

WHITE ROSE HUB SMALL STEPS FOR EACH NC OBJECTIVE (Years 5 & 6)

Each set of small steps links to where the areas are within the WHITE ROSE HUB materials to help with FLUENCY, REASONING & PROBLEM-SOLVING.

It is only a guide to be used with your own teaching assessment of the class. It is not necessarily split into terms, it is where the WRH material is for those steps.

PLEASE ENSURE: FLUENCY, REASONING & PROBLEM-SOLVING is being included in lessons, whether it be at a whole class level or opportunities for activities to ensure that learning is being deepened. Where there are only objectives for one term, please follow the outline for the year and split the objectives accordingly.

YEAR 5: PLACE VALUE			YEAR 6: PLACE VALUE		
1.	read, write, order, compare and understand place value of numbers to at least 1 000 000 and determine the value of each digit (1a-c)		10.	read, write, order and compare numbers up to 10 million and determine the value of each digit (1a)	
2.	count forwards or backwards in steps of powers of 10 (steps of 1000/100,000 100) for any given number up to 1 000 000		11.	round any number to a required degree of accuracy (1c)	
3.	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero (1d)		12.	use negative numbers in context, and calculate intervals across zero (1i)	
4.	round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 (1e)		13.	recognise binary numerals to 15 (1111) and convert between binary and decimal numerals.	
5.	solve number problems and practical problems that involve all of the above (1f)		14.	Solve number and practical problems involving all of the above. (12)	
6.	read Roman numerals to 1000 (M) and recognise years written in Roman numerals		15.	say numbers accurately	
7.	Recognise and describe linear number sequences including those involving fractions and decimals and find the term to term rule and express it in words		16.	demonstrate understanding of multiplying or dividing a whole number or a decimal by 10, 100 or 1000	
8.	Pupils extend and apply their understanding of the number system to the decimal numbers and fractions they have met so far		17.	estimate calculations	
9.	Use the vocabulary on estimation and approximation. Make and justify estimates of large numbers, and estimate simple proportions such as $\frac{1}{3}$, $\frac{7}{10}$		18.	use negative numbers in a range of contexts [not just temperature]	
			19.	describe, extend and explain number sequences and patterns with whole numbers and decimals	
			20.	round decimals to a required degree of accuracy in a range of contexts	
(AUT):			(AUT):		
-Number to 10,000			-Numbers to 10 million		
-Roman numerals to 1000			-Compare and order any number		
-Round to nearest 10, 100 and 1000			-Round any number		
-Numbers to 100,000			-Negative numbers		
-Compare and order numbers to 100,000					

<ul style="list-style-type: none"> -Round numbers within 100,000 -Numbers to a million -Counting in 10s, 100s, 1000s, 10,000s and 100,000s -Compare and order numbers to a million -Round numbers to a million -Negative numbers 					
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YEAR 5: ADDITION & SUBTRACTION		YEAR 6: ADDITION & SUBTRACTION			
<ol style="list-style-type: none"> 1. add and subtract whole numbers with more than 4 digits (5-digits first), including using formal written methods (columnar addition and subtraction) (2a-b) 2. add and subtract numbers mentally with increasingly large numbers (revising smaller numbers first of all). (2c) 3. use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy (2d) 4. solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. (2e) 5. Addition – to reorder numbers in a calculation 			<ol style="list-style-type: none"> 6. perform mental calculations, including with mixed operations and large numbers (2a-b) 7. Show confidence in column addition and subtraction with bigger numbers (2c-d) 8. Add/subtract amounts of money (2e-f) 9. use their knowledge of the order of operations to carry out calculations involving the four operations 10. solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why 11. solve problems involving addition, subtraction, multiplication and division (12) 12. use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. 13. use negative numbers in context and calculate intervals across zero 14. find what to add to a decimal with units, 10ths and 100ths to make the next higher whole number or 10th 		
<p>(AUT):</p> <ul style="list-style-type: none"> -Add whole numbers with more than 4-digits (column) -Sub whole numbers with more than 4-digits (column) -Round to estimate and approximate -Inverse operations (add/sub) -Multi-step add/sub problems 			<p>(AUT):</p> <ul style="list-style-type: none"> -Add/subtract integers -Order of operations -Mental calculations and estimation (all 4) -Reasoning from known facts (all 4) 		

