



# Mathematics Curriculum Framework

## Grades 1 to 7

## Introduction

Welcome to the Acacia Mathematics Curriculum Framework, an integrated framework for Grades 1 to 7 combining the Cambridge Mathematics Curriculum Framework and the Zambian Mathematics Syllabus. This framework is based primarily on the Cambridge curriculum, and contains the full Cambridge Mathematics Curriculum Framework from Stages 1 to 7. This framework also covers all content from the Grades 4 to 7 of the Zambian syllabus to fully prepare students for success in the Grade 7 Zambian National Exams.

This framework provides a comprehensive set of progressive learning objectives for mathematics. The objectives detail what the learner should know or what they should be able to do in each year of education from Grades 1 to 7. The learning objectives provide a structure for teaching and learning and a reference against which learners' ability and understanding can be checked.

The Acacia Primary Mathematics curriculum is presented in six content areas:

- 1. Number**
- 2. Algebra (Grade 7 only)**
- 3. Geometry**
- 4. Measure**
- 5. Handling Data**
- 6. Problem Solving**

The first five 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 and develop a holistic understanding of the subject. The Cambridge Primary Mathematics Curriculum Framework provides a solid foundation upon which the later stages of education can be built.

## About the Cambridge Curriculum

The Cambridge Curriculum is founded on the values of the University of Cambridge and best practice in schools. The curriculum is dedicated to developing learners who are confident, responsible, innovative and engaged. Each curriculum framework for English, mathematics and science is designed to engage learners in an active and creative learning Journey. The Cambridge curriculum has been carefully designed to develop deep subject knowledge, conceptual understanding and higher order thinking skills, and provides a clear framework for progression from one stage to the next.

## How this framework was developed

This framework contains the full Cambridge Mathematics Curriculum Framework from Stages 1 to 7 and covers all content from the Grades 4 to 7 of the Zambian syllabus. To develop this framework, the objectives of the Zambian syllabus were mapped against those of the Cambridge syllabus. Where an objective from the Zambian syllabus is covered by an objective from the Cambridge syllabus, a reference to the Zambian Syllabus code is included after the Cambridge objective in brackets, e.g. *C5Nn7 Round a number with one or two decimal places to the nearest whole number. (Z6.6.1).*

Where an objective from the Zambian syllabus is not covered by the Cambridge objectives, a supplementary objective has been added. These supplementary objectives are highlighted in bold. e.g. **A5Nn3a Read, write and partition any number up to one million (Z3.2.2).**

There are many similarities in content between the two curricula. However in several cases where the learning objectives are similar, the grade at which the content was delivered differs. In such cases we have tried to follow the timing of the Cambridge curriculum, so as to ensure the development of deep subject knowledge and coherent progression. This is why you might find, for example, that an objective from Grade 7 of the Zambian syllabus is mapped to an objective at Grade 5 in the Acacia Curriculum Framework, or visa versa. Deep subject knowledge is important in order to develop the ability to solve problems, to apply understanding to new situations and to enable learners to progress to the next stage. Our framework has been carefully designed to ensure students are fully prepared for success in the Zambian Grade 7 exams. For full details of how the Acacia Curriculum Framework covers the Zambian syllabus please see the document [document name].

### Note on codes

Each learning objective has a unique curriculum framework code taken from the source curriculum. We have prefixed the codes with letters to identify the source curriculum as follows:

C - Learning objective code from the Cambridge e.g. e.g. C1Nn1

Z - Learning objective code from the Zambian e.g. Z1.1.1

A - new learning objective developed for the integrated Acacia curriculum e.g. A1Nn13

# Grade 1

## Number

### Numbers and the number system (Nn)

- C1Nn1 Recite numbers in order (forwards from 1 to 100, backwards from 20 to 0).
- C1Nn2 Read and write numerals from 0 to 20.
- C1Nn3 Count objects up to 20, recognising conservation of number.
- C1Nn4 Count on in tens from zero or a single-digit number to 100 or just over.
- C1Nn5 Count on in twos, beginning to recognise odd/even numbers to 20 as 'every other number'.
- C1Nn6 Begin partitioning two-digit numbers into tens and ones and reverse.
- C1Nn7 Within the range 0 to 30, say the number that is 1 or 10 more or less than any given number.
- C1Nn8 Use more or less to compare two numbers, and give a number which lies between them.
- C1Nn9 Order numbers to at least 20 positioning on a number track; use ordinal numbers.
- C1Nn10 Use the = sign to represent equality.
- C1Nn11 Give a sensible estimate of some objects that can be checked by counting, e.g. to 30.
- C1Nn12 Find halves of small numbers and shapes by folding, and recognise which shapes are halved.

### Calculation (Nc)

#### Mental strategies

- C1Nc1 Know all number pairs to 10 and record the related addition/ subtraction facts.
- C1Nc2 Begin to know number pairs to 6, 7, 8, 9 and 10.
- C1Nc3 Add more than two small numbers, spotting pairs to 10, e.g.  $4 + 3 + 6 = 10 + 3$ .
- C1Nc4 Begin using pairs to 10 to bridge 10 when adding/subtracting, e.g.  $8 + 3$ , add 2, then 1.
- C1Nc5 Know doubles to at least double 5.
- C1Nc6 Find near doubles using doubles already known,

#### Addition and subtraction

- C1Nc8 Understand addition as counting on and combining two sets; record related addition sentences.
- C1Nc9 Understand subtraction as counting back and 'take away'; record related subtraction sentences.

- C1Nc10 Understand difference as ‘how many more to make?’
- C1Nc11 Add/subtract a single-digit number by counting on/back.
- C1Nc12 Find two more or less than a number to 20, recording the jumps on a number line.
- C1Nc13 Relate counting on and back in tens to finding 10 more/less than a number (< 100).
- C1Nc14 Begin to use the +, – and = signs to record calculations in number sentences.
- C1Nc15 Understand that changing the order of addition does not change the total.
- C1Nc16 Add a pair of numbers by putting the larger number first and counting on.
- C1Nc17 Recognise the use of a sign such as to represent an unknown, e.g.  $6 + = 10$ .
- C1Nc18 Begin to add single- and two-digit numbers.

### Multiplication and division

- C1Nc19 Double any single-digit number.
- C1Nc20 Find halves of even numbers of objects up to 10.
- C1Nc21 Try to share numbers to 10 to find which are even and which are odd.
- C1Nc22 Share objects into two equal groups in a context.

## Geometry

### Shapes and geometric reasoning

- C1Gs1 Name and sort common 2D shapes (e.g. circles, squares, rectangles and triangles) using features such as number of sides, curved or straight. Use them to make patterns and models.
- C1Gs2 Name and sort common 3D shapes (e.g. cube, cuboid, cylinder, cone and sphere) using features such as number of faces, flat or curved faces. Use them to make patterns and models.
- C1Gs3 Recognise basic line symmetry.

### Position and movement

- C1Gp1 Use everyday language of direction and distance to describe movement of objects.

## Measure

### Money

- C1Mm1 Recognise all coins and work out how to pay an exact sum using smaller coins.

## Length, mass and capacity

- C1MI1 Compare lengths and weights by direct comparison, then by using uniform non-standard units.
- C1MI2 Estimate and compare capacities by direct comparison, then by using uniform non-standard units.
- C1MI3 Use comparative language, e.g. longer, shorter, heavier, lighter.

## Time

- C1Mt1 Begin to understand and use some units of time, e.g. minutes, hours, days, weeks, months and years.
- C1Mt2 Read the time to the hour (o'clock) and know key times of day to the nearest hour.
- C1Mt3 Order the days of the week and other familiar events.

## Handling data

### Organising, categorising and representing data

- C1Dh1 Answer a question by sorting and organising data or objects in a variety of ways, e.g. using block graphs and pictograms with practical resources, discussing the results; in lists and tables with practical resources, discussing the results; in Venn or Carroll diagrams giving different criteria for grouping the same objects

## Problem solving

### Using techniques and skills in solving mathematical problems

- C1Pt1 Choose appropriate strategies to carry out calculations, explaining working out.
- C1Pt2 Explore number problems and puzzles.
- C1Pt3 Find many combinations, e.g. combinations of three pieces of different coloured clothing.
- C1Pt4 Decide to add or subtract to solve a simple word problem (oral), and represent it with objects.
- C1Pt5 Check the answer to an addition by adding the numbers in a different order.
- C1Pt6 Check the answer to a subtraction by adding the answer to the smaller number in the question.
- C1Pt7 Describe and continue patterns such as count on and back in tens, e.g. 90, 80, 70.
- C1Pt8 Identify simple relationships between numbers and shapes, e.g. this number is ten bigger than that number.

- C1Pt9 Make a sensible estimate of a calculation, and consider whether an answer is reasonable.

## Grade 2

### Number

#### Numbers and the number system

- C2Nn1 Count, read and write numbers to at least 100 and back again.
- C2Nn2 Count up to 100 objects, e.g. beads on a bead bar.
- C2Nn3 Count on in ones and tens from single- and two-digit numbers and back again.
- C2Nn4 Count in twos, fives and tens, and use grouping in twos, fives or tens to count larger groups of objects.
- C2Nn5 Begin to count on in small constant steps such as threes and fours.
- C2Nn6 Know what each digit represents in two-digit numbers; partition into tens and ones.
- C2Nn7 Find 1 or 10 more/less than any two-digit number.
- C2Nn8 Round two-digit numbers to the nearest multiple of 10.
- C2Nn9 Say a number between any given neighbouring pairs of multiples of 10, e.g. 40 and 50.
- C2Nn10 Place a two-digit number on a number line marked off in multiples of ten.
- C2Nn11 Recognise and use ordinal numbers up to at least the 10th number and beyond.
- C2Nn12 Order numbers to 100; compare two numbers using the > and < signs.
- C2Nn13 Give a sensible estimate of up to 100 objects, e.g. choosing from 10, 20, 50 or 100.
- C2Nn14 Understand even and odd numbers and recognise these up to at least 20.
- C2Nn15 Sort numbers, e.g. odd/even, multiples of 2, 5 and 10.
- C2Nn16 Recognise that we write one half  $\frac{1}{2}$ , one quarter  $\frac{1}{4}$  and three quarters  $\frac{3}{4}$
- C2Nn17 Recognise that  $\frac{2}{2}$  or  $\frac{4}{4}$  make a whole and  $\frac{1}{2}$  and  $\frac{2}{4}$  are equivalent.
- C2Nn18 Recognise which shapes are divided in halves or quarters and which are not.
- C2Nn19 Find halves and quarters of shapes and small numbers of objects.

