

2021

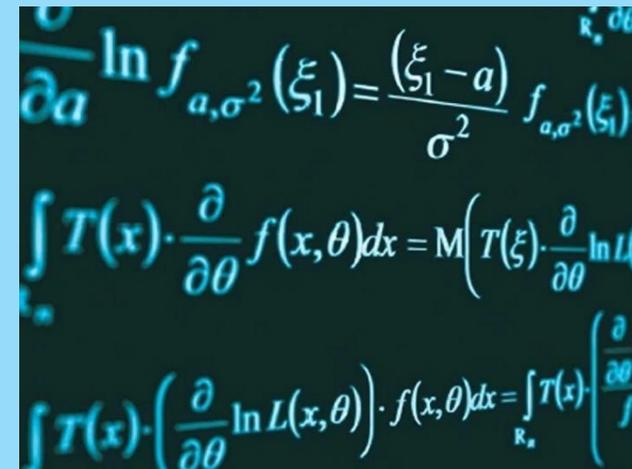
Curriculum Skills and Progression Mathematics

Old Catton C of E Junior School's Mathematics' Christian Distinctiveness Statement

At Old Catton C of E Junior School, we ensure, through a varied and thorough curriculum, that all pupils have the opportunity to study the world around them and ask questions and challenge pre-conceived ideas. Within our Maths curriculum, we inspire children to become excited by numbers, their patterns and the role they play in our everyday lives. Old Catton Junior School's key values of Love, Hope and Joy are present within our Maths curriculum: encouraging a love of numbers and their patterns; hope that a problem can be solved, no matter how difficult it may seem and joy for challenge and being able to apply skills and knowledge in order to solve these problems. Through the teaching of our school's Bible story of The Lost Sheep, children are encouraged to help one another when needed and to celebrate individual strengths. These attributes are present in our Maths curriculum through paired work, group tasks and a celebration of everyone's successes such as Times Table Masters and Rockstars.



Nebula
where stars are born



The Nebula Federation

Old Catton C of E Junior School

SKILLS MAP						
Mathematics – Year 2 (for reference and back-filling)						
Expected			Greater Depth			
<p>Pupils can ...</p> <ul style="list-style-type: none"> Partition two-digit numbers into different combinations of tens and ones. This may include using apparatus (e.g. 23 is the same as 2 tens and 3 ones which is the same as 1 ten and 13 ones) Recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20. Know that $7 + 3 = 10$, then $17 + 3 = 20$ Can add and subtract 2 two-digit numbers within 100 (e.g. $48 + 35$) and can demonstrate and explain their method using concrete apparatus or pictorial representations Can recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables to solve simple problems, demonstrating an understanding of commutativity as necessary (e.g. knowing they can make 7 groups of 5 from 35 blocks and writing $35 \div 5 = 7$; sharing 40 cherries between 10 people and writing $40 \div 10 = 4$; stating the total value of six 5p coins) Can identify $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{4}$ of a length, shape, set of objects or quantity and knows that all parts must be equal parts of the whole Can use different coins to make the same amount (e.g. pupil uses coins to make 50p in different ways; pupil can work out how many £2 coins are needed to exchange for a £20 note) Can read and draw hands on the time on the clock to the nearest 15 minutes Can describe properties of 2-D and 3-D shapes (e.g. the pupil describes a triangle: it has 3 sides, 3 vertices and 1 line of symmetry; the pupil describes a pyramid: it has 8 edges, 5 faces, 4 of which are triangles and one is a square) Read scales in divisions of ones, twos, fives and tens 			<p>Pupils can ...</p> <ul style="list-style-type: none"> Work in a systematic, logical way to find patterns, generalise and justify mathematical thinking Read scales in divisions of ones, twos, fives and tens in a practical situation where not all numbers on the scale are given and estimate points in between Use multiplication facts to make deductions outside known multiplication facts (e.g. a pupil knows that multiples of 5 have one digit of 0 or 5 and uses this to reason that 18×5 cannot be 92 as it is not a multiple of 5) Use reasoning about numbers and relationships to solve more complex problems and explain their thinking. E.g. solve more complex missing number problems (e.g. $14 + - 3 = 17$; $14 + \Delta = 15 + 27$) Solve unfamiliar word problems that involve more than one step (e.g. which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet?) Read and draw on hands to show the time on the clock to the nearest 5 minutes Describe similarities and differences of shape properties (e.g. finds 2 different 2-D shapes that only have one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices but can describe what is different about them) 			
Key Vocabulary						
Number and place value	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	Data/statistics	General/problem solving

