



Limestone Federation

Mixed Maths Planning

Year 5/6

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
Autumn	Number Place Value			Number Addition and Subtraction	Number Multiplication and Division A		Number Fractions A			Number Multiplication B		
Spring	Number Multiplication B Continued	Number Fractions B		Number Decimals A		Measurement Area, Perimeter and volume		Number Decimals B		Number Fractions, Decimals and Percentages		
Summer	Ratio	Algebra		Geometry Shape			Geometry Position and Direction		Statistics		Measurement Converting Units	

Autumn Term – 3 Weeks

Place Value

Year 5

Pupils should be taught to:

- read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0
- round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1,000 (M) and recognise years written in Roman numerals

Year 6

Pupils should be taught to:

- read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- round any whole number to a required degree of accuracy
- use negative numbers in context, and calculate intervals across 0
- solve number and practical problems that involve all of the above

Progressive Planning

Small Step

Numbers to 100,000

Y5 NC Statement: Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.

- Read and write numbers up to 100 000 in words.
- Read and write numbers up to 100 000 in digits.
- Partition numbers up to 100 000.
- Use different representations to make numbers up to 100 000.

Resources

Y5/6 White Rose Maths Step 2: Numbers to 100,000

Planning Notes

Date(s):

Mental Starter:

Fluency Skills:

Reasoning:

Next Steps

<p><u>Numbers to 1,000,000</u> Y5 NC Statement: Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit. Y6 NC Statement: Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.</p> <ul style="list-style-type: none"> • Read and write numbers up to 1,000,000 in words. • Read and write numbers up to 1,000,000 in digits. • Partition numbers up to 1,000,000. • Use different representations to make numbers up to 1,000,000. • Make numbers up to 1 000 000. <p><u>Resources</u> Y5/6 White Rose Maths Step 3: Numbers to 1,000,000 Y5/6 White Rose Maths Step 4: Read and write numbers to 1,000,000</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Numbers to 10,000,000</u> Y6 NC Statement: Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.</p> <ul style="list-style-type: none"> • Read and write numbers up to 10 000 000. • Identify the place value of digits in numbers up to 10 000 000. • Combine units to compose numbers up to 10 000 000. • Partition numbers up to 10 000 000. <p><u>Resources</u> Y5/6 White Rose Maths Step 6: Read and write numbers to 10,000,000 Y5/6 White Rose Maths Step 5: Numbers to 10,000,000</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Powers of 10</u> Y6 NC Statement: Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit. Y5 NC Statement: Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.</p> <ul style="list-style-type: none"> • Identify the value of each digit in a number. • Identify which digit will change when adding or subtracting a power of 10. • Count forwards and backwards in steps of powers of 10 • Know that each power of 10 is equal to 1 group of 10 of the next smallest power of 10. • Identify the number that is 10, 100 and 1000 times the size of a given number and associate this with multiplying or dividing by 10, 100 and 1000. • Multiply and dividing numbers up to 10 million by 10, 100 and 1000, including calculations that involve numbers with more than one significant digit. • Scale in the context of measures. <p><u>Resources</u> Y5/6 White Rose Maths Step 7: Powers of 10</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Partition Numbers to 10,000,000</u> Y6 NC Statement: Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.</p> <ul style="list-style-type: none"> • Partition numbers up to 10 million in non-standard ways and writing the related addition calculation. • Combine non-standard units to compose numbers up to 10 million and writing the related addition calculation. • Solve problems relating to non-standard partitioning. <p><u>Resources</u> Y5/6 White Rose Maths Step 8: Partition numbers to 10,000,000</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Numbers line to 10,000,000</u> Y6 NC Statement: Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.</p> <ul style="list-style-type: none"> identifying the value of each digit up to 10 000 000 comparing numbers up to 10 000 000 ordering sets of numbers up to 10 000 000. <p><u>Resources</u> Y5/6 White Rose Maths Step 9: Numbers line to 10,000,000</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Compare and order any integers</u> Y6 NC Statement: Round any whole number to a required degree of accuracy.</p> <ul style="list-style-type: none"> estimating where to place numbers with up to 7 digits on number lines; estimating the values of numbers with up to 7 digits indicated on number lines; using knowledge of dividing powers of 10 into equal parts to help with estimating; using leading digits to estimate the position of a large number on a number line. <p><u>Resources</u> Y5/6 White Rose Maths Step 10: Compare and order any integers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Round within 100,000</u> Y5 NC Statement: Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.</p> <ul style="list-style-type: none"> identifying the relevant values that come before and after the number they are rounding; identifying which digit to focus on when rounding to different values; identifying which digits to round up and which digits to round down. <p><u>Resources</u> Y5/6 White Rose Maths Step 11: Round within 100,000</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Round any integer</u> Y6 NC Statement: To round any whole number to a required degree of accuracy.</p> <ul style="list-style-type: none"> finding the midpoint on a number line when rounding; using the midpoint to determine whether a number should be rounded up or down; identifying which digits to round up and which digits to round down. <p><u>Resources</u> Y5/6 White Rose Maths Step 12: Round any integer</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Count through zero</u> Y5 NC Statement: Count backwards through zero to include negative numbers. Y6 NC Statement: To calculate intervals across zero.</p> <ul style="list-style-type: none"> explaining what a negative number is counting forwards and backwards through zero identifying missing numbers in a sequence which crosses zero. <p><u>Resources</u> Y5/6 White Rose Maths Step 13: Count through zero</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Compare and order negative numbers</u> Y6 NC Statement: To calculate intervals across zero. Round any whole number to a required degree of accuracy.</p> <ul style="list-style-type: none"> using a number line to calculate with negative numbers solving additions and subtractions above, below and across zero. <p><u>Resources</u> Y5/6 White Rose Maths Step 14: Compare and order negative numbers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Negative numbers</u> Y6 NC Statement: To calculate intervals across zero.</p> <ul style="list-style-type: none"> calculating intervals across zero solving problems involving negative numbers <p><u>Resources</u> Y5/6 White Rose Maths Step 15: Negative numbers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Roman numerals to 1,000</u> Y5 NC Statement: Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</p> <ul style="list-style-type: none"> Identify the value of the I, V, X, L, C, D and M letter symbols used in Roman numerals. Identify how Roman numerals are combined to represent numbers. Read Roman numerals. Read years written in Roman numerals. <p><u>Resources</u> Y5/6 White Rose Maths Step 1: Roman numerals to 1,000 Y5 White Rose Maths Step 1: Roman Numerals to 1000</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Autumn Term – 1 Week</p>		

<p>Y5 NC Statement: Add and subtract whole numbers with more than 4 digits, including using formal written methods.</p> <p>Y6 NC Statement: Use their knowledge of the order of operations to carry out calculations involving the four operations.</p> <ul style="list-style-type: none"> • adding whole numbers with up to four digits • using formal written methods to calculate • explaining when and why regrouping is necessary in written calculations • making up to one regroup when using formal written methods of addition. <p>Resources Y5/6 White Rose Maths Step 2: Add integers</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Subtract integers</p> <p>Y5 NC Statement: Add and subtract whole numbers with more than 4 digits, including using formal written methods.</p> <p>Y6 NC Statement: Use their knowledge of the order of operations to carry out calculations involving the four operations.</p> <ul style="list-style-type: none"> • subtracting one-digit numbers using mental recall • subtracting the digits with the smallest place value first • exchanging into the next place value column if the number being subtracted from is smaller than the number being subtracted • writing a single digit in the answer box of each place value column. <p>Resources Y5/6 White Rose Maths Step 3: Subtract integers</p>	<p>Date(s):</p> <p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Inverse operation and missing numbers</u> Y5 NC Statement: Add and subtract whole numbers with more than 4 digits, including using formal written methods.</p> <ul style="list-style-type: none"> • adding and subtracting numbers with more than four digits using formal written methods • using different representations to show how the inverse works; • using inverse operations to check answers to calculations. <p><u>Resources</u> Y5/6 White Rose Maths Step 4: Inverse operation and missing numbers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Reason from known facts</u> Y5 NC Statement: Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p> <ul style="list-style-type: none"> • rounding up or down, depending on the digit • rounding to the nearest 10, 100, and 1000 and extending to the nearest 10 000 and 100 000 • using rounding to help them decide if an answer is correct or incorrect. <p><u>Resources</u> Y5/6 White Rose Maths Step 5: Reason from known facts</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

