

# Mathletics England Key Stage 1

## Understanding Practice and Fluency (UPF)



Grade 2

November, 2021

Mathletics

# Mathletics

England Program of Studies

Understanding, Practice and Fluency (UPF)

November 2021

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# Grade 2

## 1 Number

### 1.1 Place value

| Outcome   | Quests                                   | Content                                    |
|---|--|--|
| Count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward              | Count in number sequences                | Counting in 2s                             |
|   |  | Counting in 5s                             |
|   |  | Counting in 10s                            |
|   |  | Counting in 2s, 5s and 10s                 |
|   |  | Counting in 3s                             |
| Recognise the place value of each digit in a two-digit number (10s, 1s)                             | Place value of 2-digit numbers           | Counting starting on any number            |
|   |  | Tens and ones                              |
|   |  | Partitioning tens and ones                 |
| Identify, represent and estimate numbers using different representations, including the number line | Identify, represent and estimate numbers | Non-standard partitioning of tens and ones |
|   |  | Numbers to 100                             |
| Compare and order numbers from 0 up to 100; use <, > and = signs                                    | Compare and order numbers up to 100      | Ordinal numbers                            |
|   |  | Comparing and ordering collections to 20   |
| Read and write numbers to at least 100 in numerals and in words                                     | Read and write numbers to 100            | Comparing and ordering numbers to 100      |
|   |  | Reading and writing numbers to 100         |
| Use place value and number facts to solve problems  | Use place value to solve problems        | Using place value to solve problems        |

### 1.2 Addition & subtraction

| Outcome  | Quests                                | Content                                      |
|--|---------------------------------------|--|
| Solve problems with addition and subtraction:<br>- using concrete objects and pictorial representations, including those involving numbers, quantities and measures<br>- applying their increasing knowledge of mental and written methods | Problem solving: addition/subtraction | Addition and subtraction problems within 20  |
|  |                                       | Addition and subtraction problems within 100 |
|  |                                       | Exploring change in quantity                 |
| Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100   | Addition and subtraction facts        | Number bonds to 20                           |
|  |                                       | Doubles and near doubles                     |
|  |                                       | One more and one less within 100             |
|  |                                       | Number bonds to 100                          |

|   |                                   |  |
|---|-----------------------------------|--|
|   |                                   | Adding zero to a number                        |
|   |                                   | Subtracting zero from a number                 |
| Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:<br>-a two-digit number and 1s<br>-a two-digit number and 10s<br>- 2 two-digit numbers<br>-adding 3 one-digit numbers | Add and subtract numbers          | Adding 1-digit numbers                         |
|   |                                   | Adding 1-digit and 2-digit numbers             |
|   |                                   | Adding 2-digit numbers and 10s                 |
|   |                                   | Add two 2-digit numbers                        |
|   |                                   | Subtracting 1-digit and 2-digit numbers        |
|   |                                   | Subtracting 2-digit numbers and 10s            |
|   |                                   | Subtracting two 2-digit numbers                |
|   |                                   | Introducing vertical addition and subtraction  |
|   |                                   | Using mental strategies to add and subtract    |
|   |                                   | Using the bar model within 20                  |
| Show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot  | Commutativity in addition         | Commutativity in addition                      |
| Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems  | Rules of addition and subtraction | Relationships between addition and subtraction |

### 1.3 Multiplication & division

| Outcome   | Quests                            | Content                                  |
|---|-----------------------------------|--|
| Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers  | Multiplication and division facts | 2 times-tables                           |
|   |                                   | 5 times-tables                           |
|   |                                   | 10 times-tables                          |
|   |                                   | Multiplying by 2s, 5s and 10s            |
|   |                                   | Dividing by 2                            |
|   |                                   | Dividing by 5                            |
|   |                                   | Dividing by 10                           |
|   |                                   | Dividing by 2s, 5s and 10s               |
|   |                                   | Multiplying and dividing by 2, 5, and 10 |
|   |                                   | Odd and even numbers                     |
| Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals ( $=$ ) signs | Create mathematical sentences     | Creating mathematical sentences          |

|   |                                      |  |
|---|--------------------------------------|--|
| Show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot   | Rules of multiplication              | The commutative law of multiplication              |
|   |                                      | Relationship between multiplication and division   |
| Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts | Multiplication and division problems | Using arrays                                       |
|   |                                      | Adding to multiply                                 |
|   |                                      | Solving problems using multiplication and division |

