Grimsdyke School
Knowledge and Skills Progression Map
Subject: Maths

Year Group	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Reception	*Number* • Number names, quantities, and sequence to 20 in the correct order. • To verbally continue the sequence of counting beyond 20. • Know what number symbols (numerals) look like and identify them. • Addition involves putting groups together or counting on • Subtraction involves removing items from a group or counting back • Doubling involves combining two equal groups • Halving involves splitting something into two equal groups or pieces • Sharing mathematically involves being fair and giving an equal amount to each group • Know which digit from 2 numbers is 'more' or 'less'. • To know the number bonds up to 10 • To know the odd and even numbers up to 10. *Measurement* • Size can be measured in different ways • You can use comparison and non-standard measures to talk about size • Know the names of the days of the weeks in sequence • Know that an o'clock time is shown when the long hand is on the 12 *Geometry* • Know the difference between straight and curved • Know the names of 2D (circle/ square/ triangle/ rectangle) and 3D shapes based on circles and squares/ rectangles	*Number* • Count reliably (in sequence and with one to one correspondence) with numbers from 1 to 20. • Count objects, actions and sounds • Place numbers from 1 to 20 in order. • Say which number is one more or less than a given number for numbers to 20. • Recognise the number of objects in a small group without the need to count them (subitise) • Using quantities and objects, they can add two single-digit numbers. • Using quantities and objects, they can subtract two single-digit numbers. • Can count on or back to find the answer when adding or subtracting. • They can solve addition and subtraction problems for numbers to 20 using practical apparatus. • They can double numbers to 10. • They can halve numbers to 20. • Can solve simple problems using apparatus that involve doubling and halving • They can share out an amount in a fair, mathematical way. • Compare numbers using the words 'more' or 'less' *Measurement* • Children use everyday language to talk about size, weight, capacity, distance, time, and money. • They can compare quantities, and objects in terms of size, measurement, or capacity. • They can solve simple problems involving measures using concrete materials.	*Number* • Number • more, less • odd, even • estimate • compare • order size • first, second, third… tenth • add, more, and make, sum, total altogether, take (away), leave • double, half, halve pair • count out, share out • money coin, penny, pence, pound • pay, change *Measurement* • measure, size, compare, guess, estimate • length, width, height, depth long, short, tall, high, low wide, narrow • weigh, weighs, balances • heavy/light, heavier/lighter, heaviest/lightest • full, half full, empty, holds • day, week • morning, afternoon, evening, today, yesterday, tomorrow before, after, next, last • hour, o'clock • clock, watch, hands *Geometry* • cube pyramid sphere cone

• *Know that a pattern has a rule that you can articulate* • *Know vocabulary to describe movement in simple terms* *Statistics* • *Collecting information in a systematic rather than random way helps you to count and solve problems with it* • *You can represent something or an amount with a picture or image*	• *They can say the days of the week in sequence and recognise o'clock times* *Geometry* • *They can recognise, describe, continue, copy, and create patterns.* • *They explore characteristics of everyday objects and shapes and use mathematical language to describe them.* • *They can name simple 2D shapes (circle, square, triangle, rectangle) and simple 3D shapes (sphere, cube and cuboid)* • *They can name and identify shapes which have been rotated or turned.* • *They can describe movement and position using basic terms e.g. forward, backward, turn* • *Compose and decompose shapes so that they can recognise other shapes which can be formed from the original shape.* *Statistics* • *They can collect information visually and convert into numbers to answer a question e.g. how many students have blue eyes in class?*	• *circle triangle square rectangle* • *pattern, repeating pattern* • *over, under, above, below top, bottom, side on, in, outside, inside, around, in front, behind front, back* *Statistics* • *greatest, most, biggest, largest least, fewest, smallest*

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Knowledge and Skills Progression Map
Subject: Maths

	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 1	*Number* • To know all the numbers up to 100 • To know that equals means the same as • To know the language of: equal to, more than, less than (fewer), most, least • To know that even numbers are numbers ending in 2,4,6,8 and 0 • To know that odd numbers are numbers ending in 1,3,5,7 and 9 • To know that a number bonds join numbers together to make another number • To know the number bonds up to 20 • To know that addition is finding the total of two or more numbers or objects • To know that subtraction means taking away to find how many are left. • To know the mathematical symbols for addition (+), subtraction (-) and equals (=) signs • To know that adding or subtracting a zero has no effect on the answer • To know different terminology for addition such as put together, add, altogether, total, more than • To know different terminology for subtractions such as take away, distance between, difference between and less than • To know the twos, fives and ten times tables • To know that multiplication is repeated addition • To know that division is breaking a number up into equal parts, and finding out how many equal parts can be made • To know that doubling is multiplying something by two	*Number* • To count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • To count, read and write numbers to 100 in numerals • To count in multiples of twos, fives and tens • To identify and say one more and one less than a given number • To identify and represent numbers using objects and pictorial representations including the number line • To read and write numbers from 1 to 20 in numerals and words • To connect counting (1,2,3) to ordering (first, second, third) and counting of objects (1 banana, 2 apples, 3 pears) • To begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100 • They recognise and create repeating patterns with objects and with shapes • To use number bonds and related subtraction facts within 20 • To add and subtract one-digit and two-digit numbers to 20, including zero • To read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs • To solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$ • To solve one-step problems involving multiplication and division, by calculating the answer using concrete objects,	*Number* • ones, tens, 'teens' number • number sentence • sign, operation • more than, less than, equal to, the same as • most, least, fewer • addition, altogether, total, sum, add, plus, more • subtraction, take away, difference between, less, minus *Measurement* • metre, ruler, metre stick • balance, scales, weight • seasons: spring, summer, autumn, winter • hour, o'clock, half past • months, year • unit, standard unit *Geometry* • curved, straight, round • point, pointed • face, side, edge • cube cuboid pyramid sphere cone cylinder • circle triangle square rectangle star • turn, whole turn, half turn *Statistics* • count, sort, vote group, set, table, chart, graph • Venn diagram, pictograms