Autumn Term – 2 Weeks

Multiplication and Division A

Year 5

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 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 numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally, drawing upon known facts
- 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
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- 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
- 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

Year 6

Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- 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
- 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
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the 4 operations
- 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
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Progressive Planning

Small Step	Planning Notes	Next Steps
<p><u>Multiples</u> Y5 NC Statement: Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</p> <ul style="list-style-type: none"> • explaining what a multiple is • identifying and using rules to find multiples • identifying common multiples. <p><u>Resources</u> Y5/6 White Rose Maths Step 1: Multiples Y5/6 White Rose Maths Step 2: Common Multiples</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Factors</u> Y5 NC Statement: Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. Y6 NC Statement: Identify common factors, common multiples and prime numbers</p> <ul style="list-style-type: none"> • explaining what a factor is • finding factor pairs of numbers • solving reasoning problems involving factors. <p><u>Resources</u> Y5/6 White Rose Maths Step 3: Factors</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Common Factors</u> Y5 NC Statement: Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. Y6 NC Statement: Identify common factors, common multiples and prime numbers</p> <ul style="list-style-type: none"> finding and identifying factors of a given number explaining how to identify common factors expressing a given number as a product of two or three factors. <p><u>Resources</u> Y5/6 White Rose Maths Step 4: Common factors</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Rules of divisibility</u> Y6 NC Statement: Solve problems involving addition, subtraction, multiplication and division.</p> <ul style="list-style-type: none"> Know that a number is divisible by: 2, 5 or 10 from looking at the ones digits of a number; 4 if halving the number gives an even result, or by 8 if halving and halving again gives an even result; 3 if the digit sum is divisible by 3, and 9 if the digit sum is divisible by 9. <p><u>Resources</u> Y5/6 White Rose Maths Step 5: Rules of divisibility</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Prime numbers</u> Y5 NC Statement: 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. Y6 NC Statement: Identify common factors, common multiples and prime numbers.</p> <ul style="list-style-type: none"> • creating arrays to prove answers • finding factors of numbers • explaining the differences between prime and composite numbers. • finding factors of two-digit numbers • recognising prime numbers • writing a calculation to match a drawing. <p><u>Resources</u> Y5/6 White Rose Maths Step 6: Prime numbers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Square and cube numbers</u> Y5 NC Statement: Recognise and use square numbers and cube numbers, and the notation for squared and cubed. Y6 NC Statement: Solve problems involving addition, subtraction, multiplication and division.</p> <ul style="list-style-type: none"> • creating arrays to show square numbers • writing calculations to make square numbers • using the ² notation correctly • creating cubes using interlocking cubes • writing calculations to make cube numbers • using the ³ notation correctly. <p><u>Resources</u> Y5/6 White Rose Maths Step 7: Square and cube numbers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Multiple by 10, 100, 1,000</u></p>	<p>Date(s):</p>	

<p>Y5 NC Statement: Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</p> <ul style="list-style-type: none"> explaining what each digit in a number represents multiplying by ten by moving the whole number one place to the left multiplying by one hundred by moving the whole number two places to the left multiplying by one thousand by moving the whole number three places to the left using zeros accurately as place value holders. <p>Resources Y5/6 White Rose Maths Step 8: Multiple by 10, 100, 1,000</p>	<p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Divide by 10, 100, 1,000</p> <p>Y5 NC Statement: Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</p> <ul style="list-style-type: none"> explaining what each digit in a number represents dividing by ten by moving the whole number one place to the right dividing by one hundred by moving the whole number two places to the right dividing by one thousand by moving the whole number three places to the right using zeros accurately as place value holders where necessary. <p>Resources Y5/6 White Rose Maths Step 9: Divide by 10, 100, 1,000</p>	<p>Date(s):</p> <p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Autumn Term – 4 Weeks</p>		

Fractions A

Year 5

Pupils should be taught to:

- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- 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, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$]
- add and subtract fractions with the same denominator, and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25

Year 6

Pupils should be taught to:

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions > 1
- 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 its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]
- divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]

Progressive Planning

Small Step	Planning Notes	Next Steps
<p><u>Recognise equivalent fractions</u> Y5 NC Statement: Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. Y6 N C Statement: Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.</p> <p>Children will learn to find equivalent fractions of unit and non-unit fractions through:</p> <ul style="list-style-type: none"> explaining how more than one fraction can describe the same proportion of a shape; saying how many times greater the denominator is than the numerator; using known multiplication table facts to find equivalents of a unit and non-unit fraction. <p><u>Resources</u> Y5/6 White Rose Maths Step 1: Recognise equivalent fractions</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Equivalent fractions and simplifying</u> Y6 NC Statement: Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.</p> <ul style="list-style-type: none"> In this lesson, the children build on their knowledge of factors to help them simplify fractions, choosing either the method of identifying if the denominator is a multiple of the numerator or finding the highest common factor. <p><u>Resources</u> Y5/6 White Rose Maths Step 2: Equivalent fractions and simplifying</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Equivalent fractions on a number line</u> Y6 NC Statement: Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.</p> <ul style="list-style-type: none"> In this lesson, the children use their knowledge of simplifying fractions to place fractions on a number line. The children discuss the methods they use to help them to place the fractions, including improper fractions. <p><u>Resources</u> Y5/6 White Rose Maths Step 3: Equivalent fractions on a number line</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Convert improper fractions to mixed numbers</u> Y5 NC Statement: Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.</p> <p>Children will learn to convert improper fractions to mixed numbers through:</p> <ul style="list-style-type: none"> identifying the properties of proper fractions, improper fractions and mixed numbers; representing fractions greater than 1 on a number line and as diagrams; using division to convert improper fractions to mixed numbers. <p><u>Resources</u> Y5/6 White Rose Maths Step 4: Convert improper fractions to mixed numbers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Compare fractions (denominator)</u> Y6 NC Statement: Compare and order fractions, including fractions > 1.</p>	<p>Date(s): Mental Starter:</p>	

