



***Maths Makes Sense***

**5**

***Medium-term plan***

OXFORD

# Maths Makes Sense 5 Block 1

## End-of-block objectives

### Arithmetic 1

- ☆ Write two or three 4-digit whole numbers vertically and calculate (with more than one tricky column) using addition and subtraction
- ☆ Use the three operations,  $+$ / $-$ / $\div$ , with vulgar fractions or mixed numbers with the same denominator
- ☆ Multiply and divide vulgar fractions and mixed numbers by a whole number.

### Geometry

- ☆ Name the images of objects that are points, line segments or polygons in a symmetrical shape
- ☆ Know the line of symmetry is the perpendicular bisector in a symmetrical shape
- ☆ Name two congruent shapes in a shape with an axis of symmetry.

### Data and Measure

- ☆ Solve word problems (involving capacity, volume or length) by using a division Maths Story, identifying the basic Real-Life Story as a Type 1 or Type 2 division
- ☆ Solve word problems (involving capacity, volume or length) by finding a percentage of a value or the result of a percentage increase or decrease
- ☆ Choose the correct operations to solve one-step and multi-step word problems involving capacity, volume or length
- ☆ Make a simple 3D shape by drawing, cutting out and folding a net
- ☆ Recognise that a cube cut through one diagonal forms two congruent triangular prisms.

### Arithmetic 2

- ☆ Complete missing number grids and missing number sentences
- ☆ Complete sequences involving square numbers
- ☆ Use information displayed in grids to solve word problems
- ☆ Solve one- and two-step word problems involving any of the four operations.

### Reasoning

- ☆ Write a.m./p.m. times using 24-hour clock notation
- ☆ Write 24-hour times as a.m./p.m. times
- ☆ Calculate the mean number of days in four consecutive years
- ☆ Calculate the duration between two times written using 24-hour notation.

# Daily practice

## Grade 13

- ☆ Practise adding and taking away up to and from a total of 100 with pounds/pence
- ☆ Practise multiplication and division facts from times tables (up to 12)
- ☆ Give multiples of 11 and 12 and factors of 12, 18, 25, 33 and 36
- ☆ Give the value of underlined decimal digits
- ☆ Name a quadrilateral, polygon and triangle
- ☆ Calculate angles using the sum of angles at a point, vertically opposite and supplementary angles
- ☆ Convert times from the 12-hour to the 24-hour clock, g to kg, ℓ to ml, cm to m, km to m and fractions to decimals
- ☆ Find the possible values of a whole number with given conditions
- ☆ Find a fraction of a whole number and equivalent fractions
- ☆ Find the mode and median of a data sample
- ☆ Chant times tables
- ☆ Use one step for addition of three numbers and two steps for combining addition and subtraction
- ☆ Use compasses to draw the perpendicular bisector of a line segment
- ☆ Use 'Think About the Word Problem!' to solve a problem that involves capacity
- ☆ Identify the type of problem, question or instruction and use any of the four operations to solve the problem
- ☆ Write a.m. and p.m. times as 24-hour times, complete a list of the number of days in consecutive years
- ☆ Calculate accurately with fractions and mixed numbers
- ☆ Name the image and recognise congruent shapes for a specified 'object' (point, line or polygon) on one side of the axis of symmetry
- ☆ Calculate durations using 24-hour clock notation
- ☆ Complete the questions on the 'I can' pages in Progress Book 5A
- ☆ Discuss achievements in Progress Book 5A and fill in the chart

## Resources

### Maths Makes Sense Toolkit

- ☆ Whole cups, fifths, tenths and decimals cards, pupil tables, fraction cards

### Other

- ☆ Lined, cm-squared,  $\frac{1}{2}$  cm-squared and plain exercise books, calculators, compasses, short pencils, 15-cm rulers, set squares, flipchart, classroom clock, geared clock, A4 cm-squared paper, scissors, adhesive tape, 1-cm<sup>3</sup> cubes, board compasses

## Cross-curricular links

### Art, Design and Technology

- ☆ Geometry: make models using named 3D shapes and drawing, cutting out and folding nets

### PSHCE

- ☆ Progress Books 'I can' pages: practise turn-taking and listening skills when discussing achievements in Progress Books

## Key vocabulary

perpendicular bisector • arc • fair swap • axis of symmetry • square numbers • leap year • congruent

# Maths Makes Sense 5 Block 2

## End-of-block objectives

### Arithmetic 1

- ☆ Write two or three 4-digit decimal numbers vertically, with up to three decimal places, and calculate with more than one tricky column, using addition and subtraction
- ☆ Multiply two vulgar fractions where the denominator of one and the numerator of the other are equal.

### Geometry

- ☆ Name and draw acute angles, obtuse angles, reflex angles and right angles
- ☆ Name and calculate vertically opposite angles and supplementary angles
- ☆ Use a protractor to draw acute angles, obtuse angles and right angles.

### Data and Measure

- ☆ Appreciate the need for standard units
- ☆ Know the metric units of mass: g, kg; length: mm, cm, m, km; and volume/capacity: ml, ℓ, cm<sup>3</sup> m<sup>3</sup>
- ☆ Know imperial units of measure, e.g. pound, ounce, inch, foot, yard, mile, pint, gallon
- ☆ Interpret a reading that lies between two unnumbered divisions on a scale
- ☆ Convert between metric units, e.g. kg and g to kg
- ☆ Convert between imperial units, e.g. lb and oz to oz.

### Arithmetic 2

- ☆ Use  $>/</\geq/\leq$  with positive whole numbers, e.g. in the form  $8 < m < 10$
- ☆ Use a calculator to check if a number is a factor of another number
- ☆ Distinguish between a factor and a proper factor.

### Reasoning

- ☆ Solve algebraic equations that have an expression which is the sum of two terms using algebraic methods, one term being solely 'x' and the other term a 1-digit number, e.g.  $x + 2 = 5$
- ☆ Solve algebraic equations that have an expression which consists of one term using algebraic methods, a product of 'x' and a 1-digit number, e.g.  $2x = 6$ .

# Daily practice

## Grade 14

- ☆ Practise adding and taking away up to and from a total of 100 with pounds/pence
- ☆ Practise multiplication and division facts from the 11 and 12 times tables.
- ☆ Give multiples of 7, 8, 9 and factors of 16, 24, 25, 30 and 49
- ☆ Convert times from the 12-hour to the 24-hour clock, find times after a given time using the 12-hour clock
- ☆ Convert km to m, cm to m, g to kg, to ml and mixed fractions to decimals
- ☆ Give the value of underlined decimal digits
- ☆ Name polygons and triangles
- ☆ Calculate an angle using supplementary and vertically opposite angles
- ☆ Find a fraction or a percentage of a whole number
- ☆ Find equivalent fractions
- ☆ Place decimal fractions on a number line
- ☆ Find the possible values of a whole number with given conditions
- ☆ Convert between fractions, percentages and decimals
- ☆ State doubles
- ☆ Round to the nearest 100
- ☆ Chant times tables
- ☆ Use one step for addition of three numbers with up to three decimal places, and two steps for combining addition and subtraction
- ☆ Identify and name right angles and straight lines and say and write their magnitude,  $90^\circ$  and  $180^\circ$ . Identify acute, obtuse and reflex angles
- ☆ Identify metric and non-metric units of measure
- ☆ Solve puzzles that use the symbols  $<$  and  $>$  and recognise explicit and implicit factors
- ☆ Draw two Maths Tables and solve equations with addition on the left-hand side (LHS)
- ☆ Calculate products of vulgar fractions and vertical addition and subtraction with up to three decimal places
- ☆ For angles drawn in a circle, identify acute, obtuse and right angles
- ☆ Draw two Maths Tables and solve equations with multiplication on the left-hand side (LHS)
- ☆ Complete the questions on the 'I can' pages in Progress Book 5A
- ☆ Discuss achievements in Progress Book 5A and fill in the chart

\* \* \* \* \*

## Resources

### Maths Makes Sense Toolkit

- ☆ Pupil tables, pupil negative number cards, pupil  $x$  cards, coloured ratio sticks, plain ratio sticks (long and medium)

### Other

- ☆ Lined, plain and  $\frac{1}{2}$  cm-squared exercise books, calculators, 15-cm rulers, coloured pencils, balance scales, parcel for weighing, objects of different masses, flipchart, graph paper, rulers, glue, sticky tape, protractors, variety of analogue weighing scales and spring balances, compasses, small pencils

## Cross-curricular links

### Science

- ☆ Data and Measure: use the vocabulary and actions for centimetre and decimetre when measuring length, and kilograms and grams when measuring mass

### PSHCE

- ☆ Progress Books 'I can' pages: practise turn-taking and listening skills when discussing achievements in Progress Books

## Key vocabulary

acute • reflex • obtuse • metric • imperial

# Maths Makes Sense 5 Block 3

## End-of-block objectives

### Arithmetic 1

- ☆ Use  $\frac{a}{b}$  and  $a \div b$  interchangeably, e.g.  $\frac{5}{8}$  and  $5 \div 8$
- ☆ Use the division button on a calculator to convert vulgar fractions to finite decimal fractions (no vulgar fractions with infinite decimal equivalents)
- ☆ Use the four operations (+/-/×/÷) with combinations of positive and negative numbers, including tricky examples (but not the product of two negative numbers).

### Geometry

- ☆ Use a calculator to calculate the circumference of a circle using  $C = \pi \times d$
- ☆ Use a calculator to calculate the area of a circle using  $A = \pi \times r^2$ .

### Data and Measure

- ☆ Interpret a calendar
- ☆ Interpret a timetable
- ☆ Use durations of minutes, hours, days or months in calculations and word problems
- ☆ Construct a bar chart and use it to find the mode
- ☆ Understand that the mode is the most common value in a set of data.

### Arithmetic 2

- ☆ Use divisibility tests for 2, 3, 4, 5, 6, 10
- ☆ Distinguish between factors and proper factors.

### Reasoning

- ☆ Solve problems involving measures and fractions by exploring patterns and relationships in diagrams
- ☆ Solve one-, two- and three-step word problems involving money.

# Daily practice

## Grade 15

- ☆ Practise adding and taking away up to and from a total of 100 with pounds/pence
- ☆ Practise multiplication and division facts from times tables (up to 12)
- ☆ Name multiples of 4, 7 and 8 and factors of 12, 20, 25, 30, 35 and 36
- ☆ Convert km to m, cm to m, g to kg and ml to ml
- ☆ Give the value of underlined decimal digits
- ☆ Demonstrate knowledge of factors
- ☆ Convert percentages to decimals
- ☆ Name a polygon and a triangle
- ☆ Calculate angles using the sum of angles at a point, supplementary and vertically opposite angles
- ☆ Name doubles
- ☆ Find times before a given time using the 24-hour clock
- ☆ Find a time earlier than a given digital time
- ☆ Convert the 12-hour to a 24-hour clock
- ☆ Find equivalent fractions
- ☆ Convert between fractions, decimals and percentages
- ☆ Find the mode and median of a data sample
- ☆ Round to the nearest 100
- ☆ Chant times tables  
\* \* \* \* \*
- ☆ Express division of whole numbers as fractions
- ☆ Write a multiplication Maths Story, using decimals to 2 decimal places to calculate areas of rectangles
- ☆ Use a calendar to find specific dates
- ☆ Write factors and proper factors, and use divisibility test for 2
- ☆ Solve a two-step problem using money
- ☆ Use diagrams to see fraction and decimal equivalents
- ☆ Use a calculator to calculate the circumference of a circle using
- ☆  $C = \pi \times d$  and the area of a circle using  $A = \pi \times r^2$
- ☆ Solve problems using Maths Stories with several terms, some of the terms being products
- ☆ Complete the questions on the 'I can' pages in Progress Book 5B
- ☆ Discuss achievements in Progress Book 5B and fill in the chart

## Resources

### Maths Makes Sense Toolkit

- ☆ Whole cups, pupil tables, negative number cards (-1, 0, 1)

### Other

- ☆ Lined, plain,  $\frac{1}{2}$  cm-squared and cm-squared exercise books, calculators, calendars, flipchart, coloured pencils, rulers, compasses, small pencils, 15-cm rulers

## Cross-curricular links

### Geography

- ☆ Data and Measure: design and carry out a survey of the class. Present the results as a bar chart, including identifying the mode

### PSHCE

- ☆ Progress Books 'I can' pages: practise turn-taking and listening skills when discussing achievements in Progress Books

## Key vocabulary

mode • circumference • diameter • radius •  $\pi$  ('pi') • fair swap • term • factor • product

# Maths Makes Sense 5 Block 4

## End-of-block objectives

### Arithmetic 1

- ☆ Use a grid for long multiplication with up to 2-digit by 2-digit whole numbers
- ☆ Use a grid for long multiplication with up to 3-digit by 2-digit decimal numbers (one or two decimal places), with answers up to three decimal places.

### Geometry

- ☆ Recognise corresponding angles and know they have the same value
- ☆ Recognise vertically opposite angles and know they have the same value
- ☆ Recognise opposite interior angles in a parallelogram and know they have the same value.

### Data and Measure

- ☆ Interpret a distance-time graph
- ☆ Draw a distance-time graph from given information
- ☆ Round measures of distance and time.

### Arithmetic 2

- ☆ Identify prime numbers from 0–100 using Eratosthenes' sieve.
- ☆ Write numbers as the product of their prime factors
- ☆ For  $n$  as a positive whole number, respond to a condition that describes a factor, e.g. 11 is a factor of  $n$ , and conditions that use the symbols  $<$  or  $\leq$ , e.g.  $22 < n < 55$ , and write a value of  $n$ , i.e. 33 or 44.

### Reasoning

- ☆ Solve puzzles by calculating quantities, e.g. numbers of bricks, and dimensions, e.g. lengths and heights, using pictures of 2D and 3D shapes.

# Daily practice

## Grade 16

- ☆ Practise adding up to a total of 100 with pounds/pence
- ☆ Practise multiplication and division facts from times tables (up to 12)
- ☆ Name multiples of 4, 12 and factors of 8, 18, 21, 27
- ☆ Find times after a given time and convert the 24-hour to the 12-hour clock
- ☆ Find a time earlier than a given 24-hour clock time
- ☆ Convert km to m, cm to m, g to kg and ℓ to ml
- ☆ Convert between fractions, decimals and percentages
- ☆ Name a polygon and a triangle
- ☆ Place decimal fractions on a number line
- ☆ Name doubles
- ☆ Give the value of underlined decimal digits
- ☆ Write prime numbers up to 30
- ☆ Find equivalent fractions
- ☆ Find a fraction of a whole number
- ☆ Calculate angles using supplementary and vertically opposite angles
- ☆ Name doubles
- ☆ Chant times tables  
\* \* \* \* \*
- ☆ Use basic products in multiplication tables to derive products of large numbers and decimal fractions
- ☆ Identify vertically opposite angles and recognise they are the same size
- ☆ Interpret a distance–time graph
- ☆ Identify a prime number as having no proper factors
- ☆ Solve length puzzles by calculating diameters and side lengths
- ☆ Use grids for products of 3-digit and 2-digit numbers (both large numbers and decimal fractions) for rows of circles and squares
- ☆ Recognise and write values of vertically opposite, corresponding and opposite angles in a parallelogram
- ☆ For 3D pictures of shapes made with cubes, calculate quantities for shapes of different sizes
- ☆ Complete the questions on the ‘I can’ pages in Progress Book 5B
- ☆ Discuss achievements in Progress Book 5B and fill in the chart

## Resources

### Maths Makes Sense Toolkit

- ☆ Place value cards, plain ratio sticks

### Other

- ☆ Lined, plain cm-squared and  $\frac{1}{2}$  cm-squared exercise books, calculators, flipchart, 15-cm rulers, stopwatches or stop clocks, trundle wheels, large open space, camera, poster-making materials, interlocking 1-cm cubes, graph paper, rulers, glue or sticky tape

## Cross-curricular links

### Outdoor play/physical education

- ☆ Data and Measure: use a trundle wheel to measure out a length of track. Use a stop watch to time how long it takes to cover this distance by running, walking, hopping or skipping. Compare the results

### PSHCE

- ☆ Progress Books ‘I can’ pages: practise turn-taking and listening skills when discussing achievements in Progress Books

## Key vocabulary

distance-time graph • prime number • proper factor • diameter • parallelogram

# Maths Makes Sense 5 Block 5

## End-of-block objectives

### Arithmetic 1

- ☆ Use a grid for long division including numbers with up to 3-digits divided by 1-digit whole numbers.