## 1.4 Fractions

| Outcome  | Quests                   | Content                                 |
|--|--------------------------|---|
| Recognise, find, name and write fractions $\frac{1}{3}$ , $\frac{1}{4}$ , $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity | Fractions                | Halves                                  |
|  |                          | Quarters                                |
|  |                          | Halves and quarters                     |
|  |                          | Thirds                                  |
|  |                          | Counting in halves and quarters         |
|  |                          | Counting in thirds                      |
|  |                          | Ordering and comparing simple fractions |
| Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$                              | Equivalence in fractions | Finding quarters by halving             |
|  |                          | Equivalence in fractions                |

## 2 Measurement

### 1.1 Measurement

| Outcome  | Quests                              | Content                                       |
|--|-------------------------------------|---|
| Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels | Measure lengths                     | Measuring lengths - informal                  |
|  |                                     | Measuring lengths - cm                        |
|  |                                     | Selecting appropriate units to measure length |
|  |                                     | Word problems using length                    |
|  | Measure mass                        | Introducing weight and mass                   |
|  |                                     | Measuring mass in kilograms                   |
|  |                                     | Measuring mass in grams                       |
|  |                                     | Selecting appropriate unit to measure mass    |
|  | Measure volume                      | Capacity and volume                           |
|  |                                     | Measuring capacity using litres               |
|  |                                     | Measuring capacity using millilitres          |
|  |                                     | Selecting appropriate units to measure volume |
|  | Reading a thermometer               | Temperature                                   |
| Identify correct unit of measure   | Choosing the right unit of measure  |   |
| Compare and order lengths, mass, volume/capacity and record the results using >, < and =   | Compare lengths, mass and volume    | Comparing lengths                             |
|  |                                     | Comparing mass                                |
|  |                                     | Comparing volume                              |
| Compare temperatures   | Comparing temperatures              |   |
| Find different combinations of coins that equal the same amounts of money  | Combinations of coins               | Combinations of money                         |
| Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change   | Add and subtract money              | Adding and subtracting money                  |
| Compare and sequence intervals of time   | Internals of time                   | Comparing and sequencing intervals of time    |
| Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times   | Tell the time: digital and analogue | O'clock and half past (analogue clocks)       |
|  |                                     | O'clock and half past (digital clocks)        |
|  |                                     | Quarter past and quarter to (analogue clocks) |
|  |                                     | Quarter past and quarter to (digital clocks)  |
|  |                                     | Telling time to 5 minutes (analogue clocks)   |
|  |                                     | Telling time to 5 minutes (digital clocks)    |

|  |  |  |
|--|--|--|
|  |  | Problem solving with hours and minutes |
|--|--|--|



## 3 Geometry

### 3.1 Properties of shapes

| Outcome   | Quests                            | Content                                   |
|---|-----------------------------------|---|
| Identify and describe the properties of 2-D shapes, including the number of sides, and line symmetry in a vertical line | 2D shapes                         | Recognising 2D shapes                     |
|   |                                   | Recognising lines of symmetry in 2D shape |
| Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces                   | 3D shapes                         | Introducing spheres                       |
|   |                                   | Introducing cubes                         |
|   |                                   | Introducing cylinders                     |
|   |                                   | Introducing prisms                        |
|   |                                   | Introducing cones                         |
|   |                                   | Introducing pyramids                      |
|   |                                   | Describing the properties of 3D shapes    |
| Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]     | Identify 2D shapes on 3D shapes   | Identifying 3D shapes in the environment  |
|   |                                   |   |
| Compare and sort common 2-D and 3-D shapes and everyday objects   | Compare and sort 2D and 3D shapes | Sorting 2D shapes                         |
|   |                                   | Sorting 3D shapes                         |
|   |                                   | Comparing 2D shapes                       |
|   |                                   | Comparing 3D shapes                       |

### 3.2 Position & direction

| Outcome   | Quests                           | Content                          |
|---|----------------------------------|----------------------------------|
| Order and arrange combinations of mathematical objects in patterns and sequences  | Patterns and sequences           | Making patterns with shapes      |
|   |                                  | Number patterns                  |
| Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise) | Position, direction and movement | Describing position and movement |
|   |                                  | Describing movement and turns    |

## 4 Statistics

### 4.1 Statistics

| Outcome   | Quests                         | Content                              |
|---|--------------------------------|--------------------------------------|
| Interpret and construct simple pictograms, tally charts, block diagrams and tables  | Interpret and construct graphs | Pictograms                           |
|   |                                | Tally charts                         |
|   |                                | Block diagrams                       |
|   |                                | Tables                               |
|   |                                | Mixed data displays                  |
|   |                                | Constructing graphs                  |
| Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity | Answer questions about data    | Answering questions by counting      |
| Ask-and-answer questions about totalling and comparing categorical data   | Ask questions and collect data | Asking questions and collecting data |

# Mathletics

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