<p>In this lesson, the children compare and order fractions which have unlike denominators using the method of changing them into equivalent with the lowest common denominator.</p> <p>Resources Y5/6 White Rose Maths Step 6: Compare fractions (denominator)</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Compare fractions (numerator) Y6 NC Statement: Compare and order fractions, including fractions > 1.</p> <p>In this lesson, the children focus on understanding that when fractions have the same numerator, we can use the rule that the larger the denominator is, the smaller the fraction. They can use this rule to compare and order fractions by finding a common numerator. The children are encouraged to see this as a good method to use when the numerators are multiples of the same number.</p> <p>Resources Y5/6 White Rose Maths Step 7: Compare fractions (numerator)</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Order fractions Y5 NC Statement: Compare and order fractions whose denominators are all multiples of the same number.</p> <p>Children will learn to compare fractions less than/greater than 1 through:</p> <ul style="list-style-type: none"> • looking at the numerator to compare improper fractions with the same denominator; • using the lowest common multiple to convert improper fractions with different denominators; • converting mixed numbers to improper fractions to help compare fractions. 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<p>Resources Y5/6 White Rose Maths Step 8: Order fractions</p>	<p>Reasoning:</p>	
<p><u>Add and subtract fractions with the same denominator</u> Y5 NC Statement: Add and subtract fractions with the same denominator and denominators that are multiples of the same number. Y6 NC Statement: Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.</p> <p>Children will learn to add and subtract fractions with the same denominators through:</p> <ul style="list-style-type: none"> • adding fractions with the same denominator, where the answer is less than 1; • adding fractions with the same denominator, where the answer is greater than 1; • subtracting fractions with the same denominator, where the answer is less than 1; • subtracting fractions with the same denominator, where the answer is greater than 1. <p>Resources Y5/6 White Rose Maths Step 9: Add and subtract fractions with the same denominator</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Add fractions where one denominator is a multiple of the other</u> Y5 NC Statement: Add and subtract fractions with the same denominator and denominators that are multiples of the same number.</p> <p>Children will learn to add and subtract fractions with the same denominators through:</p> <ul style="list-style-type: none"> • adding fractions with the same denominator, where the answer is less than 1; • adding fractions with the same denominator, where the answer is greater than 1; 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> subtracting fractions with the same denominator, where the answer is less than 1; subtracting fractions with the same denominator, where the answer is greater than 1. <p>Resources Y5/6 White Rose Maths Step 10: Add fractions where one denominator is a multiple of the other</p>	<p>Reasoning:</p>	
<p>Add any two fractions Y5 NC Statement: Add and subtract fractions with the same denominator and denominators that are multiples of the same number.</p> <p>Children will learn to add fractions with denominators that are multiples of the same number through:</p> <ul style="list-style-type: none"> using bar models to show both fractions with the same denominator; using multiplication to change a fraction into an equivalent. <p>Resources Y5/6 White Rose Maths Step 11: Add any two fractions</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Add mixed numbers Y5 NC Statement: Add and subtract fractions with the same denominator and denominators that are multiples of the same number.</p> <p>Children will learn to add mixed numbers through:</p> <ul style="list-style-type: none"> adding the whole numbers first; changing to an improper fraction first; choosing the most efficient method for adding mixed numbers. <p>Resources Y5/6 White Rose Maths Step 12: Add mixed numbers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Subtraction fractions where one denominator is a multiple of the other</u> Y5 NC Statement: Add and subtract fractions with the same denominator and denominators that are multiples of the same number.</p> <p>Children will learn to subtract fractions with denominators that are multiples of the same number through:</p> <ul style="list-style-type: none"> • subtracting fractions with the same denominator; • converting between improper fractions and mixed numbers; • using multiplication to change a fraction into an equivalent; • subtracting fractions with denominators that are multiples of the same number. <p><u>Resources</u> Y5/6 White Rose Maths Step 13: Subtraction fractions where one denominator is a multiple of the other</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Subtract any two fractions</u> Y5 NC Statement: Add and subtract fractions with the same denominator and denominators that are multiples of the same number. Y6 NC Statement: Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.</p> <p>Children will learn to subtract any two fractions through:</p> <ul style="list-style-type: none"> • using visual representations; • using flexible partitioning to subtract from mixed numbers; • use multiplication to change a fraction into an equivalent; • using denominators that are multiples of the same number. <p><u>Resources</u> Y5/6 White Rose Maths Step 14: Subtract any two fractions</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Subtract from a mixed number</u> Y5 NC Statement: Add and subtract fractions with the same denominator and denominators that are multiples of the same number. Y6 NC Statement: Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.</p> <p>Children will learn to subtract proper fractions from mixed numbers through:</p> <ul style="list-style-type: none"> • using visual representations; • converting between improper and mixed number fractions to support or check calculations; • using multiplication to change a fraction into an equivalent; • using denominators that are multiples of the same number <p><u>Resources</u> Y5/6 White Rose Maths Step 15: Subtract from a mixed number Y5/6 White Rose Maths Step 16: Subtract from a mixed number – breaking the whole</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Subtract two mixed numbers</u> Y5 NC Statement: Add and subtract fractions with the same denominator and denominators that are multiples of the same number</p> <p>Children will learn to subtract two mixed numbers through:</p> <ul style="list-style-type: none"> • using visual representations; • breaking the whole within a mixed number; • using flexible partitioning; • subtracting mixed numbers with denominators that are multiples of the same number. <p><u>Resources</u> Y5/6 White Rose Maths Step 17: Subtract two mixed numbers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Multi-step problems</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 18: Multi-step problems</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

Autumn Term – 2 Weeks
Spring Term – 1 Week

Multiplication and Division B

Year 5

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 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 numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally, drawing upon known facts
- 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
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- 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
- 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

Year 6

Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- 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
- 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
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the 4 operations
- 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
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Progressive Planning

Small Step	Planning Notes	Next Steps
<p>Multiply a 2-digit number by a 2-digit number Y5 NC Statement: 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.</p> <ul style="list-style-type: none">• setting out the written method of long multiplication correctly• beginning by multiplying in the place value column with the smallest value• using zero correctly as a placeholder. <p>Resources Y5/6 White Rose Maths Step 1: Multiply a 2-digit number by a 2-digit number</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Multiply up to a 4-digit number by a 2-digit number Y6 NC Statement: Multiply multi-digit numbers up to 4 digits by a two-digit number using the formal written method of long multiplication.</p> <ul style="list-style-type: none">• setting out the written method of long multiplication correctly• beginning by multiplying in the place value column with the smallest value• using zero correctly as a placeholder. <p>Resources Y5/6 White Rose Maths Step 2: Multiply up to a 4-digit number by a 2-digit number</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Solve problems with multiplication</u> <u>Resources</u> Y5/6 White Rose Maths Step 3: Solve problems with multiplication</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Short division</u> Y5 NC Statement: 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.</p> <ul style="list-style-type: none"> • setting out the written method of short division correctly; • beginning with the place value column of the greatest value, when dividing; • solving division calculations which involve zero as a place holder. <p><u>Resources</u> Y5/6 White Rose Maths Step 4: Short divisions</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Divide a 4-digit number by a 1-digit number</u> Y5 NC Statement: 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.</p> <ul style="list-style-type: none"> • setting out the written method of short division correctly; • beginning with the place value column of the greatest value, when dividing; 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> • exchanging correctly where necessary <p>Resources Y5/6 White Rose Maths Step 5: Divide a 4-digit number by a 1-digit number</p>	<p>Reasoning:</p>	
<p>Division using factors</p> <p>Resources Y5/6 White Rose Maths Step 6: <u>Division using factors</u></p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Long division (including remainders) Y6 NC Statement: 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.</p> <p>Resources Y5/6 White Rose Maths Step 7: Introduction to long division Y5/6 White Rose Maths Step 8: Long division with remainders</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Solve problems with division</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 9: Solve problems with division</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Efficient division</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 10: Efficient division</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Solve multi-step problems</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 11: Solve multi-step problems</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

	Reasoning:	
<p><u>Order of operations</u> Y6 NC Statement: Use their knowledge of the order of operations to carry out calculations involving the 4 operations.</p> <ul style="list-style-type: none"> Children are introduced to the correct order of operations where there are multiple steps to a problem, using BODMAS to remember. They will apply this rule to some practice questions before working independently. <p><u>Resources</u> Y5/6 White Rose Maths Step 12: Order of operations</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Mental calculations and estimation</u> Y6 NC Statement: Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</p> <ul style="list-style-type: none"> By looking at various pictorial representations, children are asked to estimate values and explain their answers. They are asked to perform mental calculations and use estimation to check their answers to record times and distances in sporting events. <p><u>Resources</u> Y5/6 White Rose Maths Step 13: Mental calculations and estimation</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<u>Reason from known facts</u>	Date(s):	

<p><u>Resources</u> Y5/6 White Rose Maths Step 14: Reasons from known facts</p>	<p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
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Spring Term – 2 Weeks

Fractions B

Year 5

Pupils should be taught to:

- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- 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, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1 \frac{1}{5}$]
- add and subtract fractions with the same denominator, and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25

Year 6

Pupils should be taught to:

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions > 1
- 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 its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]
- divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]

Progressive Planning

Small Step

Multiply a unit fraction by an integer

Y5 NC Statement: Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.

Y6 NC Statement: Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.

