

Attainment Targets and Level Descriptions for Mathematics

2

KEY STAGE

Mathematics at Key Stage 1 has five attainment targets which relate directly to the sections within the programmes of study:

- Processes in Mathematics;
- Number;
- Measures;
- Shape and Space;
- Handling Data.

Level Descriptions
MATHEMATICS

PROCESSES IN MATHEMATICS

Pupils should develop mathematical processes through practical tasks, real-life problems and investigations within mathematics itself.

LEVEL 1
Pupils use materials provided under direction. They use mathematics as an integral part of classroom activities. They talk about their work in response to questions. They represent their work with objects or pictures. They begin to make simple predictions.

LEVEL 2
Pupils select, with help, the materials and mathematics required for some classroom activities. They talk about their work, using appropriate mathematical language and represent their work using symbols and simple diagrams. They respond to open-ended questions.

LEVEL 3
Pupils select and use the materials and mathematics appropriate for their work. They find ways to overcome difficulties that arise when they are solving problems. They begin to organise their work and work systematically. They use and interpret mathematical symbols and diagrams. They represent their work in a variety of ways and check it themselves. They discuss their mathematics and begin to explain their thinking.

LEVEL 4
Pupils gather information required for a task. They begin to develop and use their own strategies for solving problems. They discuss their work and compare their ideas and methods with others. They present information and results in a clear and organised way, explaining the reasons for their choice of presentation. They understand general statements and investigate whether or not particular cases match them.

NUMBER

Pupils should understand number, number notation, number operations - addition, subtraction, multiplication and division - and make use of appropriate methods of calculation. They should estimate and approximate in number. They should recognise and use patterns, relationships and sequences, and make generalisations. They should understand and use function machines and rules expressed in words.

LEVEL 1
Pupils count, read, write and order whole numbers up to at least 10. They understand the conservation of number. They begin to make sensible estimates of small numbers of objects. They add and subtract up to 10 using real objects and use these skills to solve simple problems. They copy, continue and devise repeating patterns using real objects or pictures.

LEVEL 2
Pupils read, write and order whole numbers up to at least 100 and begin to show some understanding of place value. They have good recall of number facts to 10 and add and subtract up to at least 20, using these skills to solve problems, including those that involve money. They explore and use addition and subtraction patterns up to 10 and use these patterns to understand the relationship between addition and subtraction.

LEVEL 3
Pupils read, write and order whole numbers up to at least 1000 and use the knowledge that the position of the digit indicates its value. They approximate to the nearest 10 or 100. They use mental recall of number facts up to 20 and of the majority of multiplication tables up to 10 x 10 in solving problems. They add and subtract money expressed in conventional notation up to £10. They solve problems involving addition, subtraction and multiplication (involving numbers up to 1000) and those that involve division in practical situations. They recognise and understand simple fractions which arise naturally, and their notation. They explain and predict number patterns within 100, including those in the 2, 5 and 10 times tables. They use function machines with one operation.

LEVEL 4
Pupils understand and use numbers with up to two decimal places in relevant contexts. They add mentally two two-digit numbers and subtract mentally one two-digit number from another. In solving problems, they use a range of mental, written and calculator methods of computation involving the four operations. They recognise approximate proportions of a whole and use simple fractions to describe these. They understand that addition and subtraction are inverse operations and use this to check their results when solving problems. They explore and predict patterns and sequences of whole numbers, such as doubling and halving numbers. They understand number properties, such as multiple and factor. They understand and use simple rules expressed in words.

MEASURES

Pupils should estimate and measure quantities and appreciate the approximate nature of measurement.

LEVEL 1
Pupils measure and order objects using direct comparison and use appropriate language associated with length, 'weight', capacity and area. They sequence events and recognise 'special' times on the clock.

LEVEL 2
Pupils use non-standard units to measure length, 'weight', capacity and area and understand the need for standard units. They know the most commonly used units in length, 'weight', capacity and time.

LEVEL 3
Pupils use standard units to measure length, 'weight', capacity and time in a range of contexts. They read times on the analogue clock and the date from a calendar. They choose and use a range of units and instruments, interpreting, with reasonable accuracy, numbers on a range of measuring instruments.

LEVEL 4
Pupils understand the relationship between metric units. They find perimeters of simple shapes, find areas by counting squares and find volumes by counting cubes. They begin to make sensible estimates using standard units in relation to everyday situations. They understand and use the twelve and twenty-four hour clocks.

SHAPE AND SPACE

Pupils should recognise and use the properties of two-dimensional and three-dimensional shapes. They should recognise locations in the study of space.

LEVEL 1
Pupils sort and make constructions with 2-D and 3-D shapes, using everyday language to describe their work. They use prepositions to state a position.

LEVEL 2
Pupils sort 2-D and 3-D shapes in various ways and give reasons for sorting. They name common 2-D shapes. They understand right and left turns.

LEVEL 3
Pupils name and describe common 2-D and 3-D shapes, using appropriate mathematical language. They identify lines of symmetry in simple 2-D shapes. They understand angle as a measurement of turn and recognise right angles in the environment.

LEVEL 4
Pupils make simple 2-D and 3-D shapes. They understand and use language associated with line and angle. They know the eight points of the compass and understand the terms clockwise and anticlockwise. They use co-ordinates to plot points and draw shapes in the first quadrant.

HANDLING DATA

Pupils should collect, record, process, represent and interpret data. They should understand and estimate simple probabilities.

LEVEL 1
Pupils sort and classify objects and talk about the criterion they have used. They record their work using real objects or drawings.

LEVEL 2
Pupils sort and classify objects for two criteria. They collect information and record it in simple tables, block graphs and diagrams. They interpret the information.

LEVEL 3
Pupils extract and interpret information presented in simple tables and lists. They collect, display and interpret data in pictograms and bar charts in order to communicate information.

LEVEL 4
Pupils collect, group and order discrete data with given class intervals. They represent and interpret data using a range of graphs, tables and diagrams. They construct and interpret pictograms where the symbol may represent a group of units. They interrogate a simple data base for one criterion. They understand and use simple vocabulary associated with probability, such as certain, uncertain, impossible, likely, unlikely and fair.

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LEVEL 5

Pupils identify and obtain information required to carry through tasks and solve mathematical problems. They explain their approach to the task. They present their work using symbols, words and diagrams. They check their results and consider whether these are reasonable. They make general statements based on evidence and give an explanation of their reasoning.

LEVEL 5

Pupils extend their understanding of the relationships between place values, using this to multiply and divide numbers with up to two decimal places by 10, 100 and 1000. They use the four operations with decimals to two places, multiplying and dividing by whole numbers only. Using their understanding of equivalence, they add and subtract simple fractions. They understand the relationship between simple fractions and percentages. They apply inverse operations or estimation using approximations in order to check solutions. They understand and use terms *such as square, cube and prime numbers*. They use a letter to stand for an unknown number. They follow sets of instructions to generate a sequence and determine possible rules for generating sequences.

LEVEL 5

Pupils understand and use scale in the context of maps and drawings. They calculate areas of squares, rectangles and right angle triangles and volumes of cubes and cuboids. They are familiar with the Imperial units still in common use. They convert one metric unit to another. They understand and use negative numbers in context. They use timetables involving the twenty-four hour clock.

LEVEL 5

Pupils understand congruence of 2-D shapes. They investigate properties of triangles and quadrilaterals and measure and draw angles up to 360° with reasonable accuracy. They draw nets to make simple 3-D shapes. They reflect a shape in a line.

LEVEL 5

Pupils design and use a data collection sheet and interpret the results. They calculate and use the mean and range of discrete data. They construct and interpret simple line graphs. They interpret graphs and diagrams, including pie charts, and draw conclusions. They insert and interrogate data in a computer database. They place events in order of 'likelihood' and use appropriate words to identify chance, *such as fifty-fifty and evens*.

LEVEL 6 (for comparison purposes only)

Pupils carry through substantial tasks with some given structure, modifying and refining strategies as they work. They identify and carry out the associated sub-tasks. They recognise and control some variables in the task with help where appropriate. They interpret, discuss and synthesise information which is in a variety of mathematical forms. They make generalisations with supporting arguments and make appropriate use of diagrams.

LEVEL 6 (for comparison purposes only)

Pupils understand and use decimals with up to three decimal places and approximate to two decimal places. They understand and use the equivalences between fractions, decimals and percentages, and calculate using ratios and percentages in relevant contexts. They understand and use order of precedence in numeral calculations, including the use of brackets. They use index notation to express powers of whole numbers. They understand and use the term square root. They understand and use basic conventions, simplification and substitution with an expression or formula. They understand and use formulae or linear equations expressed in symbolic form with whole number coefficients.

LEVEL 6 (for comparison purposes only)

Pupils calculate composite areas and volumes involving squares, rectangles, triangles, cubes and cuboids. They calculate the surface area of cubes and cuboids.

LEVEL 6 (for comparison purposes only)

Pupils recognise rotational symmetry, its order and centre. They know and use angle properties and symmetry properties of triangles and quadrilaterals. They classify and define types of quadrilaterals. They specify location by means of co-ordinates in all four quadrants. They understand and use language associated with the circle, *such as circumference, radius, diameter, sector, segments, arc and chord*. They construct triangles, using protractor, ruler and pair of compasses.

LEVEL 6 (for comparison purposes only)

Pupils distinguish between and are able to find the mean, median, and mode of discrete data. They construct and interpret pie charts and conversion graphs. They know that the probability of an event is the number of desirable outcomes divided by the number of possible outcomes. They understand and use 0 and 1 as the limits of the probability scale.