CURRICULUM ROAD MAP

MATHEMATICS

UNIVERSITY COLLEGIATE SCHOOL

END OF KEY STAGE 2

Understanding of place value and the number system

Fluency in written calculations for all four operations

Working with fractions, decimals, percentages and ratio to develop connections.

YEAR 7 AUTUMN

Algebra: Recognise linear and non-linear sequences. Generate sequences from a rule. Represent functions graphically. Function machines. Algebraic notation. Substitution into expressions. Form and solve one-step equations. Understand the difference between equality and equivalence. Collecting like terms.
Number: Understand and use place value. Compare and order numbers. Round to powers of ten and 1 sf. Write 1 sf numbers in standard form. Interchange between fractions and decimals below 1. Explore fractions above 1. Interchange between fractions, decimals and percentages up to 100%. Explore over 100%.
Statistics: Find the median and the range.

YEAR 7 SPRING

Number: Use the four operations with positive integers and decimals. Use a calculator. Multiply and divide by positive powers of 10. Order of operations. Multiply by 0.1 and 0.01. Use the four operations with directed numbers. Add and subtract fractions including mixed numbers. Find fractions of an amount up to 1. Solve problems with fractions greater than 1.Find percentage of amount using mental and calculator methods(up to 100%). Explore over 100% Use factors and multiples. Order Directed number.
Ratio, Proportion and Multiplicative Relationships: Convert metric units.
Algebra: Revisit notation and substitution in the context of directed number. Simple algebraic fractions. Revisit collected terms in the context of directed number. Form and solve two-step equations.
Geometry and Measure: Solve perimeter problems. Areas of rectangles, parallelograms and triangles. Area of a trapezium.
Statistics: Solve problems with line charts and bar charts. Find the mean.

YEAR 7 SUMMER

Number: Use known number facts, Prime factorisation. HCF and LCM.

Ratio, Proportion and Multiplicative Relationships: Use multiplicative relationships between known facts.
Algebra: Explore algebraic expressions.
Geometry and Measure: Geometric notation. Draw lines, angles and simple shapes. Properties of triangles and quadrilaterals. Angles at a point. Adjacent angles on a straight line. Vertically opposite angles. Angles in triangles and quadrilaterals. Parallel and perpendicular lines. Angles in parallel lines. Simple angle proofs. Name and construct polygons.
Statistics: Construct and interpret pie
Probability: Use the language of probability. Calculate simple probabilities. Use the probability scale. Sample spaces. Understand and use set notation, including Venn diagrams. Know the sum of probabilities is 1. Complement of a set.

KNOWLEDGE TRANSFER

Through varied and frequent practice students will develop conceptual understanding, build rapid recall and application of their knowledge.

YEAR 8 SUMMER

Number: Multiply and divide fractions including mixed numbers.
Algebra: Conversion graphs. Direct proportion graphs. Using coordinates. Plotting graphs. Explore gradient. Explore non-linear graphs.
Ratio, Proportion and Multiplicative Relationships: Understand and use scale factors. Scale diagrams and maps. Currency conversions. Conversion graphs. Similar shapes. Direct proportion graphs. Understand and use ratio notation. Divide in a ratio. Work out parts and wholes. ∏ as a ratio. Use the form 1:n Link gradient and ratio.
Geometry and Measure: Circumference of a circle. Work with scale factors.
Probability: Construct sample spaces for more than one event. Use sample spaces to find probabilities. Use tables and Venn diagrams to find probabilities. Use the product rule for finding total number of outcomes.
Statistics: Recognise different types of data. Construct and interpret frequency tables, grouped and ungrouped, and two way tables. Scatter graphs. Correlation. Lines of best fit.

YEAR 8 SPRING

Number: Revisit comparing and ordering. Write numbers of any size in standard form. Use negative and fractional indices. Rounding to given numbers of dp and sf. Convert between units of time. Order of operations. Calculate with money. Use estimation. Convert metric units of length and area. Use error interval notation. Express one number as a fraction of another. Explore calculator and non-calculator methods. Percentage increase and decrease. Using multipliers. Express on quantity as a percentage of another, compare two quantities using percentages. Work with percentages greater than 100%. Finding the original after percentage change.
Algebra: Expand over a single bracket. Simplify expressions, identities and equations. Expand a pair of binomials. Solve inequalities. Form and solve equations with brackets. Identify and use formulae, expressions, identities and equations. Form and solve equations with unknowns on bot sides. Work with indices. Explore powers of powers. Find the rule for the nth term of a linear sequence.
Ratio, Proportion and Multiplicative Relationships: Convert area and volume measures.

