



CURRICULUM MAP FOR MATHEMATICS

YEAR 10 Crossover

HALF TERM 1: Number and Algebra

NP4-9: Powers, Roots and Primes, Order of Operations, Directed Number, Fractions, Percentages, Decimals, Estimation and Use of Calculator

Relevant recap of:

- Powers and roots
- Index laws
- Prime factors
- Order of operations with four operations, exponents and brackets to break the order
- Four operations with directed numbers
- Powers of negative numbers
- Adding and subtracting fractions
- Finding a fraction given the whole, finding a whole given a fraction
- Multiplying and dividing fractions, fraction of an amount (including fractions of fractions) with link to multiplying; increasing and decreasing by a fraction by multiplying.
- Equivalent fractions, decimals and percentages
- Recurring and terminating decimals
- Percentages of amount, percentage increase and decrease
- Fluent use of the calculator
- Rounding, truncation and error intervals
- Estimation and approximation

A3-8: Expressions, Equations, Formulae, Coordinates, Sequences and Inequalities

Relevant recap of:

- Expand and factorise a single bracket
- Solve equations with an unknown on both sides
- Solve equations containing brackets
- Solve simple equations containing fractions
- Forming and solving equations
- Substituting into a formula to find an unknown variable
- Forming formulae and using to find unknowns
- Rearranging linear formulae
- Find the midpoint of a line segment
- Plot a linear graph
- Understand $y=mx+c$
- Find the equation of a line from the gradient and y axis intercept
- Identify parallel lines from their equations
- Plot a quadratic graph
- Generate terms of a sequence
- Find the nth term of a sequence
- Recognise common sequences
- Representing inequalities on a number line
- Solve linear inequalities
- Represent inequalities involving x or y by shading on a graph



Opportunities for wider reading and key words:

Students will read worded problems – with pronunciation corrected when necessary.

Key words:

Power
Exponent
Index
Square
Cube
Root
Surd
Prime
HCF – Highest Common Factor
Commutative
Non-commutative
Zero Pairs
Additive Inverse
Rational Numbers
Numerator
Denominator
Proper
Improper
Coprime
Complement
“Dividing is the same as multiplying by the reciprocal”
Equivalent
Recurring
Terminating
Round
Upper bound
Lower bound
Error interval
Truncate

Expand
Factor
HCF – Highest Common Factor
Factorise
Input
Output
Subject
“In terms of”
Variable
Constant
Quadrant (1st, 2nd, 3rd, 4th)
Plot
Linear
Quadratic
Gradient
Y-intercept
Sequence
Term
Difference
Inequality



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		Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words. Students will reason why a number is or is not a factor/multiple of another. Students will reason why a number is prime, coprime or neither. Students will be able to explain the precedence of operations when calculating multi-step problems. Students will need to reason whether terms will or will not be part of a given sequence.
		Speak like an expert: Emphasis will be on using the correct terminology in correctly reading decimals; 3.21 is read as "three point two one" and not "three point twenty one". Emphasis on students using the correct place value terminology when reading figures; the value of 3 in 0.831 is "3 hundredths" and not "0.03" Verbal recall of times tables. Emphasis on students using the correct terminology when saying powers or root; 3^4 is "three to the power 4" not "three four". Students will be able to read a power of 2 as squaring and a power of 3 as cubing. Students will be able to read $\sqrt{\quad}$ as square root and similarly with cube root, fourth root etc... Students will be expected to understand and use the phrase: "Dividing is the same as multiplying by the reciprocal" Students will be able to use correct terminology when referring to each part of a fraction such as saying "the numerator is". Students will read fractions such as $\frac{3}{7}$ as "three sevenths" or "three over seven" or "three out of seven". Students to understand that "fractions represent divisions". Students are able to