#### Calculation

##### Mental strategies

- C2Nc1 Find and learn by heart all number pairs to 10 and pairs with a total of 20.
- C2Nc2 Partition all numbers to 20 into pairs and record the related addition and subtraction facts.
- C2Nc3 Find all pairs of multiples of 10 with a total of 100 and record the related addition and subtraction facts.
- C2Nc4 Learn and recognise multiples of 2, 5 and 10 and derive the related division facts.
- C2Nc5 Find and learn doubles for all numbers up to 10 and also 15, 20, 25 and 50.

- Stage

### Addition and subtraction

- C2Nc6 Relate counting on/back in tens to finding 10 more/less than any two-digit number and then to adding and subtracting other multiples of 10, e.g.  $75 - 30$ .
- C2Nc7 Use the = sign to represent equality, e.g.  $16 + 4 = 17 + 3$ .
- C2Nc8 Add four or five small numbers together.
- C2Nc9 Recognise the use of a symbol such as  $\square$  or  $\Delta$  to represent an unknown, e.g.  $\Delta + = 10$ .
- C2Nc10 Solve number sentences such as  $27 + = 30$ .
- C2Nc11 Add and subtract a single digit to and from a two-digit number.
- C2Nc12 Add pairs of two-digit numbers.
- C2Nc13 Find a small difference between pairs of two-digit numbers.
- C2Nc14 Understand that addition can be done in any order, but subtraction cannot.
- C2Nc15 Understand subtraction as both difference and take away.

### Multiplication and division

- C2Nc16 Understand multiplication as repeated addition and use the  $\times$  sign.
- C2Nc17 Understand multiplication as describing an array. Stage 2
- C2Nc18 Understand division as grouping and use the  $\div$  sign.
- C2Nc19 Use counting in twos, fives or tens to solve practical problems involving repeated addition.
- C2Nc20 Find doubles of multiples of 5 up to double 50 and corresponding halves.
- C2Nc21 Double two-digit numbers.
- C2Nc22 Work out multiplication and division facts for the 3x and 4x tables.
- C2Nc23 Understand that division can leave some left over.

## Geometry

### Shapes and geometric reasoning

- C2Gs1 Sort, name, describe, visualise and draw 2D shapes (e.g. squares, rectangles, circles, regular and irregular pentagons and hexagons) referring to their properties; recognise common 2D shapes in different positions and orientations.
- C2Gs2 Sort, name, describe and make 3D shapes (e.g. cubes, cuboids, cones, cylinders, spheres and pyramids) referring to their properties; recognise 2D drawings of 3D shapes.
- C2Gs3 Identify reflective symmetry in patterns and 2D shapes; draw lines of symmetry.
- C2Gs4 Find examples of 2D and 3D shape and symmetry in the environment.

### Position and movement

- C2Gp1 Follow and give instructions involving position, direction and movement.
- C2Gp2 Recognise whole, half and quarter turns, both clockwise and anti-clockwise.

- C2Gp3 Recognise that a right angle is a quarter turn.

## Measure

### Money

- C2Mm1 Recognise all coins and notes.
- C2Mm2 Use money notation.
- C2Mm3 Find totals and the coins and notes required to pay a given amount; work out change.

### Length, mass and capacity

- C2MI1 Estimate, measure and compare lengths, weights and capacities, choosing and using suitable uniform non-standard and standard units and appropriate measuring instruments.
- C2MI2 Compare lengths, weights and capacities using the standard units: centimetre, metre, 100 g, kilogram, and litre.

### Time

- C2Mt1 Know the units of time (seconds, minutes, hours, days, weeks, months and years).
- C2Mt2 Know the relationships between consecutive units of time.
- C2Mt3 Read the time to the half hour on digital and analogue clocks.
- C2Mt4 Measure activities using seconds and minutes.
- C2Mt5 Know and order the days of the week and the months of the year.

## Handling data

### Organising, categorising and representing data

- C2Dh1 Answer a question by collecting and recording data in lists and tables, and representing it as block graphs and pictograms to show results.
- C2Dh2 Use Carroll and Venn diagrams to sort numbers or objects using one criterion; begin to sort numbers and objects using two criteria; explain choices using appropriate language, including 'not'

## Problem solving

### Using techniques and skills in solving mathematical problems

- C2Pt1 Choose appropriate mental strategies to carry out calculations and explain how they worked out the answer.
- C2Pt2 Explain methods and reasoning orally.

- C2Pt3 Explore number problems and puzzles.
- C2Pt4 Make sense of simple word problems (single and easy two step), decide what operations (addition or subtraction, simple multiplication or division) are needed to solve them and, with help, represent them, with objects or drawings or on a number line.
- C2Pt5 Make up a number story to go with a calculation, including in the context of money.
- C2Pt6 Check the answer to an addition by adding the numbers in a different order or by using a different strategy, e.g.  $35 + 19$  by adding 20 to 35 and subtracting 1, and by adding  $30 + 10$  and  $5 + 9$ .
- C2Pt7 Check a subtraction by adding the answer to the smaller number in the original subtraction.
- C2Pt8 Describe and continue patterns which count on in twos, threes, fours or fives to 30 or more.
- C2Pt9 Identify simple relationships between numbers and shapes, e.g. this number is double ...; these shapes all have ... sides.
- C2Pt10 Make a sensible estimate for the answer to a calculation.
- C2Pt11 Consider whether an answer is reasonable.

## Grade 3

### N Number

#### Nn Numbers and the number system

- C3Nn1 Recite numbers 100 to 200 and beyond.
- C3Nn2 Read and write numbers to at least 1000.
- C3Nn3 Count on and back in ones, tens and hundreds from two- and three-digit numbers.
- C3Nn4 Count on and back in steps of 2, 3, 4 and 5 to at least 50.
- C3Nn5 Understand what each digit represents in three-digit numbers and partition into hundreds, tens and units.
- C3Nn6 Find 1, 10, 100 more/less than two- and three-digit numbers.
- C3Nn7 Multiply two-digit numbers by 10 and understand the effect.
- C3Nn8 Round two-digit numbers to the nearest 10 and round three digit numbers to the nearest 100.
- C3Nn9 Place a three-digit number on a number line marked off in multiples of 100.
- C3Nn10 Place a three-digit number on a number line marked off in multiples of 10.
- C3Nn11 Compare three-digit numbers, use < and > signs, and find a number in between.
- C3Nn12 Order two- and three-digit numbers.
- C3Nn13 Give a sensible estimate of a number as a range (e.g. 30 to 50) by grouping in tens.
- C3Nn14 Find half of odd and even numbers to 40, using notation such as  $13\frac{1}{2}$ .
- C3Nn15 Understand and use fraction notation recognising that fractions are several parts of one whole, e.g.  $4\frac{3}{4}$  is three quarters and  $3\frac{2}{3}$  is two thirds. (Z3.8.1)
- C3Nn16 Recognise equivalence between  $\frac{1}{2}$ ,  $\frac{2}{4}$ ,  $\frac{4}{8}$  and  $\frac{5}{10}$  using diagrams.
- C3Nn17 Recognise simple mixed fractions, e.g.  $1\frac{1}{2}$  and  $2\frac{1}{4}$
- C3Nn18 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.
- C3Nn19 Begin to relate finding fractions to division.
- C3Nn20 Find halves, thirds, quarters and tenths of shapes and numbers (whole number answers).

#### Nc Calculation

##### Mental strategies

- C3Nc1 Know addition and subtraction facts for all numbers to 20.
- C3Nc2 Know the following addition and subtraction facts: – multiples of 100 with a total of 1000, – multiples of 5 with a total of 100
- C3Nc3 Know multiplication/division facts for  $2\times$ ,  $3\times$ ,  $5\times$ , and  $10\times$  tables.

- C3Nc4 Begin to know  $4\times$  table.
- C3Nc5 Recognise two- and three-digit multiples of 2, 5 and 10.
- C3Nc6 Work out quickly the doubles of numbers 1 to 20 and derive the related halves.
- C3Nc7 Work out quickly the doubles of multiples of 5 ( $< 100$ ) and derive the related halves.
- C3Nc8 Work out quickly the doubles of multiples of 50 to 500.

### Addition and subtraction

- C3Nc9 Add and subtract 10 and multiples of 10 to and from two- and three-digit numbers.
- C3Nc10 Add 100 and multiples of 100 to three-digit numbers.
- C3Nc11 Use the = sign to represent equality, e.g.  $75 + 25 = 95 + 5$ .
- C3Nc12 Add several small numbers.
- C3Nc13 Find complements to 100, solving number equations such as  $78 + \quad = 100$ .
- C3Nc14 Add and subtract pairs of two-digit numbers.
- C3Nc15 Add three-digit and two-digit numbers using notes to support.
- C3Nc16 Re-order an addition to help with the calculation, e.g.  $41 + 54$ , by adding 40 to 54, then 1.
- C3Nc17 Add/subtract single-digit numbers to/from three-digit numbers.
- C3Nc18 Find 20, 30, ... 90, 100, 200, 300 more/less than three-digit numbers.

### Multiplication and division

- C3Nc19 Understand the relationship between halving and doubling.
- C3Nc20 Understand the effect of multiplying two-digit numbers by 10.
- C3Nc21 Multiply single-digit numbers and divide two-digit numbers by 2, 3, 4, 5, 6, 9 and 10.
- C3Nc22 Multiply teens numbers by 3 and 5.
- C3Nc23 Begin to divide two-digit numbers just beyond  $10\times$  tables, e.g.  $60 \div 5$ ,  $33 \div 3$ .
- C3Nc24 Understand that division can leave a remainder (initially as 'some left over').
- C3Nc25 Understand and apply the idea that multiplication is commutative.
- C3Nc26 Understand the relationship between multiplication and division and write connected facts.

## G Geometry

### Gs Shapes and geometric reasoning

- C3Gs1 Identify, describe and draw regular and irregular 2D shapes including pentagons, hexagons, octagons and semi-circles. (Z6.11.1)
- C3Gs2 Classify 2D shapes according to the number of sides, vertices and right angles.

