Ditton Junior School: Mathematics Coverage Overview

Term	Milestones			
	Milestone 2 – Year 3	**Milestone 2 – Year 4**	**Milestone 3 – Year 5**	**Milestone 3 – Year 6**
Autumn	Place Value Addition and Subtraction Multiplication and Division	Place Value Addition and Subtraction Measurement: Area Multiplication and Division	Place Value Addition and Subtraction Multiplication and Division Fractions	Place Value Addition, Subtraction, Multiplication and Division Fractions Measurement: Converting Units
Spring	Multiplication and Division Measurement: Length and Perimeter Fractions Measurement: Mass and Capacity	Multiplication and Division Measurement: Length and Perimeter Fractions Decimals	Multiplication and Division Fractions Decimals and Percentages Measurement: Perimeter and Area Statistics	Ratio Algebra Fractions, Decimals and Percentages Measurement: Perimeter, Area and Volume Statistics
Summer	Fractions Money Time	Decimals Money Time	Shape Position and Direction Decimals	Shape Position and Direction

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	Shape Statistics	Shape Statistics Position and Direction	Negative Numbers Measurement: Converting Units Measurement: Volume	

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The Mathematics Milestones

Know and use numbers

This concept involves understanding the number system and how they are used in a wide variety of mathematical ways.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
Counting	• Count in multiples of 2 to 9, 25, 50, 100 and 1,000. Find 1,000 more or less than a given number. • Count backwards through zero to include negative numbers.	• Read numbers up to 10, 000, 000. • Use negative numbers in context and calculate intervals across zero.
Representing	• 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.	• Write numbers up to 10, 000, 000. • Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.
Comparing	• Order and compare numbers beyond 1,000.	• Order and compare numbers up to 10, 000, 000.

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Place Value	• Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones). • Round any number to the nearest 10, 100 or 1,000.	• Round any whole number to a required degree of accuracy. • Determine the value of each digit in any number.
Solving Problems	• Solve number and practical problems with increasingly large positive numbers.	• Solve number and practical problems.

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Add and Subtract

This concept involves understanding both the concepts and processes of addition and subtraction.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
Complexity	• Solve two-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.	• Solve multi-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.
Methods	• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. • 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 whole numbers with more than 4 digits, including using formal written methods. (columnar addition and subtraction). • Add and subtract numbers mentally with increasingly large numbers.

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Checking	• Estimate and use inverse operations to check answers to a calculation.	• Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
Using Number Facts	• Solve problems, using missing number problems, using number facts, place value and more complex addition and subtraction.	• Add and subtract negative integers.

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Multiply and Divide

This concept involves understanding both the concepts and processes of multiplication and division.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
Complexity	• Solve problems involving multiplying and dividing, 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).	• Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. • Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. • Use knowledge of the order of operations to carry out calculations involving the four operations.

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Methods	• Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. • 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. • Recognise and use factor pairs and commutativity in mental calculations.	• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. • 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. • Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. • Perform mental calculations, including with mixed operations and large numbers.
Checking	• Recognise and use the inverse relationship between multiplication and division and use this to check calculations and solve missing number problems.	• Estimate and use inverse operations and rounding to check answers to a calculation.

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Using Number Facts	• Recall multiplication and division facts for multiplication tables up to 12 × 12.	• Identify common factors, common multiples, and prime numbers. • Establish whether a number up to 100 is prime and recall prime numbers up to 19. • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. • Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3). • Solve problems involving multiplication and division including using knowledge of factors and multiples, squares, and cubes.

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Fractions

This concept involves understanding the concept of part and whole and ways of calculating.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
Recognising 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. • Round decimals with one decimal place to the nearest whole number. • Compare numbers with the same number of decimal places up to two decimal places.	• Compare and order fractions whose denominators are all multiples of the same number. • Compare and order fractions including fractions > 1. • Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number. • Round decimals with two decimal places to the nearest whole number and to one decimal place.

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Recognising Fractions (Cont'd)	• 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. • Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. • Compare and order unit fractions and fractions with the same denominators.	• Read, write, order and compare numbers with up to three decimal places. • Identify the value of each digit in numbers given to three decimal places. Solve problems involving number up to three decimal places. • Recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.
Equivalence	• Recognise and show, using diagrams, • families of common equivalent fractions. • Recognise and write decimal equivalents of any number of tenths or hundredths. • Recognise and write decimal equivalents to ¼, ½ ¾.	• Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. • Read and write decimal numbers as fractions. • Recognise and use thousandths and relate them to tenths, hundredths, and decimal equivalents. • Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. • Associate a fraction with division and calculate decimal fraction equivalents. • Recall and use equivalences between simple fractions, decimals, and percentages, including in different contexts.

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Solving Problems	• Add and subtract fractions with the same denominator within one whole. • Solve problems involving increasingly harder fractions. • Calculate quantities and fractions to divide quantities (including non-unit fractions where the answer is a whole number). • Add and subtract fractions with the same denominator. • 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.	• Add and subtract fractions with the same denominator and denominators that are multiples of the same number. • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. • Multiply simple pairs of proper fractions, writing the answer in its simplest form. • Solve problems which require knowing percentage and decimal equivalents of, 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25. • Divide proper fractions by whole numbers. • Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.

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		Ratio and Proportion • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. • Solve problems involving the calculation of percentages 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 and grouping using knowledge of fractions and multiples.

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Understand the properties of shapes

This concept involves understanding the concept of part and whole and ways of calculating using it.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
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. • 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. • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines. • Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.	• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. • Know angles are measured in degrees: estimate and compare acute, obtuse, and reflex angles. • Draw given angles and measure them in degrees (°). Identify: • Angles at a point and one whole turn (total 360°). • Angles at a point on a straight line and a turn (total 180°). • Other multiples of 90°. • Use the properties of rectangles to deduce related facts and find missing lengths and angles.

	• Identify acute and obtuse angles and compare and order angles up to two right angles by size. • 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.	• Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • Draw 2-D shapes using given dimensions and angles. • Recognise, describe, and build simple 3-D shapes, including making nets. • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons. • Illustrate and name parts of circles, including radius, diameter and circumference and 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 and find missing angles.

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Describe Position, Direction and Movement

This concept involves recognising various types of mathematical movements.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
Position, Direction and Movement	• Recognise angles as a property of shape and as an amount of rotation. • Identify right angles, recognise that 2 right angles make a half turn and 4 make a whole turn. • Identify angles that are greater than a right angle. • Describe positions on a 2-D grid as coordinates in the first quadrant. • 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.	• 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. • Describe positions on the full coordinate grid (all four quadrants). • Draw and translate simple shapes on the coordinate plane and reflect them in the axes.

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Use measures

This concept involves becoming familiar with a range of measures, devices used for measuring.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
Measuring	• 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 amounts of money to give change. (£ and p) • 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 appropriate vocabulary. • Know the number of seconds in a minute and the number of days in each month, year and leap year. • Compare durations of events.	• Convert between different units of metric measure. • Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. • Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes. • Estimate volume and capacity. • Solve problems involving converting between units of time. • Use all four operations to solve problems involving measure (for example, length,

	• Convert between different units of measure (for example, kilometre to metre; hour to minute) • 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.	mass, volume, money) using decimal notation, including scaling. • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation up to three decimal places. • Convert between miles and kilometres. • Recognise that shapes with the same areas can have different perimeters and vice versa. • Recognise when it is possible to use formulae for area and volume of shapes. • Calculate the area of parallelograms and triangles. • Calculate, estimate, and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units.

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Use statistics

This concept involves interpreting, manipulating and presenting data in various ways.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
Using Statistics	• Interpret and present data using bar charts, pictograms and tables. • Solve one-step and two-step questions (for example, 'How many more?' and 'How many fewer?') using information presented in scaled bar charts, pictograms and tables. • Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. • Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	• Solve comparison, sum, and difference problems using information presented in a line graph. • Complete, read and interpret information in tables, including timetables. • Interpret and construct pie charts and line graphs and use these to solve problems. • Calculate and interpret the mean as an average.

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Use Algebra

This concept involves recognizing mathematical properties and relationships using symbolic representations.

Threshold Concepts	Milestones	
	Milestone 2- Year 3 and 4	**Milestone 3-Year 5 and 6**
Using Algebra	• Solve addition and subtraction, multiplication and division problems that involve missing numbers.	• Use simple formulae. • Generate and 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.