YEAR 5: MULTIPLICATION & DIVISION		YEAR 6: MULTIPLICATION & DIVISION			
<ol style="list-style-type: none"> 1. identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. (3h)(3l – problems) 2. know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers and recognise and use squared and cubed numbers.(3k) 3. establish whether a number up to 100 is prime and recall prime numbers up to 19 (3i-j) 4. multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers (short and long) (3d-e) 5. multiply and divide numbers mentally drawing upon known facts (3a-b) 6. divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context (3f-g) 7. multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 (3c) 8. Solve problems involving multiplying and dividing (3m-n) 9. Apply all of the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations (3a) 10. Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (e.g. $98 \div 4 = 24$ r 2 = $24 \frac{1}{2} = 24.5 = 25$) 11. Pupils use multiplication and division as inverses to support the introduction of ratio in Year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying or dividing by powers of 1000 in converting between units such as km and m 12. Distributivity can be expressed as $a(b + c) = ab + ac$ 13. They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalent statements (for example, $4 \times 35 = 2 \times 2 \times 35$; $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$) 14. Pupils use and explain the = sign to indicate, equivalence, including missing number problems (for example, $13 + 24 = 12 + 25$; $33 = 5 \times \square$) 15. Know and apply tests of divisibility by 2,4,5,10 or 100. 16. Begin to use brackets 17. Use the principles of the arithmetic laws as they apply to multiplication. 18. To reorder numbers in a multiplication 		<ol style="list-style-type: none"> 19. multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication (3e) 20. 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 (3f) 21. 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 (3f) 22. perform mental calculations, including with mixed operations and large numbers (3a-d) 23. identify common factors, common multiples and prime numbers (3h-k) 24. use their knowledge of the order of operations to carry out calculations involving the four operations 25. solve problems involving addition, subtraction, multiplication and division (41-g) (12) 26. use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. 27. use brackets: know that they determine the order of operations, and that their contents are worked out first 28. use written division methods in cases where the answer has up to two decimal places 			
<p>(AUT):</p> <ul style="list-style-type: none"> -Multiples -Factors -Common factors -Prime numbers -Square numbers -Cube numbers -Inverse operations (mult/div) -Multiply by 10, 100 and 1000 -Divide by 10, 100 and 1000 	<p>(SPR):</p> <ul style="list-style-type: none"> -Multiply 4-digit by 1-digit -Multiply 2-digits (area model) -Multiply 2-digits by 2-digit -Multiply 3-digit by 2-digit -Multiply 4-digit by 2-digit -Divide 4-digit by 1-digit -Divide with remainders 		<p>(AUT):</p> <ul style="list-style-type: none"> -Multiply up to a 4-digit by 2-digit number -Short division -Division using factors -Long division (1) -Long division (2) -Long division (3) -Long division (4) -Common factors 		

