

Curriculum Vision - *Mathematics*

What is the purpose of the curriculum?

- To help students develop fluency in the fundamentals of mathematics.
- To enable students to reason mathematically by following a line of enquiry.
- To enable students to solve problems by applying mathematical knowledge.

Why is *Maths* an important subject?

- Mathematics enables students to develop powerful ways of thinking that help them understand and engage with the world around them.
- Mathematics enables students to reason logically and make sense of patterns, relationships and structures in the world around them.

Types of Knowledge - *Mathematics*

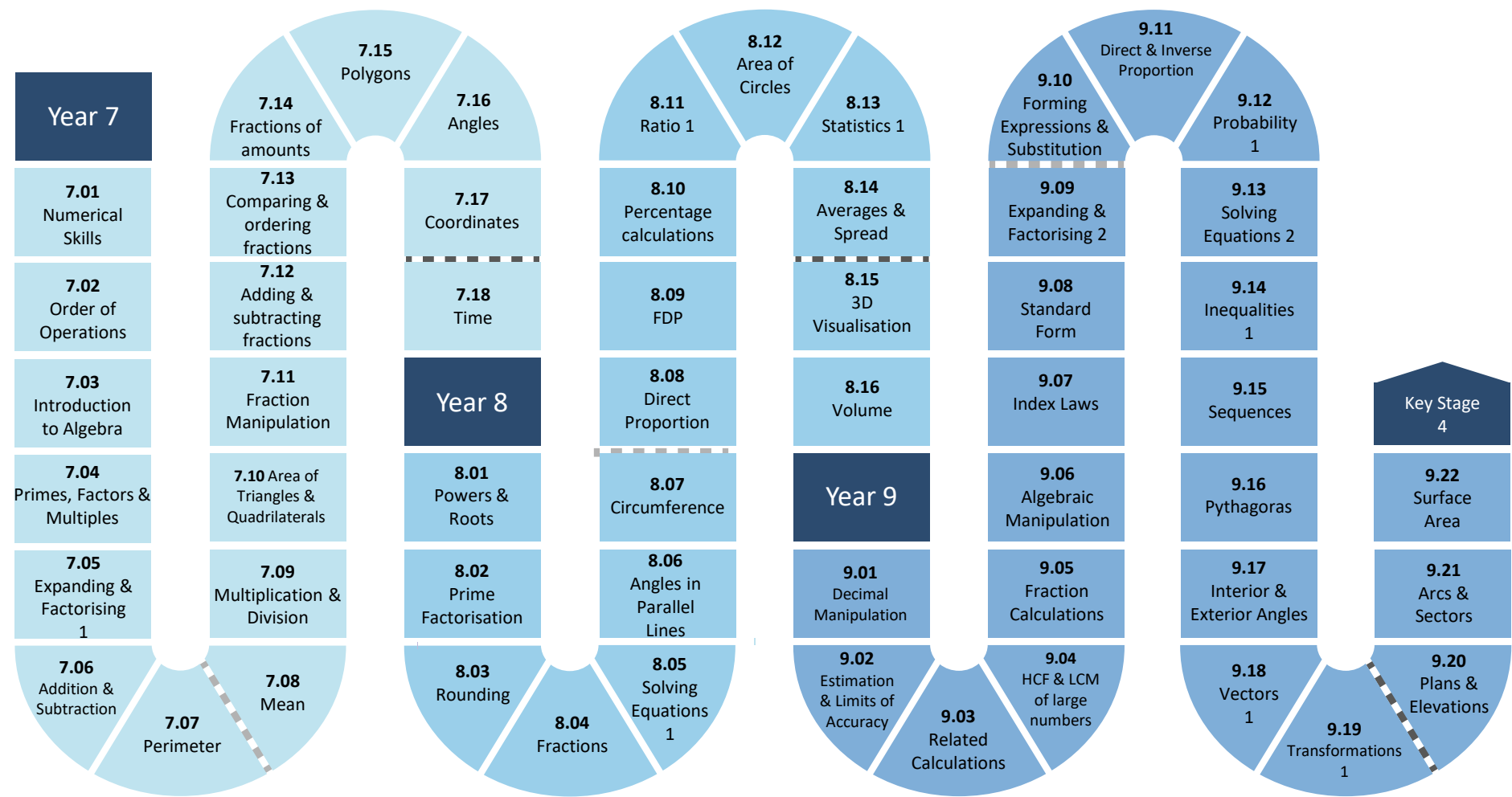
	Substantive <i>The body of work of the subject</i>	Disciplinary <i>How this body of work is produced and justified</i>
Conceptual Knowledge that can be articulated <i>(knowing that...)</i>	1. Substantive Conceptual For example, “Angles around a point sum to 360.”	2. Disciplinary Conceptual For example, “A mathematical statement requires justification before it can be accepted as true.”
Procedural Knowledge of a process <i>(knowing how to...)</i>	3. Substantive Procedural For example, “Expand $(x+2)(x+3)$.”	4. Disciplinary Procedural For example, “Construct an argument, test a conjecture, identify an error, or select an efficient strategy.”

