Can use all four operations in problems involving time, including conversions	• Can create their own problem using time and conversions.
Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	• Can solve problems involving a variety of measures. • Can convert appropriately between measures to help solve the problem	• Can create their own problem involving measure and conversion.

Statistics		
Solve comparison, sum and difference problems using information presented in a line graph	• Can answer questions that involve comparing the values between two points on a line graph *e.g. When does the temperature rise the quickest?* • Can answer questions that involve finding the difference between two points on a line graph *e.g. By how much does the temperature rise between 1 and 2pm* • Can answer questions that involve finding the sum of values on a line graph *e.g. How far did the lorry driver travel in total?*	• Can answer questions that involve predicting how a line graph will continue *e.g. What do you think the height of the plant will be at the end of the next month?*
Complete, read and interpret information in tables, including timetables	• Can answer questions that involve timetables *e.g. How long does the journey from Chester to Northwich take on the bus?* • *Can answer questions linked to information presented in tables*	Can answer questions that involve reasoning and interpretation of timetables *e.g. If you wanted to get to Chester by 8;30am which would be the best train to get?*