### Geometry

- ☆ Draw a convex polygon
- ☆ Draw and mark the exterior angles for a convex polygon
- ☆ Show that the sum of the exterior angles of a polygon is  $360^\circ$ .

### Data and Measure

- ☆ Use ratio to convert between metric units of measure
- ☆ Use ratio to convert between metric and imperial units of measure
- ☆ Estimate the area of a shape in  $\text{cm}^2$ .

### Arithmetic 2

- ☆ Evaluate terms in an expression with brackets, e.g.  $(2 \times 3) + (1 \times 2) = 6 + 2$
- ☆ Evaluate products in an expression with brackets, e.g.  $2 \times (4 + 1 \times 3) = 2 \times (4 + 3) = 2 \times 7$ .

### Reasoning

- ☆ Carry out investigations involving shapes, numbers and real-life situations using the 'What if Not' approach.

# Daily practice

## Grade 17

- ☆ Practise adding and taking away up to and from totals of 100 and £5.00 with pounds and pence
- ☆ Practise multiplication and division facts from times tables (up to 12)
- ☆ Multiply and divide by 20
- ☆ Give multiples of 20 and proper factors of 18, 28 and 36
- ☆ Convert m to mm, cm to m, kg to g and ℓ to ml
- ☆ Give the value of underlined decimal digits
- ☆ Find a fraction/percentage of a whole number
- ☆ Name a concave polygon
- ☆ Demonstrate knowledge of exterior angles of a polygon and interior angles of quadrilaterals, triangles, pentagons and hexagons
- ☆ Name doubles
- ☆ Give the value of underlined decimal digits
- ☆ Find a time earlier than a given time using the 24-hour clock
- ☆ Convert the 12-hour clock to the 24-hour clock
- ☆ Give prime numbers up to 40
- ☆ Find equivalent fractions
- ☆ Convert fractions to decimals and percentages
- ☆ Find the mode and median of a data sample
- ☆ Chant times tables  
\* \* \* \* \*
- ☆ Partition 3-digit numbers in a grid for long division
- ☆ Draw and label a convex quadrilateral, sketch and label a pentagon
- ☆ Convert units of distance from metric to imperial and vice versa
- ☆ Locate terms in an expression and say the value of each term
- ☆ Investigate the number of different shapes that can be made using congruent squares placed side to side
- ☆ Calculate  $HTU \div U$  using a grid and write the remainder
- ☆ For a convex polygon, draw and mark the exterior angles and show that the sum of the exterior angles of a polygon is  $360^\circ$
- ☆ Investigate the area and perimeter of rectangles made by placing squares side by side, 1 cm by 1 cm
- ☆ Complete the questions on the 'I can' pages in Progress Book 5C
- ☆ Discuss achievements in Progress Book 5C and fill in the chart

## Resources

### Maths Makes Sense Toolkit

- ☆ One dm stick per child

### Other

- ☆ Lined, plain  $\frac{1}{2}$  cm-squared and cm-squared exercise books, calculators, flipchart, 15-cm rulers, chalk, two blue pencils and one red pencil per child (or wallpaper and felt-tipped pens), two 1-metre rulers, compasses, short pencils, A4  $\frac{1}{2}$  cm-squared paper, large cards labelled 'A', 'B', 'C'

## Cross-curricular links

### Science

- ☆ Reasoning: use a trundle wheel to accurately measure the perimeter of school buildings and classrooms. Convert the measurements from metric to imperial

### Art, Geography

- ☆ Reasoning: use congruent squares to make collages of the school and grounds

## Key vocabulary

convex • concave • metric • imperial • term

# Maths Makes Sense 5 Block 6

## End-of-block objectives

### Arithmetic 1

- ☆ Multiply decimal numbers with up to three decimal places by multiples of powers of 10 (product no more than three decimal places), using the 'logic of the language'
- ☆ Divide decimal numbers by multiples of powers of 10 (no numbers with more than three decimal places), using the 'logic of the language'
- ☆ Use derived products to calculate multiplication and division.

### Geometry

- ☆ Recognise, name and sketch polygons (decagon, heptagon, hexagon, nonagon, octagon, pentagon, quadrilateral, triangle)
- ☆ Recognise, name and sketch a *equilateral* triangle, *isosceles* triangle, *right-angled* triangle, *scalene* triangle
- ☆ Recognise, name and sketch a *parallelogram*, *rectangle*, *rhombus*, *square*, *trapezium*
- ☆ Recognise the various special triangles and quadrilaterals, use the special name and recognise them as the more general polygons.

### Data and Measure

- ☆ Calculate durations for times specified as a.m./p.m. times and 24-hour clock times
- ☆ Draw and use a double number line showing distance and time to solve word problems involving speed, distance and time
- ☆ Use calculations to solve word problems involving speed, distance and time.

### Arithmetic 2

- ☆ Evaluate terms in an expression that includes brackets, e.g. recognise  $5 + 4 + 2 \times 5$  as an expression with three terms, evaluate  $5 + 4 + 10$  and recognise  $5 + (4 + 2) \times 5$  as an expression with two terms and evaluate  $5 + 30$
- ☆ Insert brackets in an expression so it has a specified value, e.g. calculate and write ' $2 \times 5 + 1 + 2 = 13$  and  $2 \times (5 + 1) + 2 = 14$ ' and also insert brackets for  $2 \times 5 + 1 + 2$  to have the value 16.

### Reasoning

- ☆ Calculate durations of shop opening times from information in a grid
- ☆ Use information in a grid about duration of tracks on a CD to calculate differences between durations, total durations and mean durations
- ☆ Calculate equivalences and fractions of periods of time using years, days, hours, minutes and seconds.

## Grade 18

- ☆ Practise taking away from a total of 100 with pounds and pence
- ☆ Practise multiplication and division facts from times tables (up to 12)
- ☆ Multiply by 15 and 20
- ☆ Divide by 6, 15 and 20
- ☆ Convert m to km, m to cm, mm to m, cm to mm and g to kg
- ☆ Give the value of underlined decimal digits
- ☆ Give multiples of 5, 12 and 15 and proper factors of 8, 12, 27, 28, 40 and 50
- ☆ Find a fraction/percentage of a whole number
- ☆ Name a polygon and a triangle
- ☆ Name an acute/obtuse angle, a right angle, a reflex angle and a  $180^\circ$  angle
- ☆ Name doubles
- ☆ Find a time earlier/later than a given time and convert the 12-hour to the 24-hour clock
- ☆ Convert fractions to decimals
- ☆ Give prime numbers up to 20
- ☆ Find equivalent fractions
- ☆ Place a decimal fraction on a number line
- ☆ Chant times tables  
\* \* \* \* \*
- ☆ Calculate products of tenths and hundredths using the 'logic of the language'
- ☆ Recognise, name and define polygons
- ☆ Calculate durations for times specified as a.m. /p.m. times and 24-hour clock times
- ☆ Evaluate expressions using brackets correctly
- ☆ Calculate equivalences using years, months, days, hours, minutes
- ☆ Use the 'logic of the language' to multiply and divide numbers with up to three decimal places
- ☆ Use circles as the basis for sketching triangles and quadrilaterals
- ☆ Calculate durations from information in a grid about playing times for tracks on a CD
- ☆ Complete the questions on the 'I can' pages in Progress Book 5C
- ☆ Discuss achievements in Progress Book 5C and fill in the chart

## Resources

### Maths Makes Sense Toolkit

- ☆ Percentage disc

### Other

- ☆ Lined, plain and  $\frac{1}{2}$  cm-squared exercise books, calculators, flipchart, 15-cm rulers, compasses,  $\frac{1}{2}$  cm-squared graph paper, glue or sticky tape, board compasses

## Cross-curricular links

### Outdoor play/physical education

- ☆ Daily practice: record time at beginning and end of activity and say how many minutes have passed between two times

### PSHCE

- ☆ Play 'getting to know you' games with designated partners, practising active listening and turn-taking skills

## Key vocabulary

power of 10 • equilateral • isosceles • right-angled • scalene • prime factors