YEAR 8 AUTUMN

Number:
Geometry and Measure: Find and prove simple geometric facts. Area of a trapezium, a circle and of compound shapes. Recognize line symmetry. Reflect shapes in a given line.. Standard ruler and compass constructions. Explore diagonals of quadrilaterals. Angles in parallel lines. Interior and exterior angles of polygons. Areas formed by diagonals of quadrilaterals.
Statistics: Collecting data. Multiple bar charts. Line graphs. Misleading graphs. Find the mode. Identify outliers. Compare distributions using statistical measures. Find the mean from grouped and ungrouped frequency tables.

KNOWLEDGE TRANSFER

Students will continue to develop their application of knowledge with increasingly more complex problems over time, including using mathematical language to justify,

YEAR 9 AUTUMN

Algebra: Revise algebraic representation. Graphs of : = mx + c and parallel lines. Change the subject of a formula. Testing algebraic conjectures. Expand a pair of binomials. Form and solve equations and inequalities with unknowns on both sides. Solve simultaneous equations graphically. Testing conjectures about sequences,
Ratio, Proportion and Multiplicative Relationships: Revisit scale drawings
Geometry and Measure: Surface area of cuboids and cylinders. Volume of cuboids, cylinders and other prisms. Explore the volume of cones, spheres and compound shapes. Surface area of prisms. Standard ruler and compass constructions. Loci. Recognise rotational symmetry. Rotate points about a given point. Translate shape and describe translations. Perform a series of translations. Testing conjectures about shapes. Properties of 2D and 3D shapes. Explore congruency.

YEAR 9 SPRING

Number: Types of number. Standard form. HCF and LCM. Rational and Real numbers. Fraction arithmetic. Work in the context of financial mathematics. Reverse percentages. Repeated percentage change.
Ratio, Proportion and Multiplicative Relationships Repeated percentage change.
Geometry and Measures: Chains of reasoning to find angles. Understand and use Pythagoras' Theorem. Show that a triangle is right-angled. Use Pythagoras' theorem in 3d shapes. Develop more complex proofs. Prove a triangle is/isn't right-angled. Explore proofs of Pythagoras' theorem.

Click to add text

YEAR 9 SUMMER

Number: Standard form. HCF and LCM. Prime factorisation.
Algebra: Representing inequalities. Interpret graphs in various forms including piece-wise linear, quadratic piece-wise, exponential, speed/distance/time.
Ratio, Proportion and Multiplicative Relationships: Revisit conversion graphs. Solve direct proportion problems. Inverse proportion and inverse proportion graphs. Unit pricing problems. Speed, distance, time, density and compound units. Converting compound measures.
Geometry and Measure: Recognise rotational symmetry. Rotate points about a given point. Translate shape and describe translations. Perform a series of translations. Explore ratios in right-angled triangles.
Probability: Compare experimental and theoretical probability. Use frequency trees and simple tree diagrams.
Statistics: Revise yr 7 & 8 content.

KNOWLEDGE TRANSFER

Students will apply their mathematics in a variety of routine and non-routine problems with increasing sophistication. Students will develop their ability to break down problems into a series of smaller steps and prioritise in multi-step problems.

YEAR 10 SUMMER

Number: Rounding and limits of accuracy. Upper and lower bounds. Converting recurring decimals. Factors, multiples and primes. Standard form. Work with exact answers. Calculate surds. Work with powers and roots. Calculate with standard form. Revisit conversions and non-calculator methods.
Algebra: Work with powers and roots. Find the rule for the nth term of a quadratic sequence. Sequences with surds.
Geometry and Measure: Review KS3 and earlier content as a context for non-calculator methods.
Statistics: Comparing distributions using diagrams. Frequency polygons. Time series. Cumulative frequency diagrams. Box plots. Histograms. Find the modal class. Finding the median and quartiles from cumulative frequency diagrams. Understanding the risks of extrapolation.