Curriculum Skills and Progression Map

Numbers to one hundred	Quarter past/to m/km, g/kg, ml/l	Rotation	Size	Three quarters, one third, a third	Count, tally, sort	Predict
Hundreds	Temperature (degrees)	Clockwise, anticlockwise	Bigger, larger, smaller	Equivalence, equivalent	Vote	Describe the pattern, describe the rule
Partition, recombine		Straight line	Symmetrical, line of symmetry		Graph, block graph, pictogram,	Find, find all, find different
Hundred more/less		Ninety-degree turn, right angle	Fold		Represent	Investigate
			Match		Group, set, list, table	
			Mirror line, reflection		Label, title	
			Pattern, repeating pattern		Most popular, most common, least popular, least common	

SKILLS MAP	
Mathematics – Year 3	
Expected	Greater Depth
<p>Pupils can ...</p> <ul style="list-style-type: none"> • Compare and order numbers up to 1000 • Read and write numbers up to 1000 in numerals and words • Count in multiples of 4, 8, 50 and 100 • Find 10 or 100 more or less than a given number • Recognise the place value of each digit in a three digit number (hundreds, tens, ones) • Solve number problems and practical problems involving place value • Add and subtract numbers mentally, including: a 3 digit number and ones, a 3 digit number and tens, a 3 digit number and hundreds • Add and subtract numbers with up to 3 digits using formal written methods of column addition and subtraction – see school calculation policy • Solve problems including missing number problems using number facts, place value and more complex addition and subtraction • Recall and use multiplication and division facts for the 3, 4 and 8 times tables • Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two digit numbers times one digit numbers, using mental and progressing to formal written methods • Count up and down in tenths: recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 • Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators • Recognise and show, using diagrams, equivalent fractions with small denominators • Compare and order unit fractions and fractions with the same denominators • Add and subtract fractions with the same denominator within one whole 	<p>Pupils can ...</p> <ul style="list-style-type: none"> • Work in a systematic, logical way to find patterns, generalise and justify mathematical thinking • Reason and represent place value in different ways using mathematical language • Partition a 3-digit number and use that to work out its complement to 1000, explaining their reasoning using the language of place value • Calculate mentally using efficient strategies • Solve missing numbers problems such as $384 = 171 + ?$ • Use formal methods to solve problems, including multi-step and apply skills to create own multi-step problems using mathematical language: • Solve problems such as ‘A fish weighs 50g, another fish weighs 8 times as much, how much does the larger fish weigh?’ • Solve problems such as, ‘Dad drives a truck. Last week he drove 267 miles on Monday, 186 on Tuesday and 198 on Wednesday. This week Dad drove 282 miles in total. What is the difference in mileage between this week and last week.’ • Recognise relationships between fractions and decimals and express them as equivalent quantities - Jimmy has 6 marbles. This is 0.4 or $\frac{2}{5}$s of the total number. What is the total number of marbles • Calculate using fractions and decimals • Calculate $\frac{2}{4} + \frac{3}{4} = \frac{5}{4}$ and $\frac{5}{4} - \frac{3}{4} = \frac{2}{4}$. They realise that $\frac{5}{4}$ is greater than one and can suggest ways to record this • Calculate with measures (time, capacity, length, mass) - 6 toy cars balance 2 dolls. 4 dolls balance 1 toy robot. If the robot weighs 3 kg, what does each toy car weigh? • Use mathematical reasoning to compare angles - Can you draw a quadrilateral with: 1 right angle? 2 right angles? 5 right angles? <i>No right angles?</i> Can you draw a triangle with 1 right angle? 2 Right angles? Are some of these impossible, can you explain why?