- C3Gs3 Identify, describe and make 3D shapes including pyramids and prisms; investigate which nets will make a cube.
- C3Gs4 Classify 3D shapes according to the number and shape of faces, number of vertices and edges.
- C3Gs5 Draw and complete 2D shapes with reflective symmetry and draw reflections of shapes (mirror line along one side).
- C3Gs6 Relate 2D shapes and 3D solids to drawings of them.
- C3Gs7 Identify 2D and 3D shapes, lines of symmetry and right angles in the environment.
- C3Gs8 Identify right angles in 2D shapes.

## Gp Position and movement

- C3Gp1 Use the language of position, direction and movement, including clockwise and anti-clockwise.
- C3Gp2 Find and describe the position of a square on a grid of squares where the rows and columns are labelled.
- C3Gp3 Use a set square to draw right angles.
- C3Gp4 Compare angles with a right angle and recognise that a straight line is equivalent to two right angles.

## G Measure

### Gm Money

- C3Gm1 • C3Mm1 Consolidate using money notation.
- C3Gm2 • C3Mm2 Use addition and subtraction facts with a total of 100 to find change.

### Gl Length, mass and capacity

- C3Gl1 • C3MI1 Choose and use appropriate units and equipment to estimate, measure and record measurements.
- C3Gl2 • C3MI2 Know the relationship between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres.
- C3Gl3 • C3MI3 Read to the nearest division or half division, use scales that are numbered or partially numbered.
- C3Gl4 • C3MI4 Use a ruler to draw and measure lines to the nearest centimetre.
- C3Gl5 • C3MI5 Solve word problems involving measures.

### Gt Time

- C3Gt1 • C3Mt1 Suggest and use suitable units to measure time and know the relationships between them (second, minute, hour, day, week, month, year).

- C3Gt2 • C3Mt2 Read the time on analogue and digital clocks, to the nearest 5 minutes on an analogue clock and to the nearest minute on a digital clock.
- C3Gt3 • C3Mt3 Begin to calculate simple time intervals in hours and minutes.
- C3Gt4 • C3Mt4 Read a calendar and calculate time intervals in weeks or days.

## D Handling data

### Dh Organising, categorising and representing data

- C3Dh1 Answer a real-life question by collecting, organising and interpreting data, e.g. investigating the population of mini-beasts in different environments.
- C3Dh2 Use tally charts, frequency tables, pictograms (symbol representing one or two units) and bar charts (intervals labelled in ones or twos).
- C3Dh3 Use Venn or Carroll diagrams to sort data and objects using two criteria.

## Problem solving

### Using techniques and skills in solving mathematical problems

- C3Pt1 Choose appropriate mental strategies to carry out calculations.
- C3Pt2 Begin to understand everyday systems of measurement in length, weight, capacity and time and use these to make measurements as appropriate.
- C3Pt3 Make sense of and solve word problems, single (all four operations) and two-step (addition and subtraction), and begin to represent them, e.g. with drawings or on a number line.
- C3Pt4 Check the results of adding two numbers using subtraction, and several numbers by adding in a different order.
- C3Pt5 Check subtraction by adding the answer to the smaller number in the original calculation.
- C3Pt6 Check multiplication by reversing the order, e.g. checking that  $6 \times 4 = 24$  by doing  $4 \times 6$ .
- C3Pt7 Check a division using multiplication, e.g. check  $12 \div 4 = 3$  by doing  $4 \times 3$ .
- C3Pt8 Recognise the relationships between different 2D shapes.
- C3Pt9 Identify the differences and similarities between different 3D shapes.
- C3Pt10 Estimate and approximate when calculating, and check working.
- C3Pt11 Make a sensible estimate for the answer to a calculation, e.g. using rounding.
- C3Pt12 Consider whether an answer is reasonable.

### Using understanding and strategies in solving problems

- C3Ps1 Make up a number story to go with a calculation, including in the context of money.
- C3Ps2 Explain a choice of calculation strategy and show how the answer was worked out.
- C3Ps3 Explore and solve number problems and puzzles, e.g. logic problems.

- C3Ps4 Use ordered lists and tables to help to solve problems systematically.
- C3Ps5 Describe and continue patterns which count on or back in steps of 2, 3, 4, 5, 10, or 100.
- C3Ps6 Identify simple relationships between numbers, e.g. each number is three more than the number before it.
- C3Ps7 Identify simple relationships between shapes, e.g. these shapes all have the same number of lines of symmetry.
- C3Ps8 Investigate a simple general statement by finding examples which do or do not satisfy it, e.g. when adding 10 to a number, the first digit remains the same.
- C3Ps9 Explain methods and reasoning orally, including initial thoughts about possible answers to a problem.

## Grade 4

### N Number

#### Nn Numbers and the number system

- C4Nn1 Read and write numbers up to 10 000.
- C4Nn2 Count on and back in ones, tens, hundreds and thousands from four-digit numbers.
- C4Nn3 Understand what each digit represents in a three- or four-digit number and partition into thousands, hundreds, tens and units.
- C4Nn4 Use decimal notation and place value for tenths and hundredths in context, e.g. order amounts of money; convert a sum of money such as \$13.25 to cents, or a length such as 125 cm to metres; round a sum of money to the nearest pound.
- C4Nn5 Understand decimal notation for tenths and hundredths in context, e.g. length.
- C4Nn6 Find multiples of 10, 100, 1000 more/less than numbers of up to four digits, e.g.  $3407 + 20 = 3427$ .
- C4Nn7 Multiply and divide three-digit numbers by 10 (whole number answers) and understand the effect; begin to multiply numbers by 100 and perform related divisions.
- C4Nn8 Recognise multiples of 5, 10 and 100 up to 1000.
- C4Nn9 Round three- and four-digit numbers to the nearest 10 or 100.
- C4Nn10 Position accurately numbers up to 1000 on an empty number line or line marked off in multiples of 10 or 100.
- C4Nn11 Estimate where three- and four-digit numbers lie on empty 0–1000 or 0–10 000 lines.
- C4Nn12 Compare pairs of three-digit or four-digit numbers, using the  $>$  and  $<$  signs, and find a number in between each pair.
- C4Nn13 Use negative numbers in context, e.g. temperature.
- C4Nn14 Recognise and extend number sequences formed by counting in steps of constant size, extending beyond zero when counting back.
- C4Nn15 Recognise odd and even numbers.
- C4Nn16 Make general statements about the sums and differences of odd and even numbers.
- C4Nn17 Order and compare two or more fractions with the same denominator (halves, quarters, thirds, fifths, eighths or tenths).
- C4Nn18 Recognise the equivalence between:  $\frac{1}{2}$ ,  $\frac{4}{8}$  and  $\frac{5}{10}$ ;  $\frac{1}{4}$  and  $\frac{2}{8}$ ;  $\frac{1}{5}$  and  $\frac{2}{10}$ . (Z4.8.1)
- C4Nn19 Use equivalence to help order fractions, e.g.  $\frac{7}{10}$  and  $\frac{3}{4}$ .
- C4Nn20 Understand the equivalence between one-place decimals and fractions in tenths.
- C4Nn21 Understand that  $\frac{1}{2}$  is equivalent to 0.5 and also to  $\frac{5}{10}$ .

- C4Nn22 Recognise the equivalence between the decimal fraction and vulgar fraction forms of halves, quarters, tenths and hundredths.
- C4Nn23 Recognise mixed numbers, e.g.  $5\frac{3}{4}$ , and order these on a number line.
- C4Nn24 Relate finding fractions to division.
- C4Nn25 Find halves, quarters, thirds, fifths, eighths and tenths of shapes and numbers
- **A4Nn26 Sort objects according to size, colour and shape; match sets into one-to-one correspondence. (Z1.2.1, Z1.2.2)**
- **A4Nn27 Place sets in order according to their cardinal numbers; assign numerals 0 to 10 to elements in a set; Describe sets in relation to real life situations. (Z1.2.3, Z 1.2.4, 2.1.1)**
- **A4Nn28 State membership of a set using symbol  $\in$ , and  $\{ \}$ ; describe a set by listing its members; recognise and use the symbols "=" equal to, " $\neq$ " not equal to. (Z2.1.2, Z3.1.1, Z3.1.2)**
- **A4Nn29 Draw arrow diagrams to illustrate matching and one-to-one mappings (Z2.9.1, Z3.11.1)**

## Nc Calculation

### Mental strategies

- C4Nc1 Derive quickly pairs of two-digit numbers with a total of 100, e.g.  $72 + 28 = 100$ .
- C4Nc2 Derive quickly pairs of multiples of 50 with a total of 1000, e.g.  $850 + 150 = 1000$ .
- C4Nc3 Identify simple fractions with a total of 1, e.g.  $\frac{1}{4} + \frac{3}{4} = 1$ .
- C4Nc4 Know multiplication for  $2\times$ ,  $3\times$ ,  $4\times$ ,  $5\times$ ,  $6\times$ ,  $9\times$  and  $10\times$  tables and derive division facts.
- **A4Nc4a Apply the properties of zero (0) and one (1) in multiplication (Z4.5.3)**
- C4Nc5 Recognise and begin to know multiples of 2, 3, 4, 5 and 10, up to the tenth multiple.
- C4Nc6 Add three or four small numbers, finding pairs that equal 10 or 20.
- C4Nc7 Add three two-digit multiples of 10, e.g.  $40 + 70 + 50$ .
- C4Nc8 Add and subtract near multiples of 10 or 100 to or from three digit numbers, e.g.  $367 - 198$  or  $278 + 49$ .
- C4Nc9 Add any pair of two-digit numbers, choosing an appropriate strategy.
- C4Nc10 Subtract any pair of two-digit numbers, choosing an appropriate strategy.
- C4Nc11 Find a difference between near multiples of 100, e.g.  $304 - 296$ .
- C4Nc12 Subtract a small number crossing 100, e.g.  $304 - 8$ .
- C4Nc13 Multiply any pair of single-digit numbers together.
- C4Nc14 Use knowledge of commutativity to find the easier way to multiply.
- C4Nc15 Understand the effect of multiplying and dividing three-digit numbers by 10.
- C4Nc16 Derive quickly doubles of all whole numbers to 50, doubles of multiples of 10 to 500, doubles of multiples of 100 to 5000, and corresponding halves.

