Year 6 – Mathematics Intent

Block	Topic	Term	Number of Weeks	Notes
1	Number and Place Value			
2	Addition and Subtraction			
3	Multiplication and Division			
4	Fractions			
5	Decimals and Percentages			
6	Ratio and Proportion			
7	Algebra			
8	Measure			
9	Geometry – Shape, Position and Direction			
10	Statistics			
11	Number, Geometry and Substantial Problem Solving			

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Block 1			
Number and Place Value			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning Detailed in Planning Overview**
Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit	6NPV–1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000). 6NPV–2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.	• Can explain the place value in numbers up to 10 000 000 • Can order a set of numbers to 10 000 000 • Understands how a number can be partitioned into different amounts • Can multiply and divide numbers by 10 and 1000 and explain the effect on the size of the digits in the number	*Numbers to ten million *Understanding and counting in *Powers of 10 *Partitioning in standard and non-standard ways *Compare and order numbers *Ordering on a number line *Round numbers *Negative Numbers *Calculate intervals between negative and positive numbers *Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Round any whole number to a required degree of accuracy	6NPV–3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts. 6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.	• Can round numbers to the nearest 1 000 000 • Can estimate the answers to calculations by rounding and comparing answers	
Use negative numbers in context, and calculate intervals across zero		• Can solve problems involving negative numbers linked to temperature, money and measures *e.g. find the difference between two temperatures when one is negative.*	
Solve number and practical problems that involve all of the above.		• Can solve problems involving place value, including word problems and problems linked to population of countries, money and measure	

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Block 2			
Addition and Subtraction			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning Detailed in Planning Overview**
Perform mental calculations, including with mixed operations and large numbers	6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number). 6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.	• Can mentally add and subtract numbers including decimals using a variety of strategies	*Recap/consolidate mental strategies for addition and subtraction *Use estimation to support calculation *Recap/consolidate written strategies for addition and subtraction *Two Step Problems *Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Use their knowledge of the order of operations to carry out calculations involving the four operations		• Can understand and use brackets • Can understand the order of operations, BODMAS	
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. • Solve problems including those with more than one step	
Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy		• Can use rounding to estimate the answer • Can use estimating to consider whether their answer is appropriate • Can use the inverse to check the answer	

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Block 3 Multiplication and Division			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning Detailed in Planning Overview**
Perform mental calculations, including with mixed operations and large numbers	6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number) 6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.	• Can decide when to use a mental method, informal jottings or a written method for calculations with all four operations • Can identify an appropriate strategy to solve a mental *calculation e.g. calculate 24 × 15, they multiply 24 × 10 and then halve this to get 24 × 5, adding these two results together.* • Can approximate effectively using rounding • Can derive facts involving decimals • Can use knowledge of square numbers to derive square of multiples of 10 *e.g. 60 x 60*	*Introduction *Common multiples and common factors *Prime numbers *Square and cube numbers *Mental methods of multiplication *Estimating multiplication questions *Written methods of multiplication *Written methods of division *BODMAS *Solve multi-step problems using all four operations *Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Identify common factors, common multiples and prime numbers		• Can identify common factors of 2-digit numbers • Can identify common multiples of 2-digit numbers • Can identify prime numbers to 100 and begin to recall these	
Use their knowledge of the order of operations to carry out calculations involving the four operations		• Can understand the order of BODMAS and use this to solve calculations	
Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication		• Can use mental strategies to approximate answers to multiplication and division calculations • Can use an appropriate formal written method to multiply numbers up to ThHTU by TU	
Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context		• Can use an expanded written method to divide ThHTU by TU • Can use a standard written method of long division to divide ThHTU by TU • Can interpret remainders accurately	

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		• Can use a standard written method of short division to divide ThHTU by U • Can use a standard written method of short division to divide ThHTU by TU • Can interpret remainders accurately	
Solve problems involving addition, subtraction, multiplication and division		• Can use addition and/or subtraction strategies to solve a complex problem. • Solve problems including those with more than one step	
Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.		• Can use rounding to estimate the answer • Can use estimating to consider whether their answer is appropriate • Can use the inverse to check the answer	