<ul style="list-style-type: none"> • Measure, compare, add and subtract: lengths (m/cm/mm): mass (kg/g) volume/capacity (l/ml) including measuring the perimeter of simple 2D shapes • Add and subtract amounts of money to give change using both £ and p in practical contexts • Tell and write the time from an analogue clock, including using Roman numerals from 1 to X11 and 12 hour and 24 hour clocks • Record and compare time in respect to seconds, minutes and hours • Know the number of days in a month, the number of months in a year and the number of days in a year – including a leap year • Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn: identify whether angles are greater than or less than a right angle • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines • Interpret and present data using bar charts, pictograms and tables, including solving one step and 2 step questions using information presented in scales bar charts and pictograms and tables • Draw 2D shapes using mathematical language • Recognise 2D and 3D shapes in different positions and orientation and describe them 	
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Key Vocabulary							
Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	Data/statistics
Numbers to one thousand	Column addition and subtraction	Product Multiples of four, eight, fifty and one hundred Scale up	Leap year Twelve-hour/twenty-four- hour clock Roman numerals I to XIII	Greater/less than ninety degrees Orientation (same orientation, different orientation)	Horizontal, vertical, perpendicular and parallel lines	Numerator, denominator Unit fraction, non-unit fraction Compare and order Tenths Chart	Chart, bar chart, frequency table, Carroll diagram, Venn diagram Axis, axes Diagram

SKILLS MAP Mathematics – Year 4	
Expected	Greater Depth
<p>Pupils can ...</p> <ul style="list-style-type: none"> • Count in multiples of 6, 7, 9, 25 and 1000 • Count backwards through zero to include negative numbers • Order and compare numbers beyond 1000, including up to 2 decimal places • Find a 100 more or less than a given number • Recognise the place value of each digit in a four digit whole number • Round any number to the nearest 10, 100 or 1000 • Read roman numerals up to 100 • Add and subtract numbers up to 4 digit using formal written methods – see school calculation policy • Solve addition and subtraction two step problems in contexts, deciding which operations and methods to use and why • Recall multiplication and division facts of multiplication tables up to 12 x 12 • Multiply 2 and 3 digit numbers by 1 digit number using a formal written layout – see school calculation policy • Recognise and show, using diagrams (e.g. fraction walls), common equivalent fractions, including adding and subtracting fractions • Can find fractions of a given quantity • Count up and down in hundredths: recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten, including representing as a decimal • Round decimals with one decimal place to the nearest whole number • Solve simple measure and money problems involving fractions and decimals to two decimal places, including formal column method where appropriate • Convert between different units of measure (kilometre to metre: hour to minute) • Solve problems involving converting time between analogue and digit 12 and 24 hour clocks 	<p>Pupils can ...</p> <ul style="list-style-type: none"> • Work in a systematic, logical way to find patterns, generalise and justify mathematical thinking. • Reason about place value: <i>How many different ways can you write 5510. Pupils suggest ways such as 551 tens, 55 hundreds and 1 ten 5510 ones</i> • <i>Arrange the digit cards 1 4 5 and 8 to make the number closest to 6000 and can justify their choice using the language of place value.</i> • Calculate mentally using efficient strategies: <i>Write 3 calculations in which you would use mental calculation strategies and 3 where you would apply a column method and explain the decision you made with each calculation Can work out 345×6 mentally by calculating 300×6 is 1800 40×6 is 240 and 5×6 is 30 to get 2070</i> • Apply formal methods to solve multi-step problems: <i>Sarah buys 5 pens at £1.25 each, 3 pencils at 38p each and a ruler for 85p. How much change does she get from £10?</i> • Recognise relationships between fractions and decimals and express them as equivalent quantities: <i>Can you order these decimals and fractions on a number line? 0.35 $\frac{3}{4}$ 0.5 $\frac{1}{5}$ $\frac{4}{9}$</i> • Calculate using fractions and decimals: <i>A soup recipe uses $\frac{3}{4}$ as many onions as carrots. Jo is making the soup and has 8 carrots. How many onions does Jo use? Explain how you worked out the number of onions? Did you use the same method each time?</i> • Substitute values into a simple formula to solve problems: $3 \times a + 2 = 17$ <i>What is the value of a?</i> • Calculate with measures (time, capacity, length, mass): <i>Converting and ordering across a range of measures</i> • Use mathematical reasoning to compare and order angles • Compare angles in order to decide whether a polygon is regular

