

## Maths Makes Sense

3

# Medium-term plan

### **End-of-block objectives**

#### Arithmetic 1

- Respond to *I* will act the Real Story, you write the Maths Story (including the answer), for addition and subtraction of I-digit numbers, halves, quarters and mixed numbers, e.g.  $l_2^1 + 2 \frac{1}{4} = 3\frac{1}{4}$ .
- Copy and calculate the answers to vertical additions and subtractions with tricky unit columns, with reference to written number pairs if necessary.

#### Geometry

- Distinguish between a line through two points A and B and a line segment AB and know that the length of a line is 'infinity' and that a line segment has a length that can be measured
- We a ruler to draw named straight line segments, e.g. AB and measure and write the length using cm and mm
- Name triangles, quadrilaterals (rectangles and squares), pentagons, hexagons, heptagons and octagons
- Recognise, name and use clockwise and anti-clockwise turns and draw an arc to show those turns.

#### **Data and Measure**

- Copy grids and bar charts accurately on cm-squared paper
- ☼ Draw hands on a clock face to show times expressed in analogue form (words)
- ☆ Write and say times in digital form
- Draw hands on a clock face to show times later/earlier than the time shown on a separate clock face (all times in multiples of five minutes)
- Calculate time differences shown on a pair of clocks.

#### **Arithmetic 2**

 $\Leftrightarrow$  Calculate fractions of quantities using pupil cups, e.g.  $\frac{2}{3}$  of 6 = 4.

- Calculate total distances shown on sketch maps and grids using vertical addition and subtraction (including a tricky first column)
- Calculate total populations for towns shown on grids using vertical addition and subtraction (including a tricky first column)
- Write populations and distances in ascending order and descending order.

### **Daily practice**

#### Grade 1

- Practise adding and taking away up to or from a total of 99
- ☼ Practise and recall multiplication facts from the two and five times tables
- Use a calculator to check answers to adding and taking away up to and from a total of 99 and multiplication facts from the two and five times tables
- Add and take away to and from a total of 10 and check answers with a calculator
- Add and take away up to and from a total of 99 with pence and check answers with a calculator

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- ☆ Chant times tables (up to I0)

- Join named points to draw straight line segments and measure a diagonal
- ☆ Copy grids accurately on squared paper
- Draw cups to show bigger, smaller and the same
- Use explicit information to find a Maths Story, write and calculate the vertical addition or subtraction
- Copy and calculate vertical additions and subtractions, using written number pairs
- Draw arcs on drawn polygons to show turns, and measure sides in cm
- Use explicit information to write and calculate vertical additions or subtractions with funny writing and funny counting
- Discuss achievements in Progress Book 3A and fill in the chart

#### Resources

#### Maths Makes Sense Toolkit

☼ 10 whole cups, 4 half cups, 4 quarter cups, pupil tables, 10 pupil whole cups, 4 pupil half cups, 4 pupil quarter cups (per pair), dm sticks, ratio sticks (plain and coloured)

#### Other

Lined exercise books, cm-squared exercise books, calculators, flipchart, I5-cm rulers, board set-square, clock face with moveable hands, geared clock, real clock, one blue and red pencil per child

### Cross-curricular links

#### **ICT**

☼ Daily practice: practising calculator skills

#### Geography

Reasoning: practise reading and interpreting maps

#### Science

Data and Measure: practise using and interpreting bar charts

### Key vocabulary

line segment • infinity • point • clockwise • anti-clockwise • arc • angle • right angle • rotation • centre of rotation • compare • comparison • ratio • replace • fair swap • digital clock notation (8:45, etc.) • implicit • explicit • Think sticks! • zonk

### **End-of-block objectives**

#### Arithmetic 1

- Write Maths Stories for all operations (+, -, ×, ÷) using fifths
- Write Maths Stories as vertical additions and subtractions and calculate with tricky tens columns, using number pairs for reference, if necessary.

#### Geometry

- ☼ Draw a pair of axes and label the axes 'x axis' and 'y axis'
- ☼ Plot points specified by their names and their coordinates, e.g. A (3, 5)
- Plot and label specified points, to draw polygons and measure sides and diagonals.