### Addition and subtraction

- C4Nc17 Add pairs of three-digit numbers.

- C4Nc18 Subtract a two-digit number from a three-digit number.
- C4Nc19 Subtract pairs of three-digit numbers.

### Multiplication and division

- C4Nc20 Double any two-digit number.
- C4Nc21 Multiply multiples of 10 to 90 by a single-digit number.
- C4Nc22 Multiply a two-digit number by a single-digit number.
- C4Nc23 Divide two-digit numbers by single digit-numbers (answers no greater than 20).
- C4Nc24 Decide whether to round up or down after division to give an answer to a problem.
- C4Nc25 Understand that multiplication and division are the inverse function of each other.
- C4Nc26 Begin to understand simple ideas of ratio and proportion, e.g. a picture is one fifth the size of the real dog. It is 25 cm long in the picture, so it is  $5 \times 25$  cm long in real life.

## G Geometry

### Gs Shapes and geometric reasoning

- C4Gs1 Identify, describe, visualise, draw and make a wider range of 2D and 3D shapes including a range of quadrilaterals, the heptagon and tetrahedron; use pinboards to create a range of polygons. Use spotty paper to record results. (Z5.11.3, Z7.12.3)
- **A4Gs1a Identify a cylinder and triangular prism (Z7.12.1)**
- C4Gs2 Classify polygons (including a range of quadrilaterals) using criteria such as the number of right angles, whether or not they are regular and their symmetrical properties.
- C4Gs3 Identify and sketch lines of symmetry in 2D shapes and patterns.(Z7.10.2)
- C4Gs4 Visualise 3D objects from 2D nets and drawings and make nets of common solids.
- C4Gs5 Find examples of shapes and symmetry in the environment and in art.

### Gp Position and movement

- C4Gp1 Describe and identify the position of a square on a grid of squares where rows and columns are numbered and/or lettered.
- C4Gp2 Know that angles are measured in degrees and that one whole turn is  $360^\circ$  or four right angles; compare and order angles less than  $180^\circ$ .
- C4Gp3 Devise the directions to give to follow a given path.

## G Measure

### G1 Length, mass and capacity

- C4G11 • C4M11 Choose and use standard metric units and their abbreviations (km, m, cm, mm, kg, g, l and ml ) when estimating, measuring and recording length, weight and capacity.
- C4G12 • C4M12 Know and use the relationships between familiar units of length, mass and capacity; know the meaning of 'kilo', 'centi' and 'milli'.
- C4G13 • C4M13 Where appropriate, use decimal notation to record measurements, e.g. 1.3 m, 0.6 kg, 1.2 l.
- C4G14 • C4M14 Interpret intervals/divisions on partially numbered scales and record readings accurately.

### Gt Time

- C4Gt1 • C4Mt1 Read and tell the time to nearest minute on 12-hour digital and analogue clocks.
- C4Gt2 • C4Mt2 Use am, pm and 12-hour digital clock notation.
- C4Gt3 • C4Mt3 Read simple timetables and use a calendar.
- C4Gt4 • C4Mt4 Choose units of time to measure time intervals.

### Ga Area and perimeter

- C4Ga1 • C4Ma1 Draw rectangles, and measure and calculate their perimeters.
- C4Ga2 • C4Ma2 Understand that area is measured in square units, e.g. cm<sup>2</sup>.
- C4Ga3 • C4Ma3 Find the area of rectilinear shapes drawn on a square grid by counting squares.

## D Handling data

### Dh Organising, categorising and representing data

- C4Dh1 Answer a question by identifying what data to collect, organising, presenting and interpreting data in tables, diagrams, tally charts, frequency tables, pictograms (symbol representing 2, 5, 10 or 20 units) and bar charts (intervals labelled in twos, fives, tens or twenties).
- C4Dh2 Compare the impact of representations where scales have different intervals.
- C4Dh3 Use Venn diagrams or Carroll diagrams to sort data and objects using two or three criteria.

## Problem solving

### Using techniques and skills in solving mathematical problems

- C4Pt1 Choose appropriate mental or written strategies to carry out calculations involving addition or subtraction. (Z4.3.2, Z4.4.2)
- C4Pt2 Understand everyday systems of measurement in length, weight, capacity and time and use these to solve simple problems as appropriate.
- C4Pt3 Check the results of adding numbers by adding them in a different order or by subtracting one number from the total.
- C4Pt4 Check subtraction by adding the answer to the smaller number in the original calculation.
- C4Pt5 Check multiplication using a different technique, e.g. check  $6 \times 8 = 48$  by doing  $6 \times 4$  and doubling.
- C4Pt6 Check the result of a division using multiplication, e.g. multiply 4 by 12 to check  $48 \div 4$ .
- C4Pt7 Recognise the relationships between 2D shapes and identify the differences and similarities between 3D shapes.
- C4Pt8 Estimate and approximate when calculating, and check working.

### Using understanding and strategies in solving problems

- C4Ps1 Make up a number story for a calculation, including in the context of measures.
- C4Ps2 Explain reasons for a choice of strategy when multiplying or dividing.
- C4Ps3 Choose strategies to find answers to addition or subtraction problems; explain and show working.
- C4Ps4 Explore and solve number problems and puzzles, e.g. logic problems.
- C4Ps5 Use ordered lists and tables to help to solve problems systematically.
- C4Ps6 Describe and continue number sequences, e.g. 7, 4, 1,  $-2$  ... identifying the relationship between each number.(Z4.7.1)
- C4Ps7 Identify simple relationships between shapes, e.g. these polygons are all regular because ...
- C4Ps8 Investigate a simple general statement by finding examples which do or do not satisfy it.
- C4Ps9 Explain methods and reasoning orally and in writing; make hypotheses and test them out.

## Stage 5

It is important that learners become confident users of calculators. They need to recognise that the calculator is a tool of which they are in control and to understand how it can help them to develop their mathematics. Learners can be taught how to use a calculator effectively and to recognise how and when it is appropriate to do so; by first deciding if mental and pencil-and-paper methods are quicker or more reliable. Note that to use a calculator effectively requires a secure knowledge of number, which has to be the prime aim.

## N Number

### Nn Numbers and the number system

- C5Nn1 Count on and back in steps of constant size, extending beyond zero.
- C5Nn2 Know what each digit represents in five- and six-digit numbers.
- C5Nn3 Partition any number up to one million into thousands, hundreds, tens and units.
- **A5Nn3a Read, write and partition any number up to one million (Z3.2.2)**
- C5Nn4 Use decimal notation for tenths and hundredths and understand what each digit represents. (Z5.8.2)
- C5Nn5 Multiply and divide any number from 1 to 10 000 by 10 or 100 and understand the effect.
- C5Nn6 Round four-digit numbers to the nearest 10, 100 or 1000.
- C5Nn7 Round a number with one or two decimal places to the nearest whole number. (Z6.6.1)
- C5Nn8 Order and compare numbers up to a million using the > and < signs.
- C5Nn9 Order and compare negative and positive numbers on a number line and temperature scale.
- C5Nn10 Calculate a rise or fall in temperature.
- C5Nn11 Order numbers with one or two decimal places and compare using the > and < signs.
- C5Nn12 Recognise and extend number sequences.
- C5Nn13 Recognise odd and even numbers and multiples of 5, 10, 25, 50 and 100 up to 1000.
- C5Nn14 Make general statements about sums, differences and multiples of odd and even numbers.
- C5Nn15 Recognise equivalence between:  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$ ;  $\frac{1}{3}$  and  $\frac{1}{6}$ ;  $\frac{1}{5}$  and  $\frac{1}{10}$ .
- **A5Nn15a Find equivalent fractions (Z5.7.1)**
- C5Nn16 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% and less than 10 (?Z5.8.1?)
- 7 .
- C5Nn17 Change an improper fraction to a mixed number, e.g.  $\frac{4}{7}$  to  $1\frac{3}{4}$ ; order mixed numbers and place between whole numbers on a number line. (Z4.8.3, Z4.8.4)

- **A5Nn17a Change mixed number to an improper fraction (Z4.8.4)**
- C5Nn18 Relate finding fractions to division and use to find simple fractions of quantities.
- **A5Nn18a Add and subtract proper, improper and mixed fractions with common denominators. (Z4.8.5)**
- C5Nn19 Understand percentage as the number of parts in every 100 and find simple percentages of quantities. (Z7.3.1)
- C5Nn20 Express halves, tenths and hundredths as percentages.
- C5Nn21 Use fractions to describe and estimate a simple proportion, e.g.  $\frac{1}{5}$  of the beads are yellow.
- C5Nn22 Use ratio to solve problems, e.g. to adapt a recipe for 6 people to one for 3 or 12 people.
- **A5Nn23 Identify equivalent sets, identify subsets and use the subset symbol “ $\subset$ ”; apply sets to solve problems in real life situations (Z4.1.1 - 3)**
- **A5Nn24 List all sub sets of a given set; describe sets of numbers; describe subset in a Venn diagram. (Z5.5.1 - 3)**
- **A5Nn29 Illustrate one-to-many relation using arrow. Apply relations in real life situations (Z4.12.1 - 2)**
- **A5Nn30 Illustrate a one-to-many and many-to-one relations; Apply knowledge of relations and mappings in real life situations (Z5.14.1-2)**

## Nc Calculation

### Mental strategies

- C5Nc1 Know by heart pairs of one-place decimals with a total of 1, e.g.  $0.8 + 0.2$ .
- C5Nc2 Derive quickly pairs of decimals with a total of 10, and with a total of 1.
- C5Nc3 Know multiplication and division facts for the  $2\times$  to  $10\times$  tables.
- C5Nc4 Know and apply tests of divisibility by 2, 5, 10 and 100.
- C5Nc5 Recognise multiples of 6, 7, 8 and 9 up to the 10th multiple.
- C5Nc6 Know squares of all numbers to  $10 \times 10$ .
- C5Nc7 Find factors of two-digit numbers.
- C5Nc8 Count on or back in thousands, hundreds, tens and ones to add or subtract.
- C5Nc9 Add or subtract near multiples of 10 or 100, e.g.  $4387 - 299$ .
- C5Nc10 Use appropriate strategies to add or subtract pairs of two- and three-digit numbers and numbers with one decimal place, using jottings where necessary.
- C5Nc11 Calculate differences between near multiples of 1000, e.g.  $5026 - 4998$ , or near multiples of 1, e.g.  $3.2 - 2.6$ .
- C5Nc12 Multiply multiples of 10 to 90, and multiples of 100 to 900, by a single-digit number.
- C5Nc13 Multiply by 19 or 21 by multiplying by 20 and adjusting.
- C5Nc14 Multiply by 25 by multiplying by 100 and dividing by 4.
- C5Nc15 Use factors to multiply, e.g. multiply by 3, then double to multiply by 6.
- C5Nc16 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.

