Maths planning document

Teagues Bridge Primary school

– Year 6

This document supported by the Numbersense maths program providing teaching and consolidation of mental strategies for mathematics and the white rose small steps for teaching sequences. Weeks are a guideline and should be adapted for the needs of the children. Time for consolidation is designed for recapping of previous units to ensure learning in committed to the long-term memory. This can also be used to teach areas of misconceptions.

Mathematics Intent

At Teagues Bridge, our intention is **ambitious.** We aim to create strong mathematicians who have the necessary skills and understanding to tackle mathematical challenges in varying contexts, including the ability to reason and apply their knowledge to solving problems. This should mean that children are able to apply their knowledge to everyday life and can **aspire** to achieve anything that they want. We want our pupils to have strong mental manipulation and to use written strategies when appropriate.

Our philosophy for mathematics is replacing an idea that maths is lots of rules and numbers with a study of patterns and connected ideas. In early years they will build a foundation of number understanding and representation through mainly concrete and pictorial representations. The approach will be supported by in depth questioning, throughout the school to develop mastery.

Use of CPA is encouraged to ensure the curriculum is accessible for all children and that they all have the **opportunity** and are able to demonstrate their understanding in a variety of ways. This will enable them to have a good understanding of maths and not just the ability to follow a procedure. We want to **empower** them to want to ask questions and want to find the answers.

Aims: The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

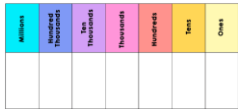
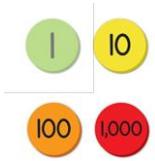
Our lessons are structured to enable all children to achieve and have an **opportunity** to make progress with their learning. Each lesson begins with a **CLIC maths** activity, where they have chance to develop their mental strategies, secure number facts and number manipulation. They then **develop** their mathematical fluency with the teacher modelling and explaining before they have a go themselves. Children then have a **reasoning/ problem solving** activity which is a variation of the previous work to demonstrate they have mastered the objective. Children who are ready can then **challenge** themselves with a task that requires applying the learning to a greater depth. We have our own programme of study which is supported with schemes like White Rose to support.

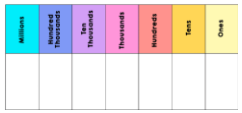
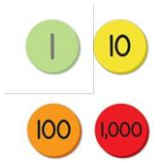
Year 6 – Yearly Overview

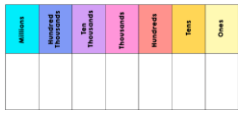
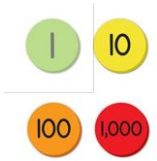
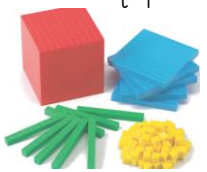
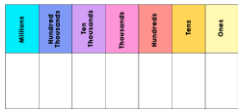
Year 6 – Yearly Overview

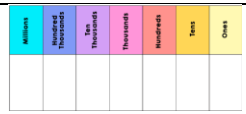
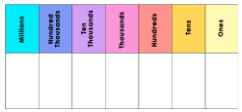
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Number and place value Numbers up to 10,000,000 , rounding and negatives		Addition and subtraction methods	Multiplication : Factors, multiples, primes, squares and cubed		Multiplication and division – formal written methods			Fractions: equivalents. Simplifying, addition and subtraction		Measurement : converting units	Fractions : Multiplying and dividing fractions – finding fractions of amounts		
Spring	4 operations of calculation		Measurement: Area, perimeter and volume		Fractions, decimals and percentages		Decimals		Algebra Ratio			Position and direction	Geometry	
Summer	Recap fractions , decimals and percentages		4 methods of calculation (including inverse)			Themed projects, consolidation and problem solving								

Year 6: Autumn term

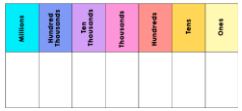
National curriculum objectives	Prior knowledge from year 6	Learning outcomes (including WR steps)	Mathematical aspect	Vocabulary	Manipulatives	Problem solving resources
Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit Solve number and practical problems that involve the above (runs through the place value unit)	Knows how to read and write numbers with up to 8 digits using the comma separator.	Maths resources for teachers | White Rose Maths Steps 1 to 5 LO I know numbers to 1,000,000 LO I know numbers to 10,000,000 LO I know how to read and write numbers to 10,000,000 LO I know how to use powers of 10 LO I know calculating on a	**Number and place value – including negative numbers**	ten thousands (10,000s) hundred thousands (100,000s) millions (1,000,000s) ten million (10,000,000) place value partition interval estimate	Place value charts  Place value counters  Base ten equipment 	Counting forwards and backwards Space Distances * Solve number and practical problems that involve all of the above Round the Four Dice * I Number Lines in Disguise **

		number line to 10,000,000 LO I know comparing numbers to 10,000,000 LO I know ordering numbers to 10,000,000				
Round any whole number to a required degree of accuracy	Knows rounding numbers to 1,000,000	Step 7 LO I know rounding numbers to 10,000,000	**Number and place value : rounding**	ten thousands (10,000s) hundred thousands (100,000s) millions (1,000,000s) ten million (10,000,000) rounding	Place value charts  Place value counters  Base ten equipment 	Round the Four Dice * I