-Multiply and divide by multiples of 10, 100 and 1000			-Common multiples -Primes to 100 -Squares and cubes -Order of operations -Mental calculations and estimation (all 4) -Reasoning from known facts (all 4)		
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YEAR 5: FRACTIONS/DECIMALS/PERCENTAGES		YEAR 6: FRACTIONS/DECIMALS/PERCENTAGES			
<p>FRACTIONS</p> <ol style="list-style-type: none"> compare and order fractions whose denominators are all multiples of the same number (4a) identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths (4b) recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$ (4c-d)] add and subtract fractions with the same denominator and denominators that are multiples of the same number (Extend understanding to calculations that exceed 1 as a mixed number) (4e-f) multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams (related to scaling and problems involving simple rates) (4g) <p>DECIMALS</p> <ol style="list-style-type: none"> read and write decimal numbers as fractions [for example, $0.71 = 71/100$ (4h)] recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (4i) round decimals with two decimal places to the nearest whole number and to one decimal place (4j) read, write, order and compare numbers with up to three decimal places (4k) solve problems involving number up to three decimal places and are confident in checking the reasonableness of their answers to problems (4l) <p>PERCENTAGES</p> <ol style="list-style-type: none"> recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal (4m-o) solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25. (4p) 		<p>FRACTIONS</p> <ol style="list-style-type: none"> use common factors to simplify fractions; use common multiples to express fractions in the same denomination (5a-b) compare and order fractions, including fractions > 1 (5c) add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions (5d) multiply fractions by whole numbers and simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{3}{4} \times \frac{1}{2} = \frac{1}{8}$] (5e-f) divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] (5g) associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $8/3$] reduce a fraction to its simplest form by cancelling common factors <p>DECIMALS</p> <ol style="list-style-type: none"> identify the value of each digit to three decimal places and multiply and divide numbers up to three decimal place by 10, 100 and 1000 (1b, d, e-h) multiply and divide numbers with up to two decimal places by 1-digit and 2-digit whole numbers. <p>PERCENTAGES</p> <ol style="list-style-type: none"> use percentages for comparison and calculate percentages of whole numbers or measures such as 15% of 360 recall and use equivalences between fractions, decimals and percentages. (5k-l) 			
	<p>Fractions (SPR):</p> <ul style="list-style-type: none"> -Equivalent fractions -Improper fractions to mixed numbers 	<p>Decimals (SUM):</p> <ul style="list-style-type: none"> -Adding decimals within 1 -Subtracting decimals within 1 -Complements to 1 	<p>(AUT):</p> <ul style="list-style-type: none"> -Simplify fractions -Fractions on a number line -Compare and order fractions by the denominator 	<p>Decimals (SPR):</p> <ul style="list-style-type: none"> -Three decimal places -Multiply by 10, 100 and 1000 -Divide by 10, 100 and 1000 -Multiply decimals by integers 	