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Block 4			
Fractions			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning Detailed in Planning Overview**
Use common factors to simplify fractions; use common multiples to express fractions in the same denomination	6F–1 Recognise when fractions can be simplified, and use common factors to simplify fractions.	• Understand equivalent fractions have common multiples • Using diagrams can see fractions are the same when simplified. • Can simplify fractions by dividing the numerator and denominator by a common factor.	*Equivalent fractions *Simplifying fractions *Compare fractions, including fractions > 1 *Order fractions, including fractions > 1 *Add fractions *Subtract fractions *Multiplying pairs of proper fractions *Dividing proper fractions by whole numbers *Associate a fraction with division and calculate decimal fraction equivalents *Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Compare and order fractions, including fractions > 1	6F–2 Express fractions in a common denomination and use this to compare fractions that are similar in value. 6F–3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy	• Can convert fractions into common denominators • Can use decimal equivalence to order and compare fractions.	
Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions		• Can use knowledge of equivalent fractions to add fractions • Can convert mixed numbers into improper fractions.	
Multiply simple pairs of proper fractions, writing the answer in its simplest form		• Understand when multiplying by a fraction the answer will be smaller. • Using diagrams can understand when multiplying fractions by a fraction the answer will be smaller. • Can follow a standard method to multiply fractions.	
Divide proper fractions by whole numbers		• Can divide a proper fraction by a whole number • Can explain how to divide a proper fraction, using diagrams if necessary to show understanding	
Associate a fraction with division and calculate decimal fraction equivalents		• Understand how to calculate a decimal from a fraction by dividing the numerator by the denominator. • Can explore recurring equivalence of decimals and fractions. • Can recall common fraction and decimal equivalents	

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Block 5			
Decimals and Percentages			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning Detailed in Planning Overview**
Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places	6NPV–1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000). 6NPV–2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning. 6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.	• Understands the effect of multiplying a decimal by 10, 100 and 100 • Understands the effect of dividing a decimal by 10, 100 and 100	*Recap/Introduction *x10/100/1000 *Rounding decimals *Link decimals to calculation – addition and subtraction *Link decimals to calculation – multiplication *Link decimals to calculation – division *Recall and use equivalences between simple fractions, decimals and percentages *Exploring percentages *Link finding percentages to measure *Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Multiply one-digit numbers with up to two decimal places by whole numbers		• Can use an appropriate formal written method to multiply numbers up to U.th by U • Can use mental strategies to approximate answers to multiplication calculations • Can say why an answer to a multiplication involving 2 decimal places cannot be correct *e.g. Sam says the answer to 2.34 x 4 is 93.6 Explain why he cannot be correct.*	
Use written division methods in cases where the answer has up to two decimal places		• Can use an appropriate formal method to divide a number with U.th by a single digit *e.g. in the context of money £4.35 ÷ 3* • Can use an appropriate formal method to divide a whole number with a remainder by a single digit, extending their working into decimal places e.g. £178 ÷ *8* • Can interpret decimal answers in context e.g. What does 5.6 represent if it is in the context of money? mass? length?	

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Solve problems which require answers to be rounded to specified degrees of accuracy	6NPV–3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.	• Can choose and use appropriate methods of calculation using all four operations. • Can decide whether to round an answer to the nearest tenth, whole number or higher value place, in context *e.g. Approximately how many metres of fabric should I buy if I need to make 3 dresses which each use 1.34m?*. • Can use rounding to estimate the answer • Can consider whether their answer is appropriate	
Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts	6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.	• Can recognise simple fraction, decimal and percentage equivalences in context including ½ = 0.5, ¼ = 0.25, ¾ = 0.75, 1/10 = 0.1, 1/5 = 0.2 • Can recognise other equivalent fractions, decimals and percentages with the same denominator e.g. If 1/10 = 0.1, 3/10 = ? • Can explain why 6/10 is more than 50%	

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Block 6			
Ratio and Proportion			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning Detailed in Planning Overview**
Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts	6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number). 6AS/MD–3 Solve problems involving ratio relationships.	• Understands ratio as a comparison of one part or amount with another • Can confidently use the language of 'for every' when describing a ratio. • Can use ratio to show the relative size of two quantities	*Describe the proportional relationship between 2 factors using ratio and proportion *Solve simple ratio problems *Use a bar model to tackle ratio problems where we know the whole and the ratio *Use ratio and proportion to solve problems with 3 unknowns *Simplifying ratio to solve problems *Using and applying ratio and proportion to solve a range of problems *Solving problems involving scaling *Scale factors *Scale factors and shape *Use multiplication to solve correspondence problems *Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison		• Understands proportion as a fraction of the whole amount • Can use percentages equivalents to describe a proportion	
Solve problems involving similar shapes where the scale factor is known or can be found		• Understands direct proportion by scaling quantities up and down • Understands ratio as additive change or a multiplicative change • Can scale up/down recipes for a given number.	
Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.		• Can investigate possible answers to a question where one fraction has an impact on the other.	

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Block 7			
Algebra			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning Detailed in Planning Overview**
Use simple formulae	6AS/MD–1 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.	• Understands that a value can be replaced by a number or a symbol • Can solve missing box calculations by using inverse. • Can use formulae for other areas of learning e.g. perimeter and measure • Can substitute values into a formula to find an answer. • Can show a good understanding of the equals sign as a balancing symbol	*Introduction to algebra *Use simple formulae *Express missing number problems algebraically *Finding unknowns in algebraic equations *Enumerate possibilities of combinations of two variables *Problem solving using money and measure problems with 2 unknowns *Solve problems with 2 unknowns and express this algebraically *Finding 2 unknowns in problems with different structures *Generate and describe linear number sequences *nth term and formula for sequences *Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Generate and describe linear number sequences		• Can create a number sequence given a rule to follow. • Understands a linear equation can be recursive, i.e. one number in the sequence is generated from the preceding number *e.g. by adding 3 to the preceding number* • Understands a linear equation can be ordinal, i.e. the position of the number in the sequence generates the number *e.g. by multiplying the position by 3, and then subtracting 2*	
Express missing number problems algebraically		• Can use symbols to express missing number problems • Can find values that satisfy the equation and make it a true statement. • Understands the associative law and can apply it to missing number problems • Understands the distributive law and can apply it to missing number problems	
Find pairs of numbers that satisfy an equation with two unknowns	6AS/MD–4 Solve problems with 2 unknowns.	• Can substitute numbers into unknowns to find a given value where there are limited answers.	
Enumerate possibilities of combinations of two variables		• Can identify different variables and consider the impact on one when one changes *e.g. list all the combinations of boys and girls in a class where there are twice as many boys as girls and between 25 & 35 children in the class altogether.*	

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<table>
<tr><th colspan="4">Block 8</th></tr>
<tr><th colspan="4">Measure</th></tr>
<tr><th>Substantive Knowledge

National Curriculum</th><th>Ready to Progress</th><th>Key Performance Indicators</th><th>Sequence of learning
Detailed in Planning Overview</th></tr>
<tr><td>Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate</td><td rowspan="3">6NPV–1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).

6NPV–2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.

6NPV–3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.

6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.</td><td>• Can recall approximate conversions and is able to tell if an answer is sensible.
• Can use decimal notation in a variety of formats to solve a problem.</td><td rowspan="4">.*Converting metric measures using decimal notation up to 3dp
*Reading scales in different units with divisions in 2, 4, 5 or 10 equal parts
*Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
*Convert between miles and kilometres
*Convert between other metric units and common imperial units
*Convert between different units of time
*Recap on area and perimeter from Y5 if needed.
*Recognise that shapes with the same areas can have different perimeters and vice versa
*Calculate the area of triangles
*Calculate the area of parallelograms
*Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units [for example, mm³ and km³].
*Make links to topic and real-life situations

*Application to SATs questions embedded into each unit of work at the appropriate stage of an objective</td></tr>
<tr><td>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</td><td>• Can explain the relationship between conversions
• Can make estimates based on approximate conversions.
○ 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</td></tr>
<tr><td>Convert between miles and kilometres</td><td>• Can use the conversion of miles to Km to apply to other facts.</td></tr>
<tr><td>Recognise that shapes with the same areas can have different perimeters and vice versa</td><td>• Can measure and calculate the perimeter and area of composite rectilinear shapes
• Can calculate the perimeters of compound shapes that can be split into rectangles.
• Can identify shapes that have the same area but have different perimeters</td></tr>
</table>

Recognise when it is possible to use formulae for area and volume of shapes		• Understands when to use a formula to find the area of a shape. • Understands when to use the formula to find the volume of a shape.	
Calculate the area of parallelograms and triangles		• Can calculate the area of right-angled triangles using their knowledge of a square • Can generalise how to find the area of a triangle • Can calculate the area of a parallelogram using their knowledge of squares and triangles.	
Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3].		• Can find volumes of regular and irregular 3D shapes using cubes. • Can estimate and compare volumes. • Can calculate volume using the formula length x width x height • Can record volume using cubic units (cm^3, m^3, mm^3 and km^3)	

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Block 9			
Geometry - Shape and Position and Direction			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning Detailed in Planning Overview**
Draw 2-D shapes using given dimensions and angles	6G–1 Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.	• Can identify, visualise and describe properties of rectangles, triangles and regular polygons • Can use knowledge of properties to draw 2-D shapes • Can use a ruler to measure accurately within 1mm • Can use a ruler to draw lines accurately within 2mm • Can use a protractor to measure angles accurately within 1 degree • Can use a protractor to draw angles accurately within 2 degrees • Can construct a triangle given two sides and the included angle	*Draw and compose 2-D shapes using given dimensions and angles *Compare and classify geometric shapes based on their properties – triangles *Compare and classify geometric shapes based on their properties – quadrilaterals *Compare and classify geometric shapes based on their properties – polygons *Find missing angles on a straight line or in a circle *Recognise missing angles in triangles and quadrilaterals *Find unknown angles in regular polygons *Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius *Describe positions of shapes on a full coordinates grid. *Draw and translate a shape and describe the new position on the coordinates grid. *Reflect a shape and describe the new position on the coordinates grid. *Recognise, describe and build simple 3-D shapes, including making nets
Recognise, describe and build simple 3-D shapes, including making nets		• Identify, visualise and describe properties of 3-D solids • Identify 3D shapes from their nets and explain why, including open and closed cubes • Draw nets of 3-D shapes with given dimensions	
Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons		• Can recognise the properties of isosceles, right angled, equilateral and scalene triangles • Can recognise the properties of squares, rectangles, rhombuses, parallelograms, trapeziums and kites • Can explain why a polygon is regular or irregular • Can identify whether a triangle is isosceles from known angles and sides • Can find unknown angles in all triangles, given one angle	
Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius		• Can recognise that the circumference is the distance around a circle • Can explain that the radius is the distance from the centre to the circumference • Can explain that the diameter is 2x the radius	
Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.		• Can estimate angles • Can use a protractor to measure and draw angles on their own and in shapes Can explain that: • the angle sum of a triangle is 180° • the angles on a straight line add to 180° • the sum of angles around a point is 360° • Can recognise vertically opposite angles and know that they are equal • Can find missing angles in a variety of contexts	

Describe positions on the full coordinate grid (all four quadrants)		• Can draw an axis for the four quadrants with equal spacing and negative numbers. • Can describe the vertices of a shape in all four quadrants • Can use the properties of a shape to complete the vertices of the shape.	*Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.		• Can draw a shape after a reflection of a simple shape in two mirror lines. • Can draw a shape after a shape has been translated across the four quadrants.	

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Block 10			
Statistics			
Substantive Knowledge **National Curriculum**	**Ready to Progress**	**Key Performance Indicators**	**Sequence of learning** **Detailed in Planning Overview**
Interpret and construct pie charts and line graphs and use these to solve problems	6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.	• Can use knowledge of fractions and percentages to interpret pie charts • Can construct a simple pie chart using common fractions • Can interpret a line graph when the answer lies between two given intervals • Can interpret a line graph that represents a conversion e.g. miles/kilometres	*Construct and interpret line graphs and use these to solve problems *Construct and interpret pie charts and use these to solve problems *Applying percentage to pie charts *Calculate and interpret mean as an average *Substantial problem solving *Application to SATs questions embedded into each unit of work at the appropriate stage of an objective
Calculate and interpret the mean as an average.		• Can calculate the mean of a set of numbers • Understands that the mean is an average and understands when it is appropriate to find the mean of a set of data	

Block 11
Number, Geometry and Substantial Problem Solving
Following on from National Assessments in May, teachers will assess children's understanding against all Ready to Progress statements and plan to cover any areas that need further consolidation. Additional projects will be explored to allow the children to explore the purpose of mathematics through open-ended investigations. Theme Park Maths, Can the Commonwealth Games/Olympics/World Championships/FIFA World Cup/Rugby World Cup happen without Mathematics?. Children will tackle open-ended problem solving and further develop their understanding at Greater Depth as appropriate using activities from the First4Maths Digging Deeper books and nRich.