<ul style="list-style-type: none"> • Compare and classify geometric shapes, using the language of orientation, including quadrilaterals and triangles, based on their properties and sizes, including Identifying acute, obtuse angles and right angles • Measure and calculate the perimeter and area of rectilinear shapes – including squares in m and cm • Identify lines of symmetry in 2D shapes presented in different orientations • Plot specified points and draw sides to complete a given polygon • Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs • Describe and plot positions on 2D grids as co-ordinates, including describing movements as translation 	
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Key Vocabulary						
Number and place value	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	Data/statistics
Tenths, hundredths Decimal (places)	Multiplication facts (up to 12x12)	Convert	Coordinates	Quadrilaterals	Equivalent decimals and fractions	Continuous data Line graph
Round (to nearest)	Division facts		Translation	Triangles		
Thousand more/less than	Inverse		Quadrant	Right angle, acute and obtuse angles		
Negative integers	Derive		x-axis, y-axis			
Count through zero			Perimeter and area			
Roman numerals (I to C)						

Years 3 and 4 CROSS-CURRICULAR LINKS

Science Units:

- Changing Sound - Measure: measuring lengths
- States of Matter – Measure: measuring temperature, reading scales on a thermometer
- Brilliant Bubbles – Measure: measuring mass and capacity
- Health and Movement – Data handling: Tally charts and pictograms
- Rocks, Fossils and Soils – Measure: reading and measuring time
- Light and Shadow – Data handling: Bar charts
– Measure: measuring length
- Forces and Magnets – Measuring: reading scales on force meters and measuring length

Geography Units:

- Countries of the World – Number: Comparing numbers, reading large numbers
- Our European Neighbours – Number: Reading and comparing large numbers
- Volcanoes – Number: reading large numbers and decimals
- In the Desert – Number: negative numbers
- Rainforest – Data Handling: Line graphs

PE Units:

- Athletics – Measure: measuring lengths and time

ICT Units:

- We are Bug Fixers: develops skills in logical reasoning and problem solving
- We are Presenters: comparing times and distances
- We are Opinion Pollsters: children apply work in statistics on interpreting and presenting data
- We are Software Developers: children create a game to reinforce areas of mathematics
- We are Meteorologists: practise interpreting and presenting discrete and continuous data

