Abbott Community Primary School

KS1 and KS2 Mathematics Assessment Document

Adapted April 2022

Using this document:

- Please use this guidance to assess each individual child's achievement within all areas of mathematics.
- This should also be used as a tool, to inform your planning.
- The aim is for **all** children to **master** the objectives within the appropriate year group, whilst at the same time, having the opportunity for **deeper learning** within these key areas.
- These planned opportunities will enable you to effectively assess the children's achievements, at different points of the academic year.

We aim for all children to acquire the ability to implement the following fundamental characteristics of mathematics:

- An understanding of the important concepts and an ability to make connections within mathematics.
- A broad range of skills in using and applying mathematics.
- Fluent knowledge and recall of number facts and the number system.
- The ability to show initiative in solving problems in a wide range of contexts, including the new or unusual.
- The ability to think independently and to persevere when face with challenges, showing a confidence of success.
- The ability to embrace the value of learning from mistakes and false starts.
- The ability to reason, generalise and make sense of solutions.
- Fluency in performing written and mental calculations and mathematical techniques.
- A wide range of mathematical vocabulary.
- A commitment to and passion for the subject.

The learning objectives are stated per year group, for each area of mathematics. Please use your knowledge of the children to decide upon a 'best fit' judgement as to whether the pupil has achieved and embedded the expected learning goals, exceeded expectations or is still working towards the goals.

Breadth of Study:

Key Stage 1	Key Stage 2
• Count and calculate in a range of practical contexts. • Use and apply mathematics in everyday activities and across the curriculum. • Repeat key concepts in many different practical ways to secure retention. • Explore numbers and place value up to at least 100. • Add and subtract using mental and formal written methods in practical contexts. • Multiply and divide using mental and formal written methods in practical contexts. • Explore the properties of shapes. • Use language to describe position, direction and movement. • Use and apply in practical contexts, a range of measures, including time. • Handle data in practical contexts.	• Count and calculate in increasingly complex contexts, including those that cannot be experienced first hand. • Rigorously apply mathematical knowledge across the curriculum, in particular in science, technology and computing. • Deepen contextual understanding of mathematics by frequent repetition and extension of key concepts in a range of engaging and purposeful contexts. • Explore numbers and place value so as to read and understand the value of all numbers. • Add and subtract using efficient mental and formal written methods. • Multiply and divide using efficient mental and formal written methods. • Use the properties of shapes and angles in increasingly complex and practical contexts, including in construction and engineering contexts. • Describe position, direction and movement in increasingly precise ways. • Use and apply measures to increasingly complex contexts. • Gather, organise and interrogate data. • Understand the practical value of using algebra.

Know and Use Numbers: - This concept involves understanding the number system and how they are used in a wide variety of mathematical ways.

	Key Stage 1	
	Year 1	**Year 2**
Counting	• count to and across 100, forward and backward, beginning with 0 or 1, or from any given number • count, read and write numbers to 100 in numerals • given a number, can identify 1 more or 1 less • count in multiples of 2s, 5s and 10s	• count in steps of 2, 3 and 5 from 0 or 1, and in tens from any number, forward and backward
Representing	• identify and represent numbers using objects and pictorial representations including the number line • read and write numbers from 1 – 20 in numerals and words	• identify, represent and estimate numbers using different representations, including the number line • read and write numbers to at least 100 in numerals and in words
Comparing	• use the language of: equal to, more than, less than (fewer), most, least	• compare and order numbers from 0 up to 100; use < > and = signs
Place Value		• recognise the place value of each digit in a 2-digit number (tens, ones)
Solving Problems		• use place value and number facts to solve problems

Add and Subtract: - This concept involves understanding both the concepts and processes of addition and subtraction.