Planning Notes

Date(s):

Mental Starter:

Next Steps

<p>Children will learn to multiply unit fractions by an integer through:</p> <ul style="list-style-type: none"> • using bar models; • using number lines; • multiplying without pictorial representations. <p>Resources Y5/6 White Rose Maths Step 1: Multiply a unit fraction by an integer</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Multiply a non-unit fraction by an integer</u> Y5 NC Statement: Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. Y6 NC Statement: Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.</p> <p>Children will learn to multiply non-unit fractions by an integer through:</p> <ul style="list-style-type: none"> • using bar models; • using number lines; • multiplying without pictorial representations. <p>Resources Y5/6 White Rose Maths Step 2: Multiply a non-unit fraction by an integer</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Multiply a mixed number by an integer</u> Y6 NC Statement: Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.</p> <p>Three methods are used: repeated addition, changing to an improper fraction and partitioning the mixed number. Differentiated activity sheets are provided to practise fluency of multiplication of mixed numbers. Included also are Diving into</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<p>Mastery resources, with reasoning and problem-solving opportunities to demonstrate greater depth.</p> <p>Resources Y5/6 White Rose Maths Step 3: Multiply a mixed number by an integer</p>	<p>Reasoning:</p>	
<p>Multiply fractions by fractions Y6 NC Statement: Multiply simple pairs of proper fractions, writing the answer in its simplest form.</p> <p>The first method visualises the calculation using a bar model. The second method involves multiplying the numerators together and then multiplying the denominators together to create a fraction which may need simplifying. The third method involves visualising the calculation as a butterfly; looking at numbers diagonally opposite for a greatest common factor</p> <p>Resources Y5/6 White Rose Maths Step 4: Multiply fractions by fractions</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Dividing a fraction by an integer Y6 NC Statement: Divide proper fractions by whole numbers.</p> <p>Resources Y5/6 White Rose Maths Step 5: Divide a fraction by an integer Y5/6 White Rose Maths Step 6: Divide any fraction by an integer</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Finding fractions of an amount</u> Y5 NC Statement: Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams</p> <p>Children will learn to calculate unit and non-unit fractions of amounts through:</p> <ul style="list-style-type: none">• using bar models;• dividing the total by the denominator to find a unit fraction of an amount;• finding the unit fraction and then multiplying that by the numerator to find a non-unit fraction of an amount;• finding the total when given the unit fraction value. <p><u>Resources</u> Y5/6 White Rose Maths Step 7: Fractions of an amount Y5/6 White Rose Maths Step 8: Fractions of an amount – Find a whole</p>	<p>Date(s):</p> <p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
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Spring Term – 2 Weeks

Decimals A

Year 5

Pupils should be taught to:

- round decimals with 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places

Year 6

Pupils should be taught to:

- identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places
- multiply one-digit numbers with up to 2 decimal places by whole numbers
- use written division methods in cases where the answer has up to 2 decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy

Progressive Planning

Small Step

Planning Notes

Next Steps

Decimals up to 2 decimal places

Y5 NC Statement: Read, write, order and compare numbers with up to 3 decimal places.

Children will learn to read and write decimal numbers and understand the value of each digit through:

- using place value counters and a place value chart to represent numbers up to two decimal places;
- reading and understanding the value of each digit;
- partitioning decimal numbers in different ways.

Resources

Y5/6 White Rose Maths Step 1: Decimals up to 2 decimal places

Date(s):

Mental Starter:

Fluency Skills:

Reasoning:

Decimals up to 3 decimal places

Y5 NC Statement: Read, write, order and compare numbers with up to 3 decimal places.

Date(s):

Mental Starter:

<p>Children will learn to read and write decimal numbers and understand the value of each digit through:</p> <ul style="list-style-type: none"> • using place value counters and a place value chart to represent numbers up to two decimal places; • reading and understanding the value of each digit; • partitioning decimal numbers in different ways. <p>Resources Y5/6 White Rose Maths Step 2: Decimals up to 3 decimal places</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Place value – integers and decimals</u> Y6 NC Statement: Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.</p> <p>In this lesson, the children consolidate their understanding of decimal place value, focusing on the decimal place value positions of tenths, hundredths and thousandths and their relationship to each other. They identify the value of any digit in a decimal number, giving the value as a fraction with a denominator of ten, hundred or a thousand.</p> <p>Resources Y5/6 White Rose Maths Step 3: Place value – integers and decimals</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Order and compare decimals</u> Y5 NC Statement: Read, write, order and compare numbers with up to 3 decimal places.</p> <p>Children will learn to compare decimal numbers with up to 3 decimal places through:</p> <ul style="list-style-type: none"> • representing decimal numbers using counters on a place value chart; • comparing decimal numbers by checking the place value of each digit from left to right; 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> knowing that the number with the greatest place value is the greatest number. <p>Resources Y5/6 White Rose Maths Step 4: Order and compare decimals (same number of decimal points) Y5/6 White Rose Maths Step 5: Order and compare decimals with</p>	<p>Reasoning:</p>	
<p>Rounding Decimals Y5 NC Statement: Round decimals with 2 decimal places to the nearest whole number and to 1 decimal place Y6 NC Statement: Solve problems which require answers to be rounded to specified degrees of accuracy.</p> <p>Children will learn to round decimals to 1 decimal place through:</p> <ul style="list-style-type: none"> finding the previous and next tenth in a decimal number; placing a decimal number on a number line; recognising the tenth a decimal number is closest to; rounding decimal numbers with 5 hundredths up to the next tenth. <p>Resources Y5/6 White Rose Maths Step 6: Round to the nearest whole number Y5/6 White Rose Maths Step 7: Round to 1 decimal place Y5/6 White Rose Maths Step 8: Round to 2 decimal places</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

Spring Term – 2 Weeks

Area, perimeter and volume

Year 5

Pupils should be taught to:

- convert between different units of metric measure [for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre]
- 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 centimetres and metres
- calculate and compare the area of rectangles (including squares), including using standard units, square centimetres (cm²) and square metres (m²), and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water]
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling

Year 6

Pupils should be taught to:

- solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 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 up to 3 decimal places
- convert between miles and kilometres
- 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
- calculate the area of parallelograms and triangles
- 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]

Progressive Planning

Small Step

Perimeter of rectangles and rectilinear shapes

Y5 NC Statement: Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.

Children will learn to calculate the perimeter of rectangles through:

- measuring sides accurately to calculate perimeter;
- using different methods to calculate the perimeter of rectangles;
- finding the length of missing sides where the perimeter is given;
- drawing rectangles that have a given perimeter.

Planning Notes

Date(s):

Mental Starter:

Fluency Skills:

Next Steps

<p>Resources Y5/6 White Rose Maths Step 1 Perimeter of rectangles and rectilinear shapes</p>	<p>Reasoning:</p>	
<p>Area of rectangles Y5 NC Statement: 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.</p> <p>Children will learn to calculate the area of rectangles and squares through:</p> <ul style="list-style-type: none"> • multiplying length by width; • recording area in standard units (cm² and m²); • selecting the most appropriate unit of measure; • comparing the area of shapes; • using mathematical reasoning to explain how a problem related to area is solved. <p>Resources Y5/6 White Rose Maths Step 2 Area of Rectangles</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Area of compound shapes Y5 NC Statement: 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.</p> <p>Children will learn to calculate the area of compound shapes through:</p> <ul style="list-style-type: none"> • explaining what is meant by a compound shape; • splitting compound shapes into separate rectangles; • using different methods to calculate area of compound shapes; • using reasoning to calculate the area in compound shape <p>Resources Y5/6 White Rose Maths Step 3 Area of Compound Shapes</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Estimate area</u> Y5 NC Statement: 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.</p> <p>Children will learn to estimate the area of irregular shapes through:</p> <ul style="list-style-type: none"> • defining key mathematical terms including estimate, approximate, rectilinear, non-rectilinear and acceptable range; • counting whole squares and part-covered squares to estimate area; • using mathematical reasoning to estimate area; • solving problems involving estimating area. <p><u>Resources</u> Y5/6 White Rose Maths Step 4 Estimate Area</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Area of triangles</u> Y6 NC Statement: Calculate the area of parallelograms and triangles.</p> <p>Children are taught how to calculate the area of triangles, starting with right-angled triangles, then moving onto isosceles and scalene triangles. They complete differentiated activity sheets, then calculate an unknown dimension, where the length of one side and the area of the triangle are given.</p> <p><u>Resources</u> Y5/6 White Rose Maths Step 5 Area of Triangles</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Area of parallelograms</u> Y6 NC Statement: Calculate the area of parallelograms and triangles.</p>	<p>Date(s): Mental Starter:</p>	

<p>Children are taught how to calculate the area of a parallelogram and why the formula used works. They calculate the areas of a variety of different parallelograms and use the skills learned to answer reasoning-style questions. In this lesson children learn how to calculate the area of a parallelogram.</p> <p>Resources Y5/6 White Rose Maths Step 6 Area of Parallelograms</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Volume – cubic centimetres Y6 NC Statement: Recognise when it is possible to use formulae for area and volume of shapes.</p> <p>Children use the formula length × width × height to calculate the volume of cubes and cuboids. They decide whether different shapes have enough information to use a formula to calculate the volume. They apply what they have learned to decide whether enough information is given to use a formula to calculate the volume of shapes from nets. Children learn when it is possible to use a formula to calculate the volume of a cuboid.</p> <p>Resources Y5/6 White Rose Maths Step 7 Volume – cubic centimetres</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Volume of a cuboid Y5 NC Statement: Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres and cubic metres, and extending to other units.</p> <p>Children are taught how to calculate the volume of cubes and cuboids by counting layers of cubes and by using a formula. Children learn how to calculate the volume of a cuboid and cube. They find the volume by counting cubes and by using a formula.</p> <p>Resources Y5/6 White Rose Maths Step 8 Volume of a cuboid</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