YEAR 10 SPRING

Number: Working with ratios and fractions. Extend KS3 conversions. Converting fractions and decimals. Simple and compound interest. Finding original values. Repeated percentage change.
Ratio, Proportion and Multiplicative Relationships: Ratios and Fractions. Ratios in the context of area and volume. Growth and decay problems. Iterative processes.
Geometry and Measure: Interpret and use bearings with Pythagoras' theorem. Parts of a circle. Review area and circumference of a circle. Arc length. Area of a sector. Surface areas and volumes of cylinders, cones and spheres. Prove and use the first four circle theorems. Understand and use vectors. Geometric proof with vectors.
Probability: Effect of sample size on estimated probabilities. Use tree diagrams. Mutually exclusive and independent events. Conditional probabilities.

YEAR 10 AUTUMN

Algebra: Revise and Extend KS3 content. Factorising quadratics. Maintain equivalence using the rules of indices. Represent solutions to inequalities on number lines. Form and solve linear simultaneous equations. Solve quadratic equations and inequalities by factorising. Solve simultaneous equations, one linear and one quadratic. Solve simultaneous equations graphically both linear and quadratic.
Ratio, Proportion and Multiplicative Relationships: Similar shapes. Enlargement. Area and volume similarity. Revise and extend KS3 content.
Geometry and Measure: Similarity and enlargement. Negative scale factors of enlargement. Revise Pythagoras' theorem. Use trigonometry to find missing sides and angles in a right-angled triangle. Exact trig values.. Using sine and cosine rules. Area of a general triangle. Prove shapes are similar. .Congruent triangles. Prove triangles are congruent.

KNOWLEDGE TRANSFER

Students will target key gaps in their knowledge and application. Students will further enhance their mathematical understanding with a heightened focus concepts in context in addition to building their mathematical reasoning skills.

YEAR 11 AUTUMN

Algebra: Substitute in kinematics formulae. Functions. Composite and inverse functions. Factorising quadratics. Completing the square. Change the subject of a formula and where the subject appears more than once. Form and solve quadratic equations by factorising, quadratic formula and completing the square. Perpendicular lines. Equation of the tangent to a circle. Roots, quadratic, cubic and reciprocal graphs. Equations of circles. Real-life graphs including speed/distance/time.
Ratio, Proportion and Multiplicative Relationships: Gradients of curves. Estimate the area under a curve.
Geometry and Measure: Review perimeter, area and volume formulae as a context for rearrangement. Volume of a pyramid. . Revisit shape properties in the context of reasoning.

YEAR 11 SPRING

Number: Revisit and extend number work from KS3. Making ordered lists. Product rule for counting. Proving equivalence of different forms of number. Review multiplicative change including fractions and decimals. Proving equivalence. "Show that" problems with percentages.
Algebra: Algebraic proof. Trig graphs. Transforming graphs.
Ratio, Proportion and Multiplicative Relationships: Direct and inverse proportion numerically and graphically. Pressure and density. Variation with powers and roots.
Geometry and Measures: Loci. Plans and elevations. Revisit trigonometry on the context of functions. Revisit Pythagoras and trigonometry. Explore trig graphs and their transformations. Prove and use the remaining circle theorems. Use correct language in "Show that" /proof questions. Revisit congruent triangles proof.
Probability: Review using sample spaces and probability rules. Revisit comparing distributions using diagrams and data. Describing a population.

YEAR 11 SUMMER

BEYOND YEAR 11

Grade 4/5+:
- Sixth Form Studies and Apprenticeships

Grade 6+:
- AS Mathematics – One Year Course and A-Level Mathematics – Two Year Course

Grade 7+:
- A-Level Mathematics – Two Year Course and Further Maths

UNIVERSITY COLLEGIATE SCHOOL

QUEST

YEAR 7 AUTUMN	YEAR 7 SPRING Barclay's Bank Money Project	YEAR 7 SUMMER
YEAR 8 SUMMER	YEAR 8 SPRING	YEAR 8 AUTUMN Carr's Pasties Delivery Project
YEAR 9 AUTUMN	YEAR 9 SPRING Barclay's Bank Money Project	YEAR 9 SUMMER
YEAR 10 SUMMER Walker's Steel Millenium Dome Project	YEAR 10 SPRING	YEAR 10 AUTUMN
YEAR 11 AUTUMN	YEAR 11 SPRING	YEAR 11 SUMMER

