Year 6

National curriculum

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

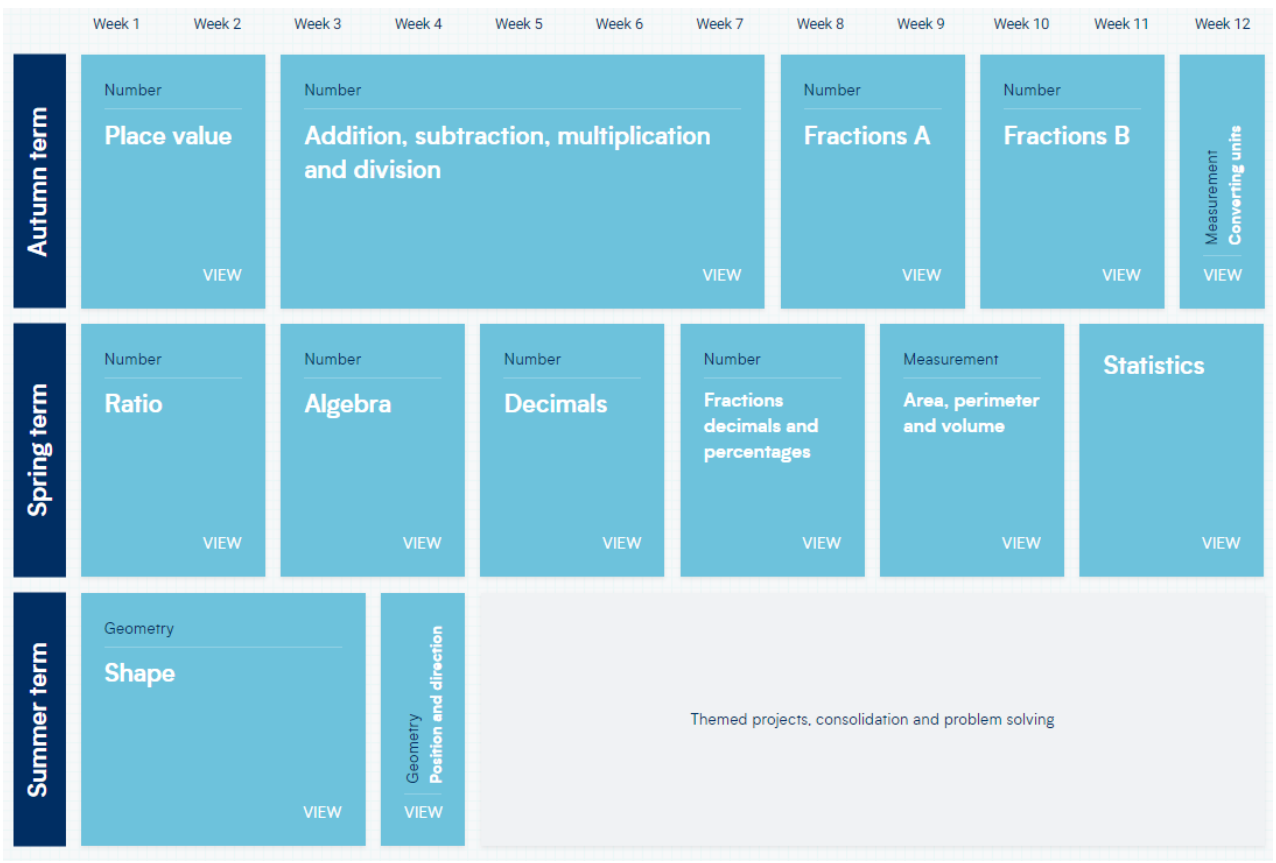
Links

https://www.ncetm.org.uk/classroom-resources/cp-year-6-curriculum-map/

https://whiterosemaths.com/resources?year=year-6-new

https://www.activelearnprimary.co.uk/app/plans/powermaths2023/year/1101168

Long term overview



Year 6 – Autumn

Place value (2 weeks)