- C5Nc17 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.

#### Addition and subtraction

- C5Nc18 Find the total of more than three two- or three-digit numbers using a written method.
- C5Nc19 Add or subtract any pair of three- and/or four-digit numbers, with the same number of decimal places, including amounts of money. (Z5.8.3)

#### Multiplication and division

- C5Nc20 Multiply or divide three-digit numbers by single-digit numbers.
- C5Nc21 Multiply two-digit numbers by two-digit numbers.
- C5Nc22 Multiply two-digit numbers with one decimal place by single digit numbers, e.g.  $3.6 \times 7$ . (Z5.8.4)
- C5Nc23 Divide three-digit numbers by single-digit numbers, including those with a remainder (answers no greater than 30). (Z5.8.5)
- C5Nc24 Start expressing remainders as a fraction of the divisor when dividing two-digit numbers by single-digit numbers.
- C5Nc25 Decide whether to group (using multiplication facts and multiples of the divisor) or to share (halving and quartering) to solve divisions.
- C5Nc26 Decide whether to round an answer up or down after division, depending on the context
- C5Nc27 Begin to use brackets to order operations and understand the relationship between the four operations and how the laws of arithmetic apply to multiplication.

## G Geometry

### Gs Shapes and geometric reasoning

- 5Gs1 Identify and describe properties of triangles and classify as isosceles, equilateral or scalene. (Z4.10.2)
- 5Gs2 Recognise reflective and rotational symmetry in regular polygons.
- 5Gs3 Create patterns with two lines of symmetry, e.g. on a pegboard or squared paper.
- 5Gs4 Visualise 3D shapes from 2D drawings and nets, e.g. different nets of an open or closed cube.
- **A5Gs4a Draw cuboids and cubes, cylinders and triangular prisms and their nets (Z5.11.2, Z5.11.3, Z7.12.2, Z7.12.3)**
- 5Gs5 Recognise perpendicular and parallel lines in 2D shapes, drawings and the environment. (Z5.10.1)

- 5Gs6 Understand and use angle measure in degrees; measure angles to the nearest  $5^\circ$ ; identify, describe and estimate the size of angles and classify them as acute, right or obtuse. (Z4.9.2)
- **A5Gs6a Classify straight angles, reflex angles and complete revolution (Z4.9.2)**
- 5Gs7 Calculate angles in a straight line.

## Gp Position and movement

- 5Gp1 Read and plot co-ordinates in the first quadrant.
- 5Gp2 Predict where a polygon will be after reflection where the mirror line is parallel to one of the sides, including where the line is oblique.
- 5Gp3 Understand translation as movement along a straight line, identify where polygons will be after a translation and give instructions for translating shapes.

## G Measure

### Money

- **A5Mm1 Prepare simple household bills (budgeting) (Z5.9.1)**
- **A5Mm2 Apply simple ready-reckoners (Z5.9.2)**
- **A5Mm3 Read and interpret water and electricity bills (Z5.9.3)**

### GI Length, mass and capacity

- C5GI1 • C5MI1 Read, choose, use and record standard units to estimate and measure length, mass and capacity to a suitable degree of accuracy.
- C5GI2 • C5MI2 Convert larger to smaller metric units (decimals to one place), e.g. change 2.6 kg to 2600 g.
- C5GI3 • C5MI3 Order measurements in mixed units.
- C5GI4 • C5MI4 Round measurements to the nearest whole unit.(Z6.6.1)
- C5GI5 • C5MI5 Interpret a reading that lies between two unnumbered divisions on a scale.
- C5GI6 • C5MI6 Compare readings on different scales.
- C5GI7 • C5MI7 Draw and measure lines to the nearest centimetre and millimetre.

### Gt Time

- C5Gt1 • C5Mt1 Recognise and use the units for time (seconds, minutes, hours, days, months and years). (Z.4.11.2)
- C5Gt2 • C5Mt2 Tell and compare the time using digital and analogue clocks using the 24-hour clock.
- C5Gt3 • C5Mt3 Read timetables using the 24-hour clock.
- C5Gt4 • C5Mt4 Calculate time intervals in seconds, minutes and hours using digital or analogue formats. (Z4.11.1)
- C5Gt5 • C5Mt5 Use a calendar to calculate time intervals in days and weeks (using knowledge of days in calendar months).

- C5Gt6 • C5Mt6 Calculate time intervals in months or years.

## Ga Area and perimeter

- C5Ga1 • C5Ma1 Measure and calculate the perimeter of regular and irregular polygons.
- C5Ga2 • C5Ma2 Understand area measured in square centimetres (cm<sup>2</sup>).
- C5Ga3 • C5Ma3 Use the formula for the area of a rectangle to calculate the rectangle's area. (Z4.11.6)

## D Handling data

### Dh Organising, categorising and representing data

- C5Dh1 Answer a set of related questions by collecting, selecting and organising relevant data; draw conclusions from their own and others' data and identify further questions to ask.
- C5Dh2 Draw and interpret frequency tables, pictograms and bar line charts, with the vertical axis labelled for example in twos, fives, tens, twenties or hundreds. Consider the effect of changing the scale on the vertical axis. (Z4.13.1, Z5.13.2)
- **A5Dh2a Understand, collect and present data on stem-leaf plot (Z5.13.1, 2)**
- C5Dh3 Construct simple line graphs, e.g. to show changes in temperature over time. (Z4.13.2)
- C5Dh4 Understand where intermediate points have and do not have meaning, e.g. comparing a line graph of temperature against time with a graph of class attendance for each day of the week.
- C5Dh5 Find and interpret the mode of a set of data.

### Db Probability

- C5Db1 Describe the occurrence of familiar events using the language of chance or likelihood.

## Problem solving

### Using techniques and skills in solving mathematical problems

- C5Pt1 Understand everyday systems of measurement in length, weight, capacity, temperature and time and use these to perform simple calculations.
- C5Pt2 Solve single and multi-step word problems (all four operations); represent them, e.g. with diagrams or a number line. (Z5.2.2., Z5.6.3)
- C5Pt3 Check with a different order when adding several numbers or by using the inverse when adding or subtracting a pair of numbers.
- C5Pt4 Use multiplication to check the result of a division, e.g. multiply  $3.7 \times 8$  to check  $29.6 \div 8$ .

- C5Pt5 Recognise the relationships between different 2D and 3D shapes, e.g. a face of a cube is a square.
- C5Pt6 Estimate and approximate when calculating, e.g. using rounding, and check working.
- C5Pt7 Consider whether an answer is reasonable in the context of a problem.

### Using understanding and strategies in solving problems

- C5Ps1 Understand everyday systems of measurement in length, weight, capacity, temperature and time and use these to perform simple calculations. (Z5.12.4, Z5.12.6)
- C5Ps2 Choose an appropriate strategy for a calculation and explain how they worked out the answer.
- C5Ps3 Explore and solve number problems and puzzles, e.g. logic problems.
- C5Ps4 Deduce new information from existing information to solve problems.
- C5Ps5 Use ordered lists and tables to help to solve problems systematically.
- C5Ps6 Describe and continue number sequences, e.g.  $-30, -27, , , -18\dots$ ; identify the relationships between numbers.
- C5Ps7 Identify simple relationships between shapes, e.g. these triangles are all isosceles because ...
- C5Ps8 Investigate a simple general statement by finding examples which do or do not satisfy it, e.g. the sum of three consecutive whole numbers is always a multiple of three.
- C5Ps9 Explain methods and justify reasoning orally and in writing; make hypotheses and test them out.
- C5Ps10 Solve a larger problem by breaking it down into sub-problems or represent it using diagrams.

## Stage 6

As in Stage 5, it is important that learners become confident users of calculators. They need to recognise that the calculator is a tool of which they are in control and to understand how it can help them to develop their mathematics. Learners can be taught how to use a calculator effectively and to recognise how and when it is appropriate to do so; by first deciding if mental and pencil-and-paper methods are quicker or more reliable. Note that to use a calculator effectively requires a secure knowledge of number, which has to be the prime aim.

## N Number

### Nn Numbers and the number system

- C6Nn1 Count on and back in fractions and decimals, e.g. 3 1 s, 0.1s, and repeated steps of whole numbers (and through zero).
- C6Nn2 Know what each digit represents in whole numbers up to a million.
- **A6Nn2a read, write and partition numbers up to a billion (Z4.2.2)**
- C6Nn3 Know what each digit represents in one- and two-place decimal numbers.
- **A6Nn3a Know what each digit represents in three-place decimal numbers. (Z6.5.1)**
- C6Nn4 Multiply and divide any whole number from 1 to 10 000 by 10, 100 or 1000 and explain the effect. (Z4.6.1, Z4.5.1)
- C6Nn5 Multiply and divide decimals by 10 or 100 (answers up to two decimal places for division).
- C6Nn6 Find factors of two-digit numbers. (Z5.6.1)
- **A6Nn6a Identify the Highest Common Factor (HCF) (Z5.6.2)**
- C6Nn7 Find some common multiples, e.g. for 4 and 5.(Z5.6.3)
- **A6Nn7a Identify the Lowest Common Multiple (LCM) by listing (Z5.6.4)**
- C6Nn8 Round whole numbers to the nearest 10, 100 or 1000.
- C6Nn9 Round a number with two decimal places to the nearest tenth or to the nearest whole number.
- C6Nn10 Make and justify estimates and approximations of large numbers.
- C6Nn11 Order and compare positive numbers to one million, and negative integers to an appropriate level.
- C6Nn12 Use the >, < and = signs correctly.(Z3.7.1)
- **A6Nn12a Use the ≠ sign correctly (Z3.7.1)**
- C6Nn13 Estimate where four-digit numbers lie on an empty 0 –10 000 line.
- C6Nn14 Order numbers with up to two decimal places (including different numbers of places).
- C6Nn15 Recognise and extend number sequences.
- C6Nn16 Recognise and use decimals with up to three places in the context of measurement.
- C6Nn17 Recognise odd and even numbers and multiples of 5, 10, 25, 50 and 100 up to 1000.

