

Maths Makes Sense

Maths Makes Sense

6

Medium-term plan

OXFORD

Maths Makes Sense 6 Block 1

End-of-block objectives

Arithmetic 1

- ☆ Use a grid for long multiplication of HTU by TU, e.g. $324 \times 23 = 7452$
- ☆ Estimate the value of products by rounding each factor
- ☆ Use the product of a 3-digit whole number and a 2-digit whole number and, using approximation, work out a related product of decimal numbers.

Geometry

- ☆ Find the sum of the exterior angles of a polygon
- ☆ Find the sum of the interior angles of a polygon.

Data and Measure

- ☆ Solve distance word problems using kilometres
- ☆ Solve volume word problems using millilitres and litres
- ☆ Solve mass word problems using grams and kilograms.

Arithmetic 2

- ☆ Use a short method for multiplication of up to 3-digit by 2-digit whole numbers, e.g. $712 \times 39 = 27768$
- ☆ Use a short method for division of up to 3-digit by 2-digit whole numbers, including remainders, e.g. $474 \div 13 = 36 \text{ r } 6$.

Reasoning

- ☆ Calculate the mean, median, mode and range of a sample.

Daily practice

Grade 19

- ☆ Practise using knowledge of addition and subtraction of 2-digit numbers to calculate with decimals
 - ☆ Practise multiplication facts from the times tables (up to 12)
 - ☆ Practise subtracting from £5.00 and £10.00 and near multiples of 1000
 - ☆ Practise multiplying and dividing with decimals
 - ☆ Practise multiplying by 15
 - ☆ Use knowledge to multiply pairs of multiples of 10 and 100
 - ☆ Round numbers to one decimal place
 - ☆ Write factors and multiples of given numbers
 - ☆ Name quadrilaterals, polygons and triangles
 - ☆ Identify a given angle
 - ☆ Convert between percentages, vulgar fractions and decimal fractions, m and km, cm and m, cm and mm and g and kg
 - ☆ Find a fraction or percentage of a whole number and calculate equivalent fractions
 - ☆ Calculate the duration between two times
 - ☆ Chant times tables
 - ☆ Solve puzzles
- * * * * *
- ☆ Calculate $HTU \times TU$ using a grid
 - ☆ Estimate and calculate total distances
 - ☆ Draw and calculate the sum of the interior angles of a convex polygon
 - ☆ Use a basic product and approximation to write implicit information for $TU \cdot t \times U \cdot t$ and similar questions
 - ☆ Calculate the mean, median, mode and range of a sample
 - ☆ Calculate up to $HTU \times TU$ multiplication using a short method
 - ☆ Draw and calculate the sum of the interior angles of a convex quadrilateral
 - ☆ Calculate the mean, median, mode and range of a sample
 - ☆ Complete the questions on the 'I can' pages in Progress Book 6A
 - ☆ Discuss achievements in Progress Book 6A and fill in the chart

Resources

Maths Makes Sense Toolkit

- ☆ Place value cards

Other

- ☆ Lined, plain and cm-squared exercise books, board compasses, large ruler, rulers, compasses, short pencils, large open space, playground chalk, blue and red pencils, calculators

Cross-curricular links

Geography

- ☆ Data & Measure: read and interpret information from maps

PSHCE

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

Key vocabulary

mean • median • mode • range • basic product • exterior angles • interior angles • direct • via

Maths Makes Sense 6 Block 2

End-of-block objectives

Arithmetic 1

- ☆ Use a grid for long division of ThHTU by U, e.g. $6342 \div 6 = 1057$
- ☆ Estimate the value of quotients by rounding
- ☆ Use the quotient of a 4-digit whole number and a 1-digit whole number and, using approximation, work out a related quotient of decimal numbers, e.g. $63.42 \div .6 = 105.7$.

Geometry

- ☆ Recognise reflection, translation, enlargement and rotation as transformations
- ☆ For an object and its image, recognise and name the transformation.

Data and Measure

- ☆ Draw a pie chart from data presented in a frequency table.

Arithmetic 2

- ☆ Convert a vulgar fraction to a percentage
- ☆ Convert a percentage to a decimal fraction
- ☆ Convert a decimal fraction to a percentage.

Reasoning

- ☆ Measure the probability of events, e.g. the probability of rolling a 3 on a fair dice numbered 1 – 6 is $\frac{1}{6}$.