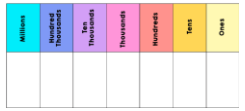
Use negative numbers in context, and calculate intervals across zero	Knows how to calculate with negative and positive numbers.	Step 8 LO I know negative numbers	**Number and place value – including negative numbers**	negative positive	negative number line	Use negative numbers in context, and calculate intervals across zero First Connect Three * G
Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	Knows efficient mental methods for addition and subtraction. Knows the formal written methods of columnar addition and subtraction with increasingly large numbers and decimals.	Maths resources for teachers | White Rose Maths Step I LO I know how to add numbers to 10,000,000 LO I know how to subtract numbers to 10,000,000	**Number: addition, subtraction, multiplication and division**	add, addition, more, plus, increase sum, total, altogether score add, subtract	Place value charts  Place value counters  Base ten equipment  Numicon 	
Identify common factors, common multiples and prime numbers		Maths resources for teachers | White Rose Maths Steps 2 -5	**Number: common factors and multiples**	multiply divide Factor common factor common multiple prime	Place value charts  Multiplication grids	Solve problems involving addition, subtraction, multiplication and division Always, Sometimes or Never? Number

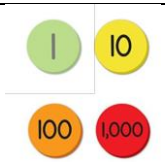
		LO I know common factors LO I know common multiples LO I know the riles of divisibility LO I know prime numbers to 100.		composite		**Abundant Numbers** * I **Three Dice** * **Factor Track** ** G
Solve problems involving addition, subtraction, multiplication and division	Knows the definition of square and cube numbers and the correct notation.	Step 6 LO I know squared numbers Lo I know cubed numbers	**Number: squared and cubed numbers**	Squared, cubed, multiply, multiplication facts,	 Multiplication grids	**Two Primes Make One Square** ** I
Multiply multi-digit numbers up to four digits by a 2-digit whole number using the formal written method of long multiplication	Knows the efficient written algorithms for long multiplication and short division.	Step 7 Lo I know how to multiply 4 x 2 digit numbers	**Number : multiplication**	lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times… ten times… times as (big, long, wide… and so on) repeated addition array row, column double, halve share, share equally	Place value charts  Multiplication grids 	Always, Sometimes or Never? Number

				factor, multiple, prime, composite		
Perform mental calculations, including with mixed operations and large numbers	Knows efficient mental methods for multiplication and division.	Step 8 LO I know how to solve problems using multiplication methods	**Number: Multiplication**	lots of, groups of times, multiply, multiplication,		**Become Maths Detectives** * I **Exploring Number Patterns You Make** ** I
Divide numbers up to four digits by a 2-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context	Knows the compact algorithm for short division including remainders.	Step 9 -13 LO I know to divide 4 by I digit numbers LO I know to divide using factors LO I know to divide 4 by 2 digit numbers LO I know to divide 4 by 2 digit numbers including remainders.	**Number: division**			

Solve problems involving addition, subtraction, multiplication and division	Knows efficient mental methods for multiplication and division.	Steps 13 and 14 LO I know to solve problems with division LO I know to solve multi-step problems	**Number : problem solving**	halve share, share equally	Place value charts  Multiplication grids 	**Division Rules * I** **Odd Squares *** **Cubes Within Cubes ***** **Curious Number ***** **I**
Use their knowledge of the order of operations to carry out calculations involving the four operations		Steps 15 LO I know how to calculate using the order of operations	**Number : order of operations**	BIDMAS		
Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	Know the test of divisibility for 2, 5 and 10. 3- digit sum of 3, 6 or 9. 4 multiple of 4 in tens and ones. 6 – even and digit sum of 3,6 or 9.	Step 16 Lo I know to use mental calculations and estimation Step 17 Lo I know to find facts from known facts	**Number : estimations**			**Four Go * G**
Use common factors to simplify fractions; use common multiples to express fractions	Knows how to convert fractions to a common denominator for addition and subtraction	Maths resources for teachers | White Rose Maths Step 1 - 2	**Fractions: equivalents , addition and subtraction**			

