WORTH PRIMARY SCHOOL
"lifelong learning"

Years 3 and 4

Long term aims and objectives

Whole School Aims

- To ensure that all pupils become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall an apply knowledge rapidly and accurately.
- To ensure that all pupils reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- To ensure that all pupils can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Lower KS2 aims

- The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.
- At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.
- Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

<table>
<tr><th>Year 3 statutory requirements</th><th>Year 4 statutory requirements</th><th>Models and images to support conceptual understanding and progression
Examples of formal written methods to be used</th></tr>
<tr><td colspan="2"><u>Maths investigation work – (nrich website, KLZ maths site, Apex books for resources)</u>
Children should be able to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and develop an argument, justification or proof using mathematical language.
<u>Term 1 focus</u> - Finding rules and describing patterns
<u>Term 2 focus</u> - Logic and reasoning puzzles</td><td rowspan="2">Addition Year 3

No number line
57 + 285 = 342
285 + 50 = 335
335 + 7 = 342

<u>Addition Year 4</u>
5735 + 562 = 6297
5735
+ 562
7
90
1200
5000
6297

<u>Subtraction Year 3</u>
874 - 523 = 351
(no decomposition
8 7 4
– 5 2 3
3 5 1

<u>Subtraction Year 4</u> –
1000 and 300 and 70 and 4
– 900 and 60 and 8
1300 and 60 and 14
– 900 and 60 and 8
400 and 0 and 6
Decomposition: 1374 - 968 = 406

<u>Multiplication Year 3</u>
36 x 4 = 144
<table><tr><td>X</td><td>30</td><td>6</td></tr><tr><td>4</td><td>120</td><td>24</td></tr></table></td></tr>
<tr><td><u>Number and place value</u>
• Count from 0 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)
• Compare and order numbers up to 1000
• Read and write numbers up to 1000 in numerals and in words
• Solve number problems and practical problems involving these ideas.

<u>Number addition and subtraction</u>
• Add and subtract numbers mentally, including: a three-digit number and ones a three-digit number and tens a three-digit number and hundreds

<u>Number – multiplication and division</u>
• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

<u>Number – fractions</u>

• Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit number 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 use fractions as numbers: unit fractions and non-unit fractions with small denominators.
• Solve problems that involve all of the above.

<u>Measurement</u></td><td><u>Number and place value</u>
• Count in multiples of 6, 7, 9, 25 and 1000
• Find 1000 more or less than a given number
• Count backwards through zero to include negative numbers
• Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
• Order and compare numbers beyond 1000
• Round any number to the nearest 10, 100 or 1000
• Solve number and practical problems that involve all of the above and with increasingly large positive numbers

<u>Number – addition, subtraction</u>
• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

<u>Number – multiplication and division</u>

• Recall multiplication and division facts for multiplication tables up to 12 × 12
• Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers

<u>Number – fractions</u>
• Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
• Round decimals with one decimal place to the nearest whole number</td></tr>
</table>

- Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- Add and subtract amounts of money to give change, using both £ and p in practical contexts
- Know the number of seconds in a minute and the number of days in each month, year and leap year

Geometry – properties of shapes

- Recognise angles as a property of shape or a description of a turn
- 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

Statistics

- Interpret and present data using bar charts, pictograms and tables

- Compare numbers with the same number of decimal places up to two decimal places
- Solve simple measure and money problems involving fractions and decimals to two decimal places.

Measurement

- Convert between different units of measure [for example, kilometre to metre; hour to minute]

Geometry – properties of shapes

- Identify acute and obtuse angles and compare and order angles up to two right angles by size

Geometry – position and direction

- Describe positions on a 2-D grid as coordinates in the first quadrant

Statistics

- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

Multiplication Year 4

43 x 6 = 258

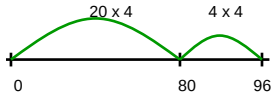
(estimate: 40 x 6 = 240)