	Reasoning:	
<p><u>Compare volume</u> Y6 NC Statement: Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres and cubic metres, and extending to other units.</p> <p>Children estimate and compare volume. They calculate the volume of cubes and cuboids and compare shapes using $<$, $>$ and $=$. They apply their learning to reasoning-style questions. Children learn to calculate and compare the volume of a cuboid and a cube.</p> <p><u>Resources</u> Y5/6 White Rose Maths Step 9 Compare volume</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Estimate volume and capacity</u> Y6 NC Statement: Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres and cubic metres, and extending to other units.</p> <p>Children are taught how to calculate the volume of cubes and cuboids by counting layers of cubes and by using a formula. Children estimate the volume of shapes. Children learn how to calculate the volume of a cuboid and cube. They find the volume by counting cubes and by using a formula</p> <p><u>Resources</u> Y5/6 White Rose Maths Step 10 Estimate volume and capacity</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

Autumn Term – 3 Weeks

Decimals B

Year 5

Pupils should be taught to:

- round decimals with 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places

Year 6

Pupils should be taught to:

- identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places
- multiply one-digit numbers with up to 2 decimal places by whole numbers
- use written division methods in cases where the answer has up to 2 decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy

Progressive Planning

Small Step	Planning Notes	Next Steps
<p><u>Decimals within 1</u> Y5 NC Statement: Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents Children will learn to use known facts to add and subtract decimals within 1 through:</p> <ul style="list-style-type: none"> • making connections between whole numbers and decimals; • applying place value knowledge; • using a range of representations to support with addition and subtraction. <p><u>Resources</u> Y5/6 White Rose Maths Step 1: Use known facts to add and subtract decimals within 1 Y5/6 White Rose Maths Step 2: Complements within 1</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Add and Subtract decimals across 1</u></p>	<p>Date(s): Mental Starter:</p>	

<p>Y5 NC Statement: Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.</p> <p>Children will learn to add and subtract decimals across 1 through:</p> <ul style="list-style-type: none"> • using known facts as a strategy; • applying the 'make 1' strategy to help add and subtract; • using part-whole models or other diagrams to support understanding. <p>Resources Y5/6 White Rose Maths Step 3: Add and subtract decimals across 1</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Add decimals with the same number of decimal points</u></p> <p>Resources Y5/6 White Rose Maths Step 4: Add decimals with the same number of decimal points</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Add decimals with different numbers of decimal points</u></p> <p>Y5 NC Statement: Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.</p> <p>Children will learn to add decimals with different numbers of decimal places through:</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> laying out calculations correctly by lining up the decimal point to ensure digits with the same place value are aligned; using a place value chart so that they can see the value of each digit in the correct place value column; identifying the important role played by place holders when adding decimals. <p>Resources Y5/6 White Rose Maths Step 6: Add decimals with different numbers of decimal points</p>	<p>Reasoning:</p>	
<p>Subtract decimals with the same number of decimal points Y5 NC Statement: Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.</p> <p>Children will learn to subtract decimals with the same number of decimal places through:</p> <ul style="list-style-type: none"> looking at calculations with no exchanges then with exchanges and numbers with up to 3 decimal places; using place value charts and counters to help understand the value of each digit and when exchange is needed; applying subtraction to real-life contexts, for example using measures and money. <p>Resources Y5/6 White Rose Maths Step 5: Subtract decimals with the same number of decimal points</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Subtract decimals with different numbers of decimal points Y5 NC Statement: Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.</p> <p>Children will learn to subtract decimals with different numbers of decimal places through:</p> <ul style="list-style-type: none"> laying out calculations correctly by lining up the decimal point to ensure digits with the same place value are aligned; 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> identifying the important role played by place holders when adding decimals; knowing how to make an exchange when zeros are involved. <p>Resources Y5/6 White Rose Maths Step 7: Subtract decimals with different numbers of decimal points</p>	<p>Reasoning:</p>	
<p>Efficient strategies Y5 NC Statement: Solve problems involving numbers up to 3 decimal places.</p> <p>Children will learn to choose efficient strategies for adding and subtracting decimals through:</p> <ul style="list-style-type: none"> exploring a range of different calculation strategies to solve addition and subtraction problems; considering the question carefully rather than relying on the same method every time; knowing when mental strategies are more efficient than written methods. <p>Resources Y5/6 White Rose Maths Step 8: Effective strategies</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Decimal sequences Y5 NC Statement: Read, write, order and compare numbers with up to 3 decimal places.</p> <p>Children will learn to complete decimals sequences through:</p> <ul style="list-style-type: none"> looking for patterns and finding simple rules that involve adding or subtracting a decimal each time; considering the question carefully rather than relying on the same method every time; knowing when mental strategies are more efficient than written methods. <p>Resources Y5/6 White Rose Maths Step 9: Decimal sequences</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p>Multiply by 10, 100 and 1,000</p> <p>Y5 NC Statement: Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</p> <p>Y6 NC Statement: Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.</p> <p>Children will learn to multiply by 10, 100 and 1000 through:</p> <ul style="list-style-type: none"> • moving concrete resources to see what happens to the digits in a number when it is multiplied by 10, 100 or 1000; • using place value charts to physically move counters to the left to see the effects of multiplying by 10, 100 and 1000; • looking at Gattegno charts to identify patterns within numbers. <p>Resources</p> <p>Y5/6 White Rose Maths Step 10: Multiply by 10, 100 and 1,000</p>	<p>Date(s):</p> <p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Divide by 10, 100 and 1,000</p> <p>Y5 NC Statement: Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</p> <p>Y6 NC Statement: Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.</p> <p>Children will learn to divide by 10, 100 and 1000 through:</p> <ul style="list-style-type: none"> • recognising the links with multiplying by 10, 100 and 1000 and noticing the inverse relationship; • using concrete resources and stem sentences to make statements about what happens to the digits in a number when they divide by 10, 100 or 1000; • using place value charts to physically move counters to the right to see the effects of dividing by 10, 100 and 1000. 	<p>Date(s):</p> <p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Resources</u> Y5/6 White Rose Maths Step 11: Divide by 10, 100 and 1,000</p>		
<p><u>Multiply decimals by integers</u> Y6 NC Statement: Multiply one-digit numbers with up to two decimal places by whole numbers.</p> <p>In this lesson, the children consolidate their use of written methods of multiplication to multiply decimal numbers by whole numbers using the context of money and measurement.</p> <p><u>Resources</u> Y5/6 White Rose Maths Step 12: Multiply decimals by integers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Divide decimals by integers</u> Y6 NC Statement: Use written division methods in cases where the answer has up to two decimal places</p> <p>In this lesson, the children consolidate their use of written methods of division where the answer has up to two decimal places, using the context of measurement.</p> <p><u>Resources</u> Y5/6 White Rose Maths Step 12: Divide decimals by integers</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Multiply and divide decimals in contexts</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 12: Multiply and divide decimals in context</p>	<p>Date(s): Mental Starter:</p>	

	<p>Fluency Skills:</p> <p>Reasoning:</p>	
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Spring Term – 2 Weeks

Fractions, decimals and percentages

Year 5

Pupils should be taught to:

- read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25

Year 6

Pupils should be taught to:

- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts

Progressive Planning

Small Step

Equivalent fractions and decimals – tenths

Y5 NC Statement: Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$, and those fractions with a denominator of a multiple of 10 or 25.