SKILLS MAP Mathematics – Year 5	
Expected	Greater Depth
<p>Pupils can ...</p> <ul style="list-style-type: none"> • Read, write, order and compare numbers to at least 1000000 and determine the value of each digit, including up to 3 decimal places • Round any number up to 1000000 to the nearest 10, 100, 100, 10,000 and 100,000, including rounding to the nearest whole number and one decimal place • Interpret negative numbers in context • Count forwards and backwards with positive and negative whole numbers, including through zero • Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) – solve multi-step problems • Add and subtract whole numbers with more than 4 digits mentally • Solve problems involving multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. Including prime numbers, composite numbers, squares and cubes • Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates (See calculation policy) • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • Compare and order fractions whose denominators are all multiples of the same number • Read and write decimal numbers as fractions • Recognise fractions and decimal equivalents of percent • Read, write, order and compare numbers with up to three decimal places • Solve problems which require knowing percentage and decimal equivalents of a half, quarter, a fifth, two fifths and four fifths and those fractions with a denominator of a multiple of 10 or 25 • Recognise mixed numbers and improper fractions and convert them from one form to the other 	<p>Pupils can ...</p> <ul style="list-style-type: none"> • Work in a systematic, logical way to find patterns, generalise and justify mathematical thinking • Reason and represent place value in different ways using mathematical language: <i>Pupils can work the connection between finding the difference between negative numbers and subtracting them</i> • Calculate mentally using efficient strategies: <i>Pupils can write a variety of calculations derived from $15 + 63 = 78$ and generalize to describe further calculations $20 \times 7 \times 5 = 20 \times 5 \times 7 = 100 \times 7 = 700$</i> • Use formal methods to solve problems, including multi-step: <i>Sam and Tom have £67.80 between them. If Sam has £6.20 more than Tom, how much does Tom have?</i> • Solve problems between fractions and decimals and percentages and express them as equivalent quantities: <i>Jack and Jill each go out shopping. Jack spends $\frac{1}{4}$ of his money. Jill spends 20% of her money. Frank says Jack spent more because $\frac{1}{4}$ is greater than 20%. Alice says you cannot tell who spent more. Who do you agree with, Frank or Alice? Explain why?</i> • Use the numbers 3 4 5 and 6 makes this sum have the smallest possible answer: <i>I spent $\frac{3}{5}$s of my money and had £1.40 left to buy lunch. How much money did I have to begin with?</i> • Substitute values into a simple formula to solve problems • Find the perimeter of a rectangle or the area of a triangle: <i>A rectangle has a perimeter of 20. What is the largest possible area it could have?</i> • Calculate with measures (time, capacity, length, mass) - <i>True or false? $1.5\text{kg} + 600\text{g} = 2.1\text{kg} + 300\text{g}$ $32\text{cm} + 1.05\text{m} = 150\text{cm} - 0.13\text{m}$ $\frac{3}{4}\text{L} + 0.05\text{L} = \text{half of } 1.6\text{L}$ Explain your reasoning</i> • Apply angle properties in different contexts • Construct a triangle with angles of 48 degrees 60 degrees and 72 degrees and draw any rectilinear shape, with given dimensions, to the nearest millimetre

<ul style="list-style-type: none"> • Add and subtract fractions with the same denominators and with denominators with the same multiples • Multiply proper fractions and mixed numbers by whole numbers • Convert between different units of metric measure (k/m) (cm/ml) (g/kg) (l/ml) • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • Calculate and compare the area of rectangles (including squares) and including using standard units, square cm and square m and estimate the area of irregular shapes • Estimate and identify the volume • Draw given angles and measure them in degrees • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles, including finding missing lengths and angles • Identify angles at a point, straight line and a quarter turn • Identify and describe and represent the position of shapes after reflection and translation • Identify 3D shapes from 2D representations • Complete, read and interpret information in tables, including timetables and line graphs-identifying patterns and trends 	
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Key Vocabulary						
Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions, decimals and percentages
Powers of 10	Efficient written method	Factor pairs Composite numbers, prime number, prime factors, square number, cubed number Formal written method	Volume Imperial units, metric units	Reflex angle Dimensions	Regular and irregular Polygons	Proper fractions, improper fractions, mixed numbers Percentage Half, quarter, fifth, two fifths, four fifths Ratio, proportion

SKILLS MAP	
Mathematics – Year 6	
Expected	Greater Depth
<p>Pupils can ...</p> <ul style="list-style-type: none"> • Demonstrate an understanding of place value, including large numbers and decimals (e.g. what is the value of the '7' in 276,541?; find the difference between the largest and smallest whole numbers that can be made from using three digits; $8.09 = 8 + 9 ?$; $28.13 = 28 + + 0.03$) • Round any whole numbers to a given degree of accuracy • Use negative numbers in context including calculating intervals across zero • Perform mental calculations including mixed operations and large numbers, using efficient strategies such as manipulating expressions using commutative and distributive properties to simplify the calculation (e.g. $53 - 82 + 47 = 53 + 47 - 82 = 100 - 82 = 18$; $20 \times 7 \times 5 = 20 \times 5 \times 7 = 100 \times 7 = 700$; $53 \div 7 + 3 \div 7 = (53 + 3) \div 7 = 56 \div 7 = 8$) • Use formal methods to solve multi-step problems (e.g. <i>find the change from £20 for three items that cost £1.24, £7.92 and £2.55; a roll of material is 6m long: how much is left when 5 pieces of 1.15m are cut from the roll?; a bottle of drink is 1.5 litres, how many cups of 175ml can be filled from the bottle, and how much drink is left?</i>) <i>Follow calculation policy</i> • Use knowledge of the order of operations to carry out calculation using the four operations (BODMAS) • Recognise the relationship between fractions, decimals and percentages and can express them as equivalent quantities (e.g. one piece of cake that has been cut into 5 equal slices can be expressed as $\frac{1}{5}$ or 0.2 or 20% of the whole cake) • Express a remainder as a decimal or fraction • Add and subtract fractions with different denominations and mixed numbers 	<p>Pupils can ...</p> <ul style="list-style-type: none"> • Work in a systematic, logical way to find patterns, generalise and justify mathematical thinking • Have sufficient depth of knowledge and understanding to reason and explain mathematical concepts and procedures and use them to solve a variety of problems, using mathematical language