- *To know different terminology for multiplication such as lots of, groups of*
- *To know different terminology for division such as sharing, grouping*
- *To know that a half is one of two equal parts of an object, shape or quantity*
- *To know that a quarter is one of four equal parts of an object, shape or quantity*
- *To know that a fractions is splitting a whole (number/shape etc) into parts*
- *To know that a missing box represents a number*

Measurement
- *To know that length/height is how long something is*
- *To know words to describe length/height such as long/short, longer/shorter, tall/short, double/half*
- *To know that mass is how heavy something is*
- *To know words to describe mass/weight such as heavy/light, heavier than, lighter than*
- *To know that capacity/volume is the amount of liquid in a container*
- *To know words to describe capacity and volume such as full/empty, more than, less than, half, half full, quarter*
- *To know words to describe time such as quicker, slower, earlier, later, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening*
- *To know the value of different denominations of coins and notes*
- *To tell the time to the hour and half past the hour*

- *To know that the hand points at the 12 for the hour*
- *To know that the hand points at the 6 for the half hour*
- *To days of the week and months of the year in sequence*
- *To know that we use rulers to measure lengths*
- *To know that we use scales to measure weight*

pictorial representations and arrays with the support of the teacher
- *To find and name quarter of an object, shape or quantity*
- *To find half a length, quantity, set of objects or shape*

Measurement
- *To compare, describe and solve practical problems for:*
* *lengths and heights [e.g. long/short, longer/shorter, tall/short, double/half]*
* *mass/weight [e.g. heavy/light, heavier than, lighter than]*
* *capacity and volume [e.g. full/empty, more than, less than, half, half full, quarter]*
* *time [e.g. quicker, slower, earlier, later]*
- *To sequence events in chronological order using language [e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]*
- *To measure and begin to record the following:*
* *lengths and heights*
* *mass/weight*
* *capacity and volume*
* *time (hours, minutes, seconds)*
- *To draw the hands on a clock face to show these times*
- *To be able to make a half term, a quarter turn and a three-quarter turns*
- *To begin to use measuring tools such as a ruler, weighing scales and containers.*

Geometry
- *To identify common 2-D and 3-D shapes, including:*

2-D shapes
- *rectangles (including squares)*
- *circles*
- *triangles*

3-D shapes
- *cuboids (including cubes)*
- *pyramids*

	• *To know that we use measuring jugs to measure capacity* *Geometry* • *To know the names and recognise common 2-D and 3-D shapes, including:* ***2-D shapes*** o *rectangles (including squares)* o *circles* o *triangles* ***3-D shapes*** o *cuboids (including cubes)* o *pyramids* o *spheres* • *To know that rectangles, triangles, cuboids and pyramids are not always similar to each other.* • *To know the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside.* • *To know that clockwise is the way that the hands move around a clock* • *To know that anticlockwise is the opposite way that the hands move around a clock*	• *spheres*	

Grimsdyke School
Knowledge and Skills Progression Map
Subject: Maths

	Knowledge (Know)	Skills (Do)	Concepts (Understand)