Daily practice

Grade 20

- ☆ Practise using knowledge of addition and subtraction of 2-digit numbers to calculate with decimals
- ☆ Practise multiplication and division facts from the times tables (up to 12)
- ☆ Practise subtracting from £5.00 and £10.00 and near multiples of 1000
- ☆ Practise multiplying and dividing pairs of multiples of 10 and 100 and decimals
- ☆ Practise multiplying by 15
- ☆ Convert between percentages, vulgar fractions and decimal fractions, cm and m, ml and ℓ, g and kg
- ☆ Round numbers to two decimal places
- ☆ Write factors and multiples of given numbers
- ☆ Find a percentage or fraction of a whole number and calculate equivalent fractions
- ☆ Name quadrilaterals, polygons and triangles
- ☆ Calculate angles around a point
- ☆ Work out the duration between two times
- ☆ Label number lines
- ☆ Chant times tables
- ☆ Solve puzzles
- ☆ Calculate $\text{ThHTU} \div \text{U}$ using a grid and write implicit information; calculate $\text{HTU} \div \text{U}$ using a short method
- ☆ Recognise the different transformations of reflection, translation, enlargement and rotation
- ☆ Complete a tally chart and a frequency table
- ☆ Identify the numerator, denominator and denomination of a fraction and express as a fraction, in hundredths, as a percentage and vice versa
- ☆ Measure probability by using a ratio and writing it as a vulgar fraction; use the notation for writing probability
- ☆ Use $\text{ThHTU} \div \text{U}$ divisions to deduce related divisions
- ☆ Draw an object and an image for vector translation
- ☆ Recognise favourable outcomes to calculate probability
- ☆ Complete the questions on the 'I can' pages in Progress Book 6A
- ☆ Discuss achievements in Progress Book 6A and fill in the chart

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Resources

Maths Makes Sense Toolkit

- ☆ Pupil tables, fifth cards, wall cards 1–6, place value cards, ratio sticks, dm sticks, wooden stand

Other

- ☆ Lined, plain and $\frac{1}{2}$ cm-squared exercise books, calculators, rulers, protractors, coloured pencils, compasses, tracing paper, paper clips, envelopes, scissors, a 50p coin, a large dice, an open-topped box large enough to place the wall cards in and 'mix' them

Cross-curricular links

Science

- ☆ Data and Measure: use data provided in tables to draw bar charts and pie charts and to interpret and discuss the results

PSHCE

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

Key vocabulary

reflection • translation • enlargement • rotation • basic product • derived product • frequency table
• $f(x)$ • bar chart • pie chart • probability • incident • trial • outcome • equally-likely • $P(x) =$

Maths Makes Sense 6 Block 3

End-of-block objectives

Arithmetic 1

- ☆ Use equivalent fractions in calculations using each of the four operations.

Geometry

- ☆ Use a protractor to measure the size of an angle in degrees; use a ruler to measure the length of a line in millimetres
- ☆ Draw the image of a polygon in a mirror line
- ☆ Complete the drawing of a named, partially-drawn shape on a pair of axes
- ☆ Calculate the size of the two equal angles in an isosceles triangle
- ☆ Sort quadrilaterals according to their properties
- ☆ Complete the coordinates of the corners of a named shape using knowledge of its properties
- ☆ Find the angle of rotation for an object and image polygon.

Data and Measure

- ☆ Solve problems involving ratio and proportion by scaling up or scaling down
- ☆ Interpret and read a scale to measure mass
- ☆ Compare the usefulness of different weighing scales for measuring mass.

Arithmetic 2

- ☆ Write the ratio of one quantity to another
- ☆ Write a quantity as a fraction or percentage of the total quantity
- ☆ Solve word problems by calculating a quantity following a percentage increase or decrease.

Reasoning

- ☆ Interpret a distance-time graph for distance travelled and time taken
- ☆ Interpret a distance-time graph for faster and slower (speed)
- ☆ Interpret a temperature-time graph for rise, fall and difference in temperature.

Daily practice

Grade 21

- ☆ Practise using knowledge of addition and subtraction of 2-digit numbers to calculate with decimals
- ☆ Practise multiplication and division facts from the times tables (up to 12)
- ☆ Practise multiplying by 25
- ☆ Practise subtracting near multiples of 1000 and from £5.00 and £10.00
- ☆ Use knowledge to multiply and divide pairs of multiples of 10 and 100 and decimals
- ☆ Convert between percentages, vulgar fractions and decimal fractions, ml and ℓ, km and m, m and cm
- ☆ Round numbers to three decimal places
- ☆ Find a fraction or a percentage of a whole number and calculate equivalent fractions
- ☆ Name quadrilaterals, polygons and triangles
- ☆ Calculate angles around a point
- ☆ Write common factors of given numbers
- ☆ Work out the duration between two times
- ☆ Chant times tables
- ☆ Solve puzzles
- ☆ Write equivalent fractions for fifths, using basic stick drawings
- ☆ Calculate angles in an isosceles triangle; draw lines of symmetry
- ☆ Read mass accurately from a scale
- ☆ Write a quantity as a percentage or ratio of the total, and as a percentage or ratio of another number or quantity
- ☆ For a distance-time graph (for cycle journeys), read start and finish times and recognise and use stationary sections
- ☆ Use mixed numbers expressed as improper fractions to calculate tricky products using vulgar fractions
- ☆ Use the properties of different quadrilaterals in a sorting diagram that sorts on two criteria
- ☆ For a temperature-time graph, identify temperatures at different times, compare temperatures between houses, and calculate difference in temperature
- ☆ Complete the questions on the 'I can' pages in Progress Book 6B
- ☆ Discuss achievements in Progress Book 6B and fill in the chart

Resources

Maths Makes Sense Toolkit

- ☆ Ratio sticks

Other

- ☆ Lined, plain and $\frac{1}{2}$ cm-squared exercise books, calculators, protractors, rulers, analogue and digital weighing scales with different ranges/accuracies, variety of items to be weighed: potatoes, rubber bands, paper clips, tissue paper, sand, letters, books, pasta, carrots, salt

Cross-curricular links

Science

- ☆ Data and Measure: discuss the usefulness and suitability of different types of analogue and digital scales for weighing mass; take turns measuring items on different scales and decide which is most 'fit for purpose'

PSHCE

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

Key vocabulary

analogue • digital • range • accuracy • distance-time graph • temperature-time graph

Maths Makes Sense 6 Block 4

End-of-block objectives

Arithmetic 1

- ☆ Calculate with negative numbers using the four operations (using $1 + -1 = 0$ with tricky examples)
- ☆ Calculate with vulgar fractions using the four operations (using equivalent fractions and improper fractions with tricky examples).

Geometry

- ☆ Draw the lines of symmetry of any polygon
- ☆ Write the number of lines of symmetry for any polygon
- ☆ Identify and write the order of rotational symmetry for any polygon.

Data and Measure

- ☆ Collect, select, process and present data, making use of ICT
- ☆ Interpret data to answer questions and solve problems
- ☆ Construct and interpret frequency tables, bar charts and pie charts, making use of ICT
- ☆ Plan and carry out a survey, suggesting and developing lines of enquiry, to collect discrete or discrete grouped data.

Arithmetic 2

- ☆ Solve word problems involving money using addition, subtraction, multiplication or division
- ☆ Add and subtract 'squares' and 'cubes' of numbers, e.g. find the sum of 10^2 and 8.7^3
- ☆ Calculate the product of a given number closest to a specified number, e.g. find the product of 28 that is closest to 298.

Reasoning

- ☆ Identify terms and products in expressions
- ☆ Evaluate expressions with and without brackets, e.g. $3 + 2 \times 3 = 9$, $(3 + 2) \times 3 = 15$
- ☆ Insert brackets in an expression for it to take a specified value, e.g. insert brackets so that the expression $3 + 2 \times 3$ has the value 15.

Daily practice

Grade 22

- ☆ Practise using knowledge of addition and subtraction of 2-digit numbers to calculate with decimals
- ☆ Practise multiplication and division facts from the times tables (up to 12)
- ☆ Practise multiplying by 25
- ☆ Practise subtracting near multiples of 1000 and from £5.00 and £10.00
- ☆ Use knowledge to multiply and divide pairs of multiples of 10 and 100 and decimals
- ☆ Convert between percentages, vulgar fractions and decimal fractions, m and km, kg and g, ml and ℓ and cm and mm
- ☆ Round numbers to one or two decimal places
- ☆ Find a fraction or percentage of a number and calculate equivalent fractions
- ☆ Name quadrilaterals, polygons, triangles and types of transformation
- ☆ Find common factors of given numbers
- ☆ Work out the duration between two times
- ☆ Chant times tables
- ☆ Solve puzzles
- ☆ Draw a Maths Table to complete a Maths Story (with addition and subtraction) using negative numbers
- ☆ Draw lines of symmetry on a regular polygon
- ☆ Design and draw a tally chart and frequency table
- ☆ Calculate multiples, totals and differences for two-step word problems using money
- ☆ Evaluate expressions with or without brackets
- ☆ Add and subtract vulgar fractions with tricky examples, draw a Maths Table to act the Real Story for a Maths Story using vulgar fractions
- ☆ Sketch shapes with different orders of rotational symmetry
- ☆ Insert brackets into an expression for it to take a specified value
- ☆ Complete the questions on the 'I can' pages in Progress Book 6B
- ☆ Discuss achievements in Progress Book 6B and fill in the chart