<ul style="list-style-type: none"> • Multiply pairs of proper fractions and divide fractions by whole numbers • Use common factors to simplify fractions, compare and order fractions including fractions greater than one • Calculate using fractions, decimals or percentages (<i>e.g. knowing that 7 divided by 21 is the same as $\frac{7}{21}$ and that this is equal to $\frac{1}{3}$; 15% of 60; $11\frac{2}{3} + 3\frac{4}{5}$; $\frac{7}{9}$ of 108; 0.8×70).</i> • Substitute values into a simple formula to solve problems (<i>e.g. perimeter of a rectangle or area of a triangle</i>). • Generate and describe linear number sequences • Express missing number problems algebraically • Find pairs of numbers that satisfies an equations with 2 unknown • Enumerate possibilities of combinations of 2 variables • Calculate with measures (e.g. calculate length of a bus journey given start and end times; convert 0.05km into m and then into cm) • Convert between miles and km • Calculate and compare volumes of cubes and cuboids • Solve problems involving ratio and scale factor • Reason why shapes with the same area can have different perimeters (and vice versa) • Calculate areas of parallelograms and triangles 	
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Key Vocabulary							
Number and place value	Addition and subtraction	Multiplication and division	Geometry (position and direction)	Geometry (properties of shape)	Fractions, decimals and percentages	Algebra	Data/statistics
Numbers to ten million	Order of operations	Order of operations Common factors, common multiples	Four quadrants (for coordinates)	Vertically opposite (angles) Circumference, radius, diameter	Degree of accuracy Simplify	Linear number sequence Substitute Variables Symbol Known values	Mean Pie chart Construct

Years 5 and 6 CROSS-CURRICULAR LINKS

English Units:

- Power of Reading: The Promise – Data Handling: line graphs of emotions over time

Science Units:

- Healthy Bodies – Data Handling: bar and line graphs
- Earth and Space – Number: Calculation and ratio
 - Data Handling: line graph
 - Measure: scaled drawing
- Forces in Action – Data Handling: calculating mean, bar graph
 - Measure: measuring mass
- Properties and Changes of Materials – Data Handling: bar graph
- Seeing Light – Data Handling: bar graph

Geography Units:

- United Kingdom – Data Handling: bar graph
 - Measure: comparing lengths

Design Technology Units:

- Fairgrounds – Measure: measuring lengths
- Christmas Fair – Measure: measuring mass and capacity
 - Number: calculating with money
- Bread – Measure: measuring mass and capacity
- Building Bridges – Measure: measuring length
- Biscuits – Measure: measuring mass and capacity
 - Data Handling: car graph
 - Geometry: nets

ICT Units:

- We are Cryptographers: encryption and decryption use mathematical functions, frequency tables
- We are Artists: use knowledge of angles, 2D shapes, translations and that angles at a point total 360°
- We are Project Managers: pupils can create a revision maths app
- We are App Developers: logical thinking and problem solving

LIST OF APPENDICES

1. How Maths Looks at OCJS
2. Maths Action Plan
3. Calculation Policy
4. Calculation hand-out for parents
5. Long-term maths planning with links to Guidance
6. Non-Statutory Maths Guidance
7. Deeper Learning questions