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.

Rackham CE Primary School Curriculum: Mathematics

Mathematics		**Number**	**Calculation**		**Fractions**
		Number & Place Value	Addition & Subtraction	Multiplication & Division	Fractions
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	**Y1**	Count to & across 100, forwards & backwards, beginning with 0 or 1, or from any given number. Count, read & write numbers to 100 in numerals. Read & write numbers from 1 to 20 in in numerals and words. Count in multiples of 2s, 5s and 10s. Identify & represent numbers using objects & pictorial representations including number lines. Use *equal to*, *more than*, *less than (fewer)*, *most, least*. Given a number, identify one more and one less.	Represent & use number bonds & related subtraction facts within 20. Read, write & interpret mathematical statements involving addition +, subtraction – and equals = signs. Add & subtract one-digit & two-digit numbers to 20, including zero. Solve one-step problems that involve + & –, using concrete objects and pictorial representations. Solve missing number problems such as 7 = ? – 9.	Solve one-step multiplication & division problems using concrete objects, pictorial representations and arrays (with adult support). Group & share small quantities.	Recognise, find and name a half as two equal parts of an object, shape or quantity. Recognise, find and name a quarter as four equal parts of an object, shape or quantity.
	Y2	Read and write numbers to at least 100 in numerals and in words. Begin to read, write and recognise 3-digit nos. Compare & order numbers from 0 to 100; use <, > and = signs. Recognise the place value of each digit in a 2-digit and some 3-digit numbers. Identify, represent & estimate numbers using different representations, including the number line. Count in steps of 2, 3, 5 from 0, & and 10s from any no., forward & backward. Use place value and number facts to solve problems.	Recall & use addition & subtraction facts to 20 fluently. Derive & use related facts up to 100. Add & subtract: 2-digit nos. & ones; 2-digit nos. & tens; two 2-digit nos.; three 1-digit nos. Solve one-step problems with + & - using concrete objects & pictorial representations, including those involving numbers, quantities and measures. Apply knowledge of mental methods. Know that + can be done in any order (commutative) but subtraction cannot. Recognise + & – as inverses and use to check calculations & solve missing number problems.	Recall & use × and ÷ facts for 2, 5 and 10. Recognise odd & even numbers. Write & calculate × & ÷ statements within multplication tables using x, ÷ and = signs. Show that × can be done in any order (commutative) but ÷ cannot. Solve problems involving × & ÷ using materials, arrays, repeated addition & mental methods, including problems in context.	Recognise, find, name & write 1/3; 1/4; 2/4; 3/4 of length, shape, set of objects or quantity. Write simple fractions such as ½ of 6 = 3. Recognise equivalence of ½ and ¼.

Fluency, Reasoning, Problem Solving

 © Cambridgeshire CC 2014

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.

