Hampshire County Council

Hampshire Mathematics Team Assessment Model - Fluency, Reasoning and Problem Solving

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Year 2	Number and place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Geometry		Statistics
						Properties of shape	Position and	
Fluency Reasoning Problem solving	• use place value and number facts to solve problems	• solve problems with addition and subtraction	• solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods,		• solve simple problems in a practical context involving addition and subtraction of money of the same unit,			
Phase 1	• count in steps of 2, from 0,and in tens from any number, forward or backward • recognise the place value of each digit in a two-digit number (tens, ones) • identify, represent and estimate numbers using different representations, including the number line • compare and order numbers from 0 up to 100; use <, > and = signs • read and write numbers to at least 100 in numerals	• solve problems with addition and subtraction: • using concrete objects and pictorial representations, including those involving numbers. • applying their increasing knowledge of mental and written methods • recall and use addition and subtraction facts to 20 fluently. • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones • a two-digit number and tens	• recall and use multiplication and division facts for the 2, and 10 multiplication tables, including recognising odd and even numbers • show that multiplication of two numbers can be done in any order (commutative) • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods,	• recognise, find, name and write fractions $^1/_3$, $^1/_4$,	• compare and order lengths, record the results using >, < and = • find different combinations of coins that equal the same amounts of money • solve simple problems in a practical context involving addition and subtraction of money of the same unit, • compare and sequence intervals of time	• identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line • identify 2-D shapes on the surface of 3-D shapes, for example a circle on a cylinder and a triangle on a pyramid	• order and arrange combinations of mathematical objects in patterns	
Phase 2	• count in steps of 5 from 0 from any number, forward or backward • read and write numbers to at least 100 in words • use place value and number facts to solve problems.	• using concrete objects and pictorial representations, including those involving measures • adding three one-digit numbers • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot	• recall and use multiplication and division facts for the 5 multiplication tables, including recognising odd and even numbers • calculate mathematical statements for multiplication using the multiplication (×), and equals (=) signs	• recognise, find, name and write fractions $^2/_4$ and $^3/_4$ of a length, shape, set of objects or quantity	• choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm);using rulers • recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value • solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change • tell and write the time Including quarter past/to the hour and draw the hands on a clock face to show these times. • know the number of minutes in an hour and the number of hours in a day	• identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces	• use mathematical vocabulary to describe position, direction and movement, including movement in a straight line	• ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
Phase 3	• count in steps of 3 from 0 from any number, forward or backward	• using concrete objects and pictorial representations, including those involving quantities • recall and use addition and subtraction facts to 20 fluently,and derive and use related facts up to 100 • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: two-digit numbers • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems.	• calculate mathematical statements for division within the multiplication tables and write them using division (÷) • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot • solve problems involving multiplication and division facts, including problems in contexts.	• write simple fractions e.g. $^1/_2$ of 6 = 3 and recognise the equivalence of $^2/_4$ and $^1/_2$.	• choose and use appropriate standard units to estimate and measure mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using scales thermometers and measuring vessels • compare and order mass, volume/capacity and record the results using >, < and = • tell and write the time to 5 minutes	• compare and sort common 2-D and 3-D shapes and everday objects.	• and distinguish 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 and answer questions about totalling and comparing categorical data

Key Stage 1 Years 1 and 2

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.
By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.
Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Year 2

Number and place value

Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third.
As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations.
Pupils should partition numbers in different ways (for example, 23 = 20 + 3 and 23 = 10 + 13) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a place holder.

Addition and subtraction

Pupils extend their understanding of the language of addition and subtraction to include sum and difference.
Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10; 10 – 7 = 3 and 7 = 10 – 3 to calculate 30 + 70 = 100; 100 – 70 = 30 and 70 = 100 – 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition.
Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

Multiplication and division

Pupils use a variety of language to describe multiplication and division.
Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.
Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, 40 ÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).

Fractions

Pupils use fractions as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet ¾ as the first example of a non-unit fraction. 4 3
Pupils should count in fractions up to 10, starting from any number and using the ½ and 2/4 equivalence on the number line (for example, 1 ¼ , 1 2/4 (or 1 ½), 1 ¾ , 2). This reinforces the concept of fractions as numbers and that they can add up to more than one.

Measurement

Pupils use standard units of measurement with increasing accuracy, using their knowledge of the number system. They use the appropriate language and record using standard abbreviations.
Comparing measures includes simple multiples such as 'half as high'; 'twice as wide'.
They become fluent in telling the time on analogue clocks and recording it.
Pupils become fluent in counting and recognising coins. They read and say amounts of money confidently and use the symbols £ and p accurately, recording pounds and pence separately.

Geometry- properties of shapes

Pupils handle and name a wide variety of common 2-D and 3-D shapes including: quadrilaterals and polygons, and cuboids, prisms and cones, and identify the properties of each shape (for example, number of sides, number of faces). Pupils identify, compare and sort shapes on the basis of their properties and use vocabulary precisely, such as sides, edges, vertices and faces.
Pupils read and write names for shapes that are appropriate for their word reading and spelling.
Pupils draw lines and shapes using a straight edge.

Geometry-position and direction

Pupils should work with patterns of shapes, including those in different orientations.
Pupils use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (for example, pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles).

Statistics

Pupils record, interpret, collate, organise and compare information (for example, using many-to-one correspondence in pictograms with simple ratios 2, 5, 10).