

# Misson Primary School

## Numeracy – Long Term Plan 2016

SEPTEMBER 2016

		KS1	Lower KS2	Upper KS2
To know and use numbers	Counting	<ul style="list-style-type: none"> <li>Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.</li> <li>Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens.</li> <li>Given a number, identify one more and one less.</li> <li>Count in steps of 2, 3, 5 and 10 from 0 or 1 and in tens from any number, forward and backward.</li> </ul>	<ul style="list-style-type: none"> <li>Count in multiples of 2 to 9, 25, 50, 100 and 1000.</li> <li>Find 1000 more or less than a given number.</li> <li>Count backwards through zero to include negative numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Read numbers up to 10 000 000.</li> <li>Use negative numbers in context and calculate intervals across zero.</li> </ul>
	Representing	<ul style="list-style-type: none"> <li>Identify, represent and estimate numbers using different representations, including the number line.</li> <li>Read and write numbers initially from 1 to 20 and then to at least 100 in numerals and in words.</li> </ul>	<ul style="list-style-type: none"> <li>Identify, represent and estimate numbers using different representations.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Write numbers up to 10 000 000</li> <li>Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</li> </ul>
	Comparing	<ul style="list-style-type: none"> <li>Use the language of: equal to, more than, less than (fewer), most and least.</li> <li>Compare and order numbers from 0 up to 100; use &lt;, &gt; and = signs.</li> </ul>	<ul style="list-style-type: none"> <li>Order and compare numbers beyond 1000.</li> </ul>	<ul style="list-style-type: none"> <li>Order and compare numbers up to 10 000 000.</li> </ul>
	Place value	<ul style="list-style-type: none"> <li>Recognise the place value of each digit in a two-digit number (tens, ones).</li> </ul>	<ul style="list-style-type: none"> <li>Recognise the place value of each digit in a four-digit number. (thousands, hundreds, tens, and ones)</li> </ul>	<ul style="list-style-type: none"> <li>Round any whole number to a required degree of accuracy.</li> <li>Determine the value of each digit in any number.</li> </ul>

			<ul style="list-style-type: none"> <li>• Round any number to the nearest 10, 100 or 1000.</li> </ul>	
	Solving problems	<ul style="list-style-type: none"> <li>• Use place value and number facts to solve problems.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve number and practical problems with increasingly large positive numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve number and practical problems.</li> </ul>
To add and subtract	Complexity	<ul style="list-style-type: none"> <li>• Solve one-step problems with addition and subtraction: <ul style="list-style-type: none"> <li>• Using concrete objects and pictorial representations including those involving numbers, quantities and measures.</li> <li>• Using the addition (+), subtraction (-) and equals (=) signs.</li> <li>• Applying their increasing knowledge of mental and written methods.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Solve two-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve multi-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.</li> </ul>
	Methods	<ul style="list-style-type: none"> <li>• Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> <li>• One-digit and two-digit numbers to 20, including zero.</li> <li>• A two-digit number and ones.</li> <li>• A two-digit number and tens.</li> <li>• Two two-digit numbers.</li> <li>• Adding three one-digit numbers.</li> <li>• Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.</li> <li>• Add and subtract numbers mentally, including: <ul style="list-style-type: none"> <li>• A three-digit number and ones.</li> <li>• A three-digit number and tens.</li> <li>• A three-digit number and hundreds.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Add and subtract whole numbers with more than 4 digits, including using formal written methods. (columnar addition and subtraction)</li> <li>• Add and subtract numbers mentally with increasingly large numbers.</li> </ul>
	Checking	<ul style="list-style-type: none"> <li>• Recognise and use the inverse</li> </ul>	<ul style="list-style-type: none"> <li>• Estimate and use inverse</li> </ul>	<ul style="list-style-type: none"> <li>• Use rounding to check answers to</li> </ul>

