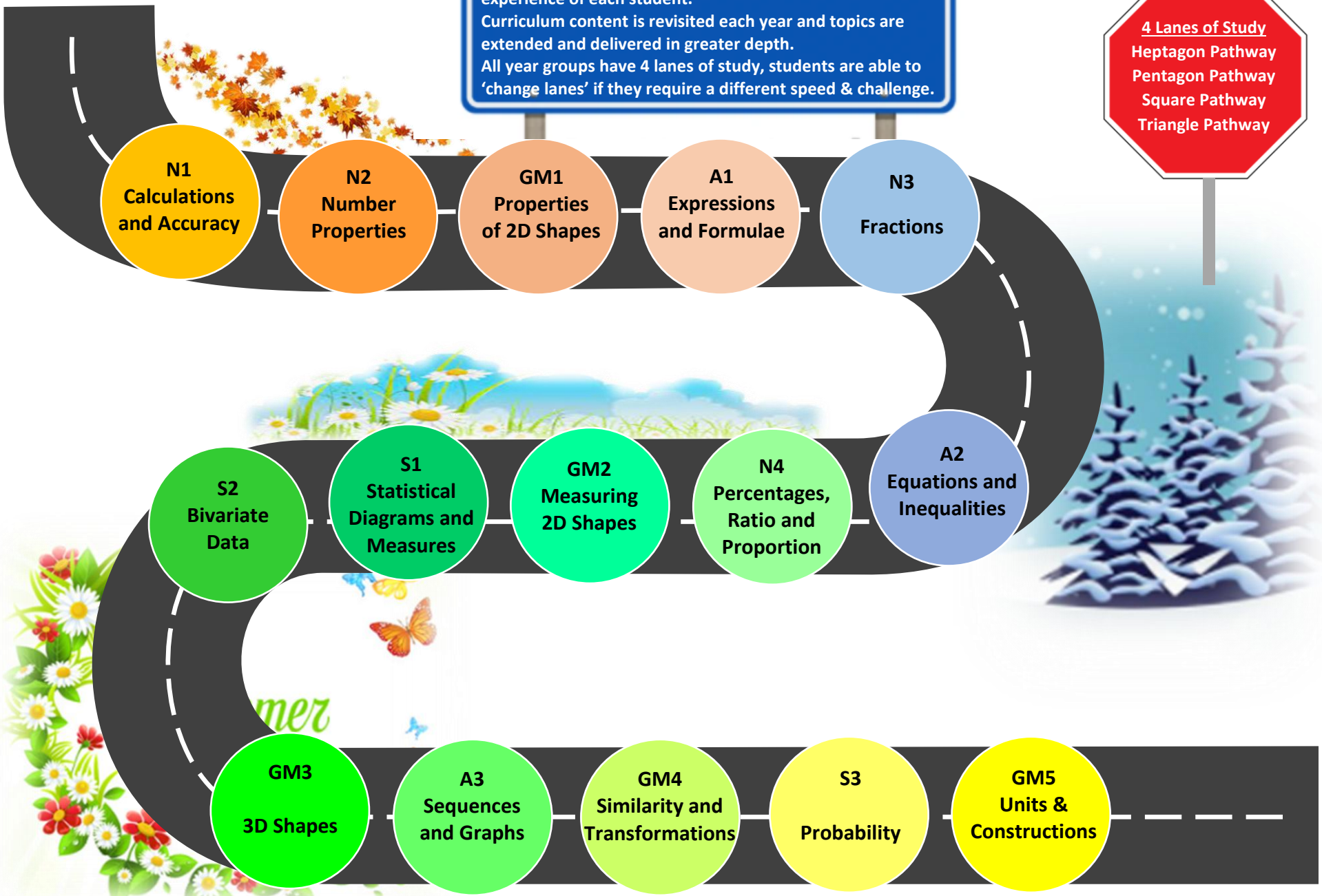
Mathematics Curriculum Journey

REDHILL ACADEMY TRUST

The Mathematics curriculum is separated into broad topic areas, taught throughout the year.
Each year, the journey remains the same, however the route taken will differ according to the age, attainment and experience of each student.
Curriculum content is revisited each year and topics are extended and delivered in greater depth.
All year groups have 4 lanes of study, students are able to 'change lanes' if they require a different speed & challenge.

4 Lanes of Study
Heptagon Pathway
Pentagon Pathway
Square Pathway
Triangle Pathway



Mathematics
Curriculum Journey - Outline of Key Topics

REDHILL ACADEMY TRUST

N1
- Work with whole numbers and decimals
- Round and Estimate answers
- Use Upper and lower bounds
- Calculate with negative numbers
- Know and apply the Priority of Operations

N2
- Identifying properties of numbers
- Working with Primes
- Calculation of powers and roots
- Laws of Indices
- Manipulating Surds
- Use standard form

GM1
- Identify properties of polygons
- Recognise symmetry in shapes
- Know and use basic angle facts
- Learn properties of angles with parallel lines
- Calculate Interior and exterior angles of polygons.

A1
- Use correct algebraic terminology
- Simplify expressions
- Substitute into algebraic formulae
- Rearrange formulae
- Expand and factorise
- Manipulate quadratic functions

N3
- Understand equivalent fractions
- Add, subtract, multiply and divide fractions and mixed numbers
- Calculate fractions of a quantity
- Convert between fractions, decimals and percentages

A2
- Solve simple equations
- Solve inequalities
- Solve equations with brackets, fractions and unknowns on both sides
- Solve simultaneous equations
- Represent inequalities on a number line

N4
- Find percentages of a quantity
- Calculate percentage increase or decrease
- Identify equivalent ratios
- Divide a quantity into a ratio
- Solve ratio and proportion problems
- Work with direct and inverse proportion

GM2
- Find the perimeter of 2D shapes
- Know and apply area formulae
- Calculate area and circumference of circles
- Find the area of composite shapes
- Apply Pythagoras' Theorem
- Use trigonometry

S1
- Understand the difference between a population and sample
- Find mean, median, mean and range of different types of data
- Interpret and represent data using a variety of statistical diagrams

S2
- Plot and interpret scatter diagrams
- Identify types of correlation
- Explain relationship between two variables
- Identify trends in data over time

GM3
- Recognise and identify properties of 3D Shapes
- Draw accurate 2D representations of 3D shapes
- Calculate volume and surface area of solids
- Find volumes of cones and spheres

A3
- Identify patterns in sequences
- Generate terms of a sequence
- Recognise special number sequences
- Work with coordinates in all four quadrants
- Plot graphs of linear and quadratic functions
- Identify gradient and intercept of a straight line

GM4
- Understand and use vector notation
- Perform transformations – reflect, rotate, translate and enlarge shapes
- Describe transformations
- Identify similar shapes

S3
- Use the language of probability
- Understand and use the probability scale
- Calculate probabilities
- Construct Venn diagrams
- Identify outcomes of events
- Use probability tree diagrams

GM5
- Use and convert standard units of measurement
- Construct and interpret graphs in real world situations
- Use scales in maps and plans
- Measure and draw bearings
- Use a ruler, compasses and a protractor accurately

KS3 Maths –Mapping Overview

Triangle Pathway

A student following a triangle pathway will study these curriculum goals throughout Y7, 8 & 9.

These are extracts from the Scheme of Work and show the key content that is taught in each unit.
Each unit of study is not limited to these curriculum goals.

Students are able to 'change lanes' onto a different pathway if they require a different speed & challenge.

REDHILL ACADEMY TRUST

N1

Y7 - Understand place value. Round to nearest whole, 10, 100 & 1000.
Y8 - Calculate with integers. Round to nearest whole, 10, 100 & 1000.
Y9 - Perform calculations with integers & decimals, with and without a calculator. Begin to round to significant figures.

N2

Y7 - Identify odd, even and prime numbers. Recognise simple powers of 2, 5 and 10.
Y8 - Identify types of number including prime numbers. Recognise simple powers.
Y9 - Find HCF & LCM by listing. Write a number as a product of its prime factors. Calculate powers and roots.

GM1

Y7 - Classify triangles based on their properties. Identify types of angles
Y8 - Classify triangles and quadrilaterals using their properties. Know basic angle facts.
Y9 - Classify 2D shapes from their properties. Calculate interior and exterior angles of regular polygons.

A1

Y7 - Simplify simple expressions by collecting like terms.
Y8 - Collect like terms to simplify expressions. Substitute positive numbers into algebraic expressions.
Y9 - Work with algebraic expressions including those with a single bracket. Substitute into expressions with powers.

N3

Y7 - Simplify fractions. Find basic fractions of an amount.
Y8 - Order fractions. Add, subtract and multiply fractions.
Y9 - Convert between mixed numbers & improper fractions. Add, subtract, multiply & divide fractions.

S1

Y7 - Calculate the mode, median and range for a data set. Record information in a tally chart.
Y8 - Find the mean, median, mode and range for a set of data. Collect and represent data using charts and diagrams.
Y9 - Compare simple data sets using averages. Represent data using a variety of charts and diagrams.

GM2

Y7 - Calculate perimeter & area of rectangles.
Y8 - Calculate perimeter & area of rectangles, triangles & parallelograms.
Y9 - Calculate perimeter & area of 2D shapes including circles and composite shapes.

N4

Y7 - Calculate the percentage of an amount using a calculator. Begin to use ratio notation.
Y8 - Calculate the percentages of quantities. Split a quantity into a ratio.
Y9 - Calculate percentage increase & decrease of quantities using a calculator. Divide quantities into given ratios.

A2

Y7 - Understand and use function machines.
Y8 - Solve one and two step linear equations. Use <,≤ , ≥, > symbols appropriately.
Y9 - Solve one and two step linear equations, including those with brackets. Solve simple inequalities.

GM3

Y7 - Recognise and know the properties of the cube and cuboid. Calculate the volume of cuboids.
Y8 - Recognise properties of simple 3D shapes. Calculate surface area and volume of cubes & cuboids.
Y9 - Interpret plans & elevations. Solve problems involving volume and surface area of cubes, cuboids & triangular prisms.

A3

Y7 - Generate a sequence by spotting a pattern or using a term-to-term rule given in words. Plot and read co-ordinates.
Y8 - Generate a sequence by spotting a pattern or using a term-to-term rule. Name & plot graphs of horizontal & vertical lines.
Y9 - Understand the nth term of a sequence. Plot graphs of simple straight line functions. Identify the gradient and intercept of straight line graphs.

GM4

Y7

Translate, Rotate and Reflect simple shapes.

S3

Y8

Use the probability scale and language of probability.

List outcomes of events.

GM5

Y9

Perform calculations with time.

Use map scales and other scales to create accurate plans.

State the angles of compass directions.

KS3 Maths –Mapping Overview

Square Pathway

A student following a square pathway will study these curriculum goals throughout Y7, 8 & 9.

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REDHILL ACADEMY TRUST

N1

Y7 - Understand place value and calculate with integers. Round to nearest whole, 10, 100 & 1000.
Y8 - Calculate with integers & decimals. Round to decimal places.
Y9 - Perform complex calculations with negatives & decimals. Round to appropriate levels of accuracy.

N2

Y7 - Identify types of number. Recognise simple powers.
Y8 - Know types of number. Find HCF & LCM. Calculate powers and roots.
Y9 - Express a number as a product of its prime factors using power notation. Convert large & small numbers to and from standard form.

GM1

Y7 - Identify properties of simple 2D shapes. Know basic angle facts.
Y8 - Know properties of polygons. Find interior and exterior angles of polygons.
Y9 - Use geometrical reasoning with properties of polygons. Identify congruent triangles. Find angles on parallel lines.

A1

Y7 - Simplify expressions. Substitute with positive numbers.
Y8 - Form and simplify expressions including expanding brackets & factorising. Substitute into expressions with powers.
Y9 - Recognise a quadratic expression. Factorise and expand expressions. Formulate simple formulae and expressions from real-world contexts. Change the subject of a given formula.

N3

Y7 - Simplify and find equivalent fractions. Find a fractions of an amount.
Y8 - Convert between improper fractions & mixed numbers. Add, subtract, multiply & divide fractions.
Y9 - Add, subtract, multiply & divide mixed numbers. Convert between FDP.

S1

Y7 - Find the mean, median, mode and range for a set of data. Represent data through the use of tally charts & bar charts.
Y8 - Make comparisons about data using averages & range. Represent data through the use of pictograms, dual bar charts & line charts.
Y9 - Find the mean, mode and range from a frequency table. Recognise how graphs can be misleading.

GM2

Y7 - Calculate perimeter & area of rectangles & triangles.
Y8 - Calculate perimeter & area of 2D shapes including circles.
Y9 - Solve problems involving perimeter & area of 2D shapes, including circles & composite shapes. Use Pythagoras' Theorem to find missing sides in triangles.

N4

Y7 - Calculate the percentages of quantities. Simplify and find equivalent ratios.
Y8 - Calculate percentage increase & decrease of quantities. Divide quantities into given ratios. Use the unitary method to solve problems.
Y9 - Calculate percentage change between two amounts. Use percentage multipliers for calculations. Solve ratio problems.

A2

Y7 - Solve simple linear equations.
Y8 - Solve linear equations, including those with brackets. Solve simple inequalities.
Y9 - Solve linear equations and inequalities, including those with unknowns on both sides. Represent inequalities on a number line.

GM3

Y7 - Identify properties of simple 3D shapes. Calculate volume and surface area of cubes & cuboids.
Y8 - Know properties of 3D shapes. Interpret plans & elevations. Calculate volume and surface area of cubes, cuboids & triangular prisms.
Y9 - Construct plans & elevations. Calculate volume and surface area of cylinders. Find missing lengths when given volume.

A3

Y7 - Find missing terms in sequences from identifying the term-to-term rule. Identify & plot graphs of horizontal & vertical lines.
Y8 - Find the nth term of a linear sequence. Generate a sequence given the nth term. Plot graphs of straight line equations. Identify the gradient and intercept of straight line graphs.
Y9 - Find the nth term of an arithmetic sequence. Use the form y=mx+c to plot straight line graphs. Recognise & plot quadratic graphs.

GM4

Y7

Perform simple transformations and enlargements.

S3

Y8

Find the probability of events happening.

Use tables & grids to list outcomes of events.

GM5

Y9

Perform calculations with time.

Construct and interpret scale drawings.

State the bearings of compass directions.

Know and apply the speed, distance, time formula

KS3 Maths –Mapping Overview

Pentagon Pathway

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REDHILL ACADEMY TRUST

N1

Y7 - Calculate with integers & decimals. Round to decimal places.
Y8 - Perform complex calculations with negatives & decimals. Round to significant figures.
Y9 - Estimate, without a calculator, complex calculations including powers and decimals.

N2

Y7 - Know types of number. Find HCF & LCM. Calculate powers and roots.
Y8 - Use prime factors to find HCF & LCM. Calculate more complex powers & roots. Convert large & small numbers to and from standard form..
Y9 - Use prime factors to find HCF & LCM and express answers using correct power notation. Know and apply the laws of indices. Multiply & divide with numbers in standard form.

GM1

Y7 - Identify types of quadrilaterals and know properties of polygons. Find missing angles.
Y8 - Use geometrical reasoning with properties of polygons. Find angles on parallel lines.
Y9 - Give geometrical reasons to justify the properties of triangles and quadrilaterals. Begin to understand the formal proofs of congruent triangles. Know and use angles facts on parallel lines.

A1

Y7 - Form and simplify expressions including expanding brackets. Substitute into expressions with powers.
Y8 - Factorise and expand expressions. Substitute with positive & negative numbers. Change the subject of a given formula.
Y9 - Expand double brackets and factorise expressions. Change the subject of a given formula that include powers or fractions.

N3

Y7 - Convert between improper fractions & mixed numbers. Add, subtract & multiply fractions.
Y8 - Add, subtract, multiply & divide mixed numbers. Convert between FDP.
Y9 - Solve worded problems that rely on the use of calculating with mixed numbers. Convert a recurring decimal to an exact fraction.

S1

Y7 - Compare data using the mean, median, mode and range. Represent data through the use of pictograms & dual bar charts.
Y8 - Find the mean, mode and range from a frequency table. Represent data through the use of dual bar charts, pie charts and stem & leaf diagrams.
Y9 - Find the modal class and calculate estimates of mean, median & range from a frequency table. Represent data through the use of pie charts, stem & leaf diagrams and frequency polygons.

GM2

Y7 - Calculate perimeter & area of parallelograms & trapeziums.
Y8 - Solve problems involving perimeter & area of 2D shapes. Use Pythagoras' Theorem to find missing sides in triangles.
Y9 - Solve problems involving perimeter & area of 2D shapes, including composite shapes & those expressed algebraically. Find arc length and sector area. Use & apply Pythagoras' Theorem.

N4

Y7 - Calculate percentage increase & decrease of quantities. Divide quantities into given ratios.
Y8 - Calculate percentage change between two amounts. Begin to use percentage multipliers. Solve ratio problems.
Y9 - Solve percentage problems in context including the use of multipliers. Solve ratio problems. Solve formal problems involving direct proportion.

A2

Y7 - Solve linear equations, including those with brackets.
Y8 - Solve linear equations and inequalities, including those with unknowns on both sides. Represent inequalities on a number line.
Y9 - Set up and solve linear equations for perimeter & angle problems. Solve inequalities and represent solutions on a number line. Solve simultaneous equations algebraically and graphically.

GM3

Y7 - Identify properties of 3D shapes. Calculate volume and surface area of cubes, cuboids & triangular prisms.
Y8 - Classify 3D shapes from their properties. Construct plans & elevations. Calculate volume and surface area of cylinders.
Y9 - Find the missing height or radius of a cylinder given the volume. Find the volume & surface area of pyramids, cones & spheres.

A3

Y7 - Generate a sequence given the term-to-term rule. Identify & plot graphs of simple straight line equations.
Y8 - Find the nth term of a linear sequence. Use the form y=mx+c to plot straight line graphs.
Y9 - Generate a quadratic sequence from the nth term. Use the form y=mx+c to plot straight line graphs and state gradients. Calculate the gradient of a line segment. Recognise & plot quadratic graphs.

GM4

Y7

Perform transformations and enlargements.

S3

Y8

Find the probability of events happening.

Use sample space diagrams & Venn diagrams.

GM5

Y9

Calculate bearings on diagrams using angle facts.

Construct and interpret scale drawings.

Know and apply the formulas for speed, distance, time and mass, density, volume.

KS3 Maths –Mapping Overview

Heptagon Pathway

A student following a heptagon pathway will study these curriculum goals throughout Y7, 8 & 9.

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REDHILL ACADEMY TRUST

N1

Y7 - Perform complex calculations with negatives & decimals. Round to significant figures.
Y8 - Find upper and lower bounds of previously rounded numbers.
Y9 - Apply and interpret limits of accuracy to solve problems.

N2

Y7 - Use prime factors to find HCF & LCM. Calculate more complex powers & roots.
Y8 - Use prime factors to find HCF & LCM and express answers using correct power notation. Know and apply the laws of indices. Multiply & divide with numbers in standard form.
Y9 - Know and apply the laws of indices with coefficients. Use surd notation to represent irrational numbers.

GM1

Y7 - Know and use properties of polygons. Find angles on parallel lines.
Y8 - Find interior and exterior angles of regular & irregular polygons. Know and use angles facts on parallel lines.
Y9 - Use the formal proofs to prove two triangles are congruent. Introduction to circle theorems.

A1

Y7 - Factorise and expand expressions. Substitute with positive & negative numbers.
Y8 - Factorise and expand simple quadratics. Change the subject of a given formula that include powers or fractions.
Y9 - Factorise, expand and solve quadratics. Change the subject of a given formula where the subject appears twice.

N3

Y7 - Add, subtract, multiply & divide mixed numbers. Convert between FDP.
Y8 - Solve worded problems that rely on the use of calculating with mixed numbers. Order and compare mixed numbers.
Y9 - Solve worded problems that rely on the use of calculating with mixed numbers. Convert between recurring decimals and fractions.

S1

Y7 - Find the mean, mode and range from a frequency table. Represent data through the use of dual bar charts & pie charts.
Y8 - Find the mean, mode and range from a grouped frequency table. Represent data through the use of pie charts, stem & leaf diagrams and frequency polygons.
Y9 - Construct and interpret box plots & cumulative frequency graphs. Compare data sets using averages.

GM2

Y7 - Calculate perimeter & area of 2D shapes including circles.
Y8 - Solve problems involving perimeter & area of 2D shapes, including those expressed algebraically. Use & apply Pythagoras' Theorem.
Y9 - Find arc length and sector area. Use & apply Pythagoras' Theorem in 2D & 3D. An introduction to Trigonometry.

N4

Y7 - Calculate percentage change between two amounts. Solve ratio problems.
Y8 - Use multipliers to calculate percentage change. Calculate interests in financial contexts. Solve ratio problems. Solve formal problems involving direct proportion.
Y9 - Calculate reverse percentages using both non-calculator and calculator methods. Solve ratio problems. Solve formal problems involving direct & inverse proportion.

A2

Y7 - Solve linear equations, including those with unknowns on both sides.
Y8 - Solve linear equations and inequalities, including those with unknowns on both sides. Represent inequalities on a number line. Solve simultaneous equations.
Y9 - Set up and solve linear equations for perimeter & angle problems. Represent linear inequalities on a graph and shade regions. Solve simultaneous equations algebraically and graphically.

GM3

Y7 - Classify 3D shapes from their properties. Find missing lengths given the volume of cubes & cuboids.
Y8 - Represent solids from plans and elevations, using isometric paper. Find the missing height or radius of a cylinder given the volume.
Y9 - Find the volume & surface area of composite 3D shapes, including those made from pyramids, cones & spheres. Use multiples of pi in exact calculations.

A3

Y7 - Find the nth term of a linear sequence. Identify gradients of straight line graphs.
Y8 - Recognise quadratic sequences. Use the form y=mx+c to plot straight line graphs. Calculate the gradient of a line segment.
Y9 - Find an nth term of a quadratic sequence. State the equation of straight lines that pass through points. Plot quadratic graphs & identify the roots.

GM4

Y7

Perform and describe transformations and enlargements.

Find missing lengths in similar shapes.

S3

Y8

Find the probability of events happening.

Construct Venn diagrams & tree diagrams to classify outcomes.

GM5

Y9

Solve bearing problems that involve sketching right angled triangles and using Pythagoras' Theorem.

Know and apply the formulas for speed, distance, time and mass, density, volume in context.

KS4 Maths –Mapping Overview

Triangle Pathway

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REDHILL ACADEMY TRUST

N1

Estimate or check the result of a calculation by rounding to one significant figure.

Apply the priority of operation to calculations.

N2

Write a number as a product of its prime factors, giving the answer in index notation.

Convert large and small numbers to and from standard form.

GM1

Given geometrical reasons to justify properties of 2D shapes.

Calculate interior and exterior angles of polygons.
Know and use the properties of angles with parallel lines.

A1

Rearrange formula to change the subject.

Form expressions & formulae from real world contexts.

Expand and simplify single brackets.
Factorise expression by taking out common factors.

N3

Add, subtract, multiply & divide mixed numbers.

Convert between FDP.

A2

Represent and read inequalities on a number line

Solve equations with unknowns on both sides.

N4

Calculate percentage increase, decrease and percentage change using decimal multipliers.

Write ratios in the form 1:n

Solve ratio problems.

Solve currency conversion problems.

GM2

Solve problems involving perimeter & area of 2D shapes, including circles & composite shapes.

Use Pythagoras' Theorem to find the length of a hypotenuse.

S1

Understand the difference between a population & a sample.

Know different sampling methods.

Recognise graphical misrepresentation through incorrect scales & labels.

S2

Plot and interpret scatter diagrams and draw a line of best fit.
Use correlation to describe data & identify outliers.

GM3

Find missing lengths of cubes & cuboids when given volume.

Calculate volume of cylinders.
Interpret & construct plans & elevations.

A3

Recognise Fibonacci sequences.

Understand that parallel lines have the same gradients and state gradients of parallel lines.

Recognise & sketch graphs of simple quadratic functions.

GM4

Perform transformations; translations, rotations using a centre of rotation, reflections in a given line, including y=x and y=-x.

Enlarge a shape given a centre of enlargement. Identify the scale factors of a given enlargement.

S3

Use probabilities to calculate outcomes in repeated experiments.

Use a Venn diagram to organise data and calculate probabilities.

Use sample space diagrams to record and calculate probabilities of combined events.

GM5

Use and convert between metric units.

Know approximate metric and imperial conversions.

Know and apply Speed = Distance ÷ Time

Use a protractor to measure and draw bearings.

KS4 Maths –Mapping Overview

Square Pathway

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REDHILL ACADEMY TRUST

N1

Estimate, without a calculator, complex calculations including powers and decimals.

N2

Use prime factors to find HCF & LCM and express answers using correct power notation. Know and apply the laws of indices. Multiply & divide with numbers in standard form.

GM1

Solve problems to find missing angles or the number of sides with regular polygons.

Know and use angle facts on parallel lines.

A1

Simplify basic algebraic products & quotients.

Rearrange formula to change the subject, including those with fractions or powers.

Use and apply kinematics formulae.

Expand and simplify double brackets.

N3

Solve worded problems that rely on the use of calculating with mixed numbers.

Convert between FDP.

A2

Set up and solve linear equations for real world problems. Solve inequalities and represent solutions on a number line.

Solve simultaneous equations algebraically.

N4

Calculate reverse percentages.

Calculate both simple and compound interest.

Solve ratio problems.

Solve simple worded problems involving quantities in both direct & indirect proportion.

GM2

Solve problems involving perimeter & area of 2D shapes, including composite shapes & those expressed algebraically.

Calculate exactly with multiples of pi.

Use Pythagoras' Theorem to solve problems in 2D.

S1

Find the modal class and calculate estimates of mean, median & range from a frequency table.

Understand what is meant by simple random sampling & bias in sampling.

Interpret & construct stem & leaf diagrams and compare the distributions of discrete data sets.

S2

Plot & interpret scatter diagrams. Identify outliers & the relationship between represented data.

Calculate moving averages.

Identify trends.

GM3

Find the missing height, radius or diameter of a cylinder given the volume.

Find the volume & surface area of pyramids, cones & spheres.

Use and compare standard units of measurement for volume and capacity.

A3

Find the nth term of an arithmetic sequence. Recognise simple geometric progressions.

Use the form y=mx+c to plot straight line graphs and state gradients & y-intercepts.

Calculate the gradient of a line segment.

Use a table of values to plot quadratic graphs.

GM4

Perform and describe transformations.

Identify scale factors in similar shapes and find missing lengths.

Understand and use scalar multiplication of vectors.

S3

Use relative frequency as an estimate of probability.

Use tree diagrams to record probabilities of successive events.

GM5

Know and apply Density = Mass ÷ Volume

Use a compass to construct perpendicular bisectors, angle bisectors & the locus of points.

KS4 Maths –Mapping Overview

Pentagon Pathway

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REDHILL ACADEMY TRUST

Content highlighted is that which is taugtht to those students hoping to progress onto the higher tier GCSE.

N1

Estimate, without a calculator, complex calculations including powers and decimals.

Find upper & lower bounds of previously rounded numbers.

N2

Know and apply the laws of indices with coefficients.

Perform the four operations with numbers in standard form.

GM1

Use the formal proofs to prove two triangles are congruent.

Know and use angles facts on parallel lines.

Find unknown angles through algebraic methods.

A1

Expand single brackets and factorise expressions.

Change the subject of a given formula that include powers or fractions.

Expand, factorise & solve quadratics.

N3

Solve worded problems that rely on the use of calculating with mixed numbers.

Convert between recurring decimals & fractions.

S2

Plot & interpret scatter diagrams.

Identify outliers & the relationship between represented data.

S1

Understand the terms: population, sample, random sampling and bias sampling.

Find missing values in a data set when averages are given.

Recognise graphical misrepresentations.

GM2

Solve problems involving perimeter & area of 2D shapes, including composite shapes & those expressed algebraically.

Find arc length & sector area.

Use & apply Pythagoras' Theorem & Trigonometry in right angle triangles.

N4

Calculate reverse percentages.

Calculate both simple & compound interests, including in financial contexts.

Solve ratio problems.

Solve direct & inverse proportion problems.

A2

Set up and solve linear equations for perimeter & angle problems.

Solve inequalities and represent solutions on a number line.

Solve simultaneous equations algebraically and graphically.

GM3

Recognise & know the properties of the cylinder, pyramid, cone & sphere.

State the 3D co-ordinates of solids represented on axes.

Calculate the surface area of a cylinder.

A3

Calculate the length of a line segment using Pythagoras.

Use the form y=mx+c to plot straight line graphs and find equations of lines that are parallel to one another.

Recognise & plot quadratic graphs. Use the roots and symmetry to find the turning point.

GM4

Perform & describe a sequence of transformations.

Understand and use scalar multiplication of vectors.

Find missing sides in similar shapes.

Enlarge shapes using fractional scale factors.

S3

Use relative frequency as an estimate of probability.

Construct tree diagrams & Venn diagrams and calculate probabilities.

GM5

Use a compass to construct perpendicular bisectors, angle bisectors & the locus of points.

Use distance time graphs to solve problems.

Calculate bearings on diagrams using angle facts & draw diagrams to scale using bearings.

KS4 Maths –Mapping Overview

Heptagon Pathway

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REDHILL ACADEMY TRUST

N1

Use inequality notation to write error intervals for numbers measured to an appropriate degree of accuracy.

Apply & interpret limits of accuracy to solve problems

N2

Calculate with negative & fractional indices.

Perform calculations with surds, including adding, multiplying, expanding brackets & rationalising the denominator.

Work out percentage calculations involving standard form.

GM1

Use the formal proofs to prove two triangles are congruent.

Find missing angles or number of sides in regular & irregular polygons.

Know & apply circle theorems to find missing angles.

A1

Simplify algebraic fractions.

Change the subject of a given formula, including where the subject appears twice.

Expand triple brackets.

Know & use the quadratic formula.

Calculate with the Kinematics formulas.

N3

Solve worded problems that rely on the use of calculating with mixed numbers.

Convert between recurring decimals & fractions.

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S2

Plot & interpret scatter diagrams.

Identify outliers & the relationship between represented data.

Calculate moving averages.

S1

Find missing values in a data set when averages are given.

Draw & interpret box plots and cumulative frequency.

Compare data sets using median & interquartile range.

Construct & interpret Histograms.

GM2

Find arc length & sector area.

Use & apply Pythagoras' Theorem & Trigonometry in right angle triangles, both in 2D & 3D.

Know exact values of sinΘ, cosΘ & tanΘ.

Know & apply the formulas for area of any triangle, sine rule & cosine rule.

N4

Calculate percentage problems, including non-routine problems and those in financial contexts.

Express exponential growth or decay as a formula and solve problems.

Solve ratio problems.

Solve direct & inverse proportion problems, including those with powers & roots.

A2

Solve linear equations which include the manipulation of algebraic fractions.

Solve simultaneous equations algebraically and graphically.

Find the intervals in which a solution lies using a sign change method.

Use iteration to find approximate solutions.

GM3

State the 3D co-ordinates of solids represented on axes.

Solve problems involving the volume or surface area of pyramids, cones & spheres.

Write expressions for the volume or surface area of cones & spheres.

Use algebra to solve percentage problems involving the volume of solids.

A3

Find the nth term of a quadratic sequence.

Find equations of lines that are parallel & perpendicular to one another.

Plot quadratic graphs & identify the intercepts & turning points.

Find inverse functions & composite functions.

Recognise & sketch the graphs of y=sinΘ, y=cosΘ & y=tanΘ

GM4

Perform & describe a sequence of transformations.

Use & calculate with vectors in geometric diagrams & proofs.

Understand and use the relationships between lengths, areas & volumes in similar shapes.

Enlarge shapes using fractional & negative scale factors.

S3

Construct tree diagrams & Venn diagrams and calculate probabilities.

Calculate conditional probabilities.

GM5

Use a compass to construct perpendicular bisectors, angle bisectors & the locus of points.

Solve complex problems involving density, mass, volume.

Solve bearing problems that involve sketching right angled triangles and using Pythagoras' Theorem or Trigonometry.