- C6Nn18 Make general statements about sums, differences and multiples of odd and even numbers.
- C6Nn19 Recognise prime numbers up to 20 and find all prime numbers less than 100.
- **A6Nn19a Describe and list prime and composite numbers (Z6.3.1)**
- **A6Nn19b Identify prime factors of given numbers (Z6.3.2)**
- C6Nn20 Recognise the historical origins of our number system and begin to understand how it developed.
- **A6Nn20a Identify Roman numeration system (Z5.1.1)**
- **A6Nn20b Convert numerals from Arabic to Roman numeration and visa versa (Z5.1.2)**
- **A6Nn20c Order Roman numerals (Z5.1.3)**
- C6Nn21 Compare fractions with the same denominator and related denominators, e.g.  $\frac{3}{4}$  with  $\frac{7}{8}$ .
- C6Nn22 Recognise equivalence between fractions, e.g. between  $\frac{1}{100}$  s,  $\frac{1}{10}$  s and  $\frac{1}{2}$  s.
- C6Nn23 Recognise and use the equivalence between decimal and fraction forms.
- C6Nn24 Order mixed numbers and place between whole numbers on a number line.
- C6Nn25 Change an improper fraction to a mixed number, e.g.  $\frac{17}{8}$  to  $2\frac{1}{8}$ . (Z4.8.4)
- C6Nn26 Reduce fractions to their simplest form, where this is  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$  or a number of fifths or tenths.
- **A6Nn26a Express fractions with different denominators to the same denominator (Z5.7.2)**
- C6Nn27 Begin to convert a vulgar fraction to a decimal fraction using division.
- **A6Nn27a Add and subtract two simple fractions, e.g.  $8\frac{1}{8} + 9$ ,  $12\frac{11}{6} - 5$ ; find fractions of quantities (whole number answers); multiply a fraction by an integer (C7Nf4)<sup>1</sup>**
- **A6Nn27b Add and subtract proper, improper and mixed fractions with different denominators (Z5.7.3)**
- C6Nn28 Understand percentage as parts in every 100 and express  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{3}$ ,  $\frac{1}{10}$ ,  $\frac{1}{100}$  as percentages.
- C6Nn29 Find simple percentages of shapes and whole numbers.
- C6Nn30 Solve simple problems involving ratio and direct proportion. (Z6.7.4)
- **A6Nn30a Express a given ratio in its lowest term (Z6.7.3)**
- **A6Nn31 Describe index notation. (Z6.1.1, C8Ni3)**
- **A6Nn32 Change a number in index form to expanded notation and vice versa. (Z6.1.2, ?C8Ni3)**
- **A6Nn33 Evaluate numbers in index notation with positive bases and indices. (Z6.1.3, ?C8Ni3)**
- **A6Nn34 Describe the intersection, union in a Venn diagram; Use symbols of intersection " $\cap$ ", union " $\cup$ " (and subset " $\subset$ " as recap).(Z6.2.1 - 2)**
- **A6Nn35 Find number of subsets of a given set using the formula  $2^n$ ; Apply the knowledge of sets in real life situations. (Z6.2.3 - 4)**

---

<sup>1</sup> This is the only Cambridge Stage 1 to 7 objective that has been moved to another Stage: C7Nf4 moved to Grade 6.

## Nc Calculation

### Mental strategies

- 6Nc1 Recall addition and subtraction facts for numbers to 20 and pairs of one-place decimals with a total of 1, e.g.  $0.4 + 0.6$ .
- 6Nc2 Derive quickly pairs of one-place decimals totalling 10, e.g. 7.8 and 2.2, and two-place decimals totalling 1, e.g.  $0.78 + 0.22$ .
- 6Nc3 Know and apply tests of divisibility by 2, 4, 5, 10, 25 and 100.
- 6Nc4 Use place value and number facts to add or subtract two-digit whole numbers and to add or subtract three-digit multiples of 10 and pairs of decimals, e.g.  $560 + 270$ ;  $2.6 + 2.7$ ;  $0.78 + 0.23$ .
- 6Nc5 Add/subtract near multiples of one when adding numbers with one decimal place, e.g.  $5.6 + 2.9$ ;  $13.5 - 2.1$ .
- 6Nc6 Add/subtract a near multiple of 10, 100 or 1000, or a near whole unit of money, and adjust, e.g.  $3127 + 4998$ ;  $5678 - 1996$ .
- 6Nc7 Use place value and multiplication facts to multiply/divide mentally, e.g.  $0.8 \times 7$ ;  $4.8 \div 6$ .
- 6Nc8 Multiply pairs of multiples of 10, e.g.  $30 \times 40$ , or multiples of 10 and 100, e.g.  $600 \times 40$ .
- 6Nc9 Double quickly any two-digit number, e.g. 78, 7.8, 0.78 and derive the corresponding halves.
- 6Nc10 Divide two-digit numbers by single-digit numbers, including leaving a remainder.

### Addition and subtraction

- 6Nc11 Add two- and three-digit numbers with the same or different numbers of digits/decimal places.
- 6Nc12 Add or subtract numbers with the same and different numbers of decimal places, including amounts of money. (Z6.5.2)
- **A6Nc12a Add or subtract numbers with the same and different numbers of decimal places, including amounts of money, up to 3 decimal places (Z6.5.2) ???**
- 6Nc13 Find the difference between a positive and negative integer, and between two negative integers in a context such as temperature or on a number line.

### Multiplication and division

- 6Nc14 Multiply pairs of multiples of 10, e.g.  $30 \times 40$ , or multiples of 10 and 100, e.g.  $600 \times 40$ .
- 6Nc15 Multiply near multiples of 10 by multiplying by the multiple of 10 and adjusting.
- 6Nc16 Multiply by halving one number and doubling the other, e.g. calculate  $35 \times 16$  with  $70 \times 8$ .

- 6Nc17 Use number facts to generate new multiplication facts, e.g. the  $17\times$  table from  $10\times + 7\times$  tables.
- 6Nc18 Multiply two-, three- or four-digit numbers (including sums of money) by a single-digit number and two- or three-digit numbers by two-digit numbers. (Z5.4.2)
- 6Nc19 Divide three-digit numbers by single-digit numbers, including those leaving a remainder and divide three-digit numbers by two-digit numbers (no remainder) including sums of money.
- 6Nc20 Give an answer to division as a mixed number, and a decimal (with divisors of 2, 4, 5, 10 or 100).
- 6Nc21 Relate finding fractions to division and use them as operators to find fractions including several tenths and hundredths of quantities.
- 6Nc22 Know and apply the arithmetic laws as they apply to multiplication (without necessarily using the terms commutative, associative or distributive).

## G Geometry

### Gs Shapes and geometric reasoning

- C6Gs1 Classify different polygons and understand whether a 2D shape is a polygon or not.
- C6Gs2 Visualise and describe the properties of 3D shapes, e.g. faces, edges and vertices. (Z5.11.1)
- C6Gs3 Identify and describe properties of quadrilaterals (including the parallelogram, rhombus and trapezium), and classify using parallel sides, equal sides, equal angles. (Z5.10.2)
- C6Gs4 Recognise and make 2D representations of 3D shapes including nets.
- C6Gs5 Estimate, recognise and draw acute and obtuse angles and use a protractor to measure to the nearest degree. (Z4.9.3)
- C6Gs6 Check that the sum of the angles in a triangle is  $180^\circ$ , for example, by measuring or paper folding; calculate angles in a triangle or around a point.
- **A6Gs7 Identify the uses of a pair of compasses and use to draw a circle (Z5.10.4, Z5.10.5)**
- **A6Gs8 Identify centre, diameter and radius of a circle (Z5.10.6)**
- **A6Gs9 Establish the relationship between circumference and Diameter (Z7.10.3)**

### Gp Position and movement

- C6Gp1 Read and plot co-ordinates in all four quadrants.
- C6Gp2 Predict where a polygon will be after one reflection, where the sides of the shape are not parallel or perpendicular to the mirror line, after one translation or after a rotation through  $90^\circ$  about one of its vertices.

## G Measure

### Money

- **A6Mm1 Describe and calculate cost price, selling price, profit and loss (Z6.8.1, Z6.8.2)**
- **A6Mm2 Calculate simple interest, discount and profit and loss percentage (Z? Ref missing)**
- **A6Mm3 Carry out calculations involving transportation (Z6.8.4)**

### GI Length, mass and capacity

- C6GI1 • 6MI1 Select and use standard units of measure. Read and write to two or three decimal places.
- C6GI2 • 6MI2 Convert between units of measurement (kg and g, l and ml, km, m, cm and mm), using decimals to three places, e.g. recognising that 1.245 m is 1 m 24.5 cm.
- C6GI3 • 6MI3 Interpret readings on different scales, using a range of measuring instruments.
- C6GI4 • 6MI4 Draw and measure lines to the nearest centimetre and millimetre.
- C6GI5 • 6MI5 Know imperial units still in common use, e.g. the mile, and approximate metric equivalents.

### Gt Time

- C6Gt1 • 6Mt1 Recognise and understand the units for measuring time (seconds, minutes, hours, days, weeks, months, years, decades and centuries); convert one unit of time into another.
- C6Gt2 • 6Mt2 Tell the time using digital and analogue clocks using the 24-hour clock.
- C6Gt3 • 6Mt3 Compare times on digital and analogue clocks, e.g. realise quarter to four is later than 3:40.
- C6Gt4 • 6Mt4 Read and use timetables using the 24-hour clock.
- C6Gt5 • 6Mt5 Calculate time intervals using digital and analogue times.
- C6Gt6 • 6Mt6 Use a calendar to calculate time intervals in days, weeks or months.
- C6Gt7 • 6Mt7 Calculate time intervals in days, months or years.
- C6Gt8 • 6Mt8 Appreciate how the time is different in different time zones around the world.