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Resources

Maths Makes Sense Toolkit

- ☆ Pupil whole cups, 'I' and 'l' cards

Other

- ☆ Lined, plain and $\frac{1}{2}$ cm-squared exercise books, calculators, rulers, scissors, plain paper, compasses, colouring pens/pencils, model 2D shapes, computers with data-handling software, examples of types of chart or graph, e.g. pictogram, frequency bar chart, frequency line graph, pie chart, line graph

Cross-curricular links

ICT

- ☆ Data and Measure: children use results from their surveys and data-handling software to produce graphs/charts of their findings

PSHCE

- ☆ Data and Measure: children analyse the graphs of their surveys, draw conclusions and suggest ways of improving their work
- ☆ Progress Books 'I can' pages: practise turn-taking and listening skills when discussing achievements in Progress Books

Key vocabulary

symmetry • rotational symmetry • discrete data • continuous data • discrete grouped data term • expression • tally chart • frequency table

Maths Makes Sense 6 Block 5

End-of-block objectives

Arithmetic 1

- ☆ Use the formulae for diameter, circumference and area of a circle
- ☆ Use the formula for the area of a triangle
- ☆ Use the formulae for the volume of a cuboid and a cylinder.

Geometry

- ☆ Calculate an exterior angle of a regular polygon
- ☆ Calculate an interior angle of a regular polygon
- ☆ Calculate the third angle in a triangle.

Data and Measure

- ☆ Convert between yards and metres
- ☆ Calculate the perimeter and the area of compound shapes
- ☆ Calculate surface area and volume of cuboids
- ☆ Solve problems involving dimensions and volume of cuboids.

Arithmetic 2

- ☆ Use inequalities to identify a range of possible values for a number, e.g. find the values of m , where $15 < m < 20$ and m is a whole number
- ☆ Use algebraic notation for the sum, difference, product and quotient of two numbers, e.g. $m + n$, $m - n$, mn , $\frac{m}{n}$
- ☆ Find the greatest or smallest sums, difference, products and quotients of two numbers with a range of possible values
- ☆ Calculate the product of a given number closest to a specified number, e.g. calculate the product of 34 closest to 241.

Reasoning

- ☆ Solve linear equations that involve one operation with whole and decimal numbers.

Daily practice

Grade 23

- ☆ Practise using knowledge of addition and subtraction to calculate with decimals
- ☆ Practise multiplication and division facts from the times tables (up to 12)
- ☆ Practise subtracting near multiples of 1000 and from £5.00 and £10.00
- ☆ Practise multiplying by 25
- ☆ Use knowledge to multiply and divide pairs of multiples of 10 and 100 and decimals
- ☆ Convert between percentages, vulgar fractions and decimal fractions, g and kg, km and m, mm and cm, cm and m, mm and m and ℓ and ml
- ☆ Round numbers to one or two decimal places
- ☆ Find a fraction or percentage of a number
- ☆ Calculate angles in a triangle
- ☆ Naming quadrilaterals, polygons and triangles
- ☆ Write a number as a product of its prime factors
- ☆ Work out the end time when given a start time and a duration
- ☆ Chant times tables
- ☆ Solve puzzles
- ☆ Calculate diameter, circumference and area of a circle using the formulae and their conversions
- ☆ Calculate an exterior and interior angle of a regular hexagon
- ☆ Calculate perimeter using yards and metres and area of a rectangle using yards² and m²
- ☆ Solve linear equations with whole numbers and one operation
- ☆ Calculate unknowns given information using less than/more than or equals to symbols
- ☆ Calculate the volume of a cuboid
- ☆ Calculate the third interior angle in a triangle
- ☆ Solve further linear equations with whole numbers and one operation
- ☆ Complete the questions on the 'I can' pages in Progress Book 6C
- ☆ Discuss achievements in Progress Book 6C and fill in the chart

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Resources

Other

- ☆ Lined, plain and $\frac{1}{2}$ cm-squared exercise books, calculators, metre ruler, playground chalk, trundle wheels, reel tape measures, flipchart (optional), camera (optional), cuboids, cylinders, a variety of cuboidal cartons

Cross-curricular links

PSHCE

- ☆ Data and Measure: children use 'WifN' to capture the idea of disciplined exploration; they have to discuss word problems, listen to each other and agree upon ways to solve investigations
- ☆ Progress Books 'I can' pages: practise turn-taking and listening skills when discussing achievements in Progress Books

Key vocabulary

$d = 2r$ • $C = \pi d$ • $A = \pi r^2$ • $A = \frac{1}{2}bh$ • $V = lbh$ • $V = \pi r^2h$ • yards • metres • perimeter • area
surface area • WifN • investigation • inequalities • linear equations

Maths Makes Sense 6 Block 6

End-of-block objectives

Arithmetic 1

- ☆ Write a vulgar fraction as a decimal fraction to three decimal places, using a calculator for division, e.g. $\frac{7}{11} = .636$
- ☆ Convert decimal fractions to vulgar fractions using tenths, hundredths and thousandths, e.g. $.625 = \frac{625}{1000}$
- ☆ Write recurring infinite decimals as abbreviations using the conventional notation of 'dots' above one or two digits, e.g. write $.833\ 333\ 333\dots$ as $.8\dot{3}$.

Geometry

- ☆ Draw the perpendicular bisector of a line segment
- ☆ Draw the bisector of an angle
- ☆ Draw the circum-circle of a triangle
- ☆ Draw the in-circle of a triangle.

Data and Measure

- ☆ Understand the 'golden ratio', ϕ (phi), is a constant with an approximate value of 1.618
- ☆ Calculate ratios, and use ratios to calculate lengths and construct shapes
- ☆ Plan and develop lines of enquiry to research a topic, interpret and evaluate findings
- ☆ Collect, organise, select and present information using appropriate methods, including the use of ICT
- ☆ Work effectively in a group.

Arithmetic 2

- ☆ Solve number puzzles involving algebraic terms, use flow diagrams to identify inverse operations
- ☆ Recognise algebraic representations of odd and even numbers
- ☆ Identify two factors of a number, including numbers represented algebraically, and divide by each factor, e.g. for $3k$, $3k \div 3 = k$ and $3k \div k = 3$.

Reasoning

- ☆ Express vulgar fractions as percentages.

Daily practice

Grade 24

- ☆ Practise using knowledge of addition and subtraction of 2-digit numbers to calculate with decimals
- ☆ Practise multiplication and division facts from times tables (up to 12)
- ☆ Practise multiplying by 25
- ☆ Practise subtracting near multiples of 1000 and from £5.00 and £10.00
- ☆ Use knowledge to multiply and divide pairs of multiples of 10 and 100 and decimals
- ☆ Convert between percentages, vulgar fractions and decimal fractions, km and m, m and cm, mm and m, kg and g, ml and ℓ
- ☆ Round numbers to one, two or three decimal places
- ☆ Find a fraction or percentage of a number
- ☆ Name quadrilaterals, polygons and triangles
- ☆ Calculate the angles in a triangle
- ☆ Write a number as a product of its prime factors
- ☆ Work out the end time when given a start time and a duration
- ☆ Chant times tables
- ☆ Solve puzzles and comment on Maths Stories
* * * * *
- ☆ Use a calculator for division to convert vulgar fractions to decimal fractions, use the notation for recurring decimals
- ☆ Use a pair of compasses to construct the perpendicular bisector of a line segment
- ☆ Measure the rectangles to find which is closest to a golden rectangle
- ☆ Divide an algebraic or arithmetic product by a factor
- ☆ Convert vulgar fractions to percentages
- ☆ Find vulgar fractions and decimal fraction equivalents
- ☆ Use compasses to construct the circum-circle of a triangle
- ☆ Convert vulgar fractions to percentages
- ☆ Complete the questions on the 'I can' pages in Progress Book 6C
- ☆ Discuss achievements in Progress Book 6C and fill in the chart

Resources

Maths Makes Sense Toolkit

- ☆ Ratio sticks

Other

- ☆ Lined, plain and $\frac{1}{2}$ cm-squared exercise books, calculators, board compasses, large ruler, compasses, rulers, set squares, protractors, felt-tip pens, paper, tape measures, metre sticks, reel tape measures, trundle wheels, access to computers and printers, selection of paper, cardboard containers, glue, sticky tape, access to IWB or screen, stop clock (optional), rewards (optional)

Cross-curricular links

Art, History, D&T, Science, ICT

- ☆ Data and Measure: group work revolving around an investigation into the 'golden ratio' and instances where it can be found in the world around children; use the ratio in the design of a building or piece of artwork

PSHCE

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

Key vocabulary

infinite decimal • recurring decimal • perpendicular bisector • bisector • circum-circle • in-circle • 'golden ratio' • phi (φ) • flow diagram