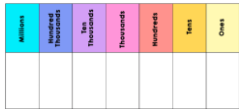
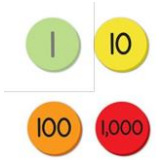
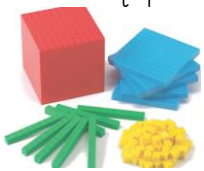
in the same denomination		Lo I know to find equivalent factions LO I know to simplify fractions				
Compare and order fractions, including fractions > 1	Knows how to multiply proper fractions and mixed numbers using the rule of dividing by 1 to represent the whole number as a fraction.	Steps 3 and 4 LO I know to compare and order using the denominator Lo I know to compare and order using the numerator	**Fractions: comparing and ordering**	numerator denominator common denominator common factor equivalent simplify simplest form factor highest common factor lowest common multiple (LCM) compare order ascending descending proper fraction improper fraction mixed number convert lowest common denominator	Fraction tiles Cuisenaire rods Fractions circles Numicon 	Compare and order fractions, including fractions >1 More Fraction Bars ** Extending Fraction Bars ** Fraction Lengths **

Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	Knows how to calculate with fractions.	Steps 5 to 9 Lo I know adding two fractions with different denominators Lo I know subtracting two fractions with different denominators Lo I know adding mixed numbers Lo I know subtracting mixed numbers LO I know solving multi-step problems	**Fractions : adding and subtracting**	numerator denominator common denominator common factor equivalent simplify simplest form factor highest common factor lowest common multiple (LCM) compare order ascending descending proper fraction improper fraction mixed number convert lowest common denominator	Fraction tiles Cuisenaire rods Fractions circles Numicon 	**Fraction Lengths** **
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	Knows how to use place value, multiplication, and division to convert between standard units.	Maths resources for teachers | White Rose Maths Steps I- 5 Lo I know metric measurements Lo I know how to convert metric measurements	**Measurement: converting units**	metric imperial unit of measurement (or measure) gram (g) kilogram (kg) pound (lbs) ounce (oz) mass	Converting formula for measurements Place value charts  Place value counters	Next Size Up **

unit, and vice versa, using decimal notation to up to 3 decimal places Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate (running through the unit in problem solving)		LO I know how to calculate with metric measurements LO I know to convert between miles and kilometres LO I know imperial measurements		millilitre (ml) litre (l) pint capacity millimetre (mm) centimetre (cm) metre (m) kilometre (km) inch (in) foot (ft) yard (yd) mile length convert conversion table conversion graph	 Conversions between metric and imperial measures	
Multiply simple pairs of proper fractions, writing the answer in its simplest form	Knows how to multiply proper fractions and mixed numbers using the rule of dividing by I to represent the whole number as a fraction.	Maths resources for teachers | White Rose Maths Steps I to 2 LO I know to multiply fractions by whole numbers Lo I know to multiply fractions by fractions	**Fractions : multiplying , dividing and fractions of amounts**			
Divide proper fractions by whole numbers	Knows how to multiply proper fractions and mixed	Step 3 and 4	**Fractions: dividing fractions by whole numbers**	numerator denominator common denominator common		

	numbers using the rule of dividing by 1 to represent the whole number as a fraction.	LO I know to divide any fraction by a whole number Lo I know to calculate with different fractions.		factor equivalent simplify simplest form factor highest common factor lowest common multiple (LCM) compare order ascending descending proper fraction improper fraction mixed number convert lowest common denominator		
Associate a fraction with division and calculate decimal fraction equivalents	Knows how to calculate with fractions.	Step 6 to 7 Lo To find fractions of amounts Lo To find fractions of a whole	**Fractions : finding fractions of amounts**	numerator, denominator,		**Fraction Lengths** **

Year 6 Spring term

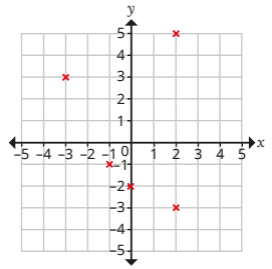
National curriculum objectives	Prior knowledge from year 5	Learning outcomes (including WR steps)	Mathematical aspect	Vocabulary	Manipulatives	Problem solving resources
• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Solve problems involving addition, subtraction, multiplication and division Perform mental calculations, including with mixed operations and large numbers	-formal written method for addition and subtraction - formal written method for long and short multiplication and short division	Step 1 : addition and subtraction of integers Steps 7 – 14 4 operations of calculations. Step 7 : Mutlipying 4 by 2 digit number Step 8 : Solve problems with multiplication Step 9 Short division Step 11 – Long division	Calculation 4 operations of calculation	add, addition, more, plus, increase sum, total, altogether score add, subtract lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times... ten times... times as (big, long, wide... and so on) repeated addition array row,	Place value charts  Place value counters  Base ten equipment  Numicon	**Become Maths Detectives** * I **Exploring Number Patterns You Make** ** I

