

Mathematics is a creative and highly inter-connected discipline . . . It is essential to everyday life. A high-quality mathematics education provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject



Long-term Plan for Mathematics

Orchards Primary School (Wisbech) New Curriculum: Mathematics

Green = brought fwd. Red = moved back. Blue = switched strand

Mathematics	Number		Calculation		Fractions
	Number & Place Value		Addition & Subtraction	Multiplication & Division	Fractions
<p>KS1 The principle focus of mathematics teaching in KS1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value</p>	Y1	Count forward/ back, read, write nos. from 0 to 100 in numerals, and numbers 0 to 20 in words. Count in 2s, 5s and 10s. Identify one more/less. Know 10 more/less. Use objects and pictures to show equal, more, less, fewer, most and least. Use ordinal numbers including first, second, third and last.	Read and write statements using + - and = symbols. Memorize bonds (and related subtraction facts) to 10 and 20 in several forms, eg. $9 + 7 = 16$, $16 - 9 = 7$, etc. Solve one step problems using concrete objects and pictures and missing number problems such as $7 = ?? - 9$.	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.	Recognise, find and name a half and a quarter as one of two equal parts of an object, shape or quantity. Know fractions of amounts, shapes, lengths, etc. Combine halves and quarters to make wholes.
	Y2	Read/ write numbers from 0 to 100 in numerals/ words. Begin to read, write and recognise 3-digit nos. Recognise place value of digits in a 2-digit number. Estimate and round to nearest 10. Compare and order using =, < and >. Count in steps of 2, 3 and 5. Count in tens from any # forwards and back. Partition eg. $20 + 3 = 23$ and $10 + 13 = 23$. Know zero as a place holder.	Apply knowledge of mental and written methods. Use addition/subtraction facts up to 20 to derive related facts to 100. Add/ subtract 2-digit #. Add 3 1-digit numbers. Show that addition is commutative, but that subtraction is not. Recognize + and - as inverses for checking and problem solving.	Recall and use 2x, 5x and 10x facts and know related division. Know odd and even. Use multiplication and division symbols. Link 10x to place value. Show that $3 \times 5 = 5 \times 3$, but also know that division is NOT commutative. Grouping and sharing, knowing that doubling and halving are inverses.	Recognise, find, name and write fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, sets of objects or quantity. Write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of two quarters and one half. Count in halves/ quarters up to 10.
	Measure		Geometry		Data
	Measurement		Properties of Shapes	Position & Direction	Statistics
	Y1	Length/ height: long/short, longer/shorter, tall/short, double/half; mass/weight: heavy/light, heavier than, lighter than; capacity and volume; full/empty, more than, less than, half, half full, quarter]. Order events: before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening, quicker, slower, earlier, later. Dates, days, weeks, months and years. Time to the hour, 1/2 past; draw hands on a clock face. Different denominations of coins and notes.	Recognise/ name common 2-D and 3-D shapes. Relate these to everyday objects. Recognise and name in different orientations and sizes. Know 2-D shapes: rectangles (including squares), circles and triangles]. Know 3-D shapes: cuboids (including cubes), pyramids, spheres].	Describe position, direction and movement, including whole, half, quarter and three-quarter turns in a clockwise direction. Use language of direction: left, right, top, middle, bottom, on top of, in front of, above, between, around, near, close, far, up/down, forward, backwards, inside, outside.	Venn Diagram relating to sorting of shapes. Carroll Diagrams in 4 regions. Tally charts, reinforce counting in 5s.
	Y2	Std. units to estimate/ measure length/height in any direction (m/cm); mass (kg/g); temperature ($^{\circ}$ C); capacity (litres/ml), using rulers, scales, thermometers, containers. Compare/ order lengths, mass, volume/ capacity; record results using >, < and =. Symbols (£)(p); Mixed coins. Simple problems with practical context; add/ subtract money, change. Time intervals. Tell time to 5 minutes, 1/4 past/to; draw hands on clock face. Minutes in hour, hours in day.	Properties of 2-D shapes, including the number of sides and reflective symmetry in a vertical line. Draw shapes/ lines using a straight edge. Properties of 3-D shapes, including the number of edges, vertices and faces. Prisms, cones. Identify faces, edges, vertices. Identify faces on the surfaces of 3-D shapes, eg. circle on a cylinder and a triangle on a pyramid. Compare and sort common 2-D and 3-D shapes; everyday objects. Read/write appropriate shape names.	Order combinations of mathematical objects in patterns and sequences. Describe position, direction and movement in a straight line, distinguishing between rotation as a turn and in terms of right angles for 1/4, 1/2 and 3/4 turns (anti)clockwise. Guide/ move one another and programmable robots/ ICT packages using instructions of turn.	Interpret/ construct simple pictograms, tally charts, block diagrams and tables. Ask/ answer simple questions by counting the # of objects in each category/ sorting the categories by quantity. Ask/ answer questions about totalling (frequency), comparing categories. Record, interpret, collate, organize, and compare information using "many-to-one correspondence with simple ratios 2, 5 and 10.