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	recognise that $\frac{3}{7}$ is equivalent to "three divided by 7". Students able to read mixed numbers such as $2\frac{3}{7}$ as "two and three sevenths". Students will refer to as unknown as a "variable". Students will be able to read $3y$ as "three y" and "three lots of y". Students will be able to read ab as "a multiplied by b" and "ab". Students will be able to read coefficients. E.g. "The coefficient of $3y$ is 3". Students will be able reason why terms are like terms or not. Students will understand that "percent" means "out of 100". Students will understand and use the word equivalent. E.g. "$\frac{1}{2}$ is equivalent to 0.5 which is also equivalent to 50%." Understanding the meaning of the coefficients in the equation $y = mx + c$. E.g. "m represents the gradient and c represents the y axis intercept". Students will need to verbally explain key words and concepts. e.g. "the sequence is arithmetic because the term-to-term rule is +3."
	 Homework, links to careers, personal development and other subjects: Homework: Set weekly to revise key concepts covered. Personal Development: Foundation numeracy and algebraic skills to build towards further academic study. Logical, critical and analytical thinking and problem-solving skills. Careers: Finance, Statistics, Construction, Engineering, Administration. Links to other subjects: Science/Geography/Computer Science/Business: Subjects require foundation mathematical skills such as algebraic and numerical fluency.



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HALF TERM 2: Ratio, Proportion and Geometry

NP10-11: Proportion and Ratio

Relevant recap of:

- Using ratio tables for direct and inverse proportion
- Value for money
- Exchange rates
- Recipes
- Decimal multipliers
- Finding a percentage change
- Simplifying ratios
- 1:n and n:1
- Ratios and fractions
- Finding parts of a ratio given another part
- Finding the value of parts given the whole
- Finding the value of parts in a ratio given the difference

GM 1-3: Measuring, Constructions, Angles and Area

Relevant recap of:

- Measuring and naming angles
- Constructing and drawing triangles
- Bisecting angles and lines
- Angles round points and on straight lines
- Vertically opposite angles
- Missing angles in triangles
- Missing angles in quadrilaterals
- Properties of quadrilaterals
- Interior angles in polygons
- Rectilinear area
- Area of a parallelogram
- Area of a triangle
- Area of a trapezium
- Area of a circle



Opportunities for wider reading and key words:

Students will read worded problems – with pronunciation corrected when necessary.

Key words:

Proportion
Direct
Inverse
Scale factor
Ratio

Point
Line
Segment
Ray
Vertex
Angle
Acute
Obtuse
Reflex
Circle
Arc
Construct
Congruent
Bisector
Locus
Loci
Equidistant
Vertex
Isosceles
Scalene
Equilateral
Interior
Parallel
Quadrilateral
Rhombus
Parallelogram
Kite
Trapezium
Regular
Irregular
Transversal
Alternate
Corresponding
Bearing
Pi



Opportunities for extended writing:

Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words.

Students will need to come to conclusions from their own mathematical calculations involving area and perimeter. E.g. *Does a farmer have enough seed to cover a lawn?*



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		Students will mathematically reason how they have arrived at an answer for a given angle using relevant angle properties.
		Speak like an expert: Emphasis on using correct angle properties such as “angles around a point/full turn” and <u>not</u> “angles around a circle”. Units of measurement read correctly; 15m^2 is read as “15 metres squared”. Emphasis will be put on the use of bar models to solve ratio problems. Students must refer to amounts being “shared” and bars being split into “equal parts”. Students will need to explain the relationship between two variables that are in direct or inverse proportion. For example, what would you expect to happen to someones wages as they work more hours? What would you expect to happen to the time taken to complete a job if more people are working on it?
		Homework: Set weekly to revise key concepts covered. Personal Development: Scaling qualities, comparing amounts, proportional reasoning. Pattern recognition, analytical thinking, spatial reasoning, geometric understanding and algebraic generalisation. Careers: Catering, Cartography, Interior/Graphic Design, Finance, Data Analysis, Scientistis, Engineering, Construction. Links to other subjects: Art/Science: Use of the golden ratio. Hospitality: Use of proportion in recipes. Science: Use of ratio tables when working with compound measures such as speed, density and pressure. Science: Area of 2D shapes needed to find the volume of 3D shapes in Science. Art/Photography: Use of enlargement to create different artistic effects.