#### **Data and Measure**

- Draw and label points and measure accurately to draw line segments from written instructions, e.g. Draw line segment AB = 3 cm; Draw point C
- We compasses and a pencil to measure accurately and draw a circle following instructions, e.g. draw a circle with centre C and a radius of 3 cm
- Accurately measure and draw a regular hexagon using compasses and a ruler.

#### Arithmetic 2

Solve word problems involving fractions of quantities.

- Calculate answers to word problems using multiplication Maths Stories
- Calculate answers to word problems using division Maths Stories
- Solve a word problem using a division Maths Story and state whether the implied basic Real-Life Story is Type I or Type 2.

- Practise adding and taking away to and from a total of 99
- ☼ Practise and recall multiplication facts from the two, three, four and five times tables
- ☆ Use a calculator to check answers when adding and taking away up to and from a total of 99 and multiplication facts from the two, three, four and five times tables
- Add and take away pairs of numbers up to and from a total of 19 and check answers with a calculator
- Add and take away up to and from a total of 99 with pence and check answers with a calculator

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- ☆ Chant times tables (up to 10)
- ☼ Draw the correct number of ½ cards to match a fraction

- Draw and label a pair of axes and answer questions about the positions of labelled points
- ☼ Draw and label a pair of axes and plot points using the x number and the y number
- Measure a line segment in mm and draw a circle with the same radius
- Embellish a Real-Life Story about everyday objects by giving it a context
- Answer a word problem about division
- Answer How much is there here? for each digit in a 4-digit number and complete vertical additions and subtractions
- Answer word problems about division and multiplication
- Complete the questions on the 'I Can' pages in Progress Book 3A
- ☼ Discuss achievements in Progress Book 3A and fill in the chart

### Resources

#### **Maths Makes Sense Toolkit**

<sup>1</sup>/<sub>2</sub> cards, whole cups, half cups, <sup>1</sup>/<sub>5</sub>, one fifth, and a fifth cards, 4-, 3-, 2- and I-digit place value cards, pupil tables, I0 pupil whole cups, dm stick, coloured ratio sticks, wooden stand

#### Other

Lined exercise books, cm-squared exercise books, calculators, 15-cm rulers, compasses with short pencils, board compasses, pupil  $\frac{1}{5}$  cards, metre ruler, board set square, flipchart (with plain and grid paper)

### Cross-curricular links

#### **ICT**

☼ Daily practice: practising calculator skills

#### Science

Arithmetic: practising reading information displayed in grids

#### Technology

Data and Measure: improving skills for making accurate drawings

### Key vocabulary

fifths • Think About the Word problem! • Type I basic Real-Life Story • Type 2 basic Real-Life Story • axis (plural axes) • x direction • y direction • x coordinate • y coordinate • set square • interior angle • compasses (pair of compasses) • centre • radius • circumference

### **End-of-block objectives**

#### Arithmetic 1

- ☆ Write Maths Stories for all four operations (+, -, ×, ÷) including fifths and sevenths with mixed numbers (no mixed denominations)
- Write addition Maths Stories as vertical additions (with tricky units and tens columns) and calculate answers
- Write subtraction Maths Stories as vertical subtractions (with tricky units or tens columns) and calculate answers

#### Geometry

- Know the measure in degrees (360°, 270°, 180°, 90°) of a full turn, a three-quarter turn, a half turn, a quarter turn
- ∀ Use angle templates to draw specified angles (multiples of 10°) using a named centre of rotation
- Use a set square as the angle template for a right angle

#### Data and Measure

- Look at a grid, bar chart or pie chart and determine the explicit information
- Interpret data in a grid, bar chart or pie chart and use implicit information to answer questions that use the vocabulary How many more/fewer ...?; What is the difference between the number of ...?; What is the total ...?.
- Interpret data in a grid, bar chart or pie chart and write a Maths Story to calculate answers to questions about the data

- Begin to use ratio when interpreting implicit information in a grid, bar chart or pie chart to answer questions that use the vocabulary What is the ratio of the number of ...?; What fraction of all the ...?
- Apply the language and notation of comparison to find implicit information in a grid, bar chart, or pie chart, e.g. *Two to three*; 2:3; \(\frac{2}{3}\).