Most of the knowledge taught in mathematics lessons is substantive procedural knowledge, which rests on a vital bed of substantive conceptual knowledge. Disciplinary knowledge of both types is focused on more strongly in year 11.

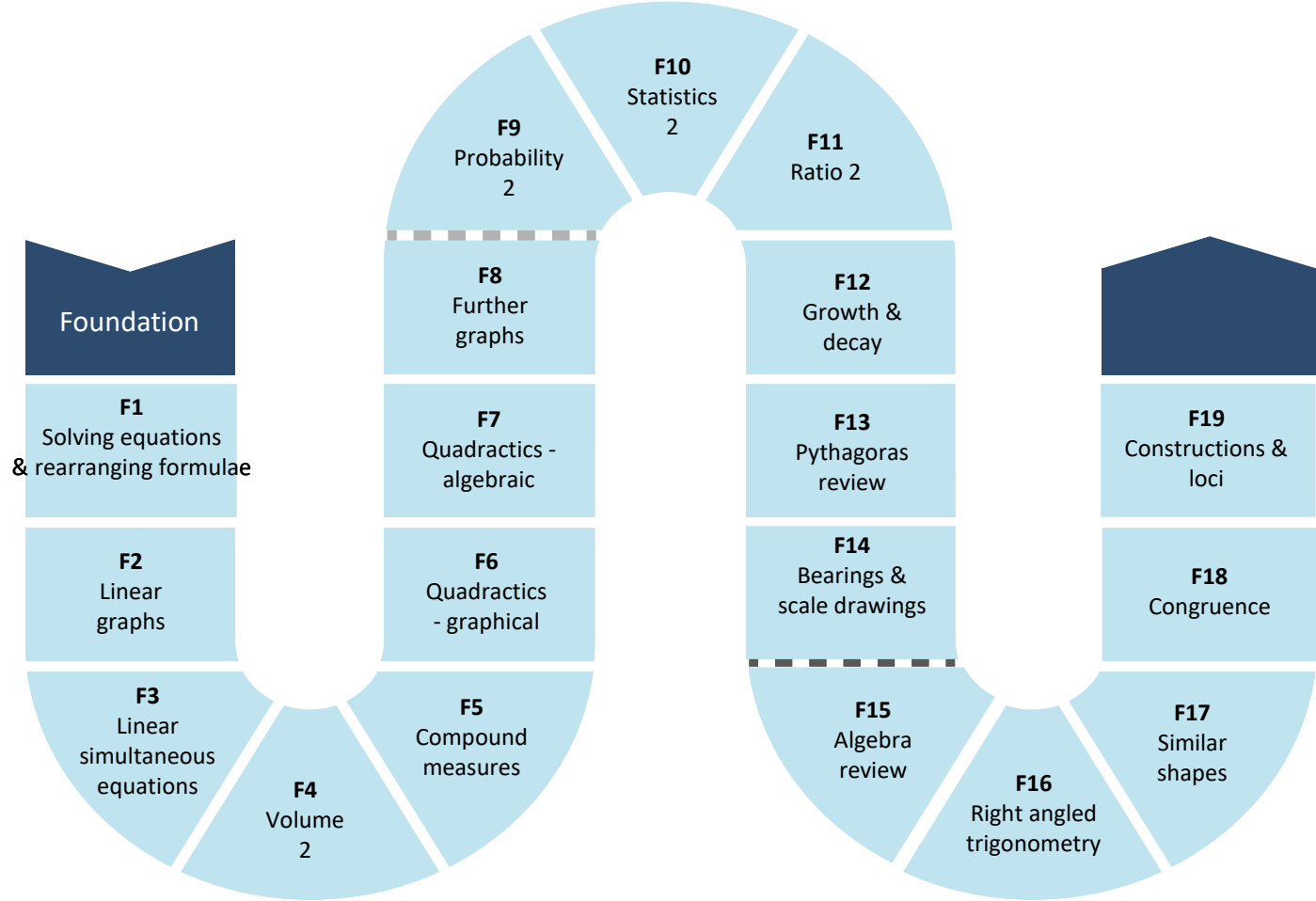
Curriculum Themes Overview - *Mathematics*

Theme	Description
Number	Number concerns the properties, relationships and behaviour of numbers. It includes the representations, operations, procedures and conventions used to work with quantities and numerical relationships.
Geometry	Geometry is the study of shape and space. It involves understanding the properties and relationships of shapes, measures and spatial structures, alongside the conventions and procedures used to solve geometrical problems.
Probability	Probability is concerned with chance and uncertainty. It provides ways of representing and analysing the likelihood of events and outcomes mathematically.
Statistics	Statistics concerns the collection, processing and analysis of data in order to draw conclusions, make inferences and evaluate uncertainty about those conclusions.
Algebra	Algebra is a language and system of notation that represents mathematical relationships and generalisations. It enables patterns and structures to be expressed, explored and communicated across mathematics.
Proportion	Proportion concerns the comparison of quantities and relationships between variables. These ideas apply across all areas of mathematics and allow relationships to be described and interpreted mathematically.

Curriculum Five Year Journey – Mathematics (KS3)



Curriculum Five Year Journey – Mathematics (KS4 Foundation)



Excellence

