

# Cambridge Primary Mathematics Curriculum outline

Cambridge Primary combines a world-class curriculum with high-quality support for teachers and integrated assessment. The curriculum is dedicated to helping schools develop learners who are confident, responsible, reflective, innovative and engaged. Cambridge Primary has curriculum frameworks for English (including English as a Second Language), Mathematics and Science which have been designed to engage learners in an active and creative learning journey.

The curriculum frameworks for each subject for Cambridge Primary are organised into six stages. They reflect the teaching target for each year group and provide comprehensive learning objectives. For Cambridge Primary Mathematics, the curriculum is presented in five content areas or 'strands'. These are further subdivided into 'substrands'. The strands and substrands are:

## Number

- Numbers and the number system
- Calculation – Mental strategies, Addition and subtraction, Multiplication and division

## Geometry

- Shapes and geometric reasoning
- Position and movement

## Measure

- Money (until stage 3)
- Length, mass and capacity
- Time
- Area and perimeter (from stage 4)

## Handling data

- Organising, categorising and representing data
- Probability (from stage 5)

## Problem solving

- Using techniques and skills in solving mathematical problems
- Using understanding and strategies in solving problems (from stage 4)

The first four content areas are all underpinned by **Problem solving**, which describes using techniques and skills and the application of understanding and strategies in solving problems. Mental strategies are also a key part of the **Number** content. This curriculum focuses on principles, patterns, systems, functions and relationships so that learners can apply their mathematical knowledge

The Cambridge Primary Mathematics curriculum framework provides a solid foundation upon which the later stages of education can be built.

Cambridge Primary offers an optional testing structure to assess learner performance and report progress for both learners and parents. These assessments provide an international benchmark that enables teachers to identify learner strengths and weaknesses for individuals and class groups and develop further teaching and learning support using the information from the test results.

Cambridge Primary Progression Tests are available to schools registered for Cambridge Primary for stages 3–6. These tests are marked by teachers and come with full mark schemes and marking guidance. At the end of Cambridge Primary, schools can also offer Cambridge Primary Checkpoint, a diagnostic test which offers comprehensive feedback at the end of the Cambridge Primary stage.



and develop a holistic understanding of the subject. On the following pages, you will find some examples from the Number strand and the substrands for stages 1, 3 and 5 of the Cambridge Primary Mathematics curriculum.



## Stage 1

### Strand: Number

#### Substrand: Numbers and the number system

- Recite numbers in order (forwards from 1 to 100, backwards from 20 to 0)
- Read and write numerals from 0 to 20
- Count objects up to 20, recognising conservation of number
- Count on in tens from zero or a single-digit number to 100 or just over
- Count on in twos, beginning to recognise odd/even numbers to 20 as 'every other number'
- Begin partitioning two-digit numbers into tens and ones and reverse
- Within the range 0 to 30, say the number that is 1 or 10 more or less than any given number
- Use more or less to compare two numbers, and give a number which lies between them
- Order numbers to at least 20, positioning on a number line; use ordinal numbers
- Use the = sign to represent equality
- Give a sensible estimate of some objects that can be checked by counting, e.g. to 30
- Find halves of small numbers and shapes by folding, and recognise which shapes are halved.



### Strand: Number

#### Substrand: Calculation

##### Mental strategies

- Know all number pairs to 10 and record the related addition/subtraction facts
- Begin to know number pairs to 6, 7, 8, 9 and 10
- Add more than two small numbers, spotting pairs to 10, e.g.  $4 + 3 + 6 = 10 + 3$
- Begin using pairs to 10 to bridge 10 when adding/subtracting, e.g.  $8 + 3$ , add 2, then 1
- Know doubles to at least double 5
- Find near doubles using doubles already known, e.g.  $5 + 6$
- Begin to recognise multiples of 2 and 10.

##### Addition and subtraction

- Understand addition as counting on and combining two sets; record related addition sentences
- Understand subtraction as counting back and 'take away'; record related subtraction sentences
- Understand difference as 'how many more to make?'
- Add/subtract a single-digit number by counting on/back
- Find two more or less than a number to 20, recording the jumps on a number line
- Relate counting on and back in tens to finding 10 more/less than a number ( $< 100$ )
- Begin to use the +, - and = signs to record calculations in number sentences
- Understand that changing the order of addition does not change the total
- Add a pair of numbers by putting the larger number first and counting on
- Recognise the use of a sign such as  $\square$  to represent an unknown, e.g.  $6 + \square = 10$
- Begin to add single and two-digit numbers.