Year 2	*Number*
	 • To know the < sing means less than
	 • To know the > sing means greater than
	 • To know the = sign means equals to
	 • To know the place value of each digit in a two-digit number (tens, ones)
	 • To know that zero is used to represent nothing or an empty set of things
	 • To know that zero can be used as a place holder – to symbolise the absence of a value in a particular position e.g. In the number 20, the zero represents no ones
	 • To know and recall addition subtraction facts to 20 fluently
	 • To know that addition of two numbers can be done in any order (commutative)
	 • To know that subtraction is not commutative
	 • To know that there is a relationship between addition and subtraction and we call this the inverse
	 • To know that the sum of two numbers is the answer you get when you add them both together
	 • To know that when we add or subtract using columns, the place value of digits need to be lined up
	 • To recall multiplication and division facts for the two, five and ten multiplication tables, including recognising odd and even numbers
	 • To know that multiplication of two numbers can be done in any order (commutative)
	 • To know that division is not commutative
	 • To know the multiplication (×) and division (÷) signs
	 • To know that an array is an arrangement of objects, numbers or pictures in equal columns or rows
		Number
		 • To count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward
		 • To compare and order numbers from 0 up to 100
		 • To identify, represent and estimate numbers using different representations, including the number line
		 • To read and write numbers to at least 100 in numerals and in words
		 • To use place value and number facts to solve problems
		 • To partition numbers in different ways (for example, 23 = 20 + 3 and 23 = 10 + 13) to support subtraction
		 • To use addition and subtraction facts to 20 to derive related facts up to 100
		 • To add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
		   * a two-digit number and ones
		   * a two-digit number and tens
		   * two two-digit numbers
		   * adding three one-digit numbers
		 • To show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
		 • To use the inverse relationship between addition and subtraction to check calculations and solve missing number problems.
		 • To solve problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures
		 • To apply their increasing knowledge of mental and written methods
		 • To record addition and subtraction in columns
			Number
			 • more than, less than, equal to, the same as
			 • most, least, fewer
			 • addition, altogether, total, sum, add, plus, more
			 • subtraction, take away, difference between, less, minus
			 • commutativity/commutative
			 • inverse
			 • tens, ones
			 • multiple of, sequence, predict, pattern, rule
			 • units, ones, tens, hundreds, digit
			 • one-, two- or three-digit number
			 • place, place value stands for, represents, exchange
			 • part, equal parts fraction, one whole, one half, two halves
			 • one quarter, two… three… four quarters
			 • addition, subtraction
			 • tens boundary
			 • lots of, groups of
			 • times, multiply, multiplied by multiple of
			 • repeated addition
			 • array, row, column
			 • share equally
			 • equal groups of
			 • divide, divided by, divided into

- To know that multiplication and division are the inverse of each other (for example, 4 × 5 = 20 and 20 ÷ 5 = 4)
- To know that a fractions is splitting a whole (number/shape etc.) into parts
- To recognise and name fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- To know that fractions can be greater than one

Measurement
- To know the symbols for pounds (£) and pence (p)
- To tell the time to five minutes, including quarter past/to the hour
- To know that there are 60 minutes in an hour
- To know that there are 24 hours in a day.
- To know that the clock face is divided up into divisions of 5
- To know that an analogue clock is a clock that has moving hands and (usually) hours marked from 1 to 12
- To know that a digital clock only shows you the digits to tell the time and can be in both 12 and 24-hour formats

Geometry
- To know that a reflected shape does not change but appears 'flipped'
- To know that a 2D shape is symmetrical if a line can be drawn through it and either side is a reflection of the other
- To know what the terms edges, vertices and faces represent on a 3-D shape
- To know that 3-D shapes have 2-D shapes on their surfaces
- To know that a polygon is a shape with straight sides
- To know a quadrilateral is a four-sided, 2D shape
- To recognize 3D shapes such as cones and prisms
- To know that rotation means to turn something

- To use multiplication and division facts for the 2, 5 and 10 multiplication tables
- To show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- To calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- To solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
- To connect the 5 multiplication table to the divisions on the clock face
- To relate multiplication and division to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition
- To find and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- To write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$
- To count in fractions up to 10, starting from any number and using the 1/2 and 2/4 equivalence on the number line (for example, 1 ¼ , 1 2/4 (or 1 ½), 1 ¾ , 2
- To use inverse operations to solve missing number problems

Measurement
- To compare and order lengths, mass, volume/capacity and record the results using >, < and =
- To compare and sequence intervals of time

- numerator, denominator

Measurement
- metre, ruler, metre stick, scales, balance, scales, weight
- metre (m), centimetre (c m)
- kilogram (kg), half-kilogram, gram (g)
- litre (l), half-litre, millilitre (ml)
- digital/analogue clock/watch, timer
- minutes, hour, seconds
- pounds (£) and pence (p)
- temperature (°C)

Geometry
- 2D & 3D
- cube, cuboid, pyramid, sphere, cone, cylinder
- circle, circular triangle, triangular square, rectangle, rectangular star
- pentagon, hexagon, octagon
- quadrilateral
- line of symmetry ,mirror line, reflection
- clockwise, anti-clockwise
- whole turn, half turn, quarter turn,
- right angle, straight line

Statistics
- Tally
- count, sort, vote
- graph, block graph, pictogram
- most popular, most common
- least popular, least common
- more than, less than

- *To know that turning at right angle is making a quarter turn*
- *To know that clockwise is turning towards the right*
- *To know that anticlockwise is turning towards the left*
- *To know that shapes can rotate without changing*

Statistics
- *To recognise pictograms, tally charts, block diagrams and simple tables*
- *To know that pictogram symbols can represent different amounts*

- *To choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels*
- *To choose and use appropriate standard units to estimate and measure mass (kg/g) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels*
- *To choose and use appropriate standard units to estimate and measure temperature (°C) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels*
- *To choose and use appropriate standard units to estimate and measure capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels*
- *To use symbols for pounds (£) and pence (p);*
- *To combine amounts to make a particular value*
- *To find different combinations of coins that equal the same amounts of money*
- *To solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change*
- *To write the time to five minutes including quarter past/to the hour and draw the hands on a clock face to show these times.*
- *To compare measures including simple multiples such as 'half as high'; 'twice as wide'*