		relationship between addition and subtraction and use this to check calculations and solve missing number problems.	operations to check answers to a calculation.	calculations and determine, in the context of a problem, levels of accuracy.
	Using number facts	<ul style="list-style-type: none"> <li>• Represent and use number bonds and related subtraction facts within 20.</li> <li>• Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction.</li> </ul>	<ul style="list-style-type: none"> <li>• Add and subtract negative integers.</li> </ul>
To multiply and divide	Complexity	<ul style="list-style-type: none"> <li>• Solve one-step problems involving multiplication and division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</li> </ul>	<ul style="list-style-type: none"> <li>• 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).</li> </ul>	<ul style="list-style-type: none"> <li>• Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.</li> <li>• Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.</li> <li>• Use knowledge of the order of operations to carry out calculations involving the four operations.</li> </ul>
	Methods	<ul style="list-style-type: none"> <li>• Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (<math>\cdot</math>), division (<math>\div</math>) and equals (<math>=</math>) signs.</li> <li>• Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.</li> <li>• Solve problems involving multiplication and division using mental methods.</li> </ul>	<ul style="list-style-type: none"> <li>• Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.</li> <li>• 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.</li> <li>• Recognise and use factor pairs and commutativity in mental calculations.</li> </ul>	<ul style="list-style-type: none"> <li>• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.</li> <li>• 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.</li> <li>• Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders</li> </ul>

				<p>according to the context.</p> <ul style="list-style-type: none"> <li>• Perform mental calculations, including with mixed operations and large numbers.</li> </ul>
	Checking	<ul style="list-style-type: none"> <li>• Use known multiplication facts to check the accuracy of calculations.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise and use the inverse relationship between multiplication and division and use this to check calculations and solve missing number problems.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimate and use inverse operations and rounding to check answers to a calculation.</li> </ul>
	Using multiplication and division facts	<ul style="list-style-type: none"> <li>• Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables.</li> <li>• Recognise odd and even numbers.</li> <li>• Use multiplication and division facts to solve problems.</li> </ul>	<ul style="list-style-type: none"> <li>• Recall multiplication and division facts for multiplication tables up to <math>12 \times 12</math>.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify common factors, common multiples and prime numbers.</li> <li>• Establish whether a number up to 100 is prime and recall prime numbers up to 19.</li> <li>• Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</li> <li>• Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).</li> <li>• Solve problems involving multiplication and division including using knowledge of factors and multiples, squares and cubes.</li> </ul>
Fractions (including decimals, percentages, ratio and proportion)	Recognising fractions	<ul style="list-style-type: none"> <li>• Recognise, find and name a half as one of two equal parts of an object, shape or quantity.</li> <li>• Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</li> <li>• Recognise, find, name and write fractions <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math> of a length, shape, set of objects</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.</li> <li>• Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.</li> <li>• Round decimals with one decimal</li> </ul>	<ul style="list-style-type: none"> <li>• Compare and order fractions whose denominators are all multiples of the same number.</li> <li>• Compare and order fractions, including fractions <math>&gt; 1</math>.</li> <li>• Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements <math>&gt; 1</math> as a</li> </ul>

		<p>or quantity.</p>	<p>place to the nearest whole number.</p> <ul style="list-style-type: none"> <li>• Compare numbers with the same number of decimal places up to two decimal places.</li> <li>• 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.</li> <li>• Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.</li> <li>• Compare and order unit fractions and fractions with the same denominators.</li> </ul>	<p>mixed number.</p> <ul style="list-style-type: none"> <li>• Round decimals with two decimal places to the nearest whole number and to one decimal place.</li> <li>• Read, write, order and compare numbers with up to three decimal places.</li> <li>• Identify the value of each digit in numbers given to three decimal places.</li> <li>• Solve problems involving number up to three decimal places.</li> <li>• Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.</li> </ul>
	Equivalence	<ul style="list-style-type: none"> <li>• Recognise the equivalence of <math>\frac{2}{4}</math> and <math>\frac{1}{2}</math>.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise and show, using diagrams, families of common equivalent fractions.</li> <li>• Recognise and write decimal equivalents of any number of tenths or hundredths.</li> <li>• Recognise and write decimal equivalents to <math>\frac{1}{4}</math>, <math>\frac{1}{2}</math>, <math>\frac{3}{4}</math>.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.</li> <li>• Read and write decimal numbers as fractions.</li> <li>• Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.</li> <li>• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.</li> <li>• Associate a fraction with division and</li> </ul>