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Mathematics	Number		Calculation		Fractions
	Number & Place Value		Addition & Subtraction	Multiplication & Division	Fractions
<p>Lower KS2 The principle focus of mathematics teaching in lower KS2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value</p>	Y3	Count in multiples of 4, 8, 50 and 100. Find ten more/less. Place value in hundreds, tens and ones. Compare/order up to 1000. Read and write # up to 1000 in numerals/words. Know different forms of partitioning. Eg $146 = 100 + 40 + 6$ or $146 = 130 + 16$. Solve # problems involving practical measures.	Add/ subtract mentally: HTU +/- U, HTU +/- tens, HTU +/- hundreds. Add/ subtract in columns 3-digit #. Estimate a calculation and use the inverse operation to check. Solve problems, including missing number problems.	Multiplication/division facts for 3x, 4x and 8x. 2-digits x one digit. Use associative law such that $3 \times 2 \times 4 = 4 \times 2 \times 3$. Through doubling/ and halving connect 2x, 4x and 8x. Develop formal written methods for TU x U. Integer scaling and correspondence where n objects are connected to m objects.	Count up/down in 1/10ths. Unit fractions and simple non-unit fractions, eg 3/8. Recognize and show simple equivalent fractions. Add/subtract fractions with same denominator, eg. $1/6 + 5/6 = 1$. Compare and order fractions with same denominator.
	Y4	Count in multiples of 6, 7, 9, 25 and 1000. Find 1000 more/less. Count below zero into negatives. Compare/order 4-digit # and also fractions and decimals met so far. Round/estimate to nearest 100 and 1000 also on measuring scales. Roman numeral IN CONTEXT up to 100.	Add/subtract up to 4-digits in formal columns. Continue to estimate for reasonableness of an answer, and check with inverse. Solve 2-step problems, deciding which operations to employ.	Recall all multiplication/division facts up to 12x12. Multiply by zero and 1. Multiply 3 numbers. Recognize and use factor pairs to aid calculation. Eg. $18 \times 5 = 9 \times 2 \times 5 = 9 \times 10 = 90$. Multiply HTU by U. Use distributive law such that $39 \times 7 = 30 \times 7 + 9 \times 7$	Show using diagrams equivalent fractions. Connect hundredths to tenths. Count up/down in tenths/ hundredths. Know that dividing tenths by ten makes hundredths. Calculate non unit fractions of quantities. Write decimals equivalent to fractions. Eg $0.4 = 4$ tenths. Including $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$ Know the effect of dividing a 1-digit # by ten/100. Round decimals to nearest one. Compare/ order decimals. Solve money problems
	Measure		Geometry		Data
	Measurement		Properties of Shapes	Position & Direction	Statistics
	Y3	Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) Measure the perimeter of simple 2-D shapes. Add and subtract money to give change, using both £ and p in practical contexts. 12/24 hour clocks.am/pm Estimate time + read to nearest minute. Record sec/min/hours. Noon, midnight. Seconds in a minute, days in each month, (leap) years.	Draw 2-d shapes. Measure in cm. Know (non) symmetrical polygons. Make 3-d shapes using modelling materials. Recognize 3-d shapes in different orientations, knowing (non) symmetrical polyhedra. Recognize angles as properties of shape + description of turn. On polygons, identify right angles; know as $\frac{1}{4}$ turn, 2 RA as half turn, etc. Conventional markings for right angles. Find whether angles are greater than/ less than a right angle, using vocabulary: acute and obtuse.	Identify horizontal and vertical lines. Identify parallel and perpendicular pairs of lines. Describe positions on a 2-d grid as co-ordinates in the first quadrant. Read, write (using bracket notation) and use pairs of co-ordinates (2,5) including using ICT plotting packages.	Interpret and present data using bar charts, pictograms and tables. Solve one and two step questions such as "How many more?" and "How many fewer?" using the information in scaled bar charts, pictograms and tables.
	Y4	Read, write, convert between analogue/ digital. Convert 12/24 h. Time problems, convert mins/sec/hours/weeks/months/years. Tell/write time, using Roman # from I to XII. Estimate, compare & calculate measures inc money. Perimeter in cm/ m. Area of shapes by counting squares. Area of rectangles (+ squares), using std unit (cm ²) and (m ²). Estimate area of irregular shapes. Convert km,m to cm, mm ,etc. Perimeter of rectilinear shapes. Area by counting squares.	Compare/ classify polygons; quadrilaterals parallelogram, rhombus, trapezium, kite; triangles: scalene, equilateral, isosceles based on properties. Identify acute/ obtuse, order angles to 180. (Ir) regular polygons based on reasoning/ comparing equal length sides/ angles. Symmetry in 2-d shapes in any orientation. Complete shapes with respect to given lines of symmetry. Includes "distant" lines of symmetry that do not dissect the reflected shape.	In first quadrant, draw a pair of axes with equal scales and integer labels. Plot specified co-ordinates to find corners and draw sides to complete a given polygon. Describe movements between positions as translations in given units to the left/right and up/down.	Interpret and present discrete data using bar charts. Use a greater range of scales. Interpret and present continuous data using "time graphs", beginning to relate graphical representation of data to recording change over time. Solve comparison, sum/ difference problems using information presented in bar charts, pictograms, tables and other graphs.