Geometry
- *To identify and describe the properties of 2-D shapes, including the number of sides and lines of symmetry in simple shapes*
- *To identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces*

		To identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] *To compare and sort common 2-D and 3-D shapes and everyday objects* *To draw lines and shapes using straight edges* *To 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)* *To order and arrange combinations of mathematical objects in patterns and sequences* *To move in quarter and half turns* *Give instructions to other pupils to move in quarter and half turns* *Statistics* *To interpret and construct simple pictograms, tally charts, block diagrams and simple tables* *To ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity* *To ask and answer questions about totalling and comparing categorical data* *To record, interpret, collate and organise data* *To compare information found in pictograms, tally charts, block diagrams and simple tables*	

Grimsdyke School
Knowledge and Skills Progression Map
Subject: Maths

	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 3	*Number* • To know all the numbers up to 1000 • To know the place value of each digit in a three-digit number (hundreds, tens, ones) • To know that tenths arise from dividing an object into 10 equal parts and in dividing one digit numbers or quantities by 10. • To know the roman numerals I=1, V=5 and X=10 • To know the formal written methods of columnar addition and subtraction • To recall multiplication and division facts for the 3, 4 and 8 multiplication tables • To know that the 2, 4 and 8 times tables are connected through doubling • To know the formal written method for multiplication • To know that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10. • To recognise fractions of a discrete set of objects • To recognise some equivalent fractions with small denominators using diagrams • To know that a denominator is the bottom number in a fraction which shows the equal number of parts something is divided into • To know that a numerator is the top number in a fraction which shows the how many parts there are out of the whole • To know that fractions can be ordered on a number line • To know that fractions can relate to measures (e.g. 3 ½ m = 350cm) *Measurement*	*Number* • To count from 0 in multiples of 4, 8, 50 and 100 • To find 10 or 100 more or less than a given number • To compare and order numbers up to 1000 • To identify, represent and estimate numbers using different representations • To read and write numbers up to 1000 in numerals and in words • To solve number problems and practical problems involving place value • To add numbers mentally, including: • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds • To subtract numbers mentally, including: • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds • To add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • To estimate the answer to a calculation and use inverse operations to check answers • To solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction • To use multiplication and division facts for the 3, 4 and 8 multiplication tables • To write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times	*Number* • hundreds, thousands • approximate, approximately • round (up or down) • nearest, round to the nearest ten • one third, two thirds, three thirds • one tenth • product • remainder • equation • inverse • Roman numeral • equivalence *Measurement* • am, pm • time • weight • length • capacity *Geometry* • right-angled vertex, vertices • cube cuboid pyramid, sphere, hemi-sphere cone, cylinder prism • circle, circular, semi-circle triangle, triangular, square, rectangle, rectangular star • pentagon, pentagonal hexagon, hexagonal octagon, octagonal quadrilateral • parallel • perpendicular

- *To know that am means the morning*
- *To know that pm means the afternoon*
- *To know that noon in 12:00 in the middle of the day*
- *To know that midnight is 12:00 in the middle of the night*
- *To know that an analogue clock is a clock that has moving hands and (usually) hours marked from 1 to 12*
- *To know that a digital clock only shows you the digits to tell the time and can be in both 12 and 24-hour formats*
- *To know the equivalences of a 12-hour and 24-hour clock*
- *To know there are 60 seconds in a minute*
- *To know that there are 30 or 31 days in a month (28 in February)*
- *To know that there are 365 days in a year*
- *To know that there are 366 days in a leap year*
- *To know that perimeter is the measurement of the outside of a shape*
- *To know that we use m/cm/mm to measure length*
- *To know that we use kg/g to measure mass*
- *To know that we use l/ml to measure capacity*

Geometry
- *To recognise 3-D shapes in different orientations*
- *To know that angles are form when two sides of a 2-D shape meet*
- *To know that a perpendicular line is a line that crosses another line at a right angle*
- *To know that parallel lines are two lines that are always the same distance apart and never meet*
- *To know that a horizontal line runs from left to right*
- *To know that a vertical line runs from top to bottom*

Statistics

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one-digit numbers, using mental and progressing to formal written methods
- *To solve problems, including missing number problems, involving multiplication and division*
- *To solve correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?)*
- *To count up and down in tenths*
- *To find and write fractions of a discrete set of objects*
- *To compare and order unit fractions, and fractions with the same denominators*
- *To show, using diagrams, equivalent fractions with small denominators*
- *To add and subtract fractions with the same denominator within one whole (e.g. $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$)*
- *To solve problems that involve all of the above*
- *To solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.*

Measurement
- *To compare durations of events, for example to calculate the time taken by particular events or tasks*
- *To estimate and read time with increasing accuracy to the nearest minute*
- *To record and compare time in terms of seconds, minutes, hours and o'clock*
- *To use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight*
- *To tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks*
- *To measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)*

Statistics
- *list, chart, bar chart table, frequency table*
- *graph label, title, axis, axes*
- *scales*

	• *To know that a bar chart displays information by using rectangular bars of different heights to represent a fixed quantity* • *To know that the x axis is the horizontal line on a graph* • *To know that the y axis is the vertical line on a graph* • *To know that the bars on a bar chart are the same width* • *To know that we use scales on graphs to help us interpret data*	• *To measure the perimeter of simple 2-D shapes* • *To add and subtract amounts of money to give change, using both £ and p in practical contexts* • *To record £ and p separately* • *To use the appropriate tool for a wide range of measures* • *To add/subtract amounts of money including mixed units* *Geometry* • *To draw 2-D shapes and make 3-D shapes using modelling materials* • *To describe 3-D shapes in different orientations* • *To identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn* • *To identify whether angles are greater than or less than a right angle* • *To identify horizontal and vertical lines and pairs of perpendicular and parallel lines* • *To identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line (this is a year 2 objective but must be revisited in year 3)* • *To use decimals to draw and measure straight lines accurately* • *To identify and describe the properties of 2-D shapes, including the number of sides and lines of symmetry in more complex shapes* *Statistics* • *To interpret and present data using bar charts, pictograms and tables* • *To solve one-step and two-step questions [e.g. 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.* • *To choose appropriate scales when constructing a bar chart*	

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Subject: Maths

	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 4	**Number** • To know that hundredths arise when dividing an object by one hundred and dividing tenths by ten • To know the roman numerals L=50 and C=100 • To know that over time, the numeral system changed to include the concept of zero and place value. • To know the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • To recall multiplication and division facts for multiplication tables up to 12 × 12 including the six, seven and nine times tables • To know that commutativity is when 2 numbers can be added or multiplied & the same answer will be found no matter what order they are in • To know the formal written method for multiplication • To know that when you multiply by zero, the answer is zero • To know that when you divide by 1, the answer is the same • To know the formal written method of division • To know that multiplying a number by a group of numbers added together is the same as doing each multiplication separately (distributive law) • To know that hundredths arise when dividing an object by one hundred and dividing tenths by ten • To recognise families of common equivalent fractions • To recognise decimal equivalents of any number of tenths or hundredths • To recognise decimal equivalents to $\frac{1}{4}$; $\frac{1}{2}$; $\frac{3}{4}$	**Number** • To count backwards through zero to include negative numbers • To count in multiples of 6, 7, 9, 25 and 1000 • To find 1000 more or less than a given number • To order and compare numbers beyond 1000 • To compare numbers with the same number of decimal places up to two decimal places • To identify, represent and estimate numbers using different representations • To read Roman numerals to 100 (I to C) • To round any number to the nearest 10, 100 or 1 000 • To solve number and practical problems that involve all of the above and with increasingly large positive numbers • To add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • To estimate and use inverse operations to check answers to a calculation • To solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why • To 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 • To use factor pairs and commutativity in mental calculations • To multiply two-digit and three-digit numbers by a one-digit number using formal written layout • To estimate and use inverse operations to check answers to a calculation	**Number** • thousands, ten thousand, hundred thousand, million • one-, two-, three- or four-digit number • integer, positive, negative above/below zero, minus • half, quarter, eighth third, sixth • fifth, tenth, twentieth proportion, • decimal, decimal fraction decimal point, decimal place • inverse • factor, quotient, divisible by **Measurement** • time • weight • length • capacity • perimeter • area, covers, surface square centimetre (cm²) • leap year • timetable, arrive, depart • Greenwich Mean Time, British Summer Time, International Date Line **Geometry** • 3D, three-dimensional cube • cuboid pyramid • sphere, hemi-sphere, spherical cone • cylinder, cylindrical prism

Measurement
- *To know that area is the measurement of space inside a 2-Dimensional shape.*
- *To know there are 100 cm in a metre*
- *To know there are 1000m in a km*
- *To know the formula for converting from m to cm is to multiply by 100*
- *To know the formula for converting from cm to m is to divide by 100*
- *To know the formula for converting from km to m is to multiply by 1000*
- *To know the formula for converting from m to km is to divide by 1000*
- *To know the decimal notation of £ and p*

Geometry
- *To know that acute angles are smaller than right angles*
- *To know that obtuse angles are larger than right angles but smaller than a straight line*
- *To know a quadrilateral is a four-sided, 2D shape*
- *To know that a parallelogram has two pairs of parallel sides*
- *A rhombus is a parallelogram with all sides equal in length*
- *To know that a trapezium is a quadrilateral with at least one pair of parallel sides*
- *To know that an equilateral triangle has three equal lengths and three equal angles*
- *To know that an isosceles triangle has two equal lengths and two equal angles*
- *To know that a scalene triangle has no equal lengths and no equal angles*
- *To know that a polygon is a shape with straight sides*
- *To know that translating a shape means moving it on a grid*

- *Use mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6*
- *To use knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, 2 x 6 x 5 = 10 x 6 = 60*
- *To count up and down in hundredths*
- *To compare numbers with the same number of decimal places up to two decimal places*
- *To round decimals with one decimal place to the nearest whole number*
- *To show, using diagrams, families of common equivalent fractions*
- *To write decimal equivalents of any number of tenths or hundredths*
- *To write decimal equivalents to $\frac{1}{4}; \frac{1}{2}; \frac{3}{4}$*
- *To add and subtract fractions with the same denominator*
- *To 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*
- *To 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*
- *To solve simple measure and money problems involving fractions and decimals to two decimal places*
- *To use factors and multiples to recognise equivalent fractions and simplify where appropriate*

Measurement
- *To estimate, compare and calculate different measures, including money in pounds and pence*
- *To measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres*

- *tetrahedron, polyhedron*
- *2D, two-dimensional*
- *circle, circular, semi-circle triangle, triangular*
- *equilateral triangle, isosceles triangle*
- *square*
- *rectangle, rectangular, oblong pentagon, pentagonal hexagon, hexagonal heptagon*
- *octagon, octagonal polygon*
- *quadrilateral, rhombus, parallelogram, trapezium*
- *origin, coordinates*
- *acute, obtuse*

Statistics
- *survey, questionnaire, data*
- *list, chart, bar chart, tally chart table, frequency table*

	• *To know that coordinates go up from the origin (0,0)* • *To know that you read coordinates on the x-axis followed by the y-axis* *Statistics* • *To know that a time graph shows a changing of data over time*	• *To find the area of rectilinear shapes by counting squares* • *To read, write and convert time between analogue and digital 12 and 24-hour clocks* • *To solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days* • *To convert between different units of measure (e.g. kilometre to metre; hour to minute)* *Geometry* • *To identify lines of symmetry in 2-D shapes presented in different orientations* • *To complete a simple symmetric figure with respect to a specific line of symmetry* • *To compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes* • *To identify acute and obtuse angles and compare and order angles up to two right angles by size* • *To compare and order angles* • *To draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry* • *Recognise line symmetry in a variety of diagrams* • *To describe movements between positions as translations of a given unit to the left/right and up/down* • *To plot specified points and draw sides to complete a given polygon* • *To describe positions on a 2-D grid as coordinates in the first quadrant* • *To draw a pair of axes in one quadrant, with equal scales and integer labels* • *To read, write and use pairs of coordinates*	

Statistics

- *To interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs*
- *To solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.*
- *To use a greater range of scales in their representations*
- *To relate the graphical representation of data to recording change over time*

	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 5	*Number* • To know the roman numerals up to M • To know place value up to 1,000,000 • To know that if a digit is 0-4, you round the number down and a digit is 5-9, you round it up • To know the formal written method of division • To know the formal written method of long multiplication • To know that a remainder is the amount left over when a number cannot be exactly divided by another number • To know that factors are numbers that divide exactly into another number. • To know that a multiple is the product result of one number multiplied by another number. • To know that prime numbers are numbers which only have two factors • To recall prime numbers up to 19 • To know that squaring a number means multiplying it by itself and it is notated as (^{2}) • To know that cubing a number is multiplying it by itself three times it is notated as (^{3}) • To know that the equals sign to indicate equivalence, including in missing number problems (for example, 13 + 24 = 12 + 25; 33 = 5 x) • To recognise equivalent fractions of a given fraction, represented visually, including tenths and hundredths • To recognise that decimal numbers have their equivalent fractions (e.g. 0.71 = $^{71}/_{100}$) • To know that per cent relates to "number of parts per hundred"	*Number* • To interpret negative numbers in context, • To count forwards and backwards with positive and negative whole numbers, including through zero • To count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • To read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • To read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • To read Roman numerals to 1000 (M) and recognise years written in Roman numerals. • To round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000 • To round decimals with two decimal places to the nearest whole number and to one decimal place • To solve number problems and practical problems that involve all of the above • To recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule in numbers and in words • To add and subtract numbers mentally with increasingly large numbers • To add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • To use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	*Number* • formula • divisible (by), divisibility, factor square number • one squared, two squared • fraction, proper/improper fraction mixed number • numerator, denominator equivalent, reduced to, cancel • decimal, percentage • prime *Measurement* • pound, ounce, inch, foot, yard, mile, gallon, pint • 24-hour clock, 12-hour clock • volume *Geometry* • regular, irregular • concave, convex • congruent • 3D, three-dimensional cube, cuboid • pyramid • sphere, hemi-sphere, spherical cone • cylinder, cylindrical prism • tetrahedron, polyhedron, octahedron • 2D, two-dimensional circle, circular, semi-circle triangle, triangular • dodecahedron • kite • polygon

- *To recognise the per cent symbol (%)*
- *To know that mixed numbers are a whole number and a fraction*
- *To know that improper fractions have a larger numerator and that they are greater than one*
- *To know that some fractions > 1 simplify, with division, to integers and other fractions > 1 to numbers with remainders*
- *To know that percentages, fractions and decimals are connected (for example, 100% represents a whole quantity and 1% is 1/100 , 50% is 50/100 , 25% is 25/100)*