National Curriculum	Small steps	Vocabulary
• Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit • Round any whole number to a required degree of accuracy • Use negative numbers in context, and calculate intervals across zero • Solve number and practical problems that involve all of the above	1. Numbers to 1,000,000 2. Numbers to 10,000,000 3. Read and write numbers to 10,000,000 4. Powers of 10 5. Number line to 10,000,000 6. Compare and order any integers 7. Round any integer 8. Negative numbers	Numeral Digit Integer Negative Ones Tens Hundreds Thousands Ten thousand Hundred thousand Million Three-digit Four-digit Five-digit Six-digit Equal to Equivalent to More, less Most, least Larger/bigger/greater Most, biggest, greatest Fewer, smaller, less Fewest, smallest, least Above/below Half-way between Ascending/descending Round, nearest, round to the nearest… Round up/round down

Ready to progress criteria

6NPV – 2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.

6NPV – 3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.

Progression

Y5

- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Read Roman numerals to 1,000 and recognise years written in Roman numerals
- Interpret negative numbers in context
- Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000
- Solve number problems and practical problems that involve all of the above

Year 6 – Autumn

Addition, subtraction, multiplication and division (5 weeks)

National Curriculum	Small steps	Vocabulary
• Perform mental calculations, including with mixed operations and large numbers • Use their knowledge of the order of operations to carry out calculations involving the four operations • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Identify common factors, common multiples and prime numbers • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • Perform mental calculations, including with mixed operations and large numbers • Solve problems involving addition, subtraction, multiplication and division	1. Add and subtract integers 2. Common factors 3. Common multiples 4. Rules of divisibility 5. Primes to 100 6. Square and cube numbers 7. Multiply up to a 4-digit number by a 2-digit number 8. Solve problems with multiplication 9. Short division 10. Diving using fractions 11. Introduction to long division 12. Long division with remainders 13. Solve problems with division 14. Solve multi-step problems 15. Order of operations 16. Mental calculations and estimation 17. Reason with known facts	Addend + addend = sum/total Add, plus, more, make, altogether Subtract, take away Minuend – subtrahend = difference Expression Equation Commutative Multiple Factor Prime factor Product Prime number Composite number Square number Cube number Prime number Factor x factor=product dividend ÷ divisor = quotient

Ready to progress criteria

6AS/MD – 1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).

6AS/MD – 2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.

Progression

Y5

- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- Add and subtract numbers mentally with increasingly large numbers
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why
- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- Know and use the vocabulary of prime numbers, prime factors and composite numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Recognise and us square numbers and cube numbers, and the notation for them.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- Multiply and divide numbers mentally drawing upon known facts
- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.

Year 6 – Autumn

Fractions A (2 weeks)

National Curriculum	Small steps	Vocabulary
• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination • Compare and order fractions, including fractions greater than 1. • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	1. Equivalent fractions and simplifying 2. Equivalent fractions on a number line 3. Compare and order (denominator) 4. Compare and order (numerator) 5. Add and subtract simple fractions 6. Add and subtract any two fractions 7. Add mixed numbers 8. Subtract mixed numbers 9. Multi-step problems	Numerator Denominator Equivalent Simplify Improper fraction Mixed number Proper fraction Convert Equivalent fraction Common denominator Integer Non-unit fractions Unit fractions

Ready to progress criteria

6F – 1 Recognise when fractions can be simplified, and use common factors to simplify fractions.
6F – 2 Express fractions in a common denomination and use this to compare fractions that are similar in value.
6F – 3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.

Progression

Y5

- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements greater than 1 as a mixed number
- Compare and order fractions whose denominators are all multiples of the same number
- Add and subtract fractions with the same denominator and denominators that are multiples of the same number
- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

Year 6 – Autumn

Fractions B (2 weeks)

National Curriculum	Small steps	Vocabulary
• multiply simple pairs of proper fractions, writing the answer in its simplest form • Divide proper fractions by whole numbers	1. Multiply fractions by integers 2. Multiply fractions by fractions 3. Divide a fraction by an integer 4. Divide any fraction by an integer 5. Mixed questions with fraction 6. Fraction of an amount 7. Fraction of an amount – find the whole	Numerator Denominator Equivalent Simplify Improper fraction Mixed number Proper fraction Convert Equivalent fraction Common denominator Integer Non-unit fractions Unit fractions

Ready to progress criteria

6F – 1 Recognise when fractions can be simplified, and use common factors to simplify fractions.
6F – 2 Express fractions in a common denomination and use this to compare fractions that are similar in value.
6F – 3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.