	Key Stage 1	
	Year 1	**Year 2**
Complexity	• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations • read, write and interpret mathematical statements involving + - = signs	• solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures • apply their increasing knowledge of mental and written methods
Solving Problems	• add and subtract numbers using concrete objects and pictorial representations, 1-digit and 2-digit numbers to 20, including zero	• add and subtract numbers mentally, including: 2-digit numbers and ones; 2-digit numbers and tens; two 2-digit numbers; adding three 1-digit numbers • understand that addition of any two numbers can be done in any order (commutative) and subtraction of one number from another cannot
Checking		• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems
Using Number Facts	• represent and use number bonds and related subtractions facts within 20	• recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100

Multiply and Divide: - This concept involves understanding both the concepts and processes of multiplication and division.

	Key Stage 1	
	Year 1	**Year 2**
Complexity	• solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	• Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in context
Methods		• calculate the mathematical statements for multiplication and division within the multiplication tables and write them using the x ÷ = signs • understand that multiplication of two numbers can be one in any order (commutative) and division of one number by another cannot
Checking		• recognise that division is the inverse of multiplication and use to check calculations
Using Number Facts		• recall and use multiplication and division facts for the 2, 5 and 10 tables • Recognise odd and even numbers

Use Fractions: - This concept involves understanding the concept of the 'part and whole' and ways of calculating, using this.

	Key Stage 1	
	Year 1	**Year 2**
Recognising Fractions	• Recognise, find and name a half as one of two equal parts of an object, shape or quantity • recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	• recognise, find, name and write fractions 1/3, 1/4, 2/4, 1/2, 3/4 of a length, shape, set of objects, or quantity • count in fractions up to 10, starting from any number and using the ½ and 2/4 equivalence on the number line
Equivalence		• recognise the equivalence of ½ and 2/4
Solving Problems		• write simple fractions e.g. ½ of 6 = 3

Shape/Direction and Movement/Measure: -

	Key Stage 1	
	Year 1	**Year 2**
Understanding the Properties of Shape	• shapes, including: 2D, e.g. rectangles (including squares), circles and triangles • identify and describe common 2D shapes, including: rectangles (including squares) circles, triangles • recognise and name common 3D shapes, including: cuboids (including cubes), pyramids, spheres	• identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line • identify and describe the properties of 3D shapes, including the number of edges, vertices and faces • identify 2D shapes on the surface of 3D shapes • compare and sort common 2D and 3D shapes and everyday objects
Describe Position, Direction and Movement	• describe position, direction and movement, including half and quarter turns • describe position, direction and movement, including half, quarter and three-quarter turns and link to shapes	• order and arrange combinations of mathematical objects in patterns and sequences • use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)
Use Measures	• sequence events in chronological order using language (e.g. before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening) • recognise and use language relating to dates, including days of the week, weeks, months, years • can tell the time to the hour and half past the hour and draw the hands on a clock face to show these times compare, describe and solve practical problems for: • mass/weight • length/height • capacity/volume • time measure and begin to record the following: • mass/weight • length/height • capacity/volume • recognise and know the value of different denominations or coins and notes	tell and write the time: • to quarter past/to the hour • to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • know the number of minutes in an hour and the number of hours in a day • compare and sequence intervals of time compare and order: • lengths, mass, • volume/capacity and record the results using >, < and = • choose and use appropriate standard units to estimate and measure: length/height in any direction (m/cm); mass (kg/g) to the nearest appropriate unit, using rulers and scales • recognise and use symbols for pounds (£) and pence (p); combine amounts to make particular values • find different combinations of coins that equal the same amounts of money • solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change

Use Statistics: - This concept involves interpreting, manipulating and presenting data in various ways.

Use Algebra: - This concept involves recognising mathematical properties and relationships using symbolic representations.

	Key Stage 1	
	Year 1	Year 2
Use Statistics		• interpret and construct: pictograms; tally charts; block diagrams and simple tables • ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity • ask and answer questions about totalling and compare categorical data
Use Algebra	• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as: $7 = \square - 9$	• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as: $7 = \square - 9$

