

2014 MATHEMATICS CURRICULUM - Year 5

Number - Number and place value

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000
- Solve number problems and practical problems that involve all of the above
- Read Roman numerals to 1000 (M) and recognise years written in Roman numerals
- Use number in context, including measurement.
- Apply their understanding of the number system to decimal numbers and fractions
- Recognise and describe linear number sequences eg. 3, 3 1/2, 4, 4 1/2 involving fractions and decimals, and find the term-to-term rule in words (eg. add 1/2)

Number - Addition and subtraction

- 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
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Practise mental calculations with increasingly large numbers eg. 12,462 - 2,300

Number - Fractions (including decimals and percentages)

- Compare and order fractions whose denominators are all multiples of the same number
- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- Recognise mixed fractions and improper fractions and convert from one to the other and write mathematical statements > 1 as a mixed number (eg. $2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$)
- 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
- Read and write decimal numbers as fractions eg. $0.71 = 71/100$
- Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents and measures
- 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 per cent symbol (%) and understand that per cent relates to 'number of parts of a hundred', and write percentages as a fraction with denominator 100, and as a decimal
- Solve problems which require knowing percentage and decimal equivalents of $1/2$, $1/4$, $1/5$, $2/5$, $4/5$ and those fractions with a denominator of a multiple of 10 or 25
- Know that percentages, decimals and fractions are different ways of expressing proportions
- Connect equivalent fractions > 1 that simplify to integers with division and other fractions > 1 to division with remainders, using the number line and other models, and move from these to improper and mixed fractions
- Connect multiplication by a fraction to using fractions as operators (fractions of), and to division relating to scaling by simple fractions, including fractions > 1
- Add and subtract fractions through increasingly complex problems that exceed 1 as a mixed number
- Count forwards and backwards in simple fractions

Number - Multiplication and division

- 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 (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- 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
- Multiply and divide numbers mentally drawing upon known facts
- 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 whole numbers and those involving decimals by 10, 100 and 1000
- Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- Apply multiplication tables and related division facts frequently, commit to memory and use them confidently to make larger calculations
- Use and understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (eg. $4 \times 35 = 2 \times 2 \times 35$; $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$)
- Interpret non-integer answers to division by expressing results in different ways, including with remainders, as fractions, as decimals or by rounding (eg. $98 \div 4 = 98/4 = 24 \text{ r}2 = 24 \frac{1}{2} = 24.5 = 25$)
- Use multiplication and division as inverses to support the introduction of ratio eg. by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of 1000 in converting between units such as kilometres and metres
- Express distributivity as $a(b + c) = ab + ac$
- Use and explain the equals sign to indicate equivalence, including in missing number problems (eg. $13 + 24 = 12 + 25$; $33 = 5 \times \square$)

Measurement

- Convert between different units of metric measure (eg. km and m; cm and mm; g and kg; l and ml)
- Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes
- Estimate volume (eg. using 1cm³ blocks to build cuboids (including cubes) and capacity (eg. using water)
- Solve problems involving converting between units of time
- Use all four operations to solve problems involving measure (eg. length, mass, volume, money) using decimal notation, including scaling
- Use their knowledge of place value and multiplication and division to convert between standard units
- Calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths
- Answer missing measure questions expressed algebraically eg. $4 + 2b = 20$ for a rectangle of sides 2cm and b cm and perimeter of 20cm
- Calculate the area from scale drawings using given measurements
- Use all four operations in problems involving time and money, including conversions (eg. days to weeks, expressing the answer as weeks and days)

- Develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities
- Count, using decimals and fractions including bridging zero, on a number line
- Mentally add and subtract tenths, and one-digit whole numbers and tenths
- Add and subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 eg. $0.83 + 0.17 = 1$
- Solve puzzles involving decimals
- Make connections between percentages, fractions and decimals (eg. 100% represents a whole quantity and 1% is $1/100$, 50% is $50/100$, 25% is $25/100$) and relate this to finding 'fractions of'.

Geometry - Properties of shapes

- 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 (total 360°)
 - angles at a point on a straight line and 1/2 a turn (total 180°)
 - other multiples of 90°
- Use the properties of rectangles to deduce related facts and find missing lengths and angles
- Distinguish between regular and irregular polygons based on reasoning about sides and angles
- Draw lines accurately with a ruler to the nearest mm, and measure with a protractor
- Use conventional markings for parallel lines and right angles
- Use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals eg. using dynamic geometry ICT tools
- Use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems

Geometry - Position and direction

- 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
- Recognise and use reflection and translation in a variety of diagrams, including to use a 2-D grid and coordinates in the first quadrant (Reflection should be in lines that are parallel to the axes)

Statistics

- Solve comparison, sum and difference problems using information presented in a line graph
- Complete, read and interpret information in tables, including timetables
- Connect their work on coordinates and scales to their interpretation of time graphs
- Begin to decide which representations of data are most appropriate and why