	<ul style="list-style-type: none"> -Mixed numbers to improper fractions -Number sequences -Compare and order fractions less than 1 -Compare and order fractions greater than 1 -Add/subtract fractions -Add fractions within 1 -Add 3 or more fractions -Add fractions -Add mixed numbers -Subtract fractions -Subtract mixed numbers -Subtract – breaking the whole Decimals and %: -Decimals up to 2DP -Decimals as fractions (1) -Decimals as fractions (2) -Understand thousandths -Thousandths as decimals -Rounding decimals -Order and compare decimals -Understand % -% as fractions and decimals -Equivalent F.D.P 	<ul style="list-style-type: none"> -Adding decimals: crossing whole -Adding decimals with same number of decimal places -Sub decimals with the same number of decimal places -Add decimals with different number of decimal places -Sub decimals with different number of decimal places -Add/sub wholes and decimals -Decimal sequences -Multiplying decimals by 10, 100 and 1000 -Dividing decimals by 10, 100 and 1000. 	<ul style="list-style-type: none"> -Compare and order fractions by the numerator -Add/sub fractions (1) -Add/sub fractions (2) -Adding fractions -Subtracting fractions -Mixed add/sub problems -Multiply fractions by whole number -Multiply fractions by fraction -Divide a fraction by a whole number (1) -Divide a fraction by a whole number (2) -4 rules with fractions -Fraction of an amount -Fraction of an amount: finding the whole 	<ul style="list-style-type: none"> -Divide decimals by integers -Division to solve problems -Decimals as fractions -Fractions to decimals (1) -Fractions to decimals (2) Percentages: -Fractions to percentages -Equivalent FDP -Percentage of an amount (1) -Percentage of an amount (2) -Percentages: missing values -Ordering FDP 	
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YEAR 5: GEOMETRY (PROPERTIES OF SHAPE)			YEAR 6: GEOMETRY (PROPERTIES OF SHAPE)		
<ol style="list-style-type: none"> 1. identify 3-D shapes, including cubes and other cuboids, from 2-D representations (6a) 2. know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles (6b) 3. draw given angles, and measure them in degrees (o) (6c) 4. identify: angles at a point and one whole turn (total 3600), angles at a point on a straight line and ½ a turn (total 1800), other multiples of 900 (6d-e) 5. use the properties of rectangles to deduce related facts and find missing lengths and angles (6f) 6. distinguish between regular and irregular polygons based on reasoning about equal sides and angles (6g-h) 7. Pupils become accurate in drawing lines with a ruler to the nearest mm, and measuring with a protractor. They use conventional markings for parallel lines and right angles 8. Pupils use the term diagonal and make conjectures about the angles formed by diagonals and sides and other properties of quadrilaterals, for example using dynamic geometry ICT tools 9. Pupils use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems 10. Classify triangles (brackets isosceles, equilateral, scalene) using criteria such as equal sides, equal angles, lines of symmetry. 11. Recognise reflective symmetry in regular polygons. 12. Complete symmetrical patterns with two lines of symmetry at right angles (using squared paper or pegboard) 13. Make shapes with increasing accuracy. Visualise 3-D shapes from 2D drawings and identify different nets from an open cube. 			<ol style="list-style-type: none"> 14. draw 2-D shape using given dimensions and angles and nam and describe (9a) 15. recognise, describe and build simple 3-D shapes, including making nets (9a, d) 16. compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons (9b-c) 17. illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius (9h) 18. recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles (9e-g) 19. use properties such as perpendicular and parallel faces or edges 20. continue to name and describe shapes 21. classify quadrilaterals using criteria such as parallel sides, equal angles, equal sides 22. identify, estimate, order, measure and calculate acute, obtuse, reflex and right angles 		
		<p>(SUM):</p> <ul style="list-style-type: none"> -Measuring angles in degrees -Measuring with a protractor (1) -Measuring with a protractor (2) -Drawing lines and angles accurately -Calculating angles on a straight line -Calculate angles around a point -Calculating lengths and angles in shapes -Regular and irregular polygons -Reasoning about 3D shapes 			<p>(SUM):</p> <ul style="list-style-type: none"> -Measure with a protractor -Introduce angles -Calculate angles -Vertically opposite angles -Angles in a triangle -Angles in a triangle: special cases -Angles in a triangle: missing angles -Angles in special quadrilaterals -Angles in regular polygons -Draw shapes accurately -Nets of 3D shapes -Circles

YEAR 5: GEOMETRY (DIRECTION)		YEAR 6: GEOMETRY (DIRECTION)		
<ol style="list-style-type: none"> 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. (7a-c) Pupils recognise and use reflection and translation in a variety of diagrams including continuing to use a 2D grid and coordinates in the first quadrant, moving on to 4 quadrants. Reflection should be in lines that are parallel to the axes 		<ol style="list-style-type: none"> describe positions on the full coordinate grid (all four quadrants) (10c) draw and translate simple shapes on the coordinate plane, and reflect them in the axes (10b) plot positions on the full coordinate grid (all four quadrants) Sketch the position of a simple shape after a rotation of 90° or 180° about a vertex 		
	<p>(SUM):</p> <ul style="list-style-type: none"> -Position in the 1st quadrant -Reflection -Reflection with co-ordinates -Translation -Translation with co-ordinates 	<p>(AUT):</p> <ul style="list-style-type: none"> -Co-ordinates in the 1st quadrant -Plotting co-ordinates -Translations -Reflections -Reasoning about shapes with co-ordinates 		

YEAR 5: MEASUREMENT		YEAR 6: MEASUREMENT		
<ol style="list-style-type: none"> convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) (5a) understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints (5b) measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres (5c) 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 (5d-e) estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water] (5f-g) solve problems involving converting between units of time (for example, days to weeks, expressing the answer as weeks and days) (5h) use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling. (5i) Use the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically, for example $4 + 2b = 20$ for a rectangle of sides 2cm and b/cm and perimeter of 20cm Calculate the area from scale drawings using given measurements Use units of time; read the time on a 24-hour digital clock and use digital 24-hour clock notation such as 19:53 		<ol style="list-style-type: none"> solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate, including time. (8h) 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 (8f, g) convert between miles and kilometres and understand equivalences of metric and common imperial units (8f, g) recognise that shapes with the same areas can have different perimeters and vice versa (8b-d) recognise when it is possible to use formulae for area and volume of shapes (8b-d) calculate the area and perimeter of rectangles, parallelograms and triangles (8b-d) 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] (8e) use, read and interpret timetables 		