A Year 1 child working at a GREATER DEPTH would meet all objectives above and:					
Number and Place Value	**Addition and Subtraction**	**Multiplication and Division**	**Fractions**	**Geometry**	**Measures**
• count forwards and backwards up to and beyond 100 with confidence • count on and back in 1s, 2s, 5s and 10s in context • use the terms one more than and one less than in different contexts • cope with reasoning and deeper thinking place value problems	• add and subtract 1-digit and 2-digit numbers to 20 at speed showing confidence and fluency • can apply knowledge of number to solve a one-step problem involving addition and	• can apply knowledge of number to solve a one-step problem involving multiplication and division	• use half and quarter in many different contexts, including within the environment	• recognise different 2D and 3D shapes in the classroom, at home and in the outside environment	• recognise all coins and notes and know their value and use them in practical situations to pay for items bought • use knowledge of time to know when key events happen during the day or year, e.g., lunchtime, home time, birthday, Christmas, Easter, etc
• rarely make a mistake when working to the Year 1 national expectations • can explain all Year 1 number operations to others in my class • cope with reasoning and thinking problems related to the Year 1 expectations for number, measurement and geometry • When it is appropriate, apply all mathematical operations known to other areas of the curriculum • explain to others how arrived at an answer to a mathematical problem and at the same time deepen own understanding • work independently and reach a conclusion without referring to teacher					

A Year 2 child working at a GREATER DEPTH would meet all objectives above *plus additions from Teacher Assessment Frameworks at the End of Key Stage 1 and:					
Number and Place Value	**4 Operations (+, -, x, ÷)**	**Fractions**	**Geometry**	**Measures**	**Statistics**
• count reliably at speed forwards and backwards up to 100 in 2s, 3s, 5s and 10s	• apply knowledge of number up to 100 to solve a one-step problem involving addition and subtraction • understand that if 4 + 5 is 9 then 40 + 50 is 90	• explain to others when shapes and numbers are accurately divided into thirds, quarters, halves and three quarters	• know about right angles and where they can be seen in the environment	• measure, compare, add and subtract using common metric measures • tell the time to 5 minute intervals in both analogue and digital and relate one to the other • know when it is sensible to measure in m or cms.; kg or gms.; l or ml.; hours or minutes	• know when it is sensible to show information in a graph
• rarely make a mistake when working to the Year 2 national expectations • can explain all Year 2 number operations to others in class • cope with reasoning and thinking problems related to the Year 2 expectations for number, measurement, geometry and statistics • when it is appropriate, apply all mathematical operations known to other areas of the curriculum • explain to others how arrived at an answer to a mathematical problem the same time deepen own understanding • work independently and reach a conclusion without referring to teacher • can explain thinking using age appropriate mathematical vocabulary • listen to others' explanations, try to make sense of them and compare and make simple evaluations					

Key Stage 1 TA Framework

Mathematics

Using the mathematics framework

- The three standards in this framework contain a number of 'pupil can' statements. To judge that a pupil is working at a standard in mathematics, teachers need to have evidence which demonstrates that the pupil meets **all** of the statements within that standard.
- The evidence informing a teacher's judgement must include the statutory end-of-key stage 1 mathematics test, which does not focus solely on the key aspects in this framework but will provide evidence to support the judgement overall and assess the broader curriculum. A pupil's answers to specific questions in the test, or any other test, may also provide evidence that pupils have met certain statements.

Working towards the expected standard

The pupil can:

- read and write numbers in numerals up to 100
- partition a two-digit number into tens and ones to demonstrate an understanding of place value, though they may use structured resources[1] to support them
- add and subtract two-digit numbers and ones, and two-digit numbers and tens, where no regrouping is required, explaining their method verbally, in pictures or using apparatus (e.g. 23 + 5; 46 + 20; 16 – 5; 88 – 30)
- recall at least four of the six[2] number bonds for 10 and reason about associated facts (e.g. 6 + 4 = 10 , therefore 4 + 6 = 10 and 10 – 6 = 4)
- count in twos, fives and tens from 0 and use this to solve problems
- know the value of different coins
- name some common 2-D and 3-D shapes from a group of shapes or from pictures of the shapes and describe some of their properties (e.g. triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres).