				<p>calculate decimal fraction equivalents.</p> <ul style="list-style-type: none"> <li>Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.</li> </ul>
Solving problems	<ul style="list-style-type: none"> <li>Write simple fractions for example, <math>\frac{1}{2}</math> of 6 = 3.</li> </ul>	<ul style="list-style-type: none"> <li>Add and subtract fractions with the same denominator within one whole.</li> <li>Solve problems involving increasingly harder fractions.</li> <li>Calculate quantities and fractions to divide quantities (including non-unit fractions where the answer is a whole number).</li> <li>Add and subtract fractions with the same denominator.</li> <li>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.</li> <li>Solve simple measure and money problems involving fractions and decimals to two decimal places.</li> </ul>	<ul style="list-style-type: none"> <li>Add and subtract fractions with the same denominator and denominators that are multiples of the same number.</li> <li>Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.</li> <li>Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.</li> <li>Multiply simple pairs of proper fractions, writing the answer in its simplest form.</li> <li>Solve problems which require knowing percentage and decimal equivalents of, <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{2}{5}</math>, <math>\frac{4}{5}</math> and those fractions with a denominator of a multiple of 10 or 25.</li> <li>Divide proper fractions by whole numbers.</li> <li>Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.</li> </ul> <p><b>Ratio and proportion</b></p> <ul style="list-style-type: none"> <li>Solve problems involving the relative</li> </ul>	

				<p>sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p> <ul style="list-style-type: none"> <li>• Solve problems involving the calculation of percentages and the use of percentages for comparison.</li> <li>• Solve problems involving similar shapes where the scale factor is known or can be found.</li> <li>• Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.</li> </ul>
<p>To understand the properties of shapes</p>		<ul style="list-style-type: none"> <li>• Recognise and name common 2D and 3D shapes.</li> <li>• Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line.</li> <li>• Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.</li> <li>• Identify 2-D shapes on the surface of 3-D shapes.</li> <li>• Compare and sort common 2-D and 3-D shapes and everyday objects.</li> </ul>	<ul style="list-style-type: none"> <li>• Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them.</li> <li>• Recognise angles as a property of shape or a description of a turn.</li> <li>• 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.</li> <li>• Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.</li> <li>• Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.</li> <li>• Identify acute and obtuse angles and compare and order angles up</li> </ul>	<ul style="list-style-type: none"> <li>• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations.</li> <li>• Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.</li> <li>• Draw given angles, and measure them in degrees (<math>^{\circ}</math>).</li> <li>• Identify:</li> <li>• Angles at a point and one whole turn (total <math>360^{\circ}</math>).</li> <li>• Angles at a point on a straight line and a turn (total <math>180^{\circ}</math>).</li> <li>• Other multiples of <math>90^{\circ}</math>.</li> <li>• Use the properties of rectangles to deduce related facts and find missing lengths and angles.</li> <li>• Distinguish between regular and</li> </ul>