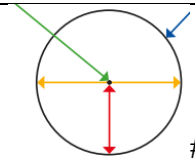
		Step 12 – Long division with remainders		column double, halve share, share equally factor, multiple, prime, composite		
- Recognise that shapes with the same areas can have different perimeters and vice versa - Recognise when it is possible to use formulae for area and volume of shapes -		Steps 1 – 2 Step one: To find areas of shapes Step two: To find area and perimeter	**Area, perimeter and volume**	Area, perimeter, length, width, volume,		**Area and Perimeter * I** **Through the Window * I** **Dicey Perimeter, Dicey Area * G**
• Calculate the area of parallelograms and triangles	Finding areas of rectangles Finding the perimeter of rectangles	Steps 3 – 8 Step three- To find areas of triangles – counting squares Step four – To find the area of right angled triangles Step five – To find the area of any triangle	**Area, perimeter and volume**	Triangle, angle, equilateral, isosceles, scalene,		**Shaping It * I** **Brush Loads * I** **Cubes * I** **Numerically Equal **** **Making Boxes ** I**

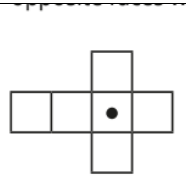
		Step six – To find the area of parallelograms Step seven – To find Volume by counting squares Step eight – To find the area of cuboids.				**Ribbon Squares** *** **Fitted** *** **Next Size Up** **
• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination	Simplifying fractions	Step one I know how to find fraction/ decimal equivalents	**Fractions , decimals and percentages**	Fraction Decimal	Fraction tiles Cuisenaire rods Fractions circles Numicon 	**Matching Fractions, Decimals and Percentages** * G
• Associate a fraction with division and calculate decimal		Step two I know how to express fractions as division calculations				

fraction equivalents for a simple fraction						
• Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts		Step three I know how to use percentages to express part of a whole. Step four I know how to convert between fractions and percentages Step five and six I know how to convert and compare fractions , decimals and percentages Step seven I know how to calculate percentages – one step Step eight I know how to calculate percentages of amounts – multi step. Step nine I know how to calculate missing percentages	**Percentages**	Part of 100 Blocks Percent Percentage		**Doughnut Percents** *

• Use simple formulae • Generate and describe linear number sequences		Maths resources for teachers | White Rose Maths (whiteroseeducation.com) **Steps 1 - 10** Step one – LO I know how to use 1 step function machines Step two – LO I know how to use 2 step function machines Step three – LO I know how to form expressions Step four – I know how to substitute in equation Step five – I know how to express formulae Step six – I know different forms of equations Step seven – I know how to solve 2 step equations Step eight – I know how to solve 2 step equations	**Algebra**	sequence rule term algebra expression calculation formula substitute generalise operation calculate equation inverse solution		Use simple formulae **Finding 3D Stacks** *** **Doplication** * **Diagonal Sums** ** Generate and describe linear number sequences **Domino Sets** * I **Break it Up!** * I **Holes** * I **Button-up Some More** ** I Find pairs of numbers that satisfy an equation with two unknowns **Price Match** ** Express missing number problems algebraically **Plenty of Pens** * **Two and Two** *** I

		Step nine – I can find pairs of values Step ten – I can solve problems with two unknowns				
Describe positions on the full coordinate grid (all four quadrants)	Position using co-ordinates	Step one I know how to describe position using co-ordinates in one quadrant Step two I know how to describe position in all 4 quadrants Step three I know how to solve problems using co-ordinates	Position and direction	X axis Y axis Horizontal Vertical Co-ordinate Quadrant Negative	Co-ordinate grid 	Cops and Robbers * G Coordinate Tan ** Ten Hidden Squares ***
Draw and translate simple shapes on the coordinate plane, and reflect them in the axes		Step four I know how to translate a point Step five I know how to reflect a shape		Translate Reflect Symmetry	Mirror	A Cartesian Puzzle *
– Recognise angles where they meet at a point, are on a straight line, or are		Step one I know how to measure and classify angles Step two	Geometry	Angle Reflex Acute Obtuse Right angle		

vertically opposite, and find missing angles		I know how to calculate angles				
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons		Step three I know how to use vertically opposite angles to calculate missing angles Step four and five I know how to calculate angles in a triangle Step six I know how to calculate missing angles in a triangle Step seven I know how to calculate angles is a quadrilateral Step eight I know how to calculate angles in polygons		Vertically opposite		**Where Are They?** * **Round a Hexagon** * **Always, Sometimes or Never? Shape** * **Quadrilaterals** *** I **Triangles All Around** *** **Name That Triangle!** *
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius		Step nine I know the properties of circles		Diameter Radius Circumference	 #circle model	

- Recognise, describe and build simple 3-D shapes, including making nets		Step 10 I know how to make and recognise 3D nets		Net 3D shape Polygon	 Nets	**Cut Nets** ** **Making Cuboids** ** I

Year 6 Summer term

Consolidation and theme based project work -