Progression

Y5

Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

Year 6 – Autumn

Converting units (1 week)

National Curriculum	Small steps	Vocabulary
• Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • Use, read, write, and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation up to three decimal places • Use all four operations to solve problems involving measure using decimal notation, including scaling	1. Metric measures 2. Convert metric measures 3. Calculate with metric measures 4. Miles and kilometres 5. Imperial measures	Metric Imperial Length Mass Volume Capacity Distance Millimetres, centimetres, metres, kilometres Grams, kilograms Millilitres, litres Inches, feet, yards, miles Ounces, pounds, pints, gallons

Ready to progress criteria

6NPV – 1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).

Progression

Y5

- Convert between different units of metric measure
- Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- use all four operations to solve problems involving measure using decimal notation, including scaling
- Solve problems involving converting between units of time

Year 6 – Spring

Ratio (2 weeks)

National Curriculum	Small steps	Vocabulary
• Solve problems involving similar shapes where the scale factor is known or can be found • Solve problems involving unequal grouping using knowledge of fractions and multiples	1. Add or multiply? 2. Use ratio language 3. Introduction to the ratio symbol 4. Ratio and fractions 5. Scale drawing 6. Use scale factors 7. Similar shapes 8. Ratio problems 9. Proportion problems 10. recipes	Ratio Proportion Part, whole, total For every… there are…. Group Fraction Unequal, equal Simplest form, simplify Enlarge, enlargement Scale, map scale, scale factor

Ready to progress criteria

6AS/MD – 3 Solve problems involving ratio relationships.

Progression

Y5 - None

Year 6 – Spring

Algebra (2 weeks)

National Curriculum	Small steps	Vocabulary
• Use simple formulae • Generate and describe linear number sequences • Express missing number problems algebraically • Find pairs of numbers that satisfy an equation with two unknowns • Enumerate possibilities of combinations of two variables	1. 1-step function machines 2. 2-step function machines 3. Form expressions 4. Substitution 5. Formulae 6. Form equations 7. Solve 1-step equations 8. Solve 2-step equations 9. Find pairs of values 10. Solve problems with two unknowns	Pattern Sequence Rule Term Expression Formula, formulae Substitute Generalise Operation Calculation Equation Inverse Solution Represent Value

Ready to progress criteria

6AS/MD – 4 Solve problems with 2 unknowns.

Progression

Y5 - None

Year 6 – Spring

Decimals (2 weeks)

National Curriculum	Small steps	Vocabulary
• Identify the value of each digit in numbers given to three decimal places • Multiply and divide numbers by 10, 100 and 1,000 giving answers up to three decimal places • Multiply one-digit numbers with up to two decimal places by whole numbers • Solve problems which require the answers to be rounded to specified degrees of accuracy	1. Place value within 1 2. Place value – integers and decimals 3. Round decimals 4. Add and subtract decimals 5. Multiply by 10, 100 and 1,000 6. Divide by 10, 100 and 1,000 7. Multiply decimals by integers 8. Divide decimals by integers 9. Multiply and divide decimals in context	Decimal Integer Decimal place Tenths Hundredths Thousandths Decimal point

Ready to progress criteria

6NPV – 1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).

6NPV – 2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.