#### **Arithmetic 2**

- Multiply α 2-digit whole number by α
   I-digit number using α grid
- ☆ Round numbers to the nearest 10.

#### Reasoning

Multiply a 2-digit number by a 1-digit number by partitioning and calculating the sum of the two products, e.g.
52 × 7 = 50 × 7 + 2 × 7 = 350 + 14 = 364.

- Practise adding and taking away to and from a total of 99
- Practise and recall multiplication facts from the two, three, four, five and ten times tables
- Use a calculator to check answers to adding and taking away up to and from a total of 99 and multiplication facts from the two, three, four, five and ten times tables
- Add and take away up to and from a total of 99 with pence and check answers with a calculator
- ☆ Practise drawing a 4-point compass
- ☆ Practise converting g/kg; cm/dm/mm
- ⇔ Chant times tables (up to 10)
- Act the Real Story and answer the Maths Story for questions using all four operations and mixed numbers (fifths)

- Use a pointer to practise ¼, ½ and ¾ of a full turn and write what angle Spike turned through
- Find explicit and implicit information from a bar chart
- ☆ Complete a grid to multiply a 2-digit multiple of ten by a I-digit number
- Multiply α 2, 3 and 4-digit multiple of ten by α I-digit number
- Act the Real Story and complete the Maths Story with mixed numbers (fifths)
- ☼ Draw an angle of 10°, 20° and 30° and mark it with an arc
- ☼ Partition a 2-digit number and multiply it by a I-digit number as the sum of two products
- ☆ Complete the questions on the 'I Can' pages in Progress Book 3B
- Discuss achievements in Progress Book 3B and fill in the chart

#### Resources

#### **Maths Makes Sense Toolkit**

#### Other

Lined exercise books, cm-squared exercise books, plain exercise books, I5-cm rulers, metre rule, scissors, calculators, modelling clay, pupil ½ cards, ½ cards (reused from PCM I5 Block 3, Arithmetic I, Lesson I), red and blue coloured pencils, board set square, set squares, flipchart

### Cross-curricular links

#### **ICT**

☼ Daily practice: practising calculator skills

#### Science

- Data and Measure: gaining confidence with information displayed in grids and becoming familiar with information displayed in pie charts
- ☼ Data and Measure: choosing appropriate units of measure
- Arithmetic: rounding numbers to begin to understand significance and sensible quantities to quote when measuring

### Key vocabulary

sevenths • product • same-value swap • equal-value swap • Make the impossible... possible • commutative law for multiplication • degrees (including notation ° for degrees) • 360°, 270°, 180°, 90° as full, three-quarter, half and quarter turns • template • centre of rotation • pie chart

### **End-of-block objectives**

#### Arithmetic 1

- → Write addition, subtraction, multiplication and division Maths Stories, including negative numbers (no combining positive and negative numbers unless the result is zero)
- Write addition, subtraction, multiplication and division Maths Stories including fifths, sevenths and other denominations with mixed numbers (no tricky denominations), e.g.  $2\frac{4}{5} + 1\frac{3}{5} = 4\frac{2}{5}$
- Write Maths Stories as vertical additions and subtractions (with tricky units or tens columns) and calculate answers.

#### Geometry

- Recognise parallel lines and not parallel lines
- Traw a line segment specified by, e.g. AB with coordinates for A and B, and draw a line segment parallel to AB
- Draw a line segment specified by, e.g. AB with coordinates for A and B, and draw a line segment perpendicular to AB
- For two drawn lines described as being parallel, draw the arrow symbols and know that the arrows 'speak to us' to indicate they are parallel
- Recognise the shape and say the name *Parallelogram*.

#### **Data and Measure**

- Decide which units to use when measuring length (mm/cm/ dm/m) and mass (g/kg)
- Calculate areas of drawn rectangles by counting squares and write the answer using square units, e.g. 12 cm², 12 dm², 12 m²

- Calculate volumes of drawn cuboids by counting cubes and write the answer using cubic units, e.g. I2 cm<sup>3</sup>
- For a labelled picture of a cuboid, write the lengths of edges and the perimeters and areas of named faces.

#### **Arithmetic 2**

- Solve word problems involving division (including answers with remainders)
- Calculate division Maths Stories with remainders and write remainders as a number and as a fraction, e.g.  $43 \div 5 = 8 \ r \ 3 \text{ or } 8\frac{3}{5}$ .

- Use vertical subtraction to calculate answers to 'How much farther' word problems
- Use grid multiplication for the product of a 2-digit number and a I-digit number to calculate answers to word problems
- Use multiplication tables to write the answers to divisions with remainders, e.g. 27 ÷ 4 = 6 r 3
- Write a ratio as a fraction, e.g. 3:7 as  $\frac{3}{7}$ , and use the fraction to write the answers to divisions with remainders as a mixed number, e.g.  $3! \div 7 = 4\frac{3}{7}$ .

- Practise adding and taking away to and from a total of 99
- Practise and recall multiplication facts from the two, three, four, five, six and ten times tables
- Use a calculator to check answers to adding and taking away up to and from a total of 99 and multiplication facts from the two, three, four, five, six and ten times tables
- Add and take away up to and from a total of 99 with pounds and check answers with a calculator
- Practise converting times between analogue and digital form
- $\Leftrightarrow$  Practise converting ml/ $\ell$ ; mm/cm/dm/m
- Practise saying how many degrees there are in a right angle
- Recognise how many degrees in a straight line
- ☆ Practise drawing a 4-point compass
- ☆ Chant times tables (up to 10)

- Add or subtract two I-digit negative numbers using cards
- Recognise whether pairs of lines are parallel or not
- ☆ Identify shapes as ID, 2D or 3D
- Embellish Type I and Type 2 basic Real-Life Stories using division without remainders
- Copy a 2-digit by I-digit multiplication Maths Story into a grid to answer a word problem
- Complete multiplication and division Maths Stories with negative numbers using cards
- Traw and label a pair of axes. Plot points and draw line segments. Show pairs of parallel lines
- Calculate divisions with remainders, using times tables, and write answers with a remainder and as a mixed number
- ☼ Discuss achievements in Progress Book 3B and fill in the chart

### Resources

#### Maths Makes Sense Toolkit

Negative number cards (0, -1, 1), \( \frac{1}{5} \) cards, place value cards, 10 whole cups, pupil tables, pupil whole cups, 2 long and 1 medium plain ratio sticks, dm sticks, wooden stand

#### Other

Lined exercise books, pupil negative number cards (0, -1, 1), pupil 1½ cards, cm-squared exercise books, 15-cm rulers, metre ruler, calculators, a playing card, A3 paper, an apple, kitchen and bathroom scales, cm-squared paper, scissors and sticky tape, metre ruler, a mixing bowl of marbles or coins, a mixing bowl of rice, spoons, 1 kg bags of sugar, one 1 cm matchstick, one 1 cm × 1 cm square of card, one 1 dm × 1 dm cube made with card, one 1 dm × 1 dm square of card, 3D model of a cuboid e.g. a building brick, flipchart, whiteboard

### Cross-curricular links

#### ICT

☼ Daily practice: practising calculator skills

#### Englist

Arithmetic: using imagination to make up stories with a mathematical content

#### Technology

☼ Data and Measure: improving skills for making accurate drawings

### Key vocabulary

negative [number] • superscript notation for negative numbers (e.g. <sup>-</sup>4) • parallel • parallelogram • ID • 2D • 3D • area • volume

### **End-of-block objectives**

#### Arithmetic 1

- Write addition and subtraction Maths Stories, including negative numbers (with tricky examples), combining positive and negative numbers to give results other than zero
- Write addition, subtraction, multiplication and division Maths Stories using fifths and other denominations with mixed numbers (no tricky denominations)
- Write Maths Stories as vertical additions and subtractions (with tricky units, tens or hundreds columns) and calculate answers.