Y6 NC Statement: Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Children will learn to find equivalent fractions and decimals through:

- exploring equivalent fractions and decimals that focus on halves, quarters, fifths and tenths;
- using the number line representation to demonstrate the value of each fraction;
- exploring non-unit fractions and fraction walls to calculate equivalent fractions and decimals

Planning Notes

Date(s):

Mental Starter:

Fluency Skills:

Reasoning:

Next Steps

<p>Resources Y5/6 White Rose Maths Step 1: Equivalent fractions and decimals - tenths</p>		
<p>Equivalent fractions and decimals - hundredths Resources Y5 NC Statement: Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. Y6 NC Statement: Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.</p> <p>Children will learn to understand the value of hundredths through:</p> <ul style="list-style-type: none"> • building on their prior learning of tenths and applying this to understanding hundredths; • using concrete and pictorial representations to represent numbers and to develop their understanding of hundredths; • exploring the relationships between tenths and hundredths, working with decimals and mixed number equivalences. <p>Y5/6 White Rose Maths Step 2: Equivalent fractions and decimals - hundredths</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Equivalent fractions and decimals – thousandths Y5 NC Statement: Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. Y6 NC Statement: Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.</p> <p>Children will learn to understand the value of thousandths through:</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> • building on their prior learning of tenths and hundredths and applying this to understanding thousandths; • using concrete and pictorial representations to represent numbers and to develop their understanding of thousandths; • exploring the relationships between tenths, hundredths and thousandths, working with decimals and mixed number equivalences. <p>Resources Y5/6 White Rose Maths Step 3: Equivalent fractions and decimals - thousandths</p>	<p>Reasoning:</p>	
<p>Fractions as division Y5 NC Statement: 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. Y6 NC Statement: 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.</p> <p>Resources Y5/6 White Rose Maths Step 4: Fractions as divisions</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Understand percentages Y5 NC Statement: Recognise the per cent symbol (%) and understand that per cent relates to ‘number of parts per 100’, and write percentages as a fraction with denominator 100, and as a decimal fraction.</p> <p>Children will learn to find percentages of amounts through:</p> <ul style="list-style-type: none"> • discovering that per cent relates to number of parts per hundred; 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> exploring different representations which show different parts of a hundred; using the % symbol when finding percentages of amounts. <p>Resources Y5/6 White Rose Maths Step 5: Understand percentages</p>	<p>Reasoning:</p>	
<p>Percentages as fractions Y5 NC Statement: Recognise the per cent symbol (%) and understand that per cent relates to ‘number of parts per 100’, and write percentages as a fraction with denominator 100, and as a decimal fraction.</p> <p>Children will learn to represent percentages as fractions through:</p> <ul style="list-style-type: none"> converting percentages to fractions with a denominator of one hundred; converting percentages to common fractions; converting percentages to fractions using a bar model; converting percentages to fractions with a numerator greater than one <p>Resources Y5/6 White Rose Maths Step 6: Percentages as fractions</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Percentages as decimals Y5 NC Statement: Recognise the per cent symbol (%) and understand that per cent relates to ‘number of parts per 100’, and write percentages as a fraction with denominator 100, and as a decimal fraction.</p> <p>Children will learn to represent percentages as decimals through:</p> <ul style="list-style-type: none"> using 100 as a denominator to enable them to understand the link between decimals and hundredths; understanding how percentages, decimals and fractions are different ways of expressing amounts; 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> engaging in talk tasks to secure understanding of representing percentages as decimals. <p>Resources Y5/6 White Rose Maths Step 7: Percentages as decimals</p>	<p>Reasoning:</p>	
<p>Equivalent fractions, decimals and percentages Y5 NC Statement: Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$, and those fractions with a denominator of a multiple of 10 or 25. 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.</p> <p>Children will learn to represent fractions as decimals and percentages through:</p> <ul style="list-style-type: none"> finding tenths as equivalent fractions, decimals and percentages; finding halves and fifths as equivalent fractions, decimals and percentages; finding hundredths as equivalent fractions, decimals and percentages; finding quarters as equivalent fractions, decimals and percentages <p>Resources Y5/6 White Rose Maths Step 8: Equivalent F.D.P</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Order fractions, decimals and percentages</p> <p>Resources Y5/6 White Rose Maths Step 9: Order F.D.P.</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

Summer Term – 1 Week

Ratio

Year 5

Year 6

- Pupils should be taught to:
- solve problems involving the relative sizes of 2 quantities where missing values can be found by using integer multiplication and division facts
 - solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison
 - solve problems involving similar shapes where the scale factor is known or can be found
 - solve problems involving unequal sharing and grouping using knowledge of fractions and multiples

Progressive Planning

Small Step	Planning Notes	Next Steps
<p><u>Add or multiply?</u> Y6 NC Statement: Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p> <ul style="list-style-type: none"> • write ratio statements and use multiplication and division facts to calculate alternative statements. • calculate simple ratios <p><u>Resources</u> Y5/6 White Rose Maths Step 1: Add or multiply?</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Use ratio language</u> Y6 NC Statement: Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p> <ul style="list-style-type: none"> • write proportion statements and use fractions to write the statements. <p><u>Resources</u> Y5/6 White Rose Maths Step 2: Use ratio language</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Ratio and fractions</u> Y6 NC Statement: Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.</p> <ul style="list-style-type: none"> • use a bar model to represent a fraction (to show ratio) problem • solve problems involving unequal sharing and grouping. <p><u>Resources</u> Y5/6 White Rose Maths Step 3: Ratio and fractions</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Use scale factors</u> Y6 NC Statement: Solve problems involving similar shapes where the scale factor is known or can be found.</p> <ul style="list-style-type: none"> • Pairs practise their previous learning on scale factors by working out missing lengths of similar shapes when the 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<p>scale factor is given, including problems in context, increasing in complexity.</p> <ul style="list-style-type: none"> Independently, children complete written tasks presented in the same way as the activities that they completed in pairs. <p>Resources Y5/6 White Rose Maths Step 4: Use scale factors</p>	<p>Reasoning:</p>	
<p>Similar shapes Y6 NC Statement: Solve problems involving similar shapes where the scale factor is known or can be found.</p> <ul style="list-style-type: none"> Children then apply their learning independently, drawing 3D shapes on spotted paper to work out new surface areas of cuboids when given a scale factor. <p>Resources Y5/6 White Rose Maths Step 5: Similar shapes</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Ratio and proportion problems Y6 NC Statement: Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p> <ul style="list-style-type: none"> Children recap their learning from previous lessons and pairs discuss fractions shown by a grid. The class is guided through a series of proportion and ratio problems, increasing in complexity, before tackling similar problems in pairs, then independently as a written task. <p>Resources Y5/6 White Rose Maths Step 6: Ratio problems</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Resources</u> Y5/6 White Rose Maths Step 2: Form expressions</p>	<p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Substitution</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 3: Substitution</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Formulae</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 4: Formulae</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

	Reasoning:	
<u>Form equations</u> <u>Resources</u> Y5/6 White Rose Maths Step 5: Form equations	Date(s): Mental Starter: Fluency Skills: Reasoning:	
<u>Solve equations</u> <u>Resources</u> Y5/6 White Rose Maths Step 6: Solve equations	Date(s): Mental Starter: Fluency Skills: Reasoning:	

<p><u>Find pairs of values</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 7: Find pairs of values</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Solve problems with two unknowns</u></p> <p><u>Resources</u> Y5/6 White Rose Maths Step 8: Solve problems with two unknowns</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

Summer Term – 3 Weeks

Shape

Year 5

Pupils should be taught to:

- identify 3-D shapes, including cubes and other cuboids, from 2-D representations
- know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- draw given angles, and measure them in degrees ($^{\circ}$)
- identify:
 - angles at a point and 1 whole turn (total 360°)
 - angles at a point on a straight line and half a turn (total 180°)
 - other multiples of 90°
- use the properties of rectangles to deduce related facts and find missing lengths and angles
- distinguish between regular and irregular polygons based on reasoning about equal sides and angles

Year 6

Pupils should be taught to:

- draw 2-D shapes using given dimensions and angles
- recognise, describe and build simple 3-D 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

Progressive Planning

Small Step

Understand and use degrees

Y5 NC Statement: Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. Draw given angles, and measure them in degrees ($^{\circ}$).

Children will learn to measure angles in degrees in this lesson through:

- Describing an angle as a turn.
- Identifying right, acute, obtuse and reflex angles as an angle of a turn.
- Describing angles of a turn in degrees.