INDUSTRY LINKS

Q. What are the industry application(s) for this knowledge/concept(s)?

EMPLOYER ENGAGEMENT LINKS

MATHEMATICS

UNIVERSITY COLLEGIATE SCHOOL

QUEST

DIGITAL ACTIVITY LINKS

MATHEMATICS

YEAR 7 AUTUMN

...MF22.01 to MF22.13
MF17.01 to MF17.116
MF18.01 to MF18.06
MF2.01 to MF2.08
MF8.01 to MF8.09

YEAR 7 SPRING

MF3.01 to MF3.16
MF7.01 to MF7.14
MF2.01 to MF2.10
MF4.07 to MF4.21

YEAR 7 SUMMER

...MF26.01 to MF26.16
MF27.01 to MF27.12
MF2.01 to MF 2.13
MF47.01 to MF47.04
MF46.01 to MF46.07
MF5.01 to MF 5.16

YEAR 8 SUMMER

...MF15.01 to MF15..20
MF39.01 to MF 39.05
MF36.01 to MF35.22
MF4.23 to MF4. 28
MF23.01 to MF23.05
MF50.01 to MF50.06
MF46.05 to MF46.07

YEAR 8 SPRING

MF17.05, MF13.03, MF13.04, MF17.17, MF17.15
MF8.01, MF8.02 MF8.03, MF8.04, MF8.05, MF8.06, MF8.07 MF8.08, MF8.09, MF8.10 MF8.11, MF8.12
MF4.29, MF6.06, MF7.08, MF7.09, MF7.10
MF4.30 MF8.17, MF7.14 MF10.01, MF10.02, MF10.03,
MF11.03 MF11.13 MF11.04 MF11.11
MF11.11 MF14.03, MF14.04 MF2.11, MF2.12 MF14.06 MF14.07 MF14.08, MF14.09 MF13.06 MF13.08
MF2.13, MF9.01, MF9.05, MF9.02, MF9.03, MF9.04 MF9.11,
MF9.12 MF9.15 MF3.14, MF3.15 MF36.04, MF36.05, MF36.06 MF36.07,
MF36.08, MF36.09 MF36.10 MF36.11 MF37.05, MF37.06, MF37.08, MF37.09

YEAR 8 AUTUMN

...MF27.07 to MF27.12
MF28.01 to MF28.11
MF31.01 to MF31.09
MF40.01 to MF40.03
MF48.01 to MF 48..07
MF49.01 MF49.09

YEAR 9 AUTUMN

...MF23.06 to MF23.17
MF19.18 to MF19.19
MF33.01 to MF33.04
MF42.01 to Mf43.09

YEAR 9 SPRING

MF3.10 to MF2.18
MF10.01 to MF10.05
MF11.1 to MF11.14
MF1MF40.04 to MF40.06
MF40.15 to MF40.17
MF43.01 to MF43.06

YEAR 9 SUMMER

...MF40.07 to MF40.14
MF43.01 to MF43.06
MF15.16 to MF.20
MF37.07MF37.12
MF38.01 to MF38.21
MF46.08 to MF46.17
MF23.10 to MF23.17

YEAR 10 SUMMER

...MF43.01 to MF43.06
MF29.06 to MF29.07
MF45.01 to MF 45.08
Mf23.17 to MF23.19
MF25.01 to MF25.12
MF19.20 to MF19.26

YEAR 10 SPRING

...MF39.01 to MF39.09
MF32.01 to MF32.16
MF41.01 to MF41.06
MF16.01 to MF16.10
MF11.06 to MF11.14
MF46.01 to MF 46.17
MF47.10 to MF47.11

YEAR 10 AUTUMN

...MF48.01 to MF 48.07
MF49.01 to MF 40.21
MF22.01 to MF22.13
MF12.01 to MF12.06
MF13.01 to MF13.07
MF17.07 to MF17.16

YEAR 11 AUTUMN

...MF23.08 to MF23.16
MF24.01 to MF24.12
MF18.01 to MF18.17
MF21.01 to MF21.30

YEAR 11 SPRING

...MF38.01 to MF38.21
MF28.01 to MF28.11
MF19.30 to MF19.26
MF40.01 to MF40.19
MF42.01 to Mf43.09

