

Woodlands mathematics curriculum plan

Year 6

Long term plan.

The LTP is a guide for what should be taught and when but this will change depending on the needs of your teaching group. If it is a weaker area then more time will need to be spent on the strand. If you feel your teaching group are secure then less time will be needed and you can then build in additional revision/consolidation or move on to the next strand. Use the LTP as a guide but ensure that the time spent on each strand matches the need of your teaching group.

The LTP does not include assessment weeks.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Number: Place value 1 to 2 weeks		Number: Addition, subtraction, multiplication and division 4 to 5 weeks				E & D week	Number: Fractions 5 weeks					Geometry: position and direction 1 week	Revision week

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Spring	Number: Decimals and percentages 4 weeks				Number: algebra 2 weeks		Measurement: converting units 1 week	Measurement: Perimeter, area and volume 2 weeks	Number: ratio 2 weeks		Statistics 1 to 2 weeks	

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Summer	Geometry: shape 3 weeks			Consolidation, investigations and preparation for KS3									

Daily dashboard, daily sizzling 6 starters, daily reasoning challenges and weekly workouts revisit and keep simmering content children have already been taught.

Areas to be also be taught through continuous provision and through cross-curricular links - statistics, measure, geometry, time, rapid recall of number facts.

Resource Links

[Vocabulary progression document](#)

[Year 1 maths mastery booklet](#)

[NCETM place value reasoning map with NRICH links](#)

[NCETM addition and subtraction reasoning map with NRICH links](#)

[NCETM multiplication and division reasoning map with NRICH links](#)

[NCETM fractions reasoning map with NRICH links](#)

[NCETM measurement reasoning map with NRICH links](#)

[NCETM Geometry – shape - reasoning map with NRICH links](#)

[NCETM Geometry – position - reasoning map with NRICH links](#)

[White Rose fluency, reasoning and problem solving documents](#)

[White Rose Autumn Mastery document](#)

[White Rose Spring Mastery document](#)

[White Rose Summer Mastery document](#)

[Blooms planning tool](#)

[Blooms questions KS1](#)

[White Rose end of block assessments](#)

[White Rose end of term assessments](#)

[White Rose reasoning problems Powerpoints](#)

[Place value within 10](#)

[Place value within 20](#)

[Place value to 50](#)

[Place value to 100](#)

[Addition and subtraction to 10](#)

[Addition and subtraction to 20](#)

[Length and height](#)

[Weight and volume](#)

[Multiplication and division](#)

[Fractions](#)

[Position and direction](#)

[Money](#)

[Time](#)

[Shape](#)

Medium term plan.

Autumn term

Number: Place value – 1 - 2 weeks

White Rose Small Steps

- Number to ten million
- Compare and order any number
- Round any number
- Negative numbers

NCETM spines

Spine 1: Number, Addition and Subtraction

1.30 Composition and calculation: numbers up to 10,000,000

NCETM spine link

Teaching point 1: Patterns seen in other powers of ten can be extended to the unit 1,000,000.

Teaching point 2: Seven-digit numbers can be written, read and ordered by identifying the number of millions, the number of thousands and the number of hundreds, tens and ones.

Teaching point 3: The digits in a number indicate its structure so it can be composed and decomposed.

Teaching point 4: Knowledge of crossing thousands boundaries can be used to work to and across millions boundaries.

Teaching point 5: Sometimes numbers are rounded as approximations to eliminate an unnecessary level of detail; rounded numbers are also used to give an estimate or average. At other times, precise readings are useful.

Teaching point 6: Fluent calculation requires the flexibility to move between mental and written methods according to the specific numbers in a calculation.

National curriculum objectives

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 zero.

Solve number and practical problems that involve all of the above.

Number: Addition, subtraction, multiplication and division – 4 to 5 weeks

White Rose Small Steps

- Add and subtract integers
- Multiply up to a 4-digit number by 2-digit number
- Short division
- Division using factors
- Long division 1 (divide 3-digit numbers by a 2-digit number without remainders. Starting with a more expanded method, before progressing to the more formal long division method).
- Long division 2 (divide 4-digit numbers by 2-digits using the long division method).
- Long division 3 (divide using long division where answers have remainders).
- Long division 4 (divide four-digit numbers using long division where their answers have remainders – they check that their remainder is smaller than their divisor).
- Common factors
- Common multiples
- Primes to 100
- Squares and cubes
- Order of operations
- Mental calculations and estimation
- Reason from known facts

NCETM spines

Spine 1: Number, Addition and Subtraction

1.31 Problems with two unknowns

NCETM link

Teaching point 1: Problems with two unknowns can have one solution or more than one solution (or no solution). A relationship between the two unknowns can be described in different ways, including additively and multiplicatively.

National curriculum objectives

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Multiply multi-digit numbers up to 4 digits by a 2-digit number using the formal written method of long multiplication.

Divide numbers up to 4 digits by a 2-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding as appropriate for the context.

Divide numbers up to 4 digits by a 2-digit number using the formal written method of short division, 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 four operations.

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.

Teaching point 2: Model drawing can be used to expose the structure of problems with two unknowns.

Teaching point 3: A problem with two unknowns has only one solution if the sum of the two unknowns and the difference between them is given (*'sum-and-difference problems'*) or if the sum of the two unknowns and a multiplicative relationship between them is given (*'sum-and-multiple problems'*).

Teaching point 4: Other problems with two unknowns have only one solution.

Teaching point 5: Some problems with two unknowns can't easily be solved using model drawing but can be solved by a 'trial-and-improvement' approach; these problems may have one solution, several solutions or an infinite number of solutions.

Year 6 – NCETM spines

Spine 2: Multiplication and Division

2.23 Multiplication strategies for larger numbers and long multiplication

[NCETM link](#)

Teaching point 1: When multiplying two numbers that are multiples of 10, 100 or 1,000, multiply the number of tens, hundreds or thousands and then adjust the product using place value.

Teaching point 2: When multiplying two numbers where one number is a multiple of 10, 100 or 1,000, use short multiplication and adjust the product using place value.

Teaching point 3: Two two-digit numbers can be multiplied by partitioning one of the factors, calculating partial products and then adding these partial products. This method can be extended to multiplication of three-digit numbers by two-digit numbers.

Teaching point 4: *'Long multiplication'* is an algorithm involving multiplication, then addition of partial products, which supports multiplication of two numbers with two or more digits.

Teaching point 5: Multiplication where one of the factors is a composite number can be carried out by multiplying one factor and then the other factor.

2.24 Division: dividing by two-digit divisors

[NCETM link](#)

Teaching point 1: Any two- or three-digit dividend can be divided by a two-digit divisor by skip counting in multiples of the divisor (quotient ≥ 10); these calculations can be recorded using the short or long division algorithms.

Teaching point 2: Any three- or four-digit dividend can be divided by a two-digit divisor using the short or long division algorithms (including quotient ≥ 10).

Teaching point 3: When there is a remainder, the result can be expressed as a whole-number quotient and a whole-number remainder, as a whole-number quotient and a proper-fraction remainder, or as a decimal-fraction quotient.

2.25 Using compensation to calculate

[NCETM link](#)

Teaching point 1: For multiplication, if there is a multiplicative change to one factor, the product changes by the same scale factor.

Teaching point 2: For division, if there is a multiplicative change to the dividend and the divisor remains the same, the quotient changes by the same scale factor.

Teaching point 3: For division, if there is a multiplicative increase to the divisor and the dividend remains the same, the quotient decreases by the same scale factor; if there is a multiplicative decrease to the divisor and the dividend remains the same, the quotient increases by the same scale factor.

2.28 Combining division with addition and subtraction

[NCETM link](#)

Teaching point 1: Division can be combined with addition and subtraction; when there are no brackets, division is completed before addition or subtraction; when there are brackets, the calculation within the brackets is completed first.

Teaching point 2: When adding or subtracting division expressions that have a common divisor, the distributive law can be applied.

2.29 Decimal place-value knowledge, multiplication and division

[NCETM link](#)

Teaching point 1: To multiply a number by 10/100/1,000, move the digits one/two/three places to the left; to divide a number by 10/100/1,000, move the digits one/two/three places to the right.

Teaching point 2: Measures can be converted from one unit to another using knowledge of multiplication and division by 10/100/1,000.

Number: Fractions – 5 weeks

White Rose Small Steps

- Simplify fractions
- Fractions on a number line
- Compare and order (denominator) – where the denominators are not multiples of the same number. They find the lowest common multiple of the denominators in order to find equivalent fractions with the same denominators. Children then compare the numerators to find the larger or smaller fraction.
- Compare and order (numerator) – children compare fractions by finding a common numerator. They focus on the idea that when the numerators are the same, the larger the denominator, the smaller the fraction.
- Add and subtract fractions 1 – add and subtract fractions within 1 where the denominators are multiples of the same number.
- Add and subtract fractions 2 - add and subtract fractions where the denominators are not multiples of the same number.
- Add fractions – adding mixed numbers
- Subtract fractions – subtract mixed numbers
- Mixed addition and subtraction
- Multiply fractions by integers
- Multiply fractions by fractions
- Divide fractions by integers 1- dividing fractions where the numerator is a multiple of the integer they are dividing by.
- Divide fractions by integers 2 – divide fractions where the numerator is not a multiple of the integer they are dividing by.
- Four rules with fractions
- Fraction of an amount
- Fraction of an amount – find the whole – children find the whole amount from the known value of a fraction.

Year 6 – NCETM spines

Spine 3: Fractions

3.9 Multiplying fractions and dividing fractions by a whole number

National curriculum objectives

Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.

Compare and order fractions, including fractions > 1

Generate and describe linear number sequences (with fractions)

Add and subtract fractions with different denominations 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 $\frac{1}{8}$]

Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

[NCETM spine link](#)

Teaching point 1: When a fraction is multiplied by a proper fraction, it makes it smaller. To multiply two fractions, multiply the numerators and multiply the denominators.

Teaching point 2: When a fraction is divided by a whole number, it makes it smaller. To divide a fraction by a whole number, convert it to an equivalent multiplication.

Teaching point 3: A more efficient method can be used to divide a fraction by a whole number when the whole number is a factor of the numerator.

3.10 Linking fractions, decimals and percentages

[NCETM spine link](#)

Teaching point 1: Some fractions are easily converted to decimals.

Teaching point 2: These fraction–decimal equivalents can be found throughout the number system.

Teaching point 3: Fraction–decimal equivalence can sometimes be used to simplify calculations.

Teaching point 4: *‘Percent’* means number of parts per hundred. A percentage can be an operator on a quantity, indicating the proportion of a quantity being considered.

Teaching point 5: Percentages have fraction and decimal equivalents.

Teaching point 6: If the value of a whole is known, a percentage of that number or amount can be calculated.

Geometry: Position and direction – 1 week

White Rose Small Steps

- The first quadrant
- Four quadrants
- Translations
- Reflections

National curriculum objectives

Describe positions on the full coordinate grid (all four quadrants)

Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

Spring term

Number: Decimals – 2 weeks

White Rose Small Steps

- Three decimal places – understanding place value
- Multiply by 10, 100 and 1,000
- Divide by 10, 100 and 1,000
- Multiply decimals by integers
- Divide decimals by integers
- Division to solve problems
- Decimals as fractions
- Fractions to decimals 1 – children explore how finding an equivalent fraction where the denominator is 10, 100 or 1,000 makes it easier to convert from a fraction to a decimal.
- Fractions to decimals 2 – children recognise that $\frac{3}{4}$ is the same as $3 \div 4$. They can use this understanding to find fractions as decimals by then dividing the numerator by the denominator.

National curriculum objectives

Identify the value of each digit in numbers given to 3 decimal places and multiply numbers by 10, 100 and 1,000 giving answers up to 3 decimal places.

Multiply 1-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.

Number: Percentages – 2 weeks

White Rose Small Steps

- Fractions to percentages
- Equivalent fractions, decimals and percentages
- Order fractions, decimals and percentages – children convert between fractions, decimals and percentages to enable them to order and compare them.
- Percentage of an amount 1 – children use known fractional equivalences to find percentages of amounts.
- Percentage of an amount 2 – children build on the last step by finding multiples of 10% and other known percentages. They explore different methods of finding certain percentages e.g. Finding 20% by dividing by 10 and multiplying by 2 or by dividing by 5. They also explore finding 5% by finding half of 10%. Using these methods, children build up to find percentages such as 35%.
- Percentages – missing values - Children use their understanding of percentages to find the missing whole or a missing percentage when the other values are given.

National curriculum objectives

Solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison.

Recall and use equivalences between simple fractions, decimals and percentages including in different contexts.

Number: Algebra – 2 weeks

White Rose Small Steps

- Find a rule – one step - Children explore simple one-step function machines. Explain that a one-step function is where they perform just one operation on the input. Children understand that for each number they put into a function machine, there is an output. They should also be taught to “work backwards” to find the input given the output. Given a set of inputs and outputs, they should be able to work out the function.
- Find a rule – two step - Children build on their knowledge of one-step functions to look at two-step function machines.
- Forming expressions - Children have now met one-step and two-step function machines with numerical inputs. In this step, children use simple algebraic inputs e.g. y . Using these inputs in a function machine leads them to forming expressions e.g. $y + 4$. The use of cubes to represent a variable can aid understanding. Children are introduced to conventions that we use when writing algebraic expressions. e.g. $y \times 4$ as $4y$.
- Substitution - Children substitute into simple expressions to find a particular value. They have already experienced inputting into a function machine, and teachers can make the links between these two concepts. Children will need to understand that the same expression can have different values depending on what has been substituted.
- Formulae - Children substitute into familiar formulae such as those for area and volume. They also use simple formulae to work out values of everyday activities such as the cost of a taxi or the amount of medicine to take given a person's age.
- Forming equations - Building on the earlier step of forming expressions, children now use algebraic notation to form one-step equations. They need to know the difference between an expression like $x + 5$, which can take different values depending on the value of x , and an equation like $x + 5 = 11.2$ where x is a specific unknown value.
- Solve simple one-step equations - Children solve simple one step equations involving the four operations
- Solve two-step equations - Children progress from solving equations that require one-step to equations that require two steps
- Find pairs of values 1 - Children use their understanding of substitution to consider what possible values a pair of variables can take.
- Find pairs of values 2/ Enumerate possibilities - Building on from the last step, children find possible solutions to equations which involve multiples of one or more unknown

National curriculum objectives

Use simple formulae.
Generate and describe linear number sequences.
Express missing number problems algebraically.
Find pairs of numbers that satisfy an equation with two unknowns.
Enumerate possibilities of combinations of two variables.

Measurement: converting units – 1 week

White Rose Small Steps

- Metric measures
- Convert metric measures
- Calculate with metric measures
- Miles and kilometres
- Imperial measures

National curriculum objectives

Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.

Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3 dp.

Convert between miles and kilometres.

Measurement: perimeter, area and volume – 2 weeks

White Rose Small Steps

- Shapes – same area - Children will find and draw rectilinear shapes that have the same area.
- Area and perimeter - Children should calculate area and perimeter of rectilinear shapes
- Area of a triangle 1 – Children will use their previous knowledge of approximating and estimating to work out the area of different triangles by counting
- Area of a triangle 2 – Children use their knowledge of finding the area of a rectangle to find the area of a right-angled triangle.
- Area of a triangle 3 – Children will extend their knowledge of working out the area of a right-angled triangle to work out the area of any triangle.
- Area of a parallelogram - Children use their knowledge of finding the area of a rectangle to find the area of a parallelogram.
- Volume – counting cubes - Children should understand that volume is the space occupied by a 3-D object.
- Volume of a cuboid - Children make the link between counting cubes and the formula ($l \times w \times h$) for calculating the volume of cuboids.

2.30 Multiplicative contexts: area and perimeter 2

[NCETM spine link](#)

Teaching point 1: The area of a parallelogram can be calculated by multiplying the base by the perpendicular height; all parallelograms with the same base and perpendicular height will have the same area.

Teaching point 2: The area of a triangle can be calculated by multiplying the base by the perpendicular height and then dividing by two.

Teaching point 3: Shapes with the same area can have different perimeters; shapes with the same perimeter can have different areas.

Teaching point 4: When a shape has been transformed by a scale factor, the perimeter is also transformed by the same scale factor.

[National curriculum objectives](#)

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 cm^3 , m^3 and extending to other units (mm^3 , km^3)

Number: Ratio – 2 weeks

White Rose Small Steps

- Using ratio language
- Ratio and fractions
- Introducing the ratio symbol
- Calculating ratio
- Using scale factors
- Calculating scale factors
- Ratio and proportion problems

2.27 Scale factors, ratio and proportional reasoning

<https://www.ncetm.org.uk/resources/53675>

Teaching point 1: Multiplication and division can be used to calculate unknown values in correspondence (cardinal comparison) problems.

Teaching point 2: Multiplication and understanding of correspondence can be used to calculate the number of possible combinations of items.

Teaching point 3: Scaling can be used to make and interpret maps.

Teaching point 4: There is a proportional relationship between the dimensions of similar shapes; if the scale factor and the dimensions of one of the shapes is known, the dimensions of the similar shape can be calculated; if the dimensions of both of the shapes are known, the scale factor can be calculated.

National curriculum objectives

Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.

Solve problems involving 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.

Statistics – 2 weeks

White Rose Small Steps

- Read and interpret line graphs
- Draw line graphs
- Use line graphs to solve problems
- Circles
- Read and interpret pie charts
- Pie charts with percentages
- Draw pie charts
- The mean

Year 6 – NCETM spines

Spine 2

2.26 Mean average and equal shares

NCETM link

Teaching point 1: The mean is the size of each part when a quantity is shared equally.

Teaching point 2: The mean is defined as the sum of all the numbers in a set of data divided by the number of numbers/values that make up the set of data. If we know the mean of a set of data and the number of numbers/values in that set, we can calculate the total of the set. The mean of a set changes if the total value of the set changes or if the number of numbers/values in the set changes.

Teaching point 3: The mean can be used to compare data.

Teaching point 4: The mean is not always an appropriate representation of a set of data.

National curriculum objectives

Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.

Interpret and construct pie charts and line graphs and use these to solve problems.

Calculate the mean as an average.

Summer term

Geometry: properties of shape – 3 weeks

White Rose Small Steps

- Measure with a protractor
- Introduce angles
- Calculate angles
- Vertically opposite angles
- Angles in a triangle
- Angles in a triangle – special cases
- Angles in a triangle – missing angles
- Angles in special quadrilaterals
- Angles in regular polygons
- Draw shapes accurately
- Draw nets of 3-D shapes

National curriculum objectives

Draw 2-D shapes using given dimensions and angles.

Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons.

Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.