Resources

Y5/6 White Rose Maths Step 1: Understand and use degrees

Planning Notes

Date(s):

Mental Starter:

Fluency Skills:

Reasoning:

Next Steps

<p><u>Classify angles (include estimate)</u> Y6 NC Statement: Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.</p> <ul style="list-style-type: none"> • Pairs discuss similarities and differences between a set of triangles / quadrilaterals and the teacher introduces different types of quadrilaterals and their properties. • Pairs investigate angles in a triangle / quadrilateral before the whole class is shown how to work out a missing angle when three are known. • In the written activity, children identify types of four-sided shape and work out missing angles. <p><u>Resources</u> Y5/6 White Rose Maths Step 2: Classify angles (include estimate)</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Measure angles (include estimate)</u> Y5 NC Statement: Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. Draw given angles, and measure them in degrees ($^{\circ}$).</p> <ul style="list-style-type: none"> • Describing an angle as a turn. • Identifying right, acute, obtuse and reflex angles as an angle of a turn. • Describing angles of a turn in degrees • Reading acute angles shown on a protractor. • Estimating the size of acute angles. • Using a protractor to accurately measure angles less than 90 degrees. • Using both the inside and outside scale of the protractor accurately • Reading obtuse angles shown on a protractor. 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<ul style="list-style-type: none"> • Estimating the size of obtuse angles. • Using a protractor to accurately measure angles greater than 90 degrees. • Using both the inside and outside scale of the protractor accurately. <p>Resources Y5/6 White Rose Maths Step 3: Measure angles (include estimate)</p>		
<p>Calculate angles around point Y5 NC Statement: Identify angles at a point and one whole turn, angles at a point on a straight line and $\frac{1}{2}$ a turn and other multiples of 90 degrees. Y6 NC Statement: Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.</p> <p>Children will learn to calculate missing angles around a point in this lesson through:</p> <ul style="list-style-type: none"> • Knowing that four right angles are equivalent to an angle around a point. • Knowing that an angle around a point is equivalent to a full turn. • Using a bar model to represent missing angles around a point. • Calculating missing angles around a point. <p>Resources Y5/6 White Rose Maths Step 4: Calculate angles around point</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Calculate angles on a straight line Y5 NC Statement: Identify angles at a point and one whole turn, angles at a point on a straight line and $\frac{1}{2}$ a turn and other multiples of 90 degrees.</p>	<p>Date(s): Mental Starter:</p>	

<p>Y6 NC Statement: Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.</p> <p>Children will learn to calculate missing angles on a straight line in this lesson through:</p> <ul style="list-style-type: none"> • Knowing that two right angles are equivalent to a straight-line angle. • Knowing that a straight-line angle is equivalent to half of a turn. • Using a bar model to represent missing angles on a straight line. • Calculating missing angles on straight lines <p>Resources Y5/6 White Rose Maths Step 5: Calculate angles on a straight line</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Vertically opposite angles</u></p> <p>Y6 NC Statement: Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.</p> <ul style="list-style-type: none"> • The teacher introduces intersecting, straight lines totalling 360° and that pairs of angles opposite each other on these lines are always equal. • They apply this fact to a selection of practice examples and work independently to identify vertically opposite angles in a written task <p>Resources Y5/6 White Rose Maths Step 6: Vertically opposite angles</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Angles in a triangle</u></p>	<p>Date(s): Mental Starter:</p>	

<p>Y6 NC Statement: Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.</p> <ul style="list-style-type: none"> • Pairs discuss similarities and differences between a set of triangles and the teacher introduces different types of triangles and their properties. • Pairs investigate angles in a triangle before the whole class is shown how to work out a missing angle when two are known. In the written activity, children identify types of triangles and work out missing angles. <p>Resources Y5/6 White Rose Maths Step 7: Angles in a triangle (include missing angles) Y5/6 White Rose Maths Step 8: Angles in a triangle – special cases (including missing angles)</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Angles in quadrilaterals Y6 NC Statement: Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.</p> <ul style="list-style-type: none"> • Pairs discuss similarities and differences between a set of quadrilaterals and the teacher introduces different types of quadrilaterals and their properties. • Pairs investigate angles in a quadrilateral before the whole class is shown how to work out a missing angle when three are known. <p>Resources Y5/6 White Rose Maths Step 9: Angles in quadrilaterals</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Regular polygons</p>	<p>Date(s): Mental Starter:</p>	

<p>Y6 NC Statement: Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons</p> <ul style="list-style-type: none"> Children are introduced to a formula for working out the sum of the angles inside any polygon then work in pairs to apply the formula to find the interior angles of irregular polygons. The whole class is shown how to work out a missing angle when the rest are known. In the written activity, children work out missing angles of polygons. <p>Resources Y5/6 White Rose Maths Step 10: Regular polygons</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Irregular polygons</p> <p>Y6 NC Statement: Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons</p> <p>Children will learn to reason about irregular polygons in this lesson through:</p> <ul style="list-style-type: none"> Recognising the properties of polygons Sorting regular and irregular 2D shapes. Identifying if a polygon is regular or irregular from lengths and angles. <p>Resources Y5/6 White Rose Maths Step 11: Irregular polygons</p>	<p>Date(s):</p> <p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Circles</p> <p>Y6 NC Statement: Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.</p>	<p>Date(s):</p> <p>Mental Starter:</p>	

<ul style="list-style-type: none"> • The teacher introduces the terms radius, diameter and circumference on a labelled circle. • Pairs match circles to descriptions to check their understanding of the new vocabulary. The teacher models how to use a pair of compasses to draw a circle where they are given the radius • The teacher guides children, working in pairs, through a set of reasoning questions shown on the Lesson Presentation and activity sheets. • Children independently apply the same methods to solving a set of reasoning questions, involving calculating radii and diameters of circles, and self-assess their work using the answers on the Presentation. <p>Resources Y5/6 White Rose Maths Step 12: Circles</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Draw shapes Y6 NC Statement: Draw 2D shapes using given dimensions and angles.</p> <ul style="list-style-type: none"> • Children recap reading measurements on protractors and rulers. • The teacher models drawing a 2D shape from a set of instructions involving measuring angles and lengths; children independently draw three different 2D shapes by following similar instructions. <p>Resources Y5/6 White Rose Maths Step 13: Draw shapes</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>3-D shapes Y6 NC Statement: Recognise, describe and build simple 3D shapes, including making nets.</p>	<p>Date(s): Mental Starter:</p>	

- The whole class identifies the number of faces on a series of given 3D shapes and partners try to name and describe as many 3D shapes as possible shown on the Lesson Presentation.
- Pairs then play dominoes requiring them to match a net to a 3D shape and discuss 3D solids where the faces are all identical.
- In the independent task, children identify faces, vertices and edges of 3D shapes

Resources

Y5/6 White Rose Maths Step 14: 3-D shapes

Fluency Skills:

Reasoning:

Summer Term – 2 Weeks

Position and direction

Year 5

Pupils should be taught to:

- 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

Year 6

Pupils should be taught to:

- describe positions on the full coordinate grid (all 4 quadrants)
- draw and translate simple shapes on the coordinate plane, and reflect them in the axes

Progressive Planning

Small Step	Planning Notes	Next Steps
<p><u>The first quadrant</u> Y6 NC Statement: Describe positions on the full coordinate grid (all four quadrants).</p> <ul style="list-style-type: none"> • Children practise reading coordinates in the first quadrant in the first whole-class activity. They are introduced to reading coordinates in all four quadrants and have this modelled and led by the teacher before trying this with a partner. Individually, children find sports on a four-quadrant grid. In the plenary, they identify missing coordinates. • Children use their knowledge to find famous historical figures behind coordinates on a grid (first quadrant) as a class. They are reminded of their work from the previous lesson on all four quadrants. They play Four Quadrant Coordinate Bingo in groups; famous figures are called out and children find them on their grid. <p><u>Resources</u> Y5/6 White Rose Maths Step 1:The first quadrant</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Four quadrants</u> Y6 NC Statement: Describe positions on the full coordinate grid (all four quadrants).</p>	<p>Date(s): Mental Starter:</p>	