##### Multiplication and division

- Double any single-digit number
- Find halves of even numbers of objects up to 10
- Try to share numbers to 10 to find which are even and which are odd
- Share objects into two equal groups in a context.



## Stage 3

### Strand: Number

#### Substrand: Numbers and the number system

- Recite numbers 100 to 200 and beyond
- Read and write numbers to at least 1000
- Count on and back in ones, tens and hundreds from two- and three-digit numbers
- Count on and back in steps of 2, 3, 4 and 5 to at least 50
- Understand what each digit represents in three-digit numbers and partition into hundreds, tens and units
- Find 1, 10, 100 more/less than two- and three-digit numbers
- Multiply two-digit numbers by 10 and understand the effect
- Round two-digit numbers to the nearest 10 and round three-digit numbers to the nearest 100
- Place a three-digit number on a number line marked off in multiples of 100
- Place a three-digit number on a number line marked off in multiples of 10
- Compare three-digit numbers, use  $<$  and  $>$  signs, and find a number in between
- Order two- and three-digit numbers
- Give a sensible estimate of a number as a range (e.g. 30 to 50) by grouping in tens
- Find half of odd and even numbers to 40, using notation such as  $13\frac{1}{2}$
- Understand and use fraction notation, recognising that fractions are several parts of one whole, e.g.  $\frac{3}{4}$  is three quarters and  $\frac{2}{3}$  is two thirds
- Recognise equivalence between  $\frac{1}{2}$ ,  $\frac{2}{4}$ ,  $\frac{4}{8}$ ,  $\frac{5}{10}$  using diagrams
- Recognise simple mixed fractions, e.g.  $1\frac{1}{2}$  and  $2\frac{1}{4}$
- Order simple or mixed fractions on a number line, e.g. using the knowledge that  $\frac{1}{2}$  comes half way between  $\frac{1}{4}$  and  $\frac{3}{4}$ , and that  $1\frac{1}{2}$  comes half way between 1 and 2
- Begin to relate finding fractions to division
- Find halves, thirds, quarters and tenths of shapes and numbers (whole number answers).



## Stage 3 continued

### Strand: Number

#### Substrand: Calculation

##### Mental strategies

- Know addition and subtraction facts for all numbers to 20
- Know the following addition and subtraction facts:
  - multiples of 100 with a total of 1000
  - multiples of 5 with a total of 100
- Know multiplication/division facts for  $2\times$ ,  $3\times$ ,  $5\times$  and  $10\times$  tables
- Begin to know  $4\times$  table
- Recognise two- and three-digit multiples of 2, 5 and 10
- Work out quickly the doubles of numbers 1 to 20 and derive the related halves
- Work out quickly the doubles of multiples of 5 ( $< 100$ ) and derive the related halves
- Work out quickly the doubles of multiples of 50 to 500.

##### Addition and subtraction

- Add and subtract 10 and multiples of 10 to and from two- and three-digit numbers
- Add 100 and multiples of 100 to three-digit numbers
- Use the = sign to represent equality, e.g.  $75 + 25 = 95 + 5$
- Add several small numbers
- Find complements to 100, solving number equations such as  $78 + \square = 100$
- Add and subtract pairs of two-digit numbers
- Add three-digit and two-digit numbers using notes to support
- Re-order an addition to help with the calculation, e.g.  $41 + 54$ , by adding 40 to 54, then 1
- Add/subtract single-digit numbers to/from three-digit numbers
- Find 20, 30, ... 90, 100, 200, 300 more/less than three-digit numbers.

##### Multiplication and division

- Understand the relationship between halving and doubling
- Understand the effect of multiplying two-digit numbers by 10
- Multiply single-digit numbers and divide two-digit numbers by 2, 3, 4, 5, 6, 9 and 10
- Multiply teens numbers by 3 and 5
- Begin to divide two-digit numbers just beyond  $10\times$  tables, e.g.  $60 \div 5$ ,  $33 \div 3$
- Understand that division can leave a remainder (initially as 'some left over')
- Understand and apply the idea that multiplication is commutative
- Understand the relationship between multiplication and division and write connected facts.



