

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 4 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.

Overview of Progression in Year 1:

Number and place value

During the Foundation Stage, children counted and estimated groups of up to 20 objects. In Year 1, children extend their use of counting numbers to at least 100. They develop recognition of patterns in the number system (including odd and even numbers) by counting in ones, twos, fives and tens. Children use first, second, third for example when ordering items. Children do not need to recognise the place value of each digit in a two-digit number as they will do this in Year 2. However, they should understand that they can tell whether a number is larger than another by looking at the first digit as well as the second digit.

Addition and subtraction

During the Foundation Stage, children related addition to combining two groups and subtraction to *taking away* when doing practical activities. In Year 1, children use mathematical statements to record addition and subtraction. They read, interpret and write the symbols +, – and =. Through practice of addition and subtraction, children learn the number trios for numbers to 20 (8 + 5 = 13, 13 – 8 = 5, 13 – 5 = 8). They use different strategies to help them derive number facts, such as adding numbers in any order, or finding a difference by counting up.

Multiplication and division

In Year 1, children are introduced to the concepts of multiplication and division, although they will not use the standard signs (× and ÷) until Year 2. In practical activities, using arrays and physical objects such as blocks, children solve multiplication and division problems using small quantities. With support, children investigate the links between arrays, number patterns and their experience of counting in twos, fives and tens.

Fractions

Children learn to identify halves and quarters by solving practical problems – for example, finding half of a set of ten blocks or a quarter of a square. They learn that the concepts of a half and a quarter apply to objects and quantities as well as to shapes. They link the idea of halves and quarters back to the concepts of sharing and grouping, which they use in their work on multiplication and division. They will build on this in Year 2 when they learn to write simple fractions.

Measurement

In Year 1, children begin to use some common standard units, including measuring objects using rulers, weighing scales and jugs. They accurately use comparative language for length, weight, volume and time, such as longer/shorter, heavier than/lighter than, more/less, and quicker/slower. Children read the time on analogue clocks to the hour and half-hour, and they learn to recognise different coins and notes. In Year 2, children will use standard units more independently and gain experience in telling the time and doing simple calculations with money.

Geometry: properties of shapes

In Year 1, children become familiar with a range of common 2D and 3D shapes, including rectangles, circles and triangles, cuboids, pyramids and spheres. They recognise these shapes in different orientations, sizes and contexts.

Geometry: position and direction

Children continue to use positional language accurately when describing where people or objects are in the environment. They experience the differences between half, quarter and three-quarter turns by practising making these turns in a clockwise direction.

Key Maths Concepts in Year 1

Using practical activities to reinforce concepts of number, place value and calculation

In Year 1, children begin to extend their understanding of number, building on concrete, exploratory approaches used in the Foundation Stage. Practical activities and the physical exploration of concepts continue to play an important part in children’s mathematical work in Year 1 and beyond. Children start to use more abstract approaches to mathematical problem solving, including using mathematical statements that involve symbols such as +, – and =.

Working with numbers to 100 and beyond

It can be difficult for young children to grasp larger numbers. They will have learned to work with numbers and groups of objects up to 10, but envisaging numbers greater than this can prove more challenging. Providing children with opportunities to see larger numbers in different contexts will help them to become more familiar with the names and relative values. For example, noticing house numbers as they walk along the street will help them to recognise that number 12 is a long way from number 78. They can also be encouraged to use numbers for practical purposes, such as recording and comparing the numbers of children at school on different days, or comparing the number of paint brushes in a pot to the number of writing pencils, for example.

Place value

By comparing numbers, children will begin to see that it is helpful to look at the first digit in two-digit numbers when comparing numbers for size – for example, 23 is less than 32, because 23 has the first digit 2, whereas 32 has the first digit 3. Using hundred squares and number lines to compare numbers will help children identify the decades that numbers belong to, and so build their understanding of how numbers compare in size. This will help build a firm foundation for the further work on place value which children will undertake in Year 2.

Addition and subtraction

To help children remember the addition and subtraction number bonds to 20, provide them with opportunities to add and subtract in many different contexts, such as dice games, puzzles and differences in race times. Also, use addition and subtraction throughout the school day, for example – *Have we got enough pencils for this group? How many more pencils do we need? Yes, 6 take away 4 is 2. We need two more pencils.*

Year 1 programme of study (statutory requirements)

| Number and place value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Addition and subtraction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Multiplication and division                                                                                                                                                                                                                                              | Fractions                                                                                                                                                                                                                                                                          | Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Geometry: properties of shapes                                                                                                                                                                                                                                                                                                                               | Geometry: position and direction                                                                                                                                                     |
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| <p>Pupils should be taught to:</p> <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>identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least</li><li>read and write numbers from 1 to 20 in numerals and words</li></ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"><li>read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</li><li>represent and use number bonds and related subtraction facts within 20</li><li>add and subtract one-digit and two-digit numbers to 20, including zero</li><li>solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = \square - 9</math></li></ul> | <p>Pupils should be taught to:</p> <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> | <p>Pupils should be taught to:</p> <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></ul> | <p>Pupils should be taught to:</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 (for example, long/short, longer/shorter, tall/short, double/half)</li><li>mass / weight (for example, heavy/light, heavier than, lighter than)</li><li>capacity and volume (full/empty, more than, less than, half, half full, quarter)</li><li>time (quicker, slower, earlier, later)</li></ul></li><li>measure and begin to record the following:<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 (for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening)</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></ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"><li>recognise and name common 2-D and 3-D shapes, including:<ul style="list-style-type: none"><li>2-D shapes [for example, rectangles (including squares), circles and triangles]</li><li>3-D shapes [for example, cuboids (including cubes), pyramids and spheres]</li></ul></li></ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"><li>describe position, direction and movement, including whole, half, quarter and three-quarter turns</li></ul> |

Y1 notes and Guidance (non-statutory)

| Number and place value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Addition and subtraction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Multiplication and division                                                                                                                                                                                                                                                                                          | Fractions                                                                                                                                                                                                                                                                                                                                                                                                                                           | Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Geometry: properties of shapes                                                                                                                                                                                                                                       | Geometry: position and direction                                                                                                                                                                                                                                                                                                                                                                   |
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| <p>Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), or to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.</p> <p>Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.</p> <p>They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions.</p> <p>They recognise and create repeating patterns with objects and with shapes.</p> | <p>Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, <math>9 + 7 = 16</math>; <math>16 - 7 = 9</math>; <math>7 = 16 - 9</math>). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.</p> <p>Pupils combine and increase numbers, counting forwards and backwards.</p> <p>They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.</p> | <p>Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.</p> <p>They make connections between arrays, number patterns, and counting in twos, fives and tens.</p> | <p>Pupils are taught half and quarter as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape.</p> <p>Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole.</p> | <p>The pairs of terms: mass and weight, volume and capacity, are used interchangeably at this stage.</p> <p>Pupils move from using and comparing different types of quantities and measures using non-standard units, including discrete (for example, counting) and continuous (for example, liquid) measurement, to using manageable common standard units.</p> <p>In order to become familiar with standard measures, pupils begin to use measuring tools such as a ruler, weighing scales and containers.</p> <p>Pupils use the language of time, including telling the time throughout the day, first using o'clock and then half past.</p> | <p>Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently. They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.</p> | <p>Pupils use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside.</p> <p>Pupils make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face.</p> |