<ul style="list-style-type: none"> • Children first collect sets of fingerprints by reading them from a four-quadrant coordinate grid. The teacher recaps how to accurately read a four-quadrant grid before children crack codes in groups using their coordinates knowledge and independently decode a message. • Children are challenged to write a secret message of their own using letters on a grid. C • After reading coordinates and ensuring that they can identify and recall the names of 2D shapes, children plot coordinates and then join them to identify the shape they make. In pairs, they do this with the coordinates given on the Lesson Presentation, then complete an individual activity sheet to plot and then identify shapes. <p>Resources Y5/6 White Rose Maths Step 2: Four quadrants</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Solve problems with coordinates Y6 NC Statement: Describe positions on the full coordinate grid (all four quadrants).</p> <ul style="list-style-type: none"> • Children work their way through a series of coordinate-based problems, presented in different styles, shown on the Lesson Presentation and led by the teacher. They are given three differentiated problems to complete as an activity sheet. <p>Resources Y5/6 White Rose Maths Step 3: Solve problems with coordinates</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Translations Y6 NC Statement: Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.</p>	<p>Date(s): Mental Starter:</p>	

<ul style="list-style-type: none"> Children are shown basic translations of triangles and are asked to describe each movement. The teacher then models two-step translations and introduces the class to expressing translations as coordinates. They play bingo in small groups where translations are called out and they must match them to the translation shown as a picture on their sheet. Translations presented as algebraic formulas (e.g. $x-5$, $y-6$) are modelled to the class before they practise applying their understanding in an individual activity and the plenary. <p>Resources Y5/6 White Rose Maths Step 4: Translations</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Lines of symmetry Y5 NC Statement: Identify lines of symmetry in 2D shapes presented in different orientations.</p> <ul style="list-style-type: none"> The teacher introduces children to the vocabulary 'lines of symmetry' and shows examples of images with different numbers of lines of symmetry. Pairs fold shapes to find lines of symmetry and investigate the link between number of sides and lines of symmetry. Independently, children find and draw lines of symmetry on a selection of shapes using a mirror and ruler, before the whole class completes a recap quiz. <p>Resources Y5/6 White Rose Maths Step 5: Lines of symmetry</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Reflections Y6 NC Statement: Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.</p> <ul style="list-style-type: none"> The teacher talks the class through the rules of reflecting shapes along an axis on a coordinate grid; the reflection of 	<p>Date(s): Mental Starter:</p>	

a shape is modelled along both axes. They are guided, in pairs, through a series of reflection questions and are then shown how to find the coordinates of reflected shapes.

- Children practise reflecting shapes and finding their new coordinates independently.

Resources

Y5/6 White Rose Maths Step 6: Reflections

Fluency Skills:

Reasoning:

Summer Term – 2 Weeks

Statistics

Year 5

Pupils should be taught to:

- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables

Year 6

Pupils should be taught to:

- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average

Progressive Planning

Small Step	Planning Notes	Next Steps
<p><u>Draw line graphs</u> Y5 NC Statement: To solve comparison, sum and difference problems using information presented in a line graph.</p> <p>Children will learn to draw line graphs through:</p> <ul style="list-style-type: none"> • using an appropriate scale on axes; • plotting data on a grid; • answering questions about in-between values; • adding 2 sets of data to a line graph. <p><u>Resources</u> Y5/6 White Rose Maths Step 1: Draw line graphs</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Read and interpret line graphs</u> Y5 NC Statement: To solve comparison, sum and difference problems using information presented in a line graph.</p> <p>Children will learn to interpret line graphs through:</p> <ul style="list-style-type: none"> • identifying values on a line graph; • estimating values between intervals on a line graph; 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p>	

<ul style="list-style-type: none"> • comparing, finding the sum of and finding the difference between two values on a line graph; • solving problems using data on a line graph. <p>Resources Y5/6 White Rose Maths Step 2: Read and interpret line graphs</p>	<p>Reasoning:</p>	
<p><u>Bar charts (to include dual bar charts)</u></p> <p>Resources Y5/6 White Rose Maths Step 3: Bar charts (to include dual bar charts)</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Tables (to include two-way table)</u> Y5 NC Statement: To complete, read and interpret information in tables, including timetables.</p> <p>Children will learn to read and interpret tables through:</p> <ul style="list-style-type: none"> • retrieving information from a table; • completing information in a table; • comparing data in a table; • using addition and subtraction to solve problems. • understanding that a two-way table shows more than one piece of information about each variable; • finding missing values in a table; • using the correct mathematical terms; • solving problems and using mathematical reasoning involving two-way tables. 	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

<p><u>Resources</u> Y5/6 White Rose Maths Step 4: Tables (to include two-way table)</p>		
<p><u>Timetables</u> Y5 NC Statement: To complete, read and interpret information in tables, including timetables.</p> <p>Children will learn to read and interpret timetables through:</p> <ul style="list-style-type: none"> • reading and interpreting times in on a digital clock; • reading and interpreting timetables; • calculating durations of time; • reasoning and solving problems related to durations of time. <p><u>Resources</u> Y5/6 White Rose Maths Step 5: Timetables</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Read and interpret pie chats</u> Y6 NC Statement: To interpret and construct pie charts and line graphs and use these to solve problems</p> <p><u>Resources</u> Y5/6 White Rose Maths Step 6: Read and interpret pie chats</p>	<p>Date(s): Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p><u>Pie charts with percentages</u> Y6 NC Statement: To interpret and construct pie charts and line graphs and use these to solve problems</p>	<p>Date(s): Mental Starter:</p>	

	Reasoning:	
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<p>Children will learn to convert from litres to millilitres and metres to millimetres in this lesson through:</p> <ul style="list-style-type: none"> • understanding that the prefix ‘milli’ relates to one thousand; • carefully multiplying by 1000; • using a range of concrete resources to gain a better understanding of the conversions. <p>Resources Y5/6 White Rose Maths Step 2: Millimetres and millilitres</p>	<p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Concert metric units Y5 NC Statement: Convert between different units of metric measure.</p> <p>Children will learn to convert between different units of length in this lesson through:</p> <ul style="list-style-type: none"> • choosing the appropriate unit for measurement; • converting between millimetres, metres and kilometres; • dividing by different multiples of 10 to convert between the different measurements. <p>Y5/6 White Rose Maths Step 3: Concert metric units</p>	<p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Miles and kilometres Y6 NC Statement: Convert between miles and kilometres</p> <ul style="list-style-type: none"> • To convert from miles to kilometres, they first divide by five, then multiply by eight. To convert from kilometres to miles, they divide by eight, then multiply by five. • Differentiated activity sheets give children activities to practise their conversion skills and to use these skills to solve problems 	<p>Mental Starter:</p> <p>Fluency Skills:</p>	

<p>Y5/6 White Rose Maths Step 4: Miles and kilometres</p>	<p>Reasoning:</p>	
<p>Imperials measures Y5 NC Statement: Understand and use approximate equivalences between metric units and common imperial units.</p> <p>Children will learn to use imperial units of measure in this lesson through:</p> <ul style="list-style-type: none"> • understanding and using approximate equivalences between metric and imperial units; • using decimal notation when converting between units of measure; • using all four operations to solve problems involving measure. <p>Y5/6 White Rose Maths Step 5: Imperials measures</p>	<p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	
<p>Convert units of time Y5 NC Statement: Solve problems involving converting between units of time. Y6 NC Statement: 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.</p> <ul style="list-style-type: none"> • They use multiplication to convert from larger units of time to smaller units – from days to hours, hours to minutes and minutes to seconds. They also convert times more than one step away, for example days to minutes. • They use division to convert from smaller units of time to larger units – from seconds to minutes, minutes to hours and hours to days. • They use division, with answers in whole numbers and with remainders. Where the answer includes a remainder, 	<p>Mental Starter:</p> <p>Fluency Skills:</p> <p>Reasoning:</p>	

they write the answer with a mixed unit, for example 3 hours 45 minutes.

Y5/6 White Rose Maths Step 6: Convert units of time

Calculate with timetables

Y5 NC Statement: Solve problems involving converting between units of time.

Children will learn to use timetables to retrieve information in this lesson through:

- reading and interpreting a range of timetables;
- calculating durations using information given in a timetable;
- solving problems involving timetables, including finding missing times.

Y5/6 White Rose Maths Step 7: Calculate with timetables

Mental Starter:

Fluency Skills:

Reasoning: