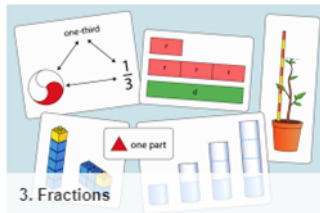
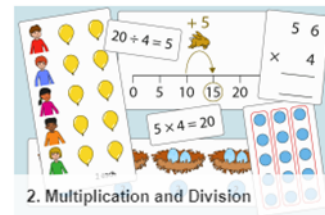
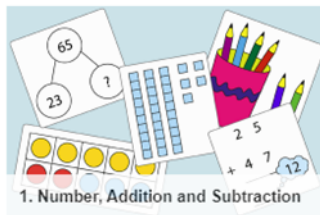




## White Rose Scheme of learning and the NCETM PD materials



This document includes our long term plan for the Year which is aligned with the White Rose Scheme of Learning and the NCETM PD materials. At Stapleford we follow teaching for mastery and these materials and tools are used to guide our planning to ensure lessons build gradually and demonstrate coherence. We use progression documents to help us ensure learning follows on from what has come before and aim to develop cross curricular links with other subjects and across math topics to deepen learning. We also use Nrich regularly to reinforce learning and promote fluency of number and problem solving and reasoning.

The [NCETM](#) and [DFE Maths guidance Year 6](#) gives guidance as to the progression through areas of study.

## Year 6 Maths

	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	White Rose Number : <a href="#">Place Value</a>  NCETM 1. 30 <a href="#">Composition and calculation: numbers up to 10,000,000</a>		White Rose Number: <a href="#">Addition, subtraction, Multiplication and Division</a>  NCETM Some 1. 30 <a href="#">Composition and calculation: numbers up to 10,000,000</a> 2. 23 <a href="#">Multiplication strategies for larger numbers and long multiplication</a> 2. 24 <a href="#">Division: dividing by two-digit divisors (some 2. 25) Using compensation to calculate</a> 2. 28 <a href="#">Combining division with addition and subtraction</a>				White Rose Number: <a href="#">Fractions</a>  NCETM 3. 9 <a href="#">Multiplying fractions and dividing fractions by a whole number</a>			White Rose: <a href="#">Geometry: position and direction</a>  NCETM <a href="#">M-curriculum resource tool and assessment materials</a>		

	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	White Rose Number : <a href="#">Decimals</a>  NCETM 2. 29 <a href="#">Decimal place-value knowledge, multiplication and division</a> 3. 10 <a href="#">Linking fractions, decimals and percentages</a>		White Rose Number : <a href="#">Percentages</a>  NCETM 3. 10 <a href="#">Linking fractions, decimals and percentages</a>		White Rose Number : <a href="#">Algebra</a>  NCETM 1. 31 <a href="#">Problems with two unknowns</a>		White Rose Measurement: <a href="#">Converting units</a>  NCETM 3. 10 <a href="#">Linking fractions, decimals and percentages</a>	White Rose Measurement: <a href="#">Perimeter, Area and Volume</a>  NCETM 3. 10 <a href="#">Linking fractions, decimals and percentages</a>  NCETM 2. 30: <a href="#">Multiplicative contexts: area and perimeter</a>		White Rose Number : <a href="#">Ratio</a>  NCETM 2. 25 <a href="#">Using compensation to calculate</a>  2. 27 <a href="#">Scale factors, ratio and proportional reasoning</a>		White Rose <a href="#">Statistics</a>  NCETM 2. 26 <a href="#">Mean average and equal shares</a>  NCETM <a href="#">curriculum</a>

				<a href="#">percent ages</a> <a href="#">NCETM-curriculum resource tool and assessment materials</a>	<a href="#">NCETM-curriculum resource tool and assessment materials</a>		<a href="#">resource tool</a>
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	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
SUMMER	White Rose Geometry: <a href="#">properties of shape</a>  <a href="#">NCETM- curriculum resource tool and assessment materials</a>			Revision and SATs			Problem solving and entrepreneur  <i>Embedding skills prior to secondary and cross stage transition</i>			Investigations  <i>Embedding skills prior to secondary and cross stage transition</i>		

## Year 6 Maths - Programme of Study Taken from the [National Curriculum](#)

### Number - number and place value

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

### Notes and guidance (non-statutory)

- Pupils use the whole number system, including saying, reading and writing numbers accurately.

### Number - addition, subtraction, multiplication and division

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

### Notes and guidance (non-statutory)

- Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division.
- They undertake mental calculations with increasingly large numbers and more complex calculations
- Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

- Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc but not to a specified number of significant figures.
- Pupils explore the order of operations using brackets
- Common factors can be related to finding equivalent fractions

## Number - Fractions (including decimals and percentages)

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,  $\frac{3}{8}$ ]
- 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
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts

### Notes and guidance (non-statutory)

- Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other ( $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$ )
- Variety of images used to support understanding
- Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (if  $\frac{1}{4}$  of a length is 36cm, the whole length is  $36 \times 4 = 144$ cm)
- Practise calculations with simple fractions and decimal equivalents, including listing equivalent fractions to identify fractions with common denominators.
- Explore and make conjectures about converting a simple fraction to a decimal fraction.
- For simple fractions with recurring decimal equivalents, pupils should learn about rounding to three decimal places.
- Multiply and divide numbers with up to 2dp by one digit and 2 digit whole numbers.

- Develop skills of rounding and estimating as a means of predicting and checking calculations.

## Ratio and proportion

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

### Notes and guidance (non-statutory)

- Recognise proportionality in contexts when the relations between quantities are in the same ratio (eg shapes/ recipes)
- Link percentages or  $360^\circ$  to calculating angles of pie charts
- Consolidate understanding of ratio when comparing quantities, sizes and scale drawings
- Solve problems involving unequal parts

## Algebra

Pupils should be taught to:

- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with 2 unknowns
- enumerate possibilities of combinations of 2 variables

### Notes and guidance (non-statutory)

- Pupils should be introduced to the use the symbols and letters to represent variables and unknowns in mathematical situations they already understand, such as:  
missing numbers, lengths, coordinates and angles  
formulae in mathematics and science  
equivalent expressions (for example,  $a + b = b + a$ )  
generalisations of number patterns  
number puzzles (for example, what 2 numbers can add up to)

## Measurement

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 ( $\text{cm}^3$ ) and cubic metres ( $\text{m}^3$ ), and extending to other units [for example,  $\text{mm}^3$  and  $\text{km}^3$ ]

### Notes and guidance (non-statutory)

- Connect conversion (eg km to miles) to a graphical representation
- Know approximate conversions and are able to tell if answers are sensible
- Using a numberline, add and subtract positive and negative numbers for integers of measure.
- Relate the area of rectangles to parallelograms and triangles. Understand and use formulas to do this.
- Be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate.

## Geometry - properties of shapes

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

### Notes and guidance (non-statutory)

- Draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles
- Describe the properties of shape and explain how unknown angles and lengths can be derived from known measurements
- Relationships might be expressed algebraically (eg  $d = 2 \times r$ )

## Geometry - position and direction

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

### Notes and guidance (non-statutory)

- Draw and label a pair of axis in all 4 quadrants with equal scaling.
- Draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex  $(a,b)$  to  $(a-2, b+3)$

## Statistics

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

### Notes and guidance (non-statutory)

- Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts
- Pupils both encounter and draw graphs relating 2 variables, arising from their own enquiry and in other subjects
- They should connect conversion from kilometers to miles in measurement to its graphical representation
- Pupils know when it is appropriate to find the mean of a data set



## Year 6 Maths - Cross curricular maths

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p><b>Electricity (Science)</b> Measuring accurately for building carousels</p> <p><b>DT</b> Measuring accurately, faces, area needed for tracing paper Circles and area (linking to vocabulary from geometry)</p> <p><b>Art</b> Perspective sketches (linking to vocabulary from geometry)</p>	<p><b>History</b> Chronology of events Codes and codebreakers Graphical representations of areas of attack - comparison</p> <p><b>Science</b> Making periscopes - making a 3D shape and angles Angles - angles of incidence etc Geometry vocabulary</p> <p><b>Cookery</b> Making ration recipes</p> <p><b>Computing</b> Excel and formula</p>	<p><b>Geography</b> Lines of latitude and longitude and finding locations</p> <p><b>Topic science</b> Percentages and estimating area (amount of iceberg above/below the water) M/yards - comparing the size of icebergs and visualising/ measuring Statistics - comparing journey process and lengths surrounding journeys/ Titanic's journey Estimating angles (viewpoints of the Titanic) Surface area (various experiments linking to buoyancy) Recording results Percentages linking to results Units of measure</p> <p><b>Topic</b> Discussion of % rises in costs and how the value of money changes over time. Who was to blame - intervals of time</p> <p><b>Art</b> Perspective</p> <p><b>Cookery</b> Costings and meal inspired by the Titanic</p> <p><b>Computing</b> Creating graphs</p>	<p><b>Science/history</b> timelines and ordering events layers in soil visualising timeline and scale</p> <p><b>Geography</b> Lines of latitude and longitude and finding locations</p> <p><b>Science</b> recording results/ graphs Infographics</p>	<p><b>History</b> timelines and ordering events</p> <p><b>Science</b> Classifying animals recording results/ graphs Infographics</p> <p><b>Art</b> proportions</p>	<p><b>History</b> Chronology of events Accurate ordering on a number line (various scales used to plot dates accurately))</p> <p><b>Geography</b> Creating maps using positional and directional vocabulary (angles, ½ turn, compass points etc) Compass points and degrees/ angles</p> <p><b>Art</b> Medallions - area, radius and circumference of a circle Geometry vocabulary</p> <p><b>DT</b> Making treasure chests - linking to finding the volume Making nets (opportunity to design their own) and finding the perimeter and area of each face. Accurate measurement to create accurate boxes. Repeated with cookery (gingerbread chests) 3D shape vocabulary used (face, vertices, edge) and types of 3D shapes and nets discussed. Geometry vocabulary</p> <p><b>Science</b> recording results/ graphs interpreting graphs Infographics</p>



## Year 6 - Nrich

*This is an approximate guide. More activities can be included but those listed below are the minimum.*

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Year 6</p> <p><u>Use at different times - application of number and previously learnt skills</u></p>	<p><u>Place Value</u></p> <p><u>Rounding</u> <u>Negative numbers</u></p> <p><u>Four Operations</u></p> <p><u>Factors</u> <u>Factors 2</u></p> <p><u>Factors and multiples</u> <u>Factors and multiples 2</u></p> <p><u>Multiplication and division</u>(numbers may altered)</p> <p><u>Prime numbers</u></p> <p><u>Square numbers 1</u> <u>Square numbers 2</u></p> <p><u>Countdown</u> to refer to throughout the</p>	<p><u>Fractions</u></p> <p><u>Rectangle tangle - fractional amounts of shapes</u></p> <p><u>Adapt for equivalence, mixed and improper fractions</u></p> <p><u>Totality</u> (adapted for adding, subtracting, multiplying and dividing fractions)</p> <p><u>Adding unit fractions</u></p> <p><u>Adding and subtracting fractions</u></p> <p><u>Adding and subtracting fractions</u> (adapt</p>	<p><u>Decimals</u></p> <p><u>Totality</u> (adapted for adding, subtracting, multiplying and dividing fractions) <u>Spiralling decimals</u> <u>Multiplying decimals</u> (and adaptations)</p> <p><u>Percentages</u></p> <p><u>Equivalence</u> (percentages, decimals and fractions)</p> <p><u>Equivalence donut</u></p> <p><u>Adapt for equivalence jigsaw</u></p> <p><u>Percentages of amounts</u></p>	<p><u>Converting units</u> <u>Perimeter</u> <u>area and volume</u></p> <p><u>Area of triangles and fractions</u> <u>Volume</u></p> <p><u>Ratio</u></p> <p><u>Rod ratios</u> <u>interactivity</u> <u>Ratio problem</u> <u>context and this</u></p> <p><u>Statistics</u></p> <p><u>Mean</u> <u>Birdwatch</u></p>	<p><u>Properties of Shape</u></p> <p><u>Cuboids</u> <u>Cut nets</u> <u>Drawing shapes</u> <u>External angles</u> <u>Always, sometimes, never</u> (adapt) <u>Estimating angles</u></p>	<p><u>Problem solving, investigations and entrepreneurial</u></p> <p><u>Factors and multiples with cogs</u> <u>Exploring squares - fractions</u> <u>Four go</u> <u>Pictures from number patterns</u></p>

	<p>year to practise these skills</p> <p><u>BIDMAS</u></p> <p><u>Multiplying by a single digit 1</u></p> <p><u>Multiplying by a single digit 2</u></p>	<p>for multiplication and division)</p> <p><b><u>Geometry</u></b> <b><u>(position and direction)</u></b></p>	<p><u>Money maze</u> (adapt for percentages of amounts)</p> <p><b><u>Algebra</u></b></p> <p><u>Substitution</u></p> <p><u>Contexts</u></p> <p><u>Substitution and solving</u></p> <p><u>Formula</u></p> <p><u>Formula for proof</u></p>			
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For use in WWII unit: <https://nrich.maths.org/774>