Working at the expected standard

The pupil can:

- read scales* in divisions of ones, twos, fives and tens
- partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus
- add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. 48 + 35; 72 – 17)
- recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships (e.g. If 7 + 3 = 10, then 17 + 3 = 20; if 7 – 3 = 4, then 17 – 3 = 14; leading to if 14 + 3 = 17, then 3 + 14 = 17, 17 – 14 = 3 and 17 – 3 = 14)
- recall multiplication and division facts for 2, 5 and 10 and use them to solve simple problems, demonstrating an understanding of commutativity as necessary
- identify $\frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{4}, \frac{3}{4}$ of a number or shape, and know that all parts must be equal parts of the whole
- use different coins to make the same amount
- read the time on a clock to the nearest 15 minutes
- name and describe properties of 2-D and 3-D shapes, including number of sides, vertices, edges, faces and lines of symmetry.

[1] For example, base 10 apparatus.

[2] Key number bonds to 10 are: 0+10, 1 + 9, 2 + 8, 3 + 7, 4 + 6, 5 + 5.

* The scale can be in the form of a number line or a practical measuring situation.

Working at greater depth

The pupil can:

- read scales* where not all numbers on the scale are given and estimate points in between
- recall and use multiplication and division facts for 2, 5 and 10 and make deductions outside known multiplication facts
- use reasoning about numbers and relationships to solve more complex problems and explain their thinking (e.g. 29 + 17 = 15 + 4 + ☐; 'together Jack and Sam have £14. Jack has £2 more than Sam. How much money does Sam have?' etc.)
- solve unfamiliar word problems that involve more than one step (e.g. 'which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet?')
- read the time on a clock to the nearest 5 minutes
- describe similarities and differences of 2-D and 3-D shapes, using their properties (e.g. that two different 2-D shapes both have only one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices, but different dimensions).

* The scale can be in the form of a number line or a practical measuring situation.

Know and Use Numbers: - This concept involves understanding the number system and how they are used in a wide variety of mathematical ways.

	Lower Key Stage 2	
	Year 3	**Year 4**
Counting	• count from 0 in multiples of 4, 8, 50 and 100 • find 10 or 100 more, or less, than a given number	• count in multiples of 6, 7, 9, 25 and 1000 • count backwards through zero to include negative numbers • find 1000 more or less than a given number
Representing	• identify, represent and estimate numbers using different representations • read and write numbers to 1,000 in numerals and words	• read Roman numerals to 100 (I to C) and understand that over time, the numeral system changes to include the concept of zero and place value
Comparing	• compare and order numbers up to 1000	• compare and order numbers beyond 1000
Place Value	• recognise the place value of each digit in a 3-digit number (hundreds, tens, ones)	• recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones) • round any number to the nearest 10, 100 or 1000
Solving Problems	• solve number problems and practical problems involving these ideas	• solve number and practical problems with increasingly large positive numbers

Add and Subtract: - This concept involves understanding both the concepts and processes of addition and subtraction.

	Lower Key Stage 2	
	Year 3	**Year 4**
Complexity	• solve addition and subtraction problems in contexts	• solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why
Solving Problems	• add and subtract numbers mentally, including: 3-digit number and ones; 3-digit numbers and tens; 3-digit numbers and hundreds • add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction • add and subtract measures (length, weight and volume) with up to 3 digits, using formal written methods of columnar addition and subtraction	• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction, where appropriate
Checking		• estimate and use inverse operations to check answers to a calculation
Using Number Facts	• solve word problems including missing number problems, number facts, place value and more complex addition and subtraction	

Multiply and Divide: - This concept involves understanding both the concepts and processes of multiplication and division.

	Lower Key Stage 2	
	Year 3	**Year 4**
Complexity	• solve problems, including missing number problems, involving multiplication and division	• solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects
Methods	• write and calculate mathematical statements for multiplication using known multiplication tables, including 2-digit x 1-digit, using mental and progressing to formal written methods (Mental and Written Methods) • write and calculate mathematical statements for division using known multiplication tables, including 2-digit x 1-digit, using mental and progressing to formal written methods (Mental and Written Methods) • write and calculate mathematical statements for multiplication and division using known multiplication tables, including use of money and length • practise formal methods of multiplication and division, including a high focus on reasoning	• multiply 2-digit and 3-digit numbers by a 1-digit number using formal written layoutdivide 2-digit and 3-digit numbers by a 1-digit number using formal written layout with no remainder • use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1; multiplying three numbers together • find the effect of multiplying a number with up to 2 decimal places by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths • find the effect of dividing a 1-digit or 2-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
Checking	• estimate and use inverse operations to check answers to a calculation	• estimate and use inverse operations to check answers to a calculation
Using Number Facts	• recall and use the multiplication and division facts for the 3, 4 and 8 tables	• recall multiplication and division facts for tables up to 12x12 • recognise and use factor pairs and commutativity in mental calculations

Use Fractions: - This concept involves understanding the concept of the 'part and whole' and ways of calculating, using this.

	Lower Key Stage 2	
	Year 3	**Year 4**
Recognising Fractions	• recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators • recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators • count up and down in tenths • recognise that tenths arise from dividing and object into ten equal parts and in dividing numbers or quantities by 10 • compare and order unit fractions, and fractions with the same denominators	• round decimals with one decimal place to the nearest whole number • compare numbers with the same number of decimal places up to two decimal places • count up and down in hundredths • recognise that hundredths arise from dividing an object into one 100 equal parts and in dividing numbers or quantities by 100
Equivalence	• recognise and show, using diagrams, equivalent fractions with small denominators	• recognise and show, using diagrams, families of common equivalent fractions • recognise and write decimals equivalents of any number of tenths or hundredths • recognise and write decimal equivalents to ¼, ½ and ¾
Solving Problems	• add and subtract fractions with the same denominator within one whole • solve problems that involve fractions	• add and subtract fractions with the same denominator • solve simple measure and money problems involving fractions and decimals to two places • 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

Shape/Direction and Movement/Measure: -

	Lower Key Stage 2	
	Year 3	**Year 4**
Understanding the Properties of Shape **Describe Position, Direction and Movement**	• Draw 2D shapes • make 3D shapes using modelling materials • recognise 3D shapes in different orientations and describe them • recognise angles are a property of shape or a description of a turn • identify right angles, recognise that two right angles make a half-turn, three make three quarters and four a complete turn • identify whether angles are greater than or less than a right angle • identify horizontal and vertical lines and pairs of perpendicular and parallel lines	• compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • identify acute and obtuse angles and compare and order angles up to two right angles by size • identify lines of symmetry in 2D shapes presented in different orientations • complete a simple symmetric figure with respect to a specific line of symmetry • recognise angles are a property of shape or an amount of rotation • describe positions on a 2D grid as coordinates in the first quadrant • describe movements between positions as translations of a given unit to the left/right and up/down • plot specified points and draw sides to complete given polygon
Use Measures	• measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/ capacity (l/ml) • measure the perimeter of simple 2D shapes • add and subtract amounts of money to give change, using both £ and p in practical contexts • tell and write the time from an analogue clock, including using Roman numerals from I to XII • estimate and read time with increasing accuracy to the nearest minute • read 12-hour and 24-hour clocks • record and compare time in terms of seconds, minutes, hours • use vocabulary such as o'clock, am/pm, morning, afternoon, noon and midnight • know the numbers of seconds in a minute and the number of days in each month, year and leap year • compare durations of events, for example to calculate time taken by particular events or tasks	• read, write and convert time between analogue and digital 12-and 24-hour clocks • convert between different units of measure (e.g. km to m; hr to min) • find the area of rectilinear shapes by counting squares • measure and calculate the perimeter of a rectilinear figure (including squares) in cm and m • estimate, compare and calculate different measures, including money in pounds and pence • solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days • perimeter can be expressed algebraically as 2(a+b) where a and b are the dimensions in the same unit ***(Algebra Link – only count once)***

Use Statistics: - This concept involves interpreting, manipulating and presenting data in various ways.

Use Algebra: - This concept involves recognising mathematical properties and relationships using symbolic representations.

	Lower Key Stage 2	
	Year 3	**Year 4**
Use Statistics	• interpret and present data using: bar charts; pictograms and tables • solve 1-step and 2-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts pictograms and other graphs	• interpret and present discrete and continuous data using appropriate graphical methods, including: bar charts; time graphs • solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs
Use Algebra	• Solve addition and subtraction, multiplication and division problems that involve missing numbers.	• Solve addition and subtraction, multiplication and division problems that involve missing numbers. • perimeter can be expressed algebraically as 2(a+b) where a and b are the dimensions in the same unit ***(Measures Link – only count once)***

A Year 3 child working at a GREATER DEPTH would meet all objectives above and:					
Number and Place Value	**4 Operations (+, -, x, ÷)**	**Fractions**	**Geometry**	**Measures**	**Statistics**
• very confident and consistent when dealing with all Year 3 number objectives • can explain to peers how an answer is reached and justify reasoning	• return to a mathematical problem involving the four operations after a break and feel confident about coping with the problem • can find missing digits within mathematical problems involving the four operations	• able to link fractional values to numbers, eg, ¾ of 120 animals were cows, how many animals were not cows?	• able to apply knowledge of parallel and perpendicular lines to solve mathematical problems	• confidently apply knowledge of number to solve problem with money and measures • measure the perimeter of irregular shapes using the principles of measuring the perimeter of an oblong	• know which mathematical operation may be required when setting out statistical evidence
• provide a convincing argument for the methods or solutions used or arrived at • confident to respond to 'What if?' questions • confidently discuss mathematical work and begin to explain thinking • spot patterns in results and use these patterns to find other possibilities • when solved a problem, able to pose a similar problem for a partner • with support, understand a general statement by finding particular examples that match it • willingly reflect on others' explanations, methods or strategies and use this to improve own understanding					

A Year 4 child working at a GREATER DEPTH would meet all objectives and:					
Number and Place Value	**4 Operations (+, -, x, ÷)**	**Fractions**	**Geometry**	**Measures**	**Statistics**
• Given a sequence involving positive and negative numbers, can work out the nth number in the sequence	• deal very confidently and rapidly with addition and subtraction operations involving up to four digits • solve multi-step problems related to on-going learning in science, geography and history	• know which fractional value is an odd one out in a given set • apply my knowledge of fractions to solve problems involving money, time, weight and length	• Given an area, can draw at least two different rectangles with the given area	• cope with problems involving time even when working backwards from a given time	• collect own data on a given topic and present information in graphical formats of choosing
• make suggestions about ways to tackle a range of problems making connections to previous work • developed and applied a systematic approach to learning, predicting possibilities from results already obtained • show good levels of resilience when encountering a new challenge • present information and results in a clear and organised way (abstract) • check answers and ensure solutions make sense in the context of the problem • willingly search for a solution by trying out own ideas and proving justification • spot patterns and form generalisations or rules in words independently • make conjectures that make sense and can explain reasoning					

Know and Use Numbers: - This concept involves understanding the number system and how they are used in a wide variety of mathematical ways.

	Upper Key Stage 2	
	Year 5	**Year 6**
Counting	• count forward or backwards in steps of powers of 10 for any given number up to 1, 000, 000 • read numbers to at least 1, 000, 000 • interpret negative numbers in context, count forward and backwards with positive and negative numbers including through zero	• read numbers up to 10, 000, 000 • use negative numbers in context and calculate intervals across zero
Representing	• read Roman numerals to 1000 and recognise years written in Roman numerals • write numbers to at least 1, 000, 000	• write numbers up to 10, 000, 000
Comparing	• order and compare numbers to at least 1,000,000	• Order and compare numbers up to 10, 000, 000
Place Value	• determine the value of each digit in numbers to at least 1,000,000 • round any number up to 1,000,000 to the nearest: 10; 100; 1000; 10, 000 or 100, 000	• determine the value of each digit in any number up to 10, 000, 000 • round any whole number to the required degree of accuracy • 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
Solving Problems	• solve number problems and practical problems involving all the previous	• solve related number and practical problems involving all previous

Add and Subtract: - This concept involves understanding both the concepts and processes of addition and subtraction.

	Upper Key Stage 2	
	Year 5	**Year 6**
Complexity	• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
Solving Problems	• add and subtract numbers mentally with increasingly large numbers • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	• perform mental calculations, including with mixed operations and large numbers
Checking	• use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	• use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
Using Number Facts		• Add and subtract negative integers

Multiply and Divide: - This concept involves understanding both the concepts and processes of multiplication and division.

	Upper Key Stage 2	
	Year 5	**Year 6**
Complexity	• solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign • solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates	• solve problems involving multiplication and division • use knowledge of the order of operations to carry our calculations involving the four operations
Methods	• divide numbers up to 4-digits by a 1-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply numbers up to 4-digits by a 1-digit or 2-digit number using a formal written method, including long multiplication for 2-digit numbers • multiply and divide numbers mentally drawing upon known facts	• multiply multi-digit numbers up to 4-digits by a 2-digit whole number using the formal written method of long multiplication • divide numbers up to 4-digits by a 2-digit number using the formal written method of short division, where appropriate, interpreting remainders according to the context • divide numbers up to 4-digits by a 2-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 • perform mental calculations, including mixed numbers and large numbers
Checking	• use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	• use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
Using Number Facts	• identify multiples and factors including finding all factor pairs of a number and common factors of two numbers • know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • establish whether a number up to 100 is prime and recall prime numbers up to 19 • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) • solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	• identify common factors, common multiples and prime numbers

Use Fractions: - This concept involves understanding the concept of the 'part and whole' and ways of calculating, using this.

	Upper Key Stage 2	
	Year 5	**Year 6**
Recognising Fractions	• compare and order fractions whose denominators are all multiples of the same number • recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements • round decimals with two decimal places to the nearest whole number and to one decimal place • read, write, order and compare numbers with up to three decimal places • recognise the percent 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	• compare and order fractions, including fractions >1
Equivalence	• identify, 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	• recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • use common factors to simplify fractions; use common multiples to express fractions in the same denomination • associate a fraction with division to calculate decimal fraction equivalents (e.g. 0.375) for simple fractions for a simple fraction (e.g.3/8) • recall and use equivalences between simple fractions, decimals and percentages, including different contexts
Solving Problems	• add and subtract fractions with the same denominator and multiples of the same number • 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	• add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • multiply simple pairs of proper fractions, writing the answer in the simplest form (e.g. 1/4 × 1/2 = 1/8) • multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams • divide proper fractions by whole numbers
Ratio and Proportion		• solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • solve problems involving the calculation of percentages of whole numbers or measures such as 15% of 360 and the use of percentages for comparison • solve problems involving unequal sharing and grouping using knowledge of fractions and multiples

Shape/Direction and Movement/Measure: -

	Upper Key Stage 2	
	Year 5	**Year 6**

Understanding the Properties of Shape	• identify 3D shapes, including cubes and other cuboids, from 2D representations
	• know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles
	• draw given angles, and measure them in degrees
	identify angles:
	  • at a point on a straight line and ½ a turn (total 180°);
	  • identify angles at a point and one whole turn (total 360°)
	  • identify other multiples of 90°
	• use the properties of rectangles to deduce related facts and find missing lengths and angles (Algebra Link)
	• distinguish between regular and irregular polygons based on reasoning about equal sides and angles
		• draw 2D shapes using given dimensions and angles
		• recognise, describe and build simple 3D shapes, including making nets
		• compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
		• illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
		• recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

Describe Position, Direction and Movement	• identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language and know that the shape has not changed	• describe positions on the full coordinate grid, using all four quadrants • draw and translate simple shapes on the coordinate plane and reflect them in the axes
Use Measures	• convert between different units of metric measure (e.g. km/m; cm/m; cm/mm; g/kg; l/ml) • understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • measure and calculate the perimeter of composite rectilinear shapes in cm and m • calculate and compare the area of rectangles (including squares, and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes • estimate volume (e.g. using 1 cm3 blocks to build cubes, including cuboids) and capacity (e.g. using water) • solve problems involving converting between units of time • use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling	• solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate • 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 three decimal places • convert between miles and km • recognise that shapes with the same areas can have different perimeters and vice versa • recognise when it is possible to use the formulae for area and volume of shapes (Algebra Link) • calculate the area of parallelograms and triangles • calculate, estimate and compare volume of cubes and cuboids using standard units, including cm3 and m3, and extending to other units such as mm3 and km3 (Multiplication and Division Link)

Use Statistics: - This concept involves interpreting, manipulating and presenting data in various ways.

Use Algebra: - This concept involves recognising mathematical properties and relationships using symbolic representations.

	Upper Key Stage 2	
	Year 5	**Year 6**
Use Statistics	• solve comparison, addition and difference problems using information presented in a line graph • complete, read and interpret information in: tables, including timetables	• interpret and construct: pie charts; line graphs and use these to solve problems • calculate and interpret the mean as an average
Use Algebra	• use simple formulae • enumerate possibilities of combinations of two variables	• generate and describe linear number sequences • express missing number problems algebraically and use simple formulae • find pairs of numbers that satisfy number sentences with two unknowns • enumerate possibilities of combinations of two variables

A Year 5 child working at a GREATER DEPTH would meet all objectives above and:			
Number and Place Value	**4 Operations (+, -, x, ÷)**	**Measures**	**Statistics**
• deal confidently with all numbers up to 1,000,000 and apply this knowledge to scientific, historical and geographical learning • confident when it comes to working across zero for positive and negative numbers to work out time, eg, BC and AD in history	• consistently use rounding as a strategy for assessing quickly what the approximate answer should be before calculating	• use knowledge of measurement to create plans of areas around the school, such as classroom, field, outside play area etc • use a range of timetables to work out fictional journey times, such as, 'How long would it take me to reach the Amazon rainforest?'	• confidently collect own data on a personal project and present information in formats of choosing, e.g., charts, graphs or tables
• identify and obtain information to solve mathematical problems • check results, considering whether they are reasonable and make adaptations if need be • solve problems and investigations from a range of contexts, including using logical thinking • regularly make conjectures and provide examples and counter-examples • show understanding of situations by representing them mathematically using diagrams (pictorial representation) and symbols and words (abstract representation) • draw simple conclusions and give justification and proof of reasoning • spot more complex patterns and begin to express generalisations or proof using symbolic notation			

A Year 6 child working at a GREATER DEPTH would meet all objectives *plus additions from Teacher Assessment Frameworks at the End of Key Stage 2 and:			
Number	**Measures**	**Geometry**	**Statistics**
• compare, order and convert between fractions, decimals and percentages in context in relation to science, geography and history	• use appropriate formula for measuring area of shapes such as cuboids, triangles and irregular shapes	• create scaled models of historical and geographical structures showing an acceptable degree of accuracy using known measures	• collect data for a personal project and present information in formats of choosing, such as charts, graphs and tables and answer questions related to research
• solve quite complex problems independently breaking them down into smaller, more manageable tasks • use mathematical content from previous year groups and own year group to solve problems and investigate • interpret, discuss and synthesise information presented in a variety of mathematical forms, including logical thinking problems • present a concise, reasoned proof using symbols, diagrams, graphs and related explanatory text • can give mathematical justifications and proof when solving problems • use a correct logical argument that has a complete chain of reasoning to it and use terms such as: 'because', 'therefore', 'and so', 'that leads to' • ensure that argument is watertight and mathematically sound • show good resilience when dealing with a problem that has to be returned to and may take a long time to solve			

Characteristics of Mastery & Depth

Interdependence	Can apply the skill or knowledge without recall to the teacher.
Fluency	Can apply the skill and knowledge with a high level of confidence.
Application	Can apply the skill and knowledge to a range of different contexts, including other areas of the curriculum.
Consistency	Will be consistent in their use of the skills and understanding
Synthesise	Can organise ideas, information, or experiences into new, more complex interpretations and relationships and make decisions as to when to use different skills
Re-visit	Can come back to this aspect of learning after a break and still feel confident that they can work on the skill and knowledge without difficulty.