Progression

Y5

- Read and write decimal numbers as fractions
- Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- Round decimals with two decimal places to the nearest whole number and to one decimal place
- Read, write, order and compare numbers with up to three decimal places
- Solve problems involving number up to three decimal places
- Recognise the % symbol and understand that percent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25

Year 6 – Spring

Fractions, decimals and percentages (2 weeks)

National Curriculum	Small steps	Vocabulary
• Associate a fraction with division and calculate decimal fraction equivalents • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • Solve problems involving the calculation of percentages and the use of percentages for comparison	1. Decimal and fraction equivalents 2. Fractions as division 3. Understand percentages 4. Fractions as percentages 5. Equivalent fractions, decimals and percentages 6. Oder fractions, decimals and percentages 7. Percentage of an amount – one step 8. Percentage of an amount – multi-step 9. Percentages – missing values	Equivalent Fraction Decimal Percentage Percent Parts, whole

Ready to progress criteria

Progression

Y5

- Read and write decimal numbers as fractions
- Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- Round decimals with two decimal places to the nearest whole number and to one decimal place
- Read, write, order and compare numbers with up to three decimal places
- Solve problems involving number up to three decimal places
- Recognise the % symbol and understand that percent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25

Year 6 – Spring

Area, perimeter and volume (2 weeks)

National Curriculum	Small steps	Vocabulary
• Recognise that shapes with the same areas can have different perimeters and vice versa • Recognise when it is possible to use formulae for area and volume of shapes • Calculate, estimate and compare volumes of cubes and cuboids using standard units.	1. Shapes – same area 2. Area and perimeter 3. Area of a triangle – counting squares 4. Area of a right-angled triangle 5. Area of any triangle 6. Area of a parallelogram 7. Volume – counting cubes 8. Volume of a cuboid	Perimeter, distance, area, volume Cubic centimetres, cubic metres

Ready to progress criteria

6G – 1 Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.

Progression

Y5

- Measure and calculate the perimeter of composite rectilinear shapes in cm and m
- Calculate and compare the area of rectangles, and including using standard units, square centimetres and square metres and estimate the area of irregular shapes

Year 6 – Spring
Statistics

National Curriculum	Small steps	Vocabulary
• Interpret and construct pie charts and line graphs and use these to solve problems • Calculate and interpret the mean as an average	1. Line graphs 2. Dual bar charts 3. Read and interpret pie charts 4. Pie charts with percentages 5. Draw pie charts 6. The mean	Graph Line graph Table Dual line graph Horizontal Vertical Two-way table Scale Axis Plot/plotted Tallies/tally Pie chart Mean

Ready to progress criteria

Progression

Y5
- Complete, read and interpret information in tables, including timetables
- Solve comparison, sum and difference problems using information presented in a line graph

Year 6 – Summer

Shape (3 weeks)

National Curriculum	Small steps	Vocabulary
• Draw 2-D shapes using given dimensions and angles • Compare and classify geometric shapes based on their properties and sizes • Illustrate the name and parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • Recognise, describe and build simple 3-D shapes, including making nets • Find unknown angles in any triangles, quadrilaterals, and regular polygons • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles	1. Measure and classify angles 2. Calculate angles 3. Vertically opposite angles 4. Angles in a triangle 5. Angles in a triangle – special cases 6. Angles in a triangle – missing angles 7. Angles in quadrilaterals 8. Angles in polygons 9. Circles 10. Draw shapes accurately 11. Nets of 3-D shapes	Polygon Regular Irregular Parallel Perpendicular Quadrilateral Top view Plan view Side view Circumference, diameter, radius Angle Whole turn Right angle Acute Obtuse Reflex Degrees Interior angle Intersecting Clockwise Anticlockwise orientation

Ready to progress criteria

6G – 1 Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.

Progression

Y5

- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles
- Use the properties of rectangles to deduce related facts and find missing lengths and angles
- Identify 3-D shapes, including cubes and other cuboids, from 2-D representations
- Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- Draw given angles, and measure them in degrees
- Identify angles at a point and one whole turn; angles at a point on a straight line and ½ a turn; other multiples of 90 degrees

Year 6 – Summer

Position and direction (1 week)

National Curriculum	Small steps	Vocabulary
• Describe positions on the full coordinate grid (all four quadrants) • Draw and translate simple shapes on the coordinate plane , and reflect them in the axes	1. The first quadrant 2. Read and plot points in four quadrants 3. Solve problems with coordinates 4. Translations 5. Reflections	Reflection Translation Vertex Vertices Coordinates Quadrants Mirror line Horizontal/vertical axis Coordinate plane

Ready to progress criteria

Progression

Y5

Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed