Year 8

1. Number: Integers and Decimals
- Multiply and divide numbers by 10, 100 and 1000
- Understand place value to three decimal places
- Read, write, compare and order integers (positive and negative) and decimals (up to 3dp)
- Round to the nearest whole number, ten, hundred, thousand
- Round to a given number of decimal places
- Estimate answers
- Check calculations using approximation and estimation
- Check calculations by applying inverse operations
- Written addition, subtraction, multiplication and division of positive and negative integers and decimals (with and without a calculator)
- Understand and use negative numbers in practical situations, e.g. temperature, debt

2. Number: Powers, Multiples, Factors and Primes
- Find square numbers, positive and negative square roots, cube numbers and cube roots
- Use index notation for squares, cubes and powers of 10
- Find the factors and multiples of a number
- Understand prime numbers
- Use prime factor decomposition to write any number as a product of its prime factors
- Find the highest common factor (HCF) and least (lowest) common multiple (LCM) of two numbers

3. Algebra: Algebraic Expressions
- Interpret simple expressions as function machines with inputs and outputs
- Simplify expressions by collecting like terms
- Multiply a constant over a bracket/expand brackets

4. Shape, Space and Measures: Angles and Shapes
- Understand the terms parallel, perpendicular, polygons and regular polygons
- Polygons with reflection and/or rotation symmetries
- Label the sides and angles of shapes using correct the mathematical notation
- Apply the angles facts: angles at a point, angles on a straight line, vertically opposite angles, etc.
- Understand and use alternate and corresponding angles on parallel lines
- Estimate, measure, draw and label angles up to 360 degrees

5. Shape, Space and Measures: 2D and 3D Shapes
- Label the parts of a circle: centre, radius, chord, diameter, circumference
- Apply the properties and definitions of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles
- Identify the faces, edges and vertices of 3D shapes, including cubes, cuboids, prisms, cylinders, pyramids, cones and spheres
- Tessellate 2D shapes
- Reflect 2-D shapes in a line

6. **Handling Data: Tabulation and Representation**
   - Sort, classify and tabulate qualitative (categorical) data and discrete or continuous quantitative data; including the use of 2 circle Venn diagrams to sort data
   - Design and use two-way tables for discrete and grouped data
   - Construct and interpret a wide range of graphs and diagrams including frequency tables and diagrams, pictograms, bar charts, pie charts, line graphs, frequency trees and flow charts

7. **Number: Fractions**
   - Understand and use equivalent fractions
   - Write a simple fraction as a terminating decimal
   - Calculate a fraction of a quantity
   - Express one quantity as a fraction of another
   - Add and subtract simple fractions by finding a common denominator
   - Solve problems involving fractions, including money
   - Use non-calculator methods to solve problems involving fractions

8. **Number: Percentages**
   - Understand that percentage means 'number of parts per 100'
   - Calculate a percentage of a quantity
   - Express one quantity as a percentage of another
   - Solve problems involving percentages, including money
   - Use non-calculator methods to solve problems involving percentages
   - Use equivalences between fractions, decimals and percentages in a variety of contexts

9. **Algebra: Equations**
   - Set up and solve linear equations in one unknown

10. **Shape, Space and Measures: Constructions**
    - Draw diagrams from written description
    - Draw and interpret 2D representations of 3D shapes, for example nets, plans and elevations

11. **Handling Data: Data Analysis**
    - Extract data from printed tables and lists
    - Find mean, median, mode and range for ungrouped data and understand their uses
      - understand, calculate and use mean and range
      - work out and use the median and mode

12. **Number: Ratio**
    - Use ratio notation, including reduction to its simplest form and its various links to fraction notation
    - Divide a quantity in a given ratio
    - Solve problems involving ratios

13. **Algebra: Formulae**
    - Write simple formulae and expressions from real life contexts
    - Substitute numbers into formulae (which may be expressed in words or algebraically) and expressions
    - Use standard formulae

14. Shape, Space and Measures: Perimeter, Area and Volume
- Solve problems involving length, area, volume/capacity, mass, time, and temperature
- Calculate areas of squares, rectangles and right-angled triangles and volumes of cubes and cuboids;
- Calculate perimeters of a range of shapes

15. Handling Data: Probability
- Understand and use the vocabulary of probability, including notions of uncertainty and risk
- Use the terms 'fair', 'random', 'evens', 'certain', 'likely', 'unlikely ' and 'impossible'
- Place events in order of likelihood.
- List all outcomes for single events, and for two successive events
- Apply systematic listing strategies
- Work out probabilities expressed as fractions or decimals from simple experiments with equally likely outcomes and simple combined events
- Understand and use the probability scale from 0 to 1

16. Number: Financial Capability
- Use correct decimal notation when working with money
- Calculate with money
- Make informed choices about personal budgeting and spending

17. Algebra: Sequences
- Recognise and use sequences of e.g. triangular, square and cube numbers
- Generate terms of a sequence using term-to-term or position-to-term rule
- Devise and use rules for generating sequences in words and/or symbolic form

18. Shape, Space and Measures: Transformations
- Describe and transform 2D shapes using reflections about the x and y axes
- Describe and transform 2D shapes using translations

19. Shape, Space and Measures: Units and scales
- Understand and use metric units of measurement
- Make sensible estimates of a range of measures
- Convert metric measurements from one unit to another
- Read and interpret timetables

20. Handling Data: Statistical Planning and Data Collection
- Understand the handling data cycle to solve problems
- Understand what is meant by a sample and a population
- Understand simple random sampling and the effect of sample size on the reliability of conclusions
- Design an experiment or survey to test hypotheses
- Design data-collection sheets, distinguishing between different types of data (discrete and continuous)
- Identify possible sources of bias