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<p>Upper KS2 The principle focus of mathematics teaching in upper KS2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers</p>	Y5	<p>Read/write/order up to 1 million with place value. Count forward and back in powers of 10 up to millions.</p> <p>Order and compare negative numbers.</p> <p>Round and estimate to 10, 100, 1000, 10K and 100K. Roman numerals up to 1000 (M). Know years in Roman numerals. Linear # sequences including fractions and decimals, finding the rule for each term.</p> <p>ALGEBRA:</p>	<p>Add/ subtract whole numbers with more than 4 digits. Add and subtract numbers mentally with increasingly large numbers.</p> <p>Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p>	<p>Multiples and factors, finding all factor pairs of a number, and common factors of 2 numbers. Prime numbers, prime factors and composite (non-prime) numbers. Recall primes to 19. ThHTU x TU using a formal method. Multiply/ divide # mentally, drawing upon known facts.</p> <p>Divide # up to 4 digits by a 1-digit number using the formal written method of short division/ interpret remainders. Multiply/ divide integers and decimals by 10, 100, 1,000. Square/ cube numbers, notation: squared (?), cubed (?).</p>	<p>Compare/ order fractions with denominators with common multiples. Mixed and improper fractions.</p> <p>Add/subtract fractions with similar denominators. Multiply fractions. Know that $71/100 = 0.71$. Know thousandths. Round decimals to the nearest tenth. Decimals to 3d.p. Know percentage (%) as parts per 100. Solve problems knowing percentage/decimal equivalence.</p>
	Y6	<p>Read, write, order, compare up to 10 million with place value. Calculate intervals across zero into negative numbers, especially with temperatures.</p> <p>Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.</p> <p>Algebra: Express missing numbers. Describe linear # sequences. Know that $a + b = b + a$ Generalise # patterns.</p>	<p>Multiply up to 4 digits by 2-digit whole number using the formal written method of long multiplication. Divide numbers up to 4 digits by a 2-digit whole number using the formal written method of long division, with remainders as whole number remainders, fractions, or by rounding. Mental calculations, including with mixed operations and large numbers. Identify common factors, common multiples and prime numbers. Order of operations to carry out calculations involving the four operations. Multi-step problems in contexts, deciding which operations and methods to use and why. Solve problems involving addition, subtraction, multiplication and division. Use written division methods in cases where the answer has up to two decimal places. Ratio: proportionality between shapes/quantities, scaling up or down . Use simple formulae/ words.</p>	<p>Simplify fractions. Add/ subtract fractions with different denominators and mixed numbers. Multiply simple pairs of proper fractions. Eg., $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$</p> <p>Divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] Calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$] Multiply 1-digit numbers with up to 2.d.p. by whole numbers. Solve problems which require answers to be rounded. Equivalences between simple fractions, decimals, percentages in different contexts. Proportion: Find % of quantities.</p>	
	Measure		Geometry		Data
	Measurement		Properties of Shapes	Position & Direction	Statistics