Measurement
- *To know the formula for area is l x w*
- *To know that volume is the amount of physical space a 3D object takes up.*
- *To know that imperial measurements include feet, inches and pints*
- *To know that metric measurements include metres, centimtres and kilometres*
- *To know there are 10mm in 1cm*
- *To know there 1000g in a kg*
- *To know there are 1000ml in a l*
- *To know the formula for converting from cm to mm is to multiply by 10*
- *To know the formula for converting from mm to cm is to divide by 10*
- *To know the formula for converting from kg to g is to multiply by 1000*
- *To know the formula for converting from g to kg is to divide by 1000*
- *To know the formula for converting from ml to l is to multiply by 1000*

- *To multiply and divide numbers mentally drawing upon known facts*
- *To multiply and divide whole numbers and those involving decimals by 10, 100 and 1000*
- *To 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*
- *To 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*
- *To identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.*
- *To establish whether a number up to 100 is prime and*
- *To work out square numbers and cube numbers*
- *To solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes*
- *To solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates*
- *To interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding*
- *To use thousandths and relate them to tenths, hundredths and decimal equivalents*
- *To compare and order fractions whose denominators are all multiples of the same number*
- *To read, write, order and compare numbers with up to three decimal places*
- *round decimals with two decimal places to the nearest whole number and to one decimal place*

- *compound shape*
- *line of symmetry, axis of symmetry*
- *line symmetry, reflective symmetry*
- *parallel, perpendicular*
- *x-axis, y-axis quadrant*

Statistics
- *range - maximum/minimum value*
- *line graphs*

- *To know the formula for converting from l to ml is to divide by 1000*

Geometry

- *To know angles are measured in degrees (^{o})*
- *To know that angles at a point and one whole turn total 360°*
- *To know that angles at a point on a straight line and ½ a turn total 180°*
- *To know that a right angle is 90°*
- *To know the rules of measuring angles*
- *To know that a diagonal is line joining two non-adjacent vertices or corners of a polygon*
- *To know that a shape has not changed if it has been reflected or translated*

Statistics

- *To know that a line graph displays quantitative values over a specified time interval*

- *To name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths*
- *read and write decimal numbers as fractions (e.g. 0.71 = $^{71}/_{100}$)*
- *To write percentages as a fraction with denominator 100 as a decimal fraction*
- *To add and subtract fractions with the same denominator and multiples of the same number*
- *To convert mixed numbers and improper fractions from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $^2/_5 + ^4/_5 = ^6/_5 = 1^1/_5$)*
- *To multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams*
- *To solve problems involving numbers up to three decimal places*
- *To solve problems which require knowing percentage and decimal equivalents of $^1/_2, ^1/_4, ^1/_5, ^2/_5, ^4/_5$ and those with a denominator of a multiple of 10 or 25.*
- *To count in decimals and fractions, bridging zero*
- *To mentally add and subtract tenths, and one-digit whole numbers and tenths*
- *To add and subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (for example, 0.83 + 0.17 = 1)*

Measurement

- *To calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes (also included in measuring)*

- *To estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water)*
- *To use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.*
- *To measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres*
- *To calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes*
- *To solve problems involving converting between units of time*
- *To convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)*
- *To understand and use equivalences between metric units and common imperial units such as inches, pounds and pints*
- *To calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths*

Geometry
- *To identify 3-D shapes, including cubes and other cuboids, from 2-D representations*
- *draw given angles, and measure them in degrees (^{o})*
- *To use the properties of rectangles to deduce related facts and find missing lengths and angles*
- *To distinguish between regular and irregular polygons based on reasoning about equal sides and angles*
- *To estimate and compare acute, obtuse and reflex angles*
- *To identify:*

- o *angles at a point and one whole turn (total 360°)*
- o *angles at a point on a straight line and ½ a turn (total 180°)*
- o *other multiples of 90°*
- *To draw lines accurately with a ruler to the nearest millimeter*
- *To measure angles with a protractor*
- *To use conventional markings for parallel lines and right angles*
- *To use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems*
- *To identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language*

Statistics

- *To complete, read and interpret information in tables, including timetables*
- *To solve comparison, sum and difference problems using information presented in a line graph*
- *To know when to use specific representations of data*