### Ga Area and perimeter

- C6Ga1 • 6Ma1 Measure and calculate the perimeter and area of rectilinear shapes.
- C6Ga2 • 6Ma2 Estimate the area of an irregular shape by counting squares.
- C6Ga3 • 6Ma3 Calculate perimeter and area of simple compound shapes that can be split into rectangles.

## D Handling data

### Dh Organising, categorising and representing data

- C6Dh1 Solve a problem by representing, extracting and interpreting data in tables, graphs, charts and diagrams, e.g. line graphs for distance and time; a price 'ready-reckoner' for currency conversion; frequency tables and bar charts with grouped discrete data.
- C6Dh2 Find the mode and range of a set of data from relevant situations, e.g. scientific experiments.
- C6Dh3 Begin to find the median and mean of a set of data. (Z6.9.1, 2)
- C6Dh4 Explore how statistics are used in everyday life.

### Db Probability

- C6Db1 Use the language associated with probability to discuss events, to assess likelihood and risk, including those with equally likely outcomes.

## Problem solving

### Using techniques and skills in solving mathematical problems

- C6Pt1 Choose appropriate and efficient mental or written strategies to carry out a calculation involving addition, subtraction, multiplication or division.
- C6Pt2 Understand everyday systems of measurement in length, weight, capacity, temperature and time and use these to perform simple calculations.
- C6Pt3 Check addition with a different order when adding a long list of numbers; check when subtracting by using the inverse.
- C6Pt4 Recognise 2D and 3D shapes and their relationships, e.g. a cuboid has a rectangular cross-section.
- C6Pt5 Estimate and approximate when calculating, e.g. use rounding, and check working.

### Using understanding and strategies in solving problems

- C6Ps1 Explain why they chose a particular method to perform a calculation and show working.
- C6Ps2 Deduce new information from existing information and realise the effect that one piece of information has on another.
- C6Ps3 Use logical reasoning to explore and solve number problems and mathematical puzzles.
- C6Ps4 Use ordered lists or tables to help solve problems systematically.
- C6Ps5 Identify relationships between numbers and make generalised statements using words, then symbols and letters, e.g. the second number is twice the first

number plus 5 ( $n, 2n + 5$ ); all the numbers are multiples of 3 minus 1 ( $3n - 1$ ); the sum of angles in a triangle is

- $180^\circ$ .
- C6Ps6 Make sense of and solve word problems, single and multi-step (all four operations), and represent them, e.g. with diagrams or on a number line; use brackets to show the series of calculations necessary. (Z5.3.1, 2)
- C6Ps7 Solve simple word problems involving ratio and direct proportion.
- C6Ps8 Solve simple word problems involving percentages, e.g. find discounted prices. (Z7.3.5)
- C6Ps9 Make, test and refine hypotheses, explain and justify methods, reasoning, strategies, results or conclusions orally.

## Stage 7

### Number

#### Ni Integers, powers and roots

- C7Ni1 Recognise negative numbers as positions on a number line, and order, add and subtract positive and negative integers in context (Z7.6.1 - 5)
- C7Ni2 Recognise multiples, factors, common factors, primes (all less than 100), making use of simple tests of divisibility; find the lowest common multiple; use the 'sieve' for generating primes developed by Eratosthenes (Z5.6.1, Z5.6.3, Z5.6.4, Z6.3.1)
- **A7Ni2a find the Highest Common Factor (HCF) (Z5.6.2)**
- **A7Ni2b Identify prime factors (Z6.3.2)**
- C7Ni3 Recognise squares of whole numbers to at least  $20 \times 20$  and the corresponding square roots; use the notation  $7^2$  and  $\sqrt{49}$  (Z7.8.1, Z7.8.2)
- **A7Ni3a Describe cubes and Find cubes of whole numbers (Z7.8.3, Z7.8.4)**
- **A7Ni4 Illustrate base ten numeration system and Describe other number bases (Z 7.7.1, Z7.7.2)**
- **A7Ni5 Convert from Base 10 to Bases 2, 5 and 8 and visa versa; convert from base 2 to base 5 and vice versa; Add and subtract in Bases 2, 5 and 8 (Z7.7.3, Z7.7.4, Z7.7.5, Z7.7.6)**

#### Np Place value, ordering and rounding

- C7Np1 Interpret decimal notation and place value; multiply and divide whole numbers and decimals by 10, 100 or 1000
- C7Np2 Order decimals including measurements, changing these to the same units
- C7Np3 Round whole numbers to the nearest 10, 100 or 1000 and decimals, including measurements, to the nearest whole number or one decimal place
- **A7Np3a Round numbers to a given number of decimal places (Z6.2.2, Z6.5.3, C9Np2)**

#### Nf Fractions, decimals, percentages, ratio and proportion

- C7Nf1 Recognise the equivalence of simple fractions, decimals and percentages
- C7Nf2 Simplify fractions by cancelling common factors and identify equivalent fractions; change an improper fraction to a mixed number, and vice versa; convert terminating decimals to fractions, e.g.  $0.23 = \frac{23}{100}$
- **A7Nf2a Convert common fractions to decimals and vice versa (Z7.2.2)**
- C7Nf3 Compare two fractions by using diagrams, or by using a calculator to convert the fractions to decimals, e.g.  $\frac{3}{5}$  and  $\frac{13}{20}$
- **ANf3a Order Fractions and Decimals (Z7.2.3)**

- C7Nf4 Add and subtract two simple fractions, e.g.  $\frac{1}{8} + \frac{8}{9}$ ,  $\frac{11}{12} - \frac{5}{6}$ ; find fractions of quantities (whole number answers); multiply a fraction by an integer<sup>2</sup>
- **A7Nf4a Multiply fractions by whole numbers and by another fraction (Z6.4.1, Z6.4.2, C9Nf2)**
- **A7Nf4b Divide fractions by whole numbers and visa versa and divide a fraction by another fraction ((Z6.4.3, Z6.4.4, Z6.4.5, C9Nf2)**
- C7Nf5 Understand percentage as the number of parts in every 100; use fractions and percentages to describe parts of shapes, quantities and measures
- C7Nf6 Calculate simple percentages of quantities (whole number answers) and express a smaller quantity as a fraction or percentage of a larger one
- C7Nf7 Use percentages to represent and compare different quantities
- C7Nf8 Use ratio notation, simplify ratios and divide a quantity into two parts in a given ratio
- C7Nf9 Recognise the relationship between ratio and proportion (Z6.7.1, 2)
- C7Nf10 Use direct proportion in context; solve simple problems involving ratio and direct proportion (Z7.4.1)
- **A7Nf10a Describe indirect proportion. (Z7.4.2)**
- **A7Nf10b Solve problems involving indirect proportion (Z7.4.3)**
- **A7Nf10c Draw graphs to illustrate quantities in direct and indirect Proportion. (Z7.4.4)**
- **A7Nf11 Convert decimals to percentages and vice versa. (Z7.3.2, C8Nf1)**
- **A7Nf12 Convert common fractions to percentages and vice versa. (Z7.3.3, C8Nf1)**

## Nc Calculation

### Mental strategies

- C7Nc1 Consolidate the rapid recall of number facts, including positive integer complements to 100, multiplication facts to  $10 \times 10$  and associated division facts
- C7Nc2 Use known facts and place value to multiply and divide two-digit numbers by a single-digit number, e.g.  $45 \times 6$ ,  $96 \div 6$
- C7Nc3 Know and apply tests of divisibility by 2, 3, 5, 6, 8, 9, 10 and 100
- C7Nc4 Use known facts and place value to multiply simple decimals by one-digit numbers, e.g.  $0.8 \times 6$
- C7Nc5 Calculate simple fractions and percentages of quantities, e.g. one quarter of 64, 20% of 50 kg
- C7Nc6 Use the laws of arithmetic and inverse operations to simplify calculations with whole numbers and Decimals (Z5.4.1, 2)
- C7Nc7 Use the order of operations, including brackets, to work out simple calculations (Z4.3.1, Z5.4.1, 2)

<sup>2</sup> This Cambridge objective has also been moved down to Grade 6 and can be reviewed here. This is the only Cambridge objective that has been moved.

### Addition and subtraction

- C7Nc8 Add and subtract integers and decimals, including numbers with different numbers of decimal places (Z4.4.1, Z6.5.2, Z7.2.1)

### Multiplication and division

- C7Nc9 Multiply and divide decimals with one and/or two places by single-digit numbers, e.g.  $13.7 \times 8$ ,  $4.35 \div 5$
- **A7Nc9a Multiply decimal numbers by decimal numbers (Z6.5.3, C8Nc13)**
- **A7Nc9b Divide decimal numbers by decimal numbers, up to 3 decimal places (with remainder) (Z4.6.2, Z6.5.4, C8Nc13)**
- C7Nc10 Know that in any division where the dividend is not a multiple of the divisor there will be a remainder, e.g.  $157 \div 25 = 6$  remainder 7. The remainder can be expressed as a fraction of the divisor, e.g.  $157 \div 25 = 6 \frac{7}{25}$
- C7Nc11 Know when to round up or down after division when the context requires a whole-number answer
- **A7Nc12a Convert between currencies (Z7.5.1)**
- **A7Nc12b Calculate the cost of goods priced in foreign currency (Z7.5.2)**

## Algebra

### Ae Expressions, equations and formulae

- C7Ae1 Use letters to represent unknown numbers or variables; know the meanings of the words term, expression and equation
- C7Ae2 Know that algebraic operations follow the same order as arithmetic operations
- C7Ae3 Construct simple algebraic expressions by using letters to represent numbers
- C7Ae4 Simplify linear expressions, e.g. collect like terms; multiply a constant over a bracket
- C7Ae5 Derive and use simple formulae, e.g. to change hours to minutes
- C7Ae6 Substitute positive integers into simple linear expressions/formulae
- C7Ae7 Construct and solve simple linear equations with integer coefficients (unknown on one side only), e.g.  $2x = 8$ ,  $3x + 5 = 14$ ,  $9 - 2x = 7$  (Z6.10.2)
- **A7Ae8 Solve simple linear inequations in one variable. ( Z7.9.2)**
- **A7Ae9 Describe an open sentence (Z6.10.1, Z7.9.1)**

### As Sequences, functions and graphs

- C7As1 Generate terms of an integer sequence and find a term given its position in the sequence; find simple term-to-term rules (Z7.8.5)
- A7As1a Generate series (Z7.8.6)
- C7As2 Generate sequences from spatial patterns and describe the general term in simple cases