	Measure	Geometry		Data
	Measurement	Properties of Shapes	Position & Direction	Statistics
Y1	Compare, describe & solve practical problems for: lengths & heights (e.g. long/short, longer/shorter, tall/short, double/half); mass/weight (e.g. heavy/light, heavier than/lighter than); capacity & volume (e.g. full/empty, more than/less than, half/quarter) and time (eg quicker, slower, earlier, later). Measure & begin to record: lengths & heights; mass/weight; capacity & volume; time (hours, minutes, second) Sequence events in chronological order using language (e.g. before, after, next, first yesterday, tomorrow, morning, afternoon, evening) Recognise & use language of dates, days of week, weeks, months & years. Tell the time to the hour & to half past the hour and draw hands on clock faces to show these times.	Recognise and name common 2D shapes - e.g. rectangles (including squares), circles & triangles. Recognise & name common 3D shapes - e.g. cuboids (including cubes), pyramids & spheres.	Describe position, direction and movement in terms of whole, half and quarter turns.	-
Y2	Choose & use appropriate standard units to estimate & measure length /height (m/cm); mass (kg/g), temp. (C); capacity (litres/ml) to nearest approp. unit using rulers, scales, thermometers & measuring vessels. Compare & order lengths, mass, vol./capacity & record using <, > & =. Recognise & use symbols for pounds (£) and pence (p); combine amounts to make a particular value. Find different combinations of coins that equal the same amount of money. Solve simple problems in a practical context involving + & – of money of same unit, including giving change. Tell & write the time to five minutes including quarter past/quarter to; draw the hands on a clock face to show these times. Know the number of minutes in an hour & hours in a day.	Identify and describe the properties of 2-D shapes including the number of sides and line symmetry in a vertical line. Identify and describe the properties of 3-D shapes including the number of edges, vertices and faces). Identify 2-D shapes on the surface of 3-D shapes (e.g. a circle on a cylinder and a triangle on a pyramid). Compare and sort common 2-D and 3-D shapes and everyday objects.	Order and arrange combinations of mathematical objects in patterns and sequences. Use mathematical language to describe position, direction and movement, including movement in a straight line & distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise.	Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. Ask & answer simple questions by counting the number of objects in each category and sorting the categories by quantity. Ask and answer questions about totaling and comparing categorical data.

Fluency, Reasoning, Problem Solving

 © Cambridgeshire CC 2014

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.

Mathematics		**Number**	**Calculation**		**Fractions**
		Number & Place Value	Addition & Subtraction	Multiplication & Division	Fractions
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, icnluding number facts and the concept of place value	**Y3**	Count from 0 in multiples of 4, 8, 50 & 100; find 10 or 100 more or less than. Recognise place value of 3-digit nos. Compare & order numbers to 1000. Read & write numbers to 1000 in numerals & words. Identify, represent & estimate nos. using different representations. Solve number & practical problems involving above. Use multiples of 2, 3, 4, 5, 8, 10, 50 & 100.	Add & subtract numbers mentally, including 3-digit nos. & 1s, 10s & 100s Add & subtract numbers with up to 3 digits using written methods (f) where appropriate. Estimate answers to calculations & use inverse operations to check. Solve number problems, including missing number problems, using number facts, place value, + & –.	Recall & use multiplication & division facts for 3, 4, 8 multiplication tables. Connect 2, 4 & 8 multiplication tables through doubling. Write & calculate statements for × and ÷ using tables they know, including for 2-digit nos. times 1-digit nos. using mental progressing to written methods Develop efficient mental methods using commutativity and associativity and reliable written methods. Solve number problems, including missing number problems, involving × & ÷, including positive integer scaling and correspondence problems.	Count up & down in tenths; recognise that tenths arise from dividing objects into 10 equal parts or numbers by 10. Recognise, find & write fractions of a discrete set of objects and use fractions as numbers on number lines. Recognise & show equivalent fractions with small denominators. Add & subtract fractions with the same denominator within 1 whole. Compare & order unit fractions & fractions with common denominators. Solve problems that involve the above Recognise mixed numbers & improper fractions. Know pairs of fractions that total 1.
	Y4	Count from 0 in multiples of 4, 8, 50 & 100; find 10 or 100 more or less than. Count back to include negative nos. Recognise place value of 4-digit nos. Order & compare nos. beyond 1000. Round to nearest 10, 100, 1000. Identify, represent & estimate nos. using different representations. Solve number & practical problems involving above. Read Roman numerals to 100 (I to C) & how changed over time to include concept of zero & place value. Connect estimation & rounding to the use of measuring instruments.	Add & subtract numbers with up to 4 digits using written methods (f) where appropriate. Estimate & use inverse operations to check answers to a calculation. Solve + and – two-step problems in context, deciding which operations & methods to use and why.	Recall multiplication & division facts for multiplication tables up to 12 x 12. Use known and derived facts to multiply and divide mentally, including x by 0 & 1, ÷ by 1 and multiplying three numbers together. Recognise & use factor pairs and commutativity in mental calculations. Multiply 2-digit by 1-digit & 3-digit by 1-digit (f) Solve problems involving × and + including using distributive and associative law to multiply 2-digit nos. by 1-digit , integer scaling problems and harder correspondence problems such as no. of meal choices on menu.	Recognise & show, using diagrams, families of common equivalent fractions. Count up & down in hundredths. Recognise that hundredths arise when ÷ by 100 and ÷ tenths by 10. Add & subtract fractions with the same denominator. Recognise & write decimal equivalents of tenths or hundredths. Recognise & write decimal equivalents ¼, ½ and ¾. Round decimals with 1dp to nearest whole number. Compare nos. with same number of decimal places up to 2dp. Solve simple measure & number problems inv. fractions & decimals up to two decimal places. Write equivalent fractions +/- fractions with same denominator.

Fluency, Reasoning, Problem Solving

 © Cambridgeshire CC 2014

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.

	Measure	Geometry		Data
	Measurement	Properties of Shapes	Position & Direction	Statistics
Y3	Measure, compare, add & subtract lengths (m/cm/mm), mass (kg/g), volume/capacity (l/ml). Measure the perimeter of simple 2D shapes. Add & subtract amounts of money to give change using £ & p in practical contexts. Tell & write the time from analogue clocks (including using Roman numerals from I to XII), & 12-hour & 24-hour clocks. Estimate/read time to nearest minute. Record & compare time in terms of seconds, minutes & hours. Use vocabulary of time. Know number of seconds in a minute and number of days in each month, year and leap year. Compare durations of events.	Draw 2-D shapes. Make 3-D shape using modelling materials. Recognise 3-D shapes in dfferent orientations & describe them. Recognise angles as a property of shape or description of a turn. Identify right angles, recognise that two right angles make a half turn / straight line, three make ¾ of a turn & four, a complete turn. Identify whether angles greater than or less than a right angle. Identify horizontal and vertical lines. Identify pairs of parallel and perpendicular lines.	-	Interpret and present data using bar charts, pictograms and tables. Solve one-step and two-step questions (such as *'How many more?'* and *'How many fewer?'*) using information presented in scaled bar charts & pictograms and tables.
Y4	Convert between different units of measure (eg km to m; hour to minute). Measure & calculate perimeter of rectilinear figure in cm & metres. Find the area of rectilinear shapes by counting squares. Estimate, compare & calculate different measures including money. Read, write and convert time between analogue & digital 12- & 24-hour clocks. Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. Identify acute and obtuse angles. Compare & order angles up to two right angles by size. Use lengths & angles to decide if a polygon is regular or irregular. Identify lines of symmetry in 2-D shapes presented in different orientations. Complete a simple geometric figure with respect to a specific line of symmetry. Draw symmetric patterns using a variety of media to become familiar with orientations of lines of symmetry.	Describe positions on a 2-D grid using coordinates in the first quadrant. Describe movements between positions as translations to the left/right and up/down. Plot specified points and draw sides to complete a given polygon. Draw axes with equal scales and integer labels. Use coordinate –plotting ICT tools.	Interpret and present discrete & continuous data using appropriate graphs, including bar charts and time graphs. Solve comparisons, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. Begin to relate the graphical representation of data to recording change over time.

Fluency, Reasoning, Problem Solving

 © Cambridgeshire CC 2014

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.

Mathematics		**Number**	**Calculation**		**Fractions**
		Number & Place Value	Addition & Subtraction	Multiplication & Division	Fractions
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	**Y5**	Read, write, order & compare nos. to 1 000 000 & determine the value of each digit. Count forwards or back in steps of powers of 10 for any given number up to 1 000 000. Interpret negative numbers in context, counting forwards & backwards with positive & negative whole numbers, including through zero. Round any whole number up to 1 000 000 to nearest 10, 100, 1000, 10 000 or 100 000. Solve number problems & practical problems that involve all of the above. Read Roman numerals to 1000 (M) & recognise years written in Roman numerals.	Add & subtract numbers mentally with increasingly large numbers Add & subtract numbers with more than 4-digits using efficient written methods including using formal written methods. Use rounding to check answers and determine, in the context of a problem, levels of accuracy. Solve + and – multi-step problems in contexts, deciding which operations and methods to use and why.	Identify multiples & factors, including finding all factor pairs of a number, and common factors of two numbers. Know & use the vocabulary of prime numbers, prime factors & composite (non-prime) numbers. Establish whether a number up to 100 is prime & recall prime numbers to 19. Multiply numbers up to 4-digits by a 1- or 2-digit number using a formal written method, including long multiplication for 2-digit numbers. Multiply & divide numbers mentally drawing upon known facts. Divide numbers up to 4-digits by a 1- or 2-digit number using the formal written method of short division & interpret remainders appropriately for the context. Multiply & divide whole numbers & decimals by 10, 100 & 1000. Recognise & use square numbers & cube numbers, and the notation for squared (^{2}) and cubed (^{3}). Solve problems involving multiplication & division including using knowledge of factors and multiples, squares & cubes. Solve problems involving +, -, x & ÷ and a combination of these, including understanding the meaning of = sign. Solve problems involving x & ÷, including by simple fractions & problems involving simple rates.	Compare and order fractions whose denominators are all multiples of the same number. Identify, name & write equivalent fractions of a given fraction, represented visually, including tenths & hundredths Recognise mixed numbers & improper fractions & convert from one form to the other & write mathematical statements > 1 as a mixed number. Add & subtract fractions with the same denominator & denominators that are multiples of the same number Multiply proper fractions & mixed numbers by whole numbers, supported by materials & diagrams. Read & write decimal numbers as fractions. Recognise & use thousandths & relate them to tenths, hundredths & decimal equivalents. Round decimals with two decimal places to the nearest whole number & to one decimal place. Read, write, order & compare nos. with up to three decimal places. Solve problems involving number up to three decimal places. Recognise the per cent symbol (%) & understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal. Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 & those fractions with a denominator of a multiple of 10 or 25.

Fluency, Reasoning, Problem Solving

 © Cambridgeshire CC 2014

	Y6	Read, write, order and compare nos. to 10 000 000 & determine the value of each digit. Round whole number to a required degree of accuracy. Use negative numbers in context, and calculate intervals across zero. Solve number and practical problems that involve all of the above.	Multiply multi-digit numbers up to 4 digits by a 2-digit whole number using formal written methods of long multiplication. Divide numbers up to 4 digits by a 2-digit whole number using formal written methods of long division; interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Divide numbers up to 4 digits by a 2-digit number using short division where appropriate, interpreting remainders according to context. Perform mental calculations, including with mixed operations & large numbers. Identify common factors, common multiples & prime numbers. Use knowledge of the order of operations to carry out calculations involving the four operations. Solve + and – multi-step problems in contexts, deciding which operations and methods to use and why.	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination Compare and order fractions, including fractions > 1 Add & subtract fractions with different denominators & mixed numbers, using the concept of equivalent fractions. Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. ¼ x ½ = 1/8). Divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6) Associate a fraction with division & calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8). Identify the value of each digit in nos. given to three decimal places & multiply & divide numbers by 10, 100 & 1000 giving answers up to three decimal places. Multiply one-digit numbers with up to two decimal places by whole numbers Use written division methods in cases where the answer has up to two decimal places. Solve problems which require answers to be rounded to specified degrees of accuracy Recall and use equivalences between simple fractions, decimals & percentages, including in different contexts. Calculate % of a number.
		Algebra	Ration & proportion	
		Use simple formulae. Generate & describe linear number sequences. Express missing number problems algebraically. Find pairs of numbers that satisfy an equation with two unknowns. Enumerate possibilities of combinations of two variables. Represent variables & unknowns in mathematical situations already understood, such as: missing numbers, lengths, coordinates & angles ; formulae in maths & science; equiivalent expressions (e.g. *a* + *b* = *b* + *a*); generalisations of number patterns; number puzzles.	Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication & division facts. Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison. Solve problems involving similar shapes where the scale factor is known or can be found Solve problems involving unequal sharing & grouping using knowledge of fractions and multiples.	

Fluency, Reasoning, Problem Solving

 © Cambridgeshire CC 2014

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.

		Measure	**Geometry**		**Data**
		Measurement	Properties of Shapes	Position & Direction	Statistics
	Y5	Convert between different units of metric measure (e.g. km & m; cm & mm; l & ml; g & kg; litre & ml) Understand and use approximate equivalences between metric units & common imperial units such as inches, pounds and pints. Measure & calculate the perimeter of composite rectilinear shapes in centimetres & metres. Calculate & compare the area of rectangles (including squares). Use standard units, square centimetres (cm^2) & square metres (m^2) & estimate the area of irregular shapes. Estimate volume [e.g. using 1 cm^3 blocks to build cuboids (including cubes)] & capacity [e.g. using water] Solve problems involving converting between units of time (e.g. days to weeks, expressing the answer as weeks and days). Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation, including scaling.	Identify 3-D shapes, including cubes & other cuboids, from 2-D representations Know angles are measured in degrees: estimate & compare acute, obtuse and reflex angles Draw given angles, and measure them in degrees (o) Identify: angles at a point & one whole turn (total 360o); angles at a point on a straight line & ½ a turn (total 180o); other multiples of 90o. Use the properties of rectangles to deduce related facts and find missing lengths and angles. Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. Become accurate in drawing lines with a ruler to nearest mm, & measuring with a protractor. Use conventional markings for parallel lines and right angles. Make conjectures about angles formed between sides, and between diagonals & parallel sides. Use angle sum facts & other properties to make deductions about missing angles.	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.	Solve comparison, sum and difference problems using information presented in a line graph. Complete, read and interpret information in tables, including timetables. Answer questions about comparisons, sums and differences using information in a line graph. Complete, read and interpret information in tables, including timetables.

Fluency, Reasoning, Problem Solving

 © Cambridgeshire CC 2014

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.

	Y6	Solve problems involving calculation & conversion of units of measure, using decimal notation up to 3 decimal places where appropriate. Use, read, write & convert between standard units, converting measurements of length, mass, volume & time from a smaller unit of measure to a larger unit, & vice versa, using decimal notation to up to three decimal places. Convert between miles & kilometres. Recognise that shapes with the same areas can have different perimeters & vice versa. Recognise when it is possible to use formulae for area & volume of shapes. Calculate the area of parallelograms & triangles. Calculate, estimate & compare volume of cubes & cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units (e.g. mm^3 and km^3).	Draw 2-D shapes using given dimensions & angles. Recognise, describe & build simple 3-D shapes, including making nets. Compare & classify geometric shapes based on their properties & sizes and find unknown angles in any triangles, quadrilaterals & regular polygons. Illustrate & name parts of circles, including radius, diameter & circumference. Know that the diameter is twice the radius. Recognise angles where they meet at a point, are on a straight line, or are vertically opposite. Find missing angles.	Describe positions in all 4 quadrants of a coordinate grid. Draw, translate and reflect shapes on a coordinate grid across axes. Predict missing coordinates.	Interpret and construct pie charts and line graphs and use these to solve problems. Calculate and interpret the mean as an average. Connect work on angles, fractions & percentages to the interpretation of pie charts. Draw graphs relating two variables, arising from own enquiry & in other subjects. Connect conversion from kilometres to miles in measurement to its graphical representation.

Fluency, Reasoning, Problem Solving

 © Cambridgeshire CC 2014