YEAR 11 SUMMER

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UNIVERSITY COLLEGIATE SCHOOL

QUEST

NATIONAL CURRICULUM REFERENCE LINKS

MATHEMATICS

YEAR 7 AUTUMN

Number: 1.1, 1.2, 1.13, 1.8, 1.2, 1.9, 1.10
Algebra: 2.18, 2.17. 2.9, 2.2, 2.3, 2.4,
Statistics: 6.1

YEAR 7 SPRING

Number: 1.4, 1.5, 1.6, 1.15, 1.4, 1.4, 1.4, ,1.11, 1.4, 1.10, 1.3, 1.2
Algebra: 2.1, 2.2, 2.14, 2.4, 2.10
Ratio: 3.1
Geometry: 4.1
Statistics: 6.2, 6.1

YEAR 7 SUMMER

Number: 1.3, 1.7
Algebra: 2.3
Ratio: 3.7
Geometry: 4.3, 4.5, 4.6, 4.7, 4.10, 4.13, 4.11, 4.12 4.13,
Probability: 5.1, 5.2, 5.3
Statistics: 6.2

YEAR 8 SUMMER

Number: 1.4
Algebra: 2.11, 2.12, 2.13, 2.14, 2.15
Ratio: 3.2, 3.10, 3.4, 3.5, 3.6, 3.7, 3.8
Geometry: 4.2, 4.1,4.12
Probability: 5.1, 5.2, 5.3
Statistics: 6.1, 6.2, 6.3

YEAR 8 SPRING

Number: 1.1, 1.2, 1.4, 1.16, 1.15, 1.10
Algebra: 2.5, 2.6, 2.4, 2.1, 2.3, 2.7, 2.8
Ratio: 3.10, 3.3

YEAR 8 AUTUMN

Geometry: 4.8, 4.16, 4.1, 4.8, 4.9, 4.7
Statistics: 6.1, 6.2, 6.3

YEAR 9 AUTUMN

Algebra: 2.1, 2.12, 2.13, 2.14, 2.8, 2.16, 2.7, 2.10, 2.15,
Ratio: 3.2
Geometry: 4.15, 4.1, 4.2, 4.4, 4.5, 4.8, 4.9

YEAR 9 SPRING

Number: 1.8, 1.3, 1.11, 1.2, 1.4, 1.9, 1.10
Ratio: 3.8
Geometry: 4.7, 4.10, 4.11, 4.13, 4.14

YEAR 9 SUMMER

Number: 1.8, 1.3
Algebra: 2.3, 2.12, 2.13, 2.14, 2.15,
Ratio: 3.10, 3.9, 3.10
Geometry: 4.8, 4.9, 4.14
Probability: 5.1, 5.2, 5.4

YEAR 10 SUMMER

Number: 7.7, 7.5, 7.4, 7.2, 7.3, 7.1
Algebra: 8.1, 8.3, 8.19, 8.18
Statistics: 11.2, 12.1, 12.4, 12.3, 12.5, 12.6 12.2, 12.7, 12.9

YEAR 10 SPRING

Number: 7.6, 7.5
Ratio: 9.1, 9.7
Geometry: 10.5, 10.2, 10.3, 10.6, 8.12, 10.7, 10.14
Probability: 11.2, 11.3, 11.4, 11.1

YEAR 10 AUTUMN

Algebra: 8.2, 8.3, 8.17, 8.14, 8.16, 8.13, 8.7, 8.8
Ratio: 9.1, 10.8, 10.6
Geometry: 10.1, 10.8, 10.0, 10.9, 10.10, 10.11, 10.13

YEAR 11 AUTUMN

Algebra: 8.11, 8.5, 8.2, 8.13, 8.1, 8.13, 8.6, 8.8, 8.12, 8.10, 8.15
Ratio: 9.5,9.6,
Geometry: 10.7, 10.8,

YEAR 11 SPRING

Number: 7.6, 9.7
Algebra: 8.4, 8.8, 8.9
Ratio: 9.3, 9.4, 9.5, 9.2, 9.6
Geometry 4.4, 10.4, 10.9, 10.3, 10.10, 10.11, 10.12, 4.13,
Probability: 5.4, 11.1, 11.2, 11.3 , 11.4
Statistics: 12.8,

YEAR 11 SUMMER

Revision