KS3 Mathematics Journey (Year 7)

Millthorpe School

Year 8

Statistics and Data
- Scatter graphs
- stem-and-leaf diagrams
- Draw and interpret pie charts
- Bar charts
- Frequency polygons
- Line graphs
- Pictograms
- Two way tables
- Tally charts
- Mean, median, mode and range
- Types of data
- Data Handling Cycle

Sequences and Graphs
- Recognise and sketch quadratic graphs
- Recognise and sketch linear graphs
- Coordinates in all 4 quadrants
- nth term of an arithmetic sequence
- Generate terms of a sequence
- Describe and continue sequences

Assessment

Percentages
- Simple and compound interest
- Reverse percentage change
- Percentage change
- Percentages as operators
- Percentage of amounts
- Compare quantities using percentages

Geometry
- Perimeter
- Area: rectangles, triangles, parallelograms
- Angles in polygons
- Angles in parallel lines
- Angle facts
- Use a protractor to measure and draw angles
- Derive and illustrate properties of triangles, quadrilaterals, and circles
- Describe, sketch and draw using conventional terms and notations

Fractional Thinking
- Mixed numbers and improper fractions
- Fractions ↔ Decimals
- Multiples
- + - x ÷
- Fractions of amounts
- Represent fractions on a number line and in diagrams
- Equivalent fractions
- Simplify fractions
- Compare fractions

Introduction to Algebra
- Solve equations with one variable
- Algebraic manipulation
- Substitution
- Collect like terms
- Form expressions from situations described in words
- List and interpret algebraic notation
- Understand the difference between an expression, equation, formula, term, function and identity

Directed Number
- Four operations
- Ordering directed numbers

3+(-2) = 1

Year 7

- Number
- Algebra
- Ratio and proportion
- Statistics/Probability
- Geometry & measure

- Write and order numbers up to 10 million
- Use negative numbers in context
- Round any whole number to a required degree of accuracy
- Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000
- 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
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Divide up to 4 digit numbers by up to 2 digit numbers and interpret remainders as whole number remainders or fractions

- Use equivalence to order, add and subtract fractions
- Multiply proper fractions and mixed numbers by whole numbers
- Divide a proper fraction by a whole number
- Identify the value of the digits up to 3 decimal places
- Multiply 1 digit numbers with up to 2 decimal places by whole numbers
- Solve problems involving decimals up to 3 decimal places
- Use written division in cases where the answer has up to 2 decimal places
- solve problems involving the calculation of percentages
- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- Convert between metric units
- Appreciate that shapes can have the same area but different perimeters
- Calculate volume of cubes and cuboids
- Calculate area and perimeter of shapes including parallelograms, triangles and rectangles.
- Compare and classify geometric shapes based on their properties and sizes and 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

KS3 Mathematics Journey (Year 8 & 9)

Millthorpe School

GCSE

Year 9

- Pythagoras & Trigonometry
  - Trigonometric ratios
  - Congruence & similarity
  - Exact values
  - Pythagoras' Theorem
- Probability
  - Sample spaces
  - Venn diagrams
  - Probabilities sum to 1
  - Experimental probability
  - Probability scale
- Assessment

Year 8

- Transformations
  - Combinations of all transformations
  - Reflections
  - Rotations
  - Translations
- Algebra and Graphs
  - Calculate and interpret gradients
  - Coordinates in 4 quadrants
  - Solve Inequalities
  - Inequalities on a number line
  - Produce, recognise and sketch linear graphs
  - Rearrange formulae
- Algebra
  - Solve equations (unknowns on both sides, with brackets, with fractions)
  - Expand double brackets
  - Factorise in to single brackets
  - Expand single brackets
  - Laws of indices
  - Multiply algebraic terms
- Constructions
  - Loci introduction
  - Perpendicular bisector
  - Angle bisector
- Rates of change, Ratio, Proportion & rate
  - Exchange rates
  - Best buys
  - Direct and indirect proportion
  - Compound units (speed, density and pressure)
- Geometry
  - Simplify ratios
  - Divide in a given ratio
  - Area of composite shapes, trapeziums and circles
  - Perimeter of composite shapes, and trapeziums
  - Surface area and volume
  - Plans and elevations
  - Circumference of circles
  - Change freely between related standard units

Number
Algebra
Ratio and proportion
Statistics/Probability
Geometry & measure

- order positive and negative integers, decimals and fractions; using number lines an inequality
- Understand and use prime numbers, highest common factor, lowest common multiple, prime factorisation.
- ×,÷, +, – integers, decimals, fractions, all both positive and negative
- use conventional notation for the priority of operations.
- work interchangeably with terminating decimals and their corresponding fractions
- Calculate percentages of amounts
- interpret fractions and percentages as operators
- use standard units of mass, length, time, money and other measures
- round numbers and measures (dp and sf)

- express one quantity as a fraction of another
- solve problems involving percentage change, including: increase, decrease and original value problems and simple interest in financial mathematics

- use and interpret algebraic notation
- substitute numerical values into formulae and expressions
- understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- Simplify algebraic expressions by collecting like terms
- Solve linear equations
- Recognise a quadratic graph
- generate terms of a sequence from either a term-to-term or a position-to-term rule
- recognise arithmetic sequences and find the *n*th term

- calculate and solve problems involving: perimeter and area of triangles, and parallelograms
- draw and measure line segments and angles in geometric figures, including interpreting scale drawings
- describe, sketch and draw using conventional terms and notations
- derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures using appropriate language
- apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles
- alternate and corresponding angles
- derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons

- discrete, continuous and grouped data
- mean, mode, median, range, consideration of outliers)
- frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data