			<p>to two right angles by size.</p> <ul style="list-style-type: none"> <li>• Identify lines of symmetry in 2-D shapes presented in different orientations.</li> <li>• Complete a simple symmetric figure with respect to a specific line of symmetry.</li> </ul>	<p>irregular polygons based on reasoning about equal sides and angles.</p> <ul style="list-style-type: none"> <li>• Draw 2-D shapes using given dimensions and angles.</li> <li>• Recognise, describe and build simple 3-D shapes, including making nets.</li> <li>• Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.</li> <li>• Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.</li> <li>• Recognise angles where they meet at a point, are on a straight line, or are vertically opposite and find missing angles.</li> </ul>
<p>To describe position, direction and movement</p>		<ul style="list-style-type: none"> <li>• Describe position, direction and movement, including whole, half, quarter and three-quarter turns.</li> <li>• Order and arrange combinations of mathematical objects in patterns and sequences.</li> <li>• Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise angles as a property of shape and as an amount of rotation.</li> <li>• Identify right angles, recognise that 2 right angles make a half turn and 4 make a whole turn.</li> <li>• Identify angles that are greater than a right angle.</li> <li>• Describe positions on a 2-D grid as coordinates in the first quadrant.</li> <li>• Describe movements between positions as translations of a given unit to the left/right and up/down.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.</li> <li>• Describe positions on the full coordinate grid. (all four quadrants)</li> <li>• Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.</li> </ul>

			<ul style="list-style-type: none"> <li>• Plot specified points and draw sides to complete a given polygon.</li> </ul>	
<p>To use measures</p>		<ul style="list-style-type: none"> <li>• Compare, describe and solve practical problems for: <ul style="list-style-type: none"> <li>•lengths and heights.</li> <li>•mass/weight.</li> <li>•capacity and volume.</li> <li>•time.</li> </ul> </li> <li>• Measure and begin to record: <ul style="list-style-type: none"> <li>•lengths and heights.</li> <li>•mass/weight.</li> <li>•capacity and volume.</li> <li>•time. (hours, minutes, seconds).</li> </ul> </li> <li>• Recognise and know the value of different denominations of coins and notes.</li> <li>• Sequence events in chronological order using language.</li> <li>• Recognise and use language relating to dates, including days of the week, weeks, months and years.</li> <li>• Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.</li> <li>• Choose and use appropriate standard units to estimate and measure</li> </ul>	<ul style="list-style-type: none"> <li>• Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).</li> <li>• Measure the perimeter of simple 2-D shapes.</li> <li>• Add and subtract amounts of money to give change. (£ and p)</li> <li>• Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks.</li> <li>• Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use appropriate vocabulary.</li> <li>• Know the number of seconds in a minute and the number of days in each month, year and leap year.</li> <li>• Compare durations of events.</li> <li>• Convert between different units of measure. (for example, kilometre to metre; hour to minute)</li> <li>• Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.</li> <li>• Find the area of rectilinear shapes by counting squares.</li> </ul>	<ul style="list-style-type: none"> <li>• Convert between different units of metric measure.</li> <li>• Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.</li> <li>• Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.</li> <li>• Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm<sup>2</sup>) and square metres (m<sup>2</sup>) and estimate the area of irregular shapes.</li> <li>• Estimate volume and capacity.</li> <li>• Solve problems involving converting between units of time.</li> <li>• Use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling.</li> <li>• Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.</li> <li>• Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of</li> </ul>

		<p>length/height (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels.</p> <ul style="list-style-type: none"> <li>• Compare and order lengths, mass, volume/capacity and record the results using &gt;, &lt; and =.</li> <li>• Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value.</li> <li>• Find different combinations of coins that equal the same amounts of money.</li> <li>• Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.</li> <li>• Compare and sequence intervals of time.</li> <li>• Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.</li> <li>• Know the number of minutes in an hour and the number of hours in a day.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimate, compare and calculate different measures, including money in pounds and pence.</li> <li>• Read, write and convert time between analogue and digital 12- and 24-hour clocks.</li> <li>• Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.</li> </ul>	<p>measure to a larger unit, and vice versa, using decimal notation to up to three decimal places.</p> <ul style="list-style-type: none"> <li>• Convert between miles and kilometres.</li> <li>• Recognise that shapes with the same areas can have different perimeters and vice versa.</li> <li>• Recognise when it is possible to use formulae for area and volume of shapes.</li> <li>• Calculate the area of parallelograms and triangles.</li> <li>• Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>), and extending to other units.</li> </ul>
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