	Y5	<p>Solve time problems. Use timetables, charts, etc. Convert metric measures km/ m; cm/ m, cm mm; g and kg;l/ml. Approximate equivalences between metric imperial units: inches, pounds, pints. Measure/ calculate perimeter of composite rectilinear shapes in cm and m. Estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water] Use all 4 operations to solve problems involving measure: length, mass, volume, money using decimals, including scaling.</p>	<p>Identify 3-D shapes, including cubes/ cuboids, from 2-D representations. Draw/ measure to the nearest mm. Use conventional markings for pairs of parallel lines. Know angles are measured in degrees: estimate/ compare acute, obtuse, reflex angles. Draw given angles, in degrees (°).Angles sum to 90. Use angle sum facts to total 360°. Identify angles in $\frac{1}{2}$ a turn. Make conjectures about angles formed by diagonals and sides. Use properties of rectangles to deduce related facts/ find missing lengths/ angles.</p>	<p>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 (congruence).</p> <p>Use reflection, rotation and translation in a variety of diagrams including co-ordinates in the first quadrant.</p>	<p>Solve comparison, sum and difference problems using information presented in a line graph.</p> <p>Complete, read and interpret information in tables, including timetables.</p> <p>Begin to decide which representations of data are most appropriate and why.</p>
	Y6	<p>Time conversion including to 3dp. International time zones. Problems involving speed. Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 d.p. Use, read, write and convert between standard units, converting measures of length, mass, volume and time, using decimal notation to up to three decimal places. Convert between miles/ kilometres. Formulae for area and volume of shapes. Calculate the area of parallelograms and triangles. Volume of cubes and cuboids using standard units, in cubic centimetres (cm³) and cubic metres (m³), extending to other units [mm³ and km³]</p>	<p>Draw 2-D shapes using given dimensions/ angles. Describe/ build 3-D shapes: drawing/ making nets. Compare/ classify geometric shapes based on properties/ sizes. Angles in triangles, quadrilaterals, regular polygons. Illustrate, name parts of circle: radius, diameter/ circumference. Know diameter is twice the radius. Know/ use basic algebraic expressions such as $d = 2 \times r$ or $a = 180 - (b + c)$. Recognise angles at a point, on straight line, vertically opposite, explain how to derive missing angles. Ratio: Solve problems involving similar shapes, with scaling factors.</p>	<p>Describe positions on the full coordinate grid (all four quadrants). Draw and label a pair of axes with equal scaling, knowing negative numbers.</p> <p>Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.</p> <p>Draw and label rectangles, squares, parallelograms, and rhombus in all 4 quadrants, predicting missing corners as co-ordinates. Know the geometric AND numerical reasoning behind finding missing co-ordinates.</p>	<p>Interpret and construct pie charts and line graphs and use these to solve problems.</p> <p>Encounter and draw graphs relating to 2 variables, arising from own enquiry particularly in other subjects.</p> <p>Conversion from metric to imperial (eg. miles/ kilometres) can be graphically represented.</p> <p>Calculate and interpret the mean as an average, knowing when it is appropriate to do so. Ratio: Link percentages to calculating angles, shares in pie charts.</p>