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HALF TERM 3: Number and Proportion NP12-13: Standard Form, Proportion and Rates of Change Relevant recap of: • Writing large numbers • Writing small numbers • Writing large and small numbers • Adjusting to standard form • Multiplying and dividing in standard form • Addition and subtraction in standard form • Finding the whole • Finding the whole after and increase or decrease • Simple interest • Direct proportion • Graphs of direct proportion • Algebraic direct proportion • Inverse proportion • Graphs of inverse proportion • Algebraic inverse proportion • Density • Pressure • Speed • Converting compound units • Ratio problems		Opportunities for wider reading and key words: Students will read worded problems – with pronunciation corrected when necessary. Key words: Standard form
		Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words. Students will explain a journey displayed on a distance time graph using the correct mathematical language and calculations to support their description.
		Speak like an expert: Students will use proportion when reading the units of speed e.g. "20mph means 20 miles per hour which is the same as 20 miles in an hour". Students will need to verbally explain key words and concepts. e.g. "The first part of the journey had a faster speed because the gradient is more steep."
		Homework, links to careers, personal development and other subjects: Homework: Set weekly to revise key concepts covered. Personal Development: Problem-solving, analytical thinking, numerical literacy, financial skills, cross-curricular number fluency. Careers: Engineering, Finance, Scientific Research and Data Science. Links to other subjects: Science: Use of ratio, standard form and calculations with compound measures (density, pressure and speed.) Business: Simple interest and percentage increase/decrease.



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HALF TERM 4: Geometry and Algebra GM4: Congruence and Similarity Relevant recap of: - Understanding the concept of congruence. - Reading and writing two-dimensional vectors. - Drawing and identifying translations of shapes, using vectors. - Drawing and identifying reflections of shapes. - Drawing and identifying rotations of shapes. - Drawing and identifying combinations of isometric transformations. - Understanding the concept of similarity. - Identifying scale factors and finding the dimensions of similar shapes. - Drawing and identifying enlargements of shapes with positive and fractional scale factors. A9-10: Graphs and Equations Relevant recap of: - Reading contextual graphs - Drawing contextual graphs - Speed - Distance time graphs - Review of linear graphs - Working with more complex equations - Gradient Perpendicular lines - Simultaneous equations and graphs - Combining and scaling equations - Solving simultaneous equations - Solving linear inequalities - Solving linear inequalities in two dimensions	 Opportunities for wider reading and key words: Students will read worded problems – with pronunciation corrected when necessary. Key words: Congruent Vector Invariance Isometry Translation Reflection Rotation Congruent Mirror Centre Similar Enlargement Rate of change Interpolate Extrapolate Velocity
	 Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words. When students are describing transformations they must use the correct mathematical terminology and criteria. E.g. The shape has been rotated 90°, center of rotation (0,0), clockwise. When students are describing enlargements they must use the correct mathematical terminology and criteria. E.g. The shape has been enlarged by a scale factor of 2 with a center of enlargement (0,0).
	 Speak like an expert: Students must use the mathematical terms "rotate, reflect, translate" and not "turn, flip, move".
	 Homework, links to careers, personal development and other subjects: Homework: Set weekly to revise key concepts covered. Personal Development: Spatial reasoning, visual awareness, problem-solving, critical thinking, data analysis, algebraic generalisation and graph-plotting.



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		Careers: Engineering, Computer Science, Data Analysis, Mathematical Modelling, Finance, Architecture, Construction, Graphic Designer. Links to other subjects: 3D design: Use of properties of shapes and the elevations of 3D shapes. Art/Photography: Use of enlargement to create different artistic effects. Science: Area of 2D shapes needed to find the volume of 3D shapes. Graph-plotting skills and interpretation. IT: Solving simultaneous equations.
HALF TERM 5: Statistics and Geometry <u>SP3: Introduction to Probability</u> Relevant recap of: • Systematic listing • Record, describe and analyse the frequency of outcomes of simple probability experiments, introduce language of probability. • Theoretical probability – formalising language and notation, calculating. • Sum of probabilities of all mutually exclusive events = 1. • Generate theoretical sample spaces, including systematic listing of combinations and outcomes, and use these to calculate probabilities. • Recording outcomes and possibilities using frequency trees, two-way tables and simple Venn diagrams. Use these diagrams to calculate probabilities. <u>GM5: Right-Angled Triangles</u> Relevant recap of: • Using Pythagoras’ Theorem in 2D to find missing sides. • Proving a triangle is right-angled with Pythagoras’ Theorem. • Using Pythagoras’ Theorem to find the distance between two points. • Using trigonometric ratios to find missing sides in right-angled triangles. • Using trigonometric ratios to find missing angles in right-angled triangles. • Fluent recall of the exact values of $\sin\theta$, $\cos\theta$, $\tan\theta$ for $\theta = 0, 30, 45, 60, 90$. • Solving problems involving Pythagoras and Trigonometry.		Opportunities for wider reading and key words: Students will read worded problems – with pronunciation corrected when necessary. Key words: Fairness Equally/unequally likely Outcome Randomness Fairness Bias Relative frequency
		Opportunities for extended writing: Students will complete a ‘What a bad one looks like’ known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words.
		Speak like an expert: Students must be expected to use the mathematical probability vocabulary when describing events. E.g “Impossible, unlikely, even chance, likely, certain”. Students will need to verbally explain key words and concepts. e.g. “this triangle doesn’t contain a right angle because when I square the two shorter sides and add them together it’s not the same as the hypotenuse squared.” Students will need to describe Pythagoras’ Theorem as “In a right-angled triangle, the sum of the squares of the shorter sides is equal to the square of the hypotenuse.”
		Homework, links to careers, personal development and other subjects: Homework: Set weekly to revise key concepts covered. Personal Development: Spatial reasoning, visual awareness, problem-solving, critical thinking data analysis and mathematical modelling.



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		Careers: Architecture, Construction, Engineering, Cartography, Artist, Graphic Designer, Statistician, Finance, Analysis, Astronomy, Sports, Surveying. Links to other subjects: 3D design: Use of properties of shapes and the elevations of 3D shapes. Art/Photography: Use of trigonometry to create different artistic effects. Science/Sport: Trigonometry to work out distances and projectile motion. Theoretical probability calculated before an experiment.
HALF TERM 6: Geometry and Measure <u>GM6: Circles</u> Relevant recap of: - Knowing the parts and properties of a circle. - Finding the circumference of a circle and the perimeter of semicircles and quadrants, in terms of pi and rounded. - Finding the area of a circle and the perimeter of semicircles and quadrants in terms of pi and rounded. - Problems with circumference and area of a circle. - Finding the length of an arc and the area of a sector. <i>Identifying and using the circle theorems.</i>		Opportunities for wider reading and key words: Students will read worded problems – with pronunciation corrected when necessary. Key words: Centre Radius Chord Diameter Circumference Tangent Arc Sector Segment Exact value
		Opportunities for extended writing: Students will complete a ‘What a bad one looks like’ known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words. Students will be expected to reason regarding circle problems. When using circle theorems, students will be expected to accurately recall and annotate their solutions with use of these theorems. When answering area and circumference problems, students will draw conclusions from their mathematical reasoning. E.g. <i>Does a farmer have enough seed to cover a lawn?</i>
		Speak like an expert: Students will be able to use correct terminology when discussing parts of a circle and circle theorems. E.g. “The tangent to a circle is perpendicular to the radius.”
		Homework, links to careers, personal development and other subjects: Homework: Set weekly to revise key concepts covered.



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		Personal Development: Logical reasoning, problem-solving, spatial awareness and visualisation. Careers: Engineering, Architecture, Surveyors, Jewelers, Astronomy, Cartography, Astronomy. Links to other subjects: Art and Design: Use of circles to create aesthetically pleasing and geometrically sound designs. Science: Rotational and circular motion.
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