## Stage 5

### Strand: Number

#### Substrand: Numbers and the number system

- Count on and back in steps of constant size, extending beyond zero
- Know what each digit represents in five- and six-digit numbers
- Partition any number up to one million into thousands, hundreds, tens and units
- Use decimal notation for tenths and hundredths and understand what each digit represents
- Multiply and divide any number from 1 to 10 000 by 10 or 100 and understand the effect
- Round four-digit numbers to the nearest 10, 100 or 1000
- Round a number with one or two decimal places to the nearest whole number
- Order and compare numbers up to a million using the  $>$  and  $<$  signs
- Order and compare negative and positive numbers on a number line and temperature scale
- Calculate a rise or fall in temperature
- Order numbers with one or two decimal places and compare using the  $>$  and  $<$  signs
- Recognise and extend number sequences.
- Recognise odd and even numbers and multiples of 5, 10, 25, 50 and 100 up to 1000
- Make general statements about sums, differences and multiples of odd and even numbers.
- Recognise equivalence between:  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ ;  $\frac{1}{3}$  and  $\frac{1}{6}$ ;  $\frac{1}{5}$  and  $\frac{1}{10}$
- Recognise equivalence between the decimal and fraction forms of halves, tenths and hundredths and use this to help order fractions, e.g. 0.6 is more than 50 per cent and less than  $\frac{7}{10}$
- Change an improper fraction to a mixed number, e.g.  $\frac{7}{4}$  to  $1\frac{3}{4}$ ; order mixed numbers and place between whole numbers on a number line
- Relate finding fractions to division and use to find simple fractions of quantities
- Understand percentage as the number of parts in every 100 and find simple percentages of quantities
- Express halves, tenths and hundredths as percentages
- Use fractions to describe and estimate a simple proportion, e.g.  $\frac{1}{5}$  of the beads are yellow
- Use ratio to solve problems, e.g. to adapt a recipe for 6 people to one for 3 or 12 people.

### Strand: Number

#### Substrand: Calculation

##### Mental strategies

- Know by heart pairs of one-place decimals with a total of 1, e.g.  $0.8 + 0.2$
- Derive quickly pairs of decimals with a total of 10, and with a total of 1
- Know multiplication and division facts for the  $2\times$  to  $10\times$  tables
- Know and apply tests of divisibility by 2, 5, 10 and 100
- Recognise multiples of 6, 7, 8 and 9 up to the 10th multiple
- Know squares of all numbers to  $10 \times 10$
- Find factors of two-digit numbers
- Count on or back in thousands, hundreds, tens and ones to add or subtract
- Add or subtract near multiples of 10 or 100, e.g.  $4387 - 299$



## Stage 5 continued

- Use appropriate strategies to add or subtract pairs of two- and three-digit numbers and numbers with one decimal place, using jottings where necessary
- Calculate differences between near multiples of 1000, e.g.  $5026 - 4998$ , or near multiples of 1, e.g.  $3.2 - 2.6$
- Multiply multiples of 10 to 90, and multiples of 100 to 900, by a single-digit number
- Multiply by 19 or 21 by multiplying by 20 and adjusting
- Multiply by 25 by multiplying by 100 and dividing by 4
- Use factors to multiply, e.g. multiply by 3, then double to multiply by 6
- Double any number up to 100 and halve even numbers to 200, and use this to double and halve numbers with one or two decimal places, e.g. double 3.4 and half of 8.6
- Double multiples of 10 to 1000 and multiples of 100 to 10 000, e.g. double 360 or double 3600, and derive the corresponding halves.
- Divide three-digit numbers by single-digit numbers, including those with a remainder (answers no greater than 30)
- Start expressing remainders as a fraction of the divisor when dividing two-digit numbers by single-digit numbers
- Decide whether to group (using multiplication facts and multiples of the divisor) or to share (halving and quartering) to solve divisions
- Decide whether to round an answer up or down after division, depending on the context
- Begin to use brackets to order operations and understand the relationship between the four operations and how the laws of arithmetic apply to multiplication.

### Addition and subtraction

- Find the total of more than three two- or three-digit numbers using a written method
- Add or subtract any pair of three- and/or four-digit numbers, with the same number of decimal places, including amounts of money.

### Multiplication and division

- Multiply or divide three-digit numbers by single-digit numbers
- Multiply two-digit numbers by two-digit numbers
- Multiply two-digit numbers with one decimal place by single-digit numbers, e.g.  $3.6 \times 7$

### How can I access the full curriculum framework?

Only schools offering Cambridge Primary can access the full curriculum frameworks.

- If you are a Cambridge Primary school you can download the full curriculum framework from our password protected *Cambridge Primary site*
- If you are a Cambridge school and would like to offer Cambridge Primary complete and return our *Additional Qualification Types* form
- If you are not a Cambridge school and would like to find out more about Cambridge Primary complete our *Expression of interest* form.

**Learn more!** For details of Cambridge Primary, go to [www.cie.org.uk/primary](http://www.cie.org.uk/primary) or contact our Customer Services team at [info@cie.org.uk](mailto:info@cie.org.uk) or call them on +44 1223 553554.