#### Geometry

- Use compasses and a ruler to copy triangles
- Compare triangles to say whether or not they are congruent
- Draw a triangle specified by coordinates
- On axes, draw a triangle congruent to another triangle.

#### Data and Measure

- Draw a bar chart for the data that children have collected using a tally chart
- Calculate the totals of and differences between two prices, e.g. £3.48 and £1.21.

#### **Arithmetic 2**

- Calculate answers to addition, subtraction, multiplication and division Maths Stories, including tenths written as fractions and decimal fractions
- Calculate vertical additions and subtractions including decimals (one decimal point only)
- Write squares and square roots using written multiplication Maths Stories for reference.

- ☆ Calculate a Maths Story using the complement of a multiple of ten to one hundred
- ☼ Write the fraction shaded and the fraction not shaded for a picture showing a shaded fraction of a shape
- Write the sum of two fractions that total one and the difference between one and a shaded fraction using the complement to one
- Partition and rearrange numbers to calculate the answer for sums or differences of two 2-digit numbers.

- Practise adding and taking away to and from a total of 99
- Practise and recall multiplication facts from the two, three, four, five, six and ten times tables
- Use a calculator to check answers to adding and taking away up to and from a total of 99 and multiplication facts from the two, three, four, five, six and ten times tables
- Add and take away up to and from a total of 99 with pounds and pence, and check answers with a calculator
- Practise converting times between analogue and digital form
- ☼ Practise saying how many degrees there are in three quarter turns
- Recognise how many degrees in a right angle and in one full turn

- ☆ Chant times tables (up to I0)
- ☆ Calculate additions with negative numbers and complete a tricky vertical subtraction with 4-digit numbers
- ☆ Copy a triangle using compasses
- ☆ Write down the total number of tally marks
- ☆ Complete a tally chart
- ☆ Calculate the fraction shaded/not shaded by counting and making a comparison
- Calculate a vertical addition and subtraction with 4-digit numbers and calculate subtraction with negative numbers
- ☼ Plot the points and draw the triangle
- ☆ Write the words in symbols and use partitioning to work out the totals
- Complete the questions on the 'I Can' pages in Progress Book 3C
- Discuss achievements in Progress Book 3C and fill in the chart

### Resources

#### Maths Makes Sense Toolkit

Negative number cards  $(0, \bar{1}, 1)$ , pupil tables, tenth cards (tenth,  $\frac{1}{10}$ , •1, 0•1, •10, 0•10),  $\frac{1}{5}$  cards, place value cards, percentage disc, wooden stand

#### Other

Lined exercise books, cm-squared exercise books, calculators, 15-cm rulers, metre ruler, compasses with short pencils, board compasses, pupil negative number cards (0, -1, 1), pupil  $\frac{1}{5}$  cards, pupil tenth cards (tenth,  $\frac{1}{10}$ , •1, 0•1, •10, 0•10), small blank cards (optional), scissors, paper clips, flipchart

### **Cross-curricular links**

#### **ICT**

☼ Daily practice: practising calculator skills

#### Technology

Geometry: improving skills for making accurate drawings

#### Science

- Data and Measure: becoming familiar with information being collected in tally charts
- ☼ Data and Measure: using tally charts to construct bar charts

### Key vocabulary

baseline • congruent • tally mark • tally chart • point (decimal numbers) • complement • rearrange • square (numbers) • square root

### **End-of-block objectives**

#### Arithmetic 1

- Write Maths Stories for all four operations including negative numbers (with tricky examples for addition and subtraction)
- Write Maths Stories for all four operations using fifths and other denominations with mixed numbers (no tricky denominations)
- Write Maths Stories as vertical additions and subtractions (with one tricky units, tens or hundreds column) and calculate answers.

#### Geometry

- Recognise and identify a pyramid or prism from its net
- ☆ For a 2D drawing, identify which 3D shape it represents
- Draw a triangle specified by coordinates and describe it as scalene, equilateral or isosceles.

#### Data and Measure

- Estimate, measure and write mass using kg/g and capacity using ℓ/ml
- Calculate the area of drawn rectangles, by recognising that they are made up of several identical rows of I-cm² squares, e.g. Area = 3 cm² × 4 = I2 cm²
- Calculate the volume of drawn cuboids, by recognising that they are made up of several identical rows of I-cm³ cubes, e.g. Volume = 4 cm³ × 4 = 16 cm³
- Calculate answers to word problems that involve the subtraction of two areas, e.g. 12 cm² − 5 cm² = 7 cm²

#### **Arithmetic 2**

- ∀ Identify when addition is required to solve a word problem
- ☆ Identify when subtraction is required to solve a word problem
- ∀ Identify when multiplication is required to solve a word problem
- ∀ Identify when division is required to solve a word problem.

- ☆ Calculate answers to word problems using division Maths Stories
- Solve a word problem using a division Maths Story and state whether the implied basic Real-Life Story is Type I or Type 2
- ☆ Identify odd and even numbers
- Complete sequences of odd and even numbers
- Carry out simple calculations using addition or multiplication and say whether the sum or product is odd or even
- ☆ Calculate total costs and differences between prices in a grid
- Convert puzzles into simple drawings and answer related questions.

- Practise adding and taking away to and from a total of 99
- Practise and recall multiplication and division facts from the two, three, four, five, six and ten times tables
- Practise division facts from the three times table
- ☼ Practise rounding to the nearest ten or hundred
- ☆ Practise doubling I-digit numbers
- Use a calculator to check answers to adding and taking away up to and from a total of 99, multiplication and division facts from the two, three, four, five, six and ten times tables and doubling I-digit numbers
- Add and take away up to and from a total of 99 with pounds and pence, and check answers with a calculator
- ☆ Identify times earlier and later than given times
- ☆ Practise converting ml/ℓ; dm/m/cm/mm, kg/g

- ☆ Chant times tables (up to I0)
- Act Real Stories for calculations involving negative numbers and all operations
- Calculate 4-digit vertical additions and subtractions with tricky columns in the hundreds column
- Answer addition and subtraction word problems
- Solve division word problems
- Complete sequences and work out the sums and products of odd and even numbers
- Write the Maths Story and the basic Real-Life Story to calculate areas of rectangles
- Measure the sides of each triangle and draw a line to join it to its special name
- Calculate totals of prices of shopping items
- ☆ Complete the questions on the 'I Can' pages in Progress Book 3C
- Discuss achievements in Progress Book 3C and fill in the chart

### Resources

#### Maths Makes Sense Toolkit

Negative number cards (0,  $^{-}$ I, I),  $\frac{1}{2}$  cards,  $\frac{1}{4}$  cards,  $\frac{1}{5}$  cards, whole cups, half cups (optional), pupil tables, pupil whole cups, 0–99 number grid, wooden stand

#### Other

Lined exercise books, cm-squared exercise books, calculators, 15-cm rulers, pupil negative number cards (0, -1, 1), pupil  $\frac{1}{5}$  cards, selection of plastic or wooden 3D polyhedra (with no curved edges or faces, e.g. squarebased pyramid, triangular-based pyramid, heptagonalbased pyramid, triangular prism, hexagonal prism, cube, cuboid), square-based pyramid or a trianglebased prism, real-life' examples of pyramids and prisms (not cones or cylinders), plain paper, A4 paper or card, scissors, glue, modelling clay, small tin of baked beans, apples, 200 q of beads in sealed plastic bags, cotton reels, 2 kg bags of potatoes, bath sponges, potatoes, 500 g of rice in sealed bags, 2 kg of apples in sealed bags, water, 10 ml dessert spoons, coffee mugs, large plastic bottles (e.g. 2 litre), a bowl, a large glass, small glasses, plastic buckets, kitchen weighing scales, funnels, flipchart

### **Cross-curricular links**

#### **ICT**

Daily practice: practising calculator skills

#### Science

- Data and Measure: measuring mass and volume
- Reasoning: using and interpreting information presented in grids

### Key vocabulary

triangular-based • square-based
• rectangular-based • isosceles
• equilateral • scalene • weight
• capacity •
ordinal numbers (first, second,
third, etc.)