Grimsdyke School
Knowledge and Skills Progression Map
Subject: Maths

	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 6	*Number* • To know place value up to 10,000,000 • To know the order of operations (BODMAS) to carry out calculations involving the four operations • To know that orders show how many times a number or letter has been multiplied by itself • To know the formal written method of long division • To recognise the value of each digit in numbers given to three decimal places • To know that fractions are a result of division • To know and use equivalences between simple fractions, decimals and percentages, including in different contexts. • To know that ratios are a way of splitting up amounts and keeping them in proportion • To know that proportion tells us about a portion or part in relation to a whole • To recognise proportions in every day contexts such as recipes • To know that equations are balanced • To know the basic rules and conventions of algebra e.g. 5t = 5 times t • To know that symbols and letters represent variables and unknowns *Measurement* • To know that shapes with the same areas can have different perimeters and vice versa • To know that 5 miles is equivalent to 8 km • To know the formula for the area of a triangle (1/2 b x h or b x h ÷ 2) • To know the formula for area of a parallelogram (b x h)	*Number* • To use negative numbers in context, and calculate intervals across zero • To read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • To identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places • To round any whole number to a required degree of accuracy • To solve problems which require answers to be rounded to specified degrees of accuracy • To solve number and practical problems that involve all of the above • To perform mental calculations, including with mixed operations and large numbers • To use their knowledge of the order of operations to carry out calculations involving the four operations • To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy • To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • To solve problems involving addition, subtraction, multiplication and division • To explore the order of operations using brackets • To multiply and divide numbers mentally drawing upon known facts • To multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	*Number* • prime, prime factor • discount, profit, loss • investigate, interrogate, question, prove • ratio, proportion • BODMAS *Measurement* • conversion • imperial, metric • area of a triangle • area of a parallelogram *Geometry* • radius, diameter circumference, concentric, arc • intersecting, intersection plane • four quadrants • opposite angles • sum of angles in shapes *Statistics* • mean, average, median, mode • statistics, distribution • pie charts

- *To know that speed is measured in mph*

Geometry
- *To know that a net is an 'opened out' 3D shape*
- *To know that the radius is the distance from the centre of a circle to the circumference*
- *To know that the diameter is the straight line passing through the center of a circle meeting the circumference at the other side*
- *To know that the diameter is twice the radius*
- *To know that the circumference is the distance all the way round the circle*
- *To know that there are four quadrants in a coordinate grid*

Statistics
- *To know that the mean way of interpreting average*
- *To know that a pie chart is a type of graph that illustrates how different types of data fit into a whole*
- *To know that each piece of data in a pie chart is represented by 1/360 of the pie chart because there are 360° in a pie chart*
- *To know that median and mode are ways of interpreting averages*

- *To multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication*
- *To divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for the context divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division*
- *To interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context*
- *To use written division methods in cases where the answer has up to two decimal places*
- *To identify common factors, common multiples and prime numbers*
- *To use their knowledge of the order of operations to carry out calculations involving the four operations*
- *To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy*
- *To compare and order fractions, including fractions >1*
- *To solve problems which require answers to be rounded to specified degrees of accuracy*
- *To use common factors to simplify fractions; use common multiples to express fractions in the same denomination*
- *To calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $\frac{3}{8}$)*
- *To add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions*
- *To multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)*
- *To multiply one-digit numbers with up to two decimal places by whole numbers*

		To divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$) *To multiply one-digit numbers with up to two decimal places by whole numbers* *To multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places* *To identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places* *To use written division methods in cases where the answer has up to two decimal places* *To multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers* *To multiply decimals by whole numbers, starting with the simplest cases, such as 0.4 × 2 = 0.8, and in practical contexts, such as measures and money* *To divide of decimal numbers by one-digit whole number* *To solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts* *To solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison* *To solve problems involving similar shapes where the scale factor is known or can be found* *To solve problems involving unequal sharing and grouping using knowledge of fractions and multiples* *To solve problems involving unequal quantities, for example, 'for every egg you need three spoonfuls of flour', ' 3/5 of the class are boys'* *To express missing number problems algebraically* *To find pairs of numbers that satisfy number sentences involving two unknowns*	

- *enumerate all possibilities of combinations of two variables*
- *To use simple formulae*
- *To recognise when it is possible to use formulae for area and volume of shapes*
- *To generate and describe linear number sequences*

Measurement

- *To calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), extending to other units such as mm^3 and km^3.*
- *To solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate*
- *To calculate the area of parallelograms and triangles*
- *To calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), extending to other units [e.g. mm^3 and km^3].*
- *To recognise when it is possible to use formulae for area and volume of shapes*
- *To use, read, write and convert between standard units, converting 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*
- *To solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate*
- *To convert between miles and kilometres*
- *To relate the area of rectangles to parallelograms and triangles*
- *To use the formula for the area of a triangle*

- *To use the formula for the area of a parallelogram*

Geometry

- *To recognise, describe and build simple 3-D shapes, including making nets*
- *To illustrate and name parts of circles, including radius, diameter and circumference*
- *To draw 2-D shapes using given dimensions and angles*
- *To compare and classify geometric shapes based on their properties and sizes*
- *To find unknown angles in any triangles, quadrilaterals, and regular polygons*
- *To recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles*
- *To describe positions on the full coordinate grid (all four quadrants)*
- *To draw and translate simple shapes on the coordinate plane, and reflect them in the axes.*
- *To draw and label a pair of axes in all four quadrants with equal scaling*
- *To draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants*
- *To predict missing coordinates using the properties of shapes*

Statistics

- *To interpret and construct pie charts and line graphs and use these to solve problems*
- *To calculate and interpret the mean as an average*
- *To link angles, fractions and percentages to the interpretation of pie charts*
- *To know when it is appropriate to find the mean of a data set*