<p>Perimeter and area (AUT):</p> <ul style="list-style-type: none"> -Measure perimeter -Calculate perimeter -Find unknown lengths -Area of rectangles -Area of compound shapes -Estimate and approximate area 		<p>Converting units (SUM):</p> <ul style="list-style-type: none"> -Kilograms and kilometres -Milligrams and millilitres -Metric units -Imperial units -Converting units of time -Timetables <p>Volume:</p> <ul style="list-style-type: none"> -What is volume? -Compare volume -Estimate volume -Estimate capacity 		<p>Converting units (SPR):</p> <ul style="list-style-type: none"> -Metric units -Convert metric measures -Calculate with metric measures -Miles and kilometres -Imperial measures <p>Perimeter, area and volume:</p> <ul style="list-style-type: none"> -Shapes: same area -Area and perimeter -Area of a triangle (1) -Area of a triangle (2) -Area of a triangle (3) -Area of a parallelogram -Volume: counting cubes -Volume of a cuboid 	
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YEAR 5: STATISTICS			YEAR 6: STATISTICS		
<ol style="list-style-type: none"> 1. solve comparison, sum and difference problems using information presented in a line graph (8a) 2. complete, read and interpret information in tables, including timetables and pie charts. (8b) 3. Pupils connect their work on coordinates and scales to their interpretation of line graphs 4. They begin to decide which representations of data are most appropriate and why 			<ol style="list-style-type: none"> 5. interpret and construct pie charts and line graphs and use these to solve problems (11b-c) 6. calculate and interpret the mean as an average (11d) 7. Read and interpret timetables and calendars (11a) 8. calculate and interpret the median, mode and range 9. construct and interpret Venn and Carroll diagrams 10. begin to draw and interpret a line graph, in which intermediate values have meaning 		
<p>(AUT):</p> <ul style="list-style-type: none"> -Read and interpret line graphs -Draw line graphs -Use line graphs to solve problems -Read and interpret tables -2-way tables -Timetables 					<p>(SUM):</p> <ul style="list-style-type: none"> -Read and interpret line graphs -Draw line graphs -Use line graphs to solve problems -Circles -Read and interpret pie charts -Pie charts with percentages -Draw pie charts -The mean

YEAR 5: RATIO & PROPORTION			YEAR 6: RATIO & PROPORTION		
			RATIO & PROPORTION (6a-c) 12. use ratios to show the relative sizes of two quantities 13. recognise equivalent ratios and reduce a given ratio to its lowest terms 14. recognise and use division in the context of fractions, percentages and ratio. 15. solve problems involving similar shapes where the scale factor is known or can be found (12) 16. solve problems involving unequal sharing and grouping using knowledge of fractions and multiples (12)		
				(SPR): -Using ratio language -Ratio and fractions -Introducing the ratio symbol -Calculating ratio -Using scale factors -Calculating scale factors -Ratio and proportion problems	

YEAR 5: ALGEBRA			YEAR 6: ALGEBRA		
*NO SPECIFIC OBJ			1. use simple formulae (7a) 2. generate and describe linear number sequences (7b) 3. express missing number problems algebraically 4. find pairs of numbers that satisfy an equation with two unknowns, e.g. What is $2a+3b$ if $a=2$ and $b=3$? 5. enumerate possibilities of combinations of two variables 6. describe, extend and explain number sequences and patterns		
				(SPR): -Find a rule: one step -Find a rule: two step -Forming expressions -Substitution -Formulae -Forming equations -Solve simple one step equations -Solve two-step equations -Find pairs of values -Enumerate possibilities	