- C7As3 Represent simple functions using words, symbols and mappings
- C7As4 Generate coordinate pairs that satisfy a linear equation, where  $y$  is given explicitly in terms of  $x$ ; plot the corresponding graphs; recognise straight-line graphs parallel to the  $x$ - or  $y$ -axis

## Geometry

### Gs Shapes and geometric reasoning

- C7Gs1 Identify, describe, visualise and draw 2D shapes in different orientations
- C7Gs2 Use the notation and labelling conventions for points, lines, angles and shapes
- C7Gs3 Name and identify side, angle and symmetry properties of special quadrilaterals and triangles, and regular polygons with 5, 6 and 8 sides
- C7Gs4 Estimate the size of acute, obtuse and reflex angles to the nearest  $10^\circ$
- C7Gs5 Start to recognise the angular connections between parallel lines, perpendicular lines and transversals
- C7Gs6 Calculate the sum of angles at a point, on a straight line and in a triangle, and prove that vertically opposite angles are equal; derive and use the property that the angle sum of a quadrilateral is  $360^\circ$
- C7Gs7 Solve simple geometrical problems by using side and angle properties to identify equal lengths or calculate unknown angles, and explain reasoning
- C7Gs8 Recognise and describe common solids and some of their properties, e.g. the number of faces, edges and Vertices (Z5.11.1)
- C7Gs9 Recognise line and rotation symmetry in 2D shapes and patterns; draw lines of symmetry and complete patterns with two lines of symmetry; identify the order of rotation symmetry (Z7.10.1, Z7.10.2)
- C7Gs10 Use a ruler, set square and protractor to:
  - — measure and draw straight lines to the nearest millimetre
  - — measure and draw acute, obtuse and reflex angles to the nearest degree
  - — draw parallel and perpendicular lines (5.10.1)
  - — construct a triangle given two sides and the included angle (SAS) or two angles and the included side (ASA)
  - — construct squares and rectangles (Z4.10.1)
  - — construct regular polygons, given a side and the internal angle (Z6.11.2)
- **A7Gs10a Draw the equilateral and isosceles triangles using protractor and set square (Z4.10.3)**
- **A7Gs10b Draw trapezium, rhombus and parallelogram. (Z5.10.3)**
- **A7Gs11 Find the perimeter and calculate area of triangle, parallelograms, trapezium, rhombus and composite Shapes; Derive formula for area of triangle, parallelograms, trapezium and rhombus. (Z5.12.1, Z5.12.3, 5.12.2, C8Ma2)**
- **A7Gs12 Calculate circumference, using radius or diameter of the Circle; Calculate the area of a circle (7.11.1,7.11.2, C8Ma1)**

## Gp Position and movement

- C7Gp1 Read and plot coordinates of points determined by geometric information in all four quadrants
- C7Gp2 Transform 2D points and shapes by reflection in a given line, rotation about a given point, translation.  
Know that shapes remain congruent after these transformations

## Measure

### GI Length, mass and capacity

- C7GI1 • C7MI1 Choose suitable units of measurement to estimate, measure, calculate and solve problems in everyday contexts
- C7GI2 • C7MI2 Know abbreviations for and relationships between metric units; convert between: kilometres (km), metres (m), centimetres (cm), millimetres (mm); tonnes (t), kilograms (kg) and grams (g); litres (l) and millilitres (ml)
- C7GI3 • C7MI3 Read the scales on a range of analogue and digital measuring instruments

### Gt Time and rates of change

- C7Gt1 • C7Mt1 Draw and interpret graphs in real life contexts involving more than one stage, e.g. travel graphs
- C7Gt2 • C7Mt2 Know the relationships between units of time; understand and use the 12-hour and 24-hour clock systems; interpret timetables; calculate time intervals
- **A7Mt3 Describe the meaning of speed; Calculate speed using distance and Time (6.12.3, C9Mt1)**

### Ga Area, perimeter and volume

- C7Ga1 • C7Ma1 Know the abbreviations for and relationships between square metres (m<sup>2</sup>), square centimetres (cm<sup>2</sup>), square millimetres (mm<sup>2</sup>) (Z5.12.5)
- C7Ga2 • C7Ma2 Derive and use formulae for the area and perimeter of a rectangle; calculate the perimeter and area of compound shapes made from rectangles (Z4.11.5)
- C7Ga3 • C7Ma3 Derive and use the formula for the volume of a cuboid; calculate volumes of cuboids (Z5.12.7, 8)
- C7Ga4 • C7Ma4 Calculate the surface area of cubes and cuboids from their nets
- C7Ma4a Calculate the surface area and total length of edges of cubes and cuboids [by formula] (Z6.12.1, 2)

## Handling data

### Dc Planning and collecting data

- C7Dc1 Decide which data would be relevant to an enquiry and collect and organise the data
- C7Dc2 Design and use a data collection sheet or questionnaire for a simple survey
- C7Dc3 Construct and use frequency tables to gather discrete data, grouped where appropriate in equal class intervals

### Dp Processing and presenting data

- C7Dp1 Find the mode (or modal class for grouped data), median and range (Z7.13.3)
- C7Dp2 Calculate the mean, including from a simple frequency table (Z7.13.3, 4)
- C7Dp3 Draw and interpret: bar-line graphs and bar charts, frequency diagrams for grouped discrete data, simple pie charts, pictograms (Z7.13.2)

### Di Interpreting and discussing results

- C7Di1 Draw conclusions based on the shape of graphs and simple statistics (Z7.13.1)
- C7Di2 Compare two simple distributions using the range and the mode, median or mean

### Db Probability

- C7Db1 Use the language of probability to describe and interpret results involving likelihood and chance
- C7Db2 Understand and use the probability scale from 0 to 1
- C7Db3 Find probabilities based on equally likely outcomes in simple contexts
- C7Db4 Identify all the possible mutually exclusive outcomes of a single event
- C7Db5 Use experimental data to estimate probabilities
- C7Db6 Compare experimental and theoretical probabilities in simple contexts

## Problem solving

### Using techniques and skills in solving mathematical problems

- C7Pt1 Use the laws of arithmetic and inverse operations to simplify calculations with whole numbers and decimals
- C7Pt2 Manipulate numbers, algebraic expressions and equations, and apply routine algorithms

- C7Pt3 Understand everyday systems of measurement and use them to estimate, measure and calculate
- C7Pt4 Recognise and use spatial relationships in two and three dimensions
- C7Pt5 Draw accurate mathematical diagrams, graphs and constructions
- C7Pt6 Check results of calculations by using inverse operations
- C7Pt7 Estimate, approximate and check their working
- C7Pt8 Solve word problems involving whole numbers, percentages, decimals, money or measures: choose operations and mental or written methods appropriate to the numbers and context, including problems with more than one step (Z5.8.6, Z7.3.4)
- **A7Pt9 Solve problems involving addition, subtraction, multiplication and division of fractions fractions (Z4.8.6, Z5.7.4, Z6.4.6, Z7.1.1)**

### Using understanding and strategies in solving problems

- C7Ps1 Identify and represent information or unknown numbers in problems, making correct use of numbers, symbols, words, diagrams, tables and graphs
- C7Ps2 Recognise mathematical properties, patterns and relationships, generalising in simple cases (Z.4.7.1)
- C7Ps3 Work logically and draw simple conclusions
- C7Ps4 Relate results or findings to the original context and check that they are reasonable
- C7Ps5 Record and explain methods, results and conclusions
- C7Ps6 Discuss and communicate findings effectively, orally and in writing

## Long Term Plan Overview

Overview of the Mathematics taught programme of study by term, for Grade 1 to 7, taken from the Cambridge Schemes of Work (v.2018). Please see Schemes of Work for more details

	Term 1	Term 2	Term 3
<b>Grade 1</b>	1A Number and Problem Solving 1B Geometry and Problem Solving 1C Measure and Problem Solving	2A Number and Problem Solving 2B Handling data and Problem Solving 2C Measure and Problem Solving	3A Number and Problem Solving 3B Handling data and Problem Solving 3C Measure and Problem Solving
<b>Grade 2</b>	1A Number and Problem Solving 1B Geometry and Problem Solving 1C Measure and Problem Solving	2A Number and Problem Solving 2B Handling Data and Problem Solving 2C Measure and Problem Solving	3A Number and Problem Solving 3B Geometry and Problem Solving 3C Measure and Problem Solving
<b>Grade 3</b>	1A Number and Problem Solving 1B Geometry and Problem Solving 1C Measure and Problem Solving	2A Number and Problem Solving 2B Measure and Problem Solving 2C Handling Data and Problem Solving	3A Number and Problem Solving 3B Geometry and Problem Solving 3C Measure and Problem Solving
<b>Grade 4</b>	1A Number and Problem Solving 1B Measure and Problem Solving 1C Handling data and Problem Solving	2A Number and Problem Solving 2B Geometry and Problem Solving 2C Measure and Problem Solving	3A Number and Problem Solving 3B Measure and Problem Solving 3C Handling data and Problem Solving
<b>Grade 5</b>	1A Number and Problem Solving 1B Geometry and Problem Solving 1C Measure and Problem Solving	2A Number and Problem Solving 2B Handling data and Problem solving 2C Measure and Problem Solving	3A Number and Problem Solving 3B Geometry and Problem Solving 3C Measure and Problem Solving
<b>Grade 6</b>	1A Number and Problem Solving 1B Measure and Problem Solving 1C Geometry and Problem Solving	2A Number and Problem Solving 2B Measure and Problem Solving 2C Handling data and Problem Solving	3A Number and Problem Solving 3B Measure and Problem Solving 3C Geometry and Problem Solving
<b>Grade 7</b>	Unit 1A Number, Calculation and Problem Solving Unit 1B Algebra, Measure and Problem	Unit 2A Number, Calculation, Measure and Problem Solving Unit 2B Algebra, Measure and Problem	Unit 3A Number, Calculation and Problem Solving Unit 3B Measure and Problem Solving

	Solving Unit 1C Handling Data, Geometry and Problem Solving	Solving Unit 2C Handling Data, Geometry and Problem Solving	Unit 3C Handling Data, Geometry and Problem Solving
--	--	--	---