40 x 6 = 240
3 x 6 = 18

x	300	40	2
7	2100	280	14

Division Year 3

96 ÷ 4 = 24

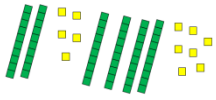
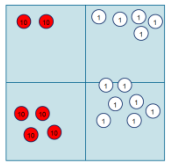
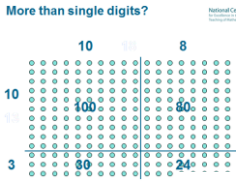
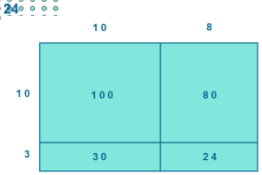
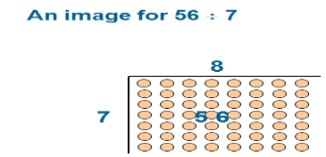


Division Year 4

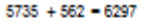
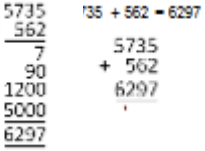
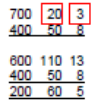
Multiples of the divisor

98 ÷ 7 = 14

10 x 7 = 70
4 x 7 = 28

Models and images - Addition and subtraction	Multiplication and division	Conceptual understanding – use of practical resources
  	  	Numicon – place values, arrays, number bonds Place value counters – with grids for addition, subtraction, multiplication and division. Cuisenaire rods – demonstrate fractions, ratios and percentages. Bead strings – to demonstrate tenths, hundredths Double sided counters – partitioning in different ways Dienes apparatus – for calculations and partitioning

Maths Medium Term plans – Years 3 and 4 - Terms 3 and 4

Year 3 statutory requirements	Year 4 statutory requirements	Models and images to support conceptual understanding and progression Examples of formal written methods to be used
Maths investigation work – (nrich website, KLZ maths site, Apex books for resources) Children should be able to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and develop an argument, justification or proof using mathematical language. Term 3 focus - Diagram and visual problems Term 4 focus - Finding all possibilities		
Number and place value • Count from 0 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) • Compare and order numbers up to 1000 **Number addition and subtraction** • Add and subtract numbers mentally, including: a three-digit number and ones a three-digit number and tens a three-digit number and hundreds • Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • Estimate the answer to a calculation and use inverse operations to check answers • Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	**Number and place value** • Count in multiples of 6, 7, 9, 25 and 1000 • Find 1000 more or less than a given number • Count backwards through zero to include negative numbers • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • Order and compare numbers beyond 1000 **Number – addition, subtraction** • Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	Addition Year 3   Addition Year 4  Subtraction Year 3 Decomposition 723 - 458  Subtraction Year 4 –

Number – multiplication and division

- 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

Number – fractions

- Recognise and show, using diagrams, equivalent fractions with small denominators.
- Add and subtract fractions with the same denominator within one whole (for example 5?7 + 1?7 = 6/7)
- Compare and order unit fractions and fractions with the same denominators.
- Solve problems that involve all of the above.

Measurement

- Measure the perimeter of simple 2-D shapes
- Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight

Geometry – properties of shapes

- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them

Statistics

- Solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

Number – multiplication and division

- Recognise and use factor pairs and commutativity in mental calculations
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Number – fractions

- Recognise and show, using diagrams, families of common equivalent fractions
- Add and subtract fractions with the same denominator
- Recognise and write decimal equivalents of any number of tenths or hundredths
- Recognise and write decimal equivalents to ¼, ½, 3/4
- Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- Solve simple measure and money problems involving fractions and decimals to two decimal places.

Measurement

- Measure and calculate the perimeter of a rectilinear figure (including squares) in
- centimetres and metres
- Find the area of rectilinear shapes by counting squares
- Estimate, compare and calculate different measures, including money in pounds and pence
- Read, write and convert time between analogue and digital 12- and 24-hour clocks
- Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

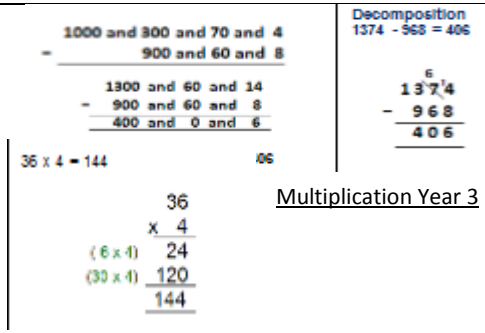
Geometry – properties of shapes

- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes

Geometry – position and direction

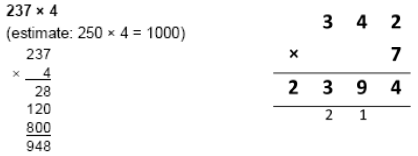
- Describe positions on a 2-D grid as coordinates in the first quadrant

Statistics

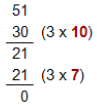


Multiplication Year 3

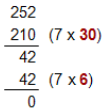
Multiplication Year 4

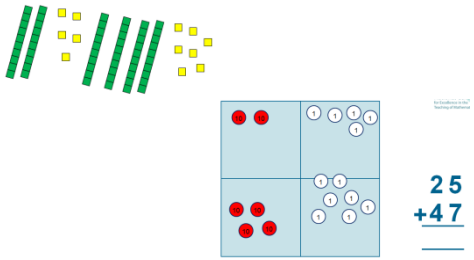
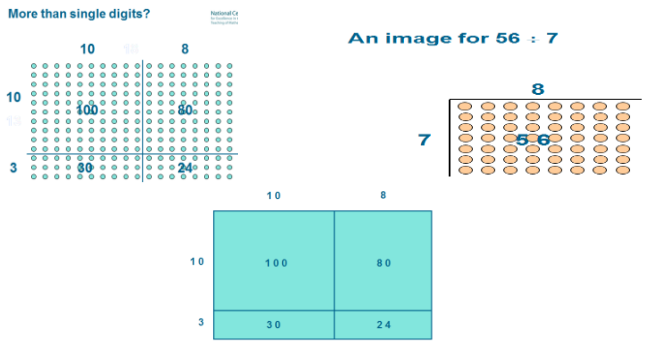


Division Year 3

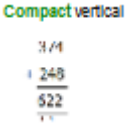
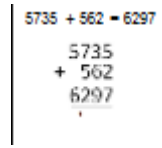
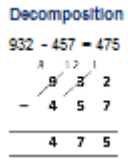


Division Year 4



	• Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	
Models and images - Addition and subtraction  	Multiplication and division  	Conceptual understanding – use of practical resources Numicon – place values, arrays, number bonds Place value counters – with grids for addition, subtraction, multiplication and division. Cuisenaire rods – demonstrate fractions, ratios and percentages. Bead strings – to demonstrate tenths, hundredths Double sided counters – partitioning in different ways Dienes apparatus – for calculations and partitioning

Maths Medium Term plans – Years 3 and 4 - Terms 5 and 6

Year 3 statutory requirements	Year 4 statutory requirements	Models and images to support conceptual understanding and progression Examples of formal written methods to be used
Maths investigation work – (nrich website, KLZ maths site, Apex books for resources) Children should be able to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and develop an argument, justification or proof using mathematical language. Term 5 focus - Finding rules and describing patterns; logic and reasoning Term 6 focus - Diagram and visual problems; finding all possibilities		Addition Year 3 
Number and place value • Identify, represent and estimate numbers using different representations	**Number and place value** • Identify, represent and estimate numbers using different representations • Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	Addition  Year 4
Number addition and subtraction • Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • Estimate the answer to a calculation and use inverse operations to check answers • Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	**Number – addition, subtraction** • Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation	Subtraction Year 3  Subtraction Year4
Number – multiplication and division		

- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Number – fractions

- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.
- Solve problems involving fractions

Measurement

- 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 I to XII, and 12-hour and 24-hour clocks

Geometry – properties of shapes

- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

Statistics

- Solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

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

Number – multiplication and division

- Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Number – fractions

- Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- Solve simple measure and money problems involving fractions and decimals to two decimal places.

Measurement

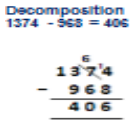
- Measure and calculate the perimeter of a rectilinear figure (including squares) in
- centimetres and metres
- Find the area of rectilinear shapes by counting squares
- Estimate, compare and calculate different measures, including money in pounds and pence
- Read, write and convert time between analogue and digital 12- and 24-hour clocks
- Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

Geometry – properties of shapes

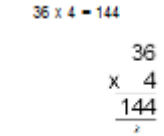
- Identify lines of symmetry in 2-D shapes presented in different orientations
- Complete a simple symmetric figure with respect to a specific line of symmetry.

Geometry – position and direction

- Describe movements between positions as translations of a given unit to the left/right and up/down
- Plot specified points and draw sides to complete a given polygon



Multiplication Year 3



Multiplication Year 4

342 x 7

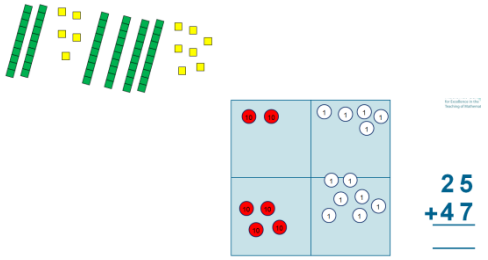
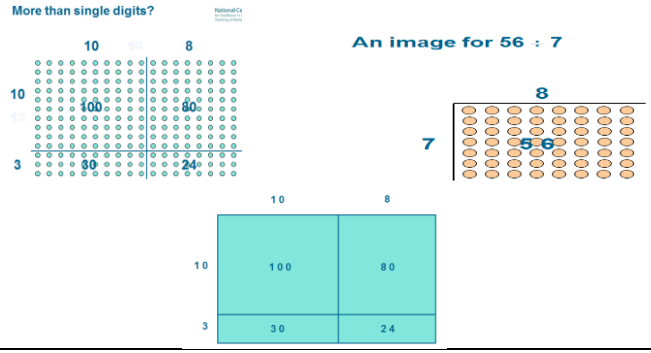
	3	4	2
×			7
2	3	9	4
	2	1	

Division Year 3

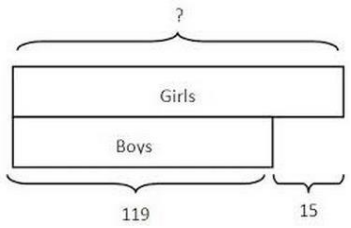
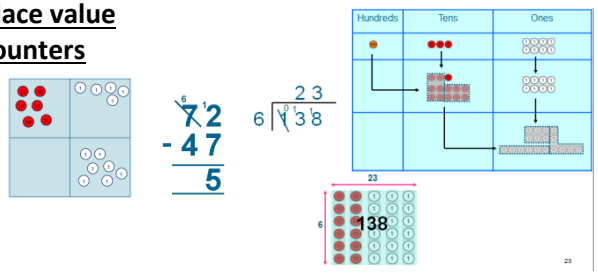
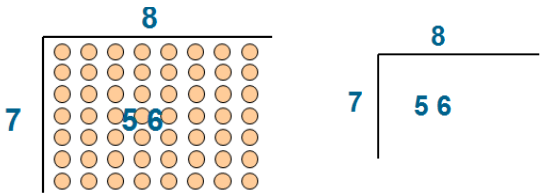
51 ÷ 3

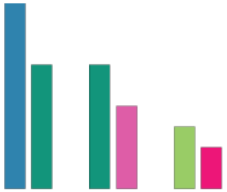
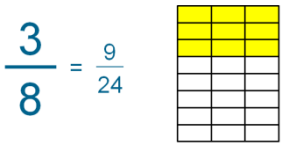
Division Year 4

252 ÷ 7 = 36

	Statistics • Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	
Models and images - Addition and subtraction  	Multiplication and division  	Conceptual understanding – use of practical resources Numicon – place values, arrays, number bonds Place value counters – with grids for addition, subtraction, multiplication and division. Cuisenaire rods – demonstrate fractions, ratios and percentages. Bead strings – to demonstrate tenths, hundredths Double sided counters – partitioning in different ways Dienes apparatus – for calculations and partitioning

Models and resources to be used to aid conceptual understanding

Bar model  • For problem solving using all 4 operations. • For visualising fractions and working out equivalence • For working out fractions of a whole and the whole when given a fraction/ percentage.	**Place value counters**  • To support conceptual understanding of decomposition and short division	**Arrays**  • Image used to support inverse operations and missing number questions e.g. e.g. ☐ ÷ 27 = 675

Cuisenaire rods  • To model ratio • To model fraction equivalence	**Fraction grids**  • Used to model equivalence of fractions • Used to model addition and subtraction of fractions	**Bead strings**  • For place value – division of one whole into tenths, hundredths and thousandths
Double-sided counters  • Used to model partitioning in different ways – how can these counters be used to make 34 or 1.6?	**Place value using computer programs**  • Place value and equivalent values of decimal numbers	