

Levels of Progression in USING MATHEMATICS across the curriculum: Primary (Levels 1–5)

The colours used in this document provide a means by which progression in the Requirements may be tracked across the levels.

For First Use 2012/13

Requirements for Using Mathematics

Across the curriculum, at a level appropriate to their ability, pupils should be enabled to:

- choose the appropriate materials, equipment and mathematics to use in a particular situation;
- use mathematical knowledge and concepts accurately;
- work systematically and check their work;
- use mathematics to solve problems and make decisions;
- develop methods and strategies, including mental mathematics;
- explore ideas, make and test predictions and think creatively;
- identify and collect information;
- read, interpret, organise and present information in mathematical formats;
- use mathematical understanding and language to ask and answer questions, talk about and discuss ideas and explain ways of working;
- develop financial capability;
- use ICT to solve problems and/or present their work;

using their **Knowledge and Understanding** of:

Number

- use, estimate, add and subtract numbers up to at least 10;
- understand conservation of number;
- create and describe repeating patterns using objects, numbers or pictures;
- recognise and use coins;

- read, write and order whole numbers up to at least 100;
- understand that the place of the digit indicates its value;
- use quick recall of number facts up to 10;
- add and subtract mentally within 20 and in written form;
- use addition and subtraction patterns within 20 to explore the relationship between addition and subtraction;
- understand that addition is commutative and subtraction is not;
- add and subtract within 100;
- understand the use of a symbol to stand for an unknown number;
- understand and use halves and quarters;
- understand relationships between all coins up to £1 and use this knowledge to carry out shopping activities;

Measures

- use everyday language associated with length, 'weight', capacity and area to describe, compare and order three objects;
- sequence familiar events;
- know the days of the week and their sequence;
- recognise 'special' times on the clock;

- identify and use non-standard units to measure length, 'weight', capacity and area;
- understand the need for standard units and know the most commonly used units in length, 'weight', capacity and time;
- name and order days of the week, months of the year and seasons;
- read simple digital and analogue clock displays;

Shape and Space

- sort 2-D and 3-D shapes and make and describe 2-D and 3-D constructions;
- use language and follow instructions, in practical situations, for position and movement;

- recognise and name common 2-D and 3-D shapes;
- sort 2-D and 3-D shapes, giving reasons for sorting;
- use language and follow instructions, in practical situations, for turning movements;

Handling Data

- sort and classify real objects for one criterion and re-sort for a different criterion using Venn, Carroll and Tree diagrams;
- collect information and record using real objects or drawings.

- sort and classify objects for two criteria using Venn, Carroll and Tree diagrams;
- collect information and record results using simple tables, block graphs, simple pictograms and diagrams;
- discuss and interpret information.

Level 1

In structured activities, in familiar and accessible contexts, pupils can:

- talk about and use the materials and equipment provided to carry out an activity;
- use some mathematical notation;
- show some organisation in their practical work;
- talk about ways to solve simple everyday problems;
- use counting strategies when carrying out activities;
- look for and talk about patterns;
- talk about and collect information required;
- represent their work using pictures and objects;
- use appropriate mathematical language to respond to questions about their work;

Level 2

In structured activities, in familiar and accessible contexts, pupils can:

- talk about how to approach an activity;
- select and use the materials, equipment and mathematics required;
- use appropriate mathematical notation;
- organise their practical work and check what they have done;
- use mental strategies to carry out calculations when solving problems/carrying out activities;
- recognise patterns and relationships and make predictions;
- discuss the information required and how it can be collected;
- present the information appropriately and talk about their findings;
- use appropriate mathematical language to talk about their work and respond to questions;

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Level 3

In structured activities, in familiar and accessible contexts, pupils can:

- suggest different ways an activity might be approached;
- select and use the appropriate materials, equipment and mathematics required;
- use a range of appropriate mathematical notation;
- organise their work and know how to check its accuracy;
- use mathematics to solve simple two-stage problems;
- use a range of mental calculation strategies;
- identify and explain patterns and relationships and make predictions;
- identify, collect and record the information required;
- present their findings clearly using a range of appropriate mathematical formats;
- explain their findings;
- use appropriate mathematical language to discuss and describe their way of working and respond to questions;

Level 4

In activities with some structure, in familiar and some unfamiliar contexts and situations, pupils can:

- decide how an activity might be approached and compare their approaches with others;
- identify and use appropriately the materials, equipment and mathematics required;
- use a range of appropriate mathematical techniques and notation;
- organise their own work and work systematically;
- review their work and check for accuracy;
- use a range of problem-solving strategies;
- use a range of efficient mental calculation strategies;
- investigate patterns and relationships, using their findings to make predictions;
- investigate general statements to see if they are true;
- find, organise and interpret relevant information;
- present information clearly;
- compare methods of presentation;
- use appropriate mathematical language to discuss their work and explain their thinking;

Level 5

In activities with some structure, in familiar and some unfamiliar contexts and situations, pupils can:

- plan and decide how an activity might be approached;
- identify and use efficiently the materials, equipment, mathematics and strategies required;
- use a range of appropriate mathematical techniques and notation;
- plan and work systematically and efficiently;
- review their work, considering if their findings are reasonable and making changes where appropriate;
- use a range of problem-solving strategies, suggesting and trying out different approaches when difficulties arise;
- make and test predictions;
- make general statements based on findings and test using new examples;
- summarise their findings;
- identify, obtain, process and interpret information appropriate and sufficient for the activity;
- present information accurately and appropriately including the use of mathematical language, symbols and diagrams;
- use appropriate mathematical language to express and communicate ideas accurately;

- understand, use, add and subtract whole numbers up to at least 1000;
- understand and use the concept of place value in whole numbers;
- use quick recall of number facts up to 20;
- add and subtract mentally two 2-digit numbers within 100;
- approximate to the nearest 10 or 100;
- identify and describe simple number patterns within the 100 square;
- know 2, 3, 4, 5 and 10 multiplication facts;
- understand that multiplication is commutative;
- explore and use division in practical situations;
- understand and use simple fractions in context;
- use number skills in the context of money up to £10;

- choose and use appropriate standard units to estimate, measure and record length, capacity, volume, 'weight', time and temperature;
- read simple measuring instruments with an appropriate degree of accuracy;
- find the area of shapes by counting whole and half squares;
- read and interpret a calendar;
- read digital and analogue clock displays;

- recognise, name and describe common 2-D and 3-D shapes;
- recognise one line of symmetry in common 2-D shapes;
- recognise tessellations through practical activities;
- recognise right angles in the environment and understand angle as a measurement of turn;
- use grid references in practical situations;

- collect and record relevant data for a given activity;
- draw and label pictograms and bar charts;
- read and interpret information from tables, pictograms, diagrams, lists, bar charts, simple pie charts and databases.

- read, write and order whole numbers within 10 000;
- use knowledge of place value to multiply and divide whole numbers by 10 and 100;
- understand place value to two decimal places;
- approximate within 10 000 to the nearest 10, 100 and 1000;
- estimate answers to calculations and approximate by rounding;
- add, subtract, multiply and divide whole numbers using a range of mental, written and calculator methods;
- add and subtract numbers with up to two decimal places;
- use the relationship between addition and subtraction to check calculations;
- know multiplication facts up to 10 x 10 and derive associated division facts;
- understand and use multiples and factors;
- use fractions to describe quantities;
- perform simple calculations involving unitary fractions;
- understand equivalence of fractions;
- understand and use simple percentages;
- interpret and apply simple rules expressed in words;
- interpret a calculator display when solving money problems;
- make choices about spending and value for money;
- know different ways in which payments for goods can be made;

- estimate and measure length, 'weight'/mass, time and temperature, working to an appropriate degree of accuracy;
- understand the relationship between metric units;
- add and subtract common measures;
- estimate area and volume of shapes by counting squares/cubes;
- work out perimeters of simple shapes;
- understand and use digital and analogue clock displays, using am, pm and 24-hour notation;

- explore the properties of common 2-D and 3-D shapes;
- explore the relationship between 2-D and 3-D shapes;
- recognise and draw lines of symmetry in a variety of 2-D shapes;
- know the eight points of the compass;
- understand and use the language of line, angle and location;
- use coordinates in the first quadrant;

- collect, group, record and present data with given class intervals;
- present and interpret data using a range of graphs, tables, diagrams, spreadsheets and databases;
- understand and use the language of probability.

- read, write and order whole numbers of any size;
- use knowledge of place value to multiply and divide numbers by 10, 100 and 1000;
- understand place value to three decimal places;
- round decimals to the nearest whole number;
- multiply and divide numbers with up to two decimal places by a whole number;
- check calculations by applying inverse operations;
- understand and use negative numbers in practical contexts;
- understand and use square, cube and prime numbers;
- understand the relationship between common fractions, decimals and percentages;
- calculate fractions and percentages of quantities, including money;
- use understanding of equivalence to add and subtract fractions;
- devise and use rules for generating sequences in words and/or symbolic form;
- express and use formulae in words and/or symbolic form;
- make informed choices about personal budgeting and spending;

- convert from one metric unit to another;
- use the four operations to solve problems related to measures;
- calculate areas of squares, rectangles and right-angled triangles and volumes of cubes and cuboids;
- calculate perimeters of a range of shapes;
- understand and use scale in the context of simple maps and drawings;
- read and interpret timetables;

- describe the properties of regular and irregular 2-D shapes in terms of sides, angles, symmetry and tessellations;
- reflect 2-D shapes in a line;
- describe the properties of 3-D shapes in terms of faces, edges and vertices;
- draw nets of 3-D shapes;
- estimate, measure, draw and label angles up to 360 degrees;

- collect, organise, record and represent data;
- design and use a data collection sheet;
- construct, label and interpret a range of graphs, tables, diagrams, spreadsheets and databases;
- understand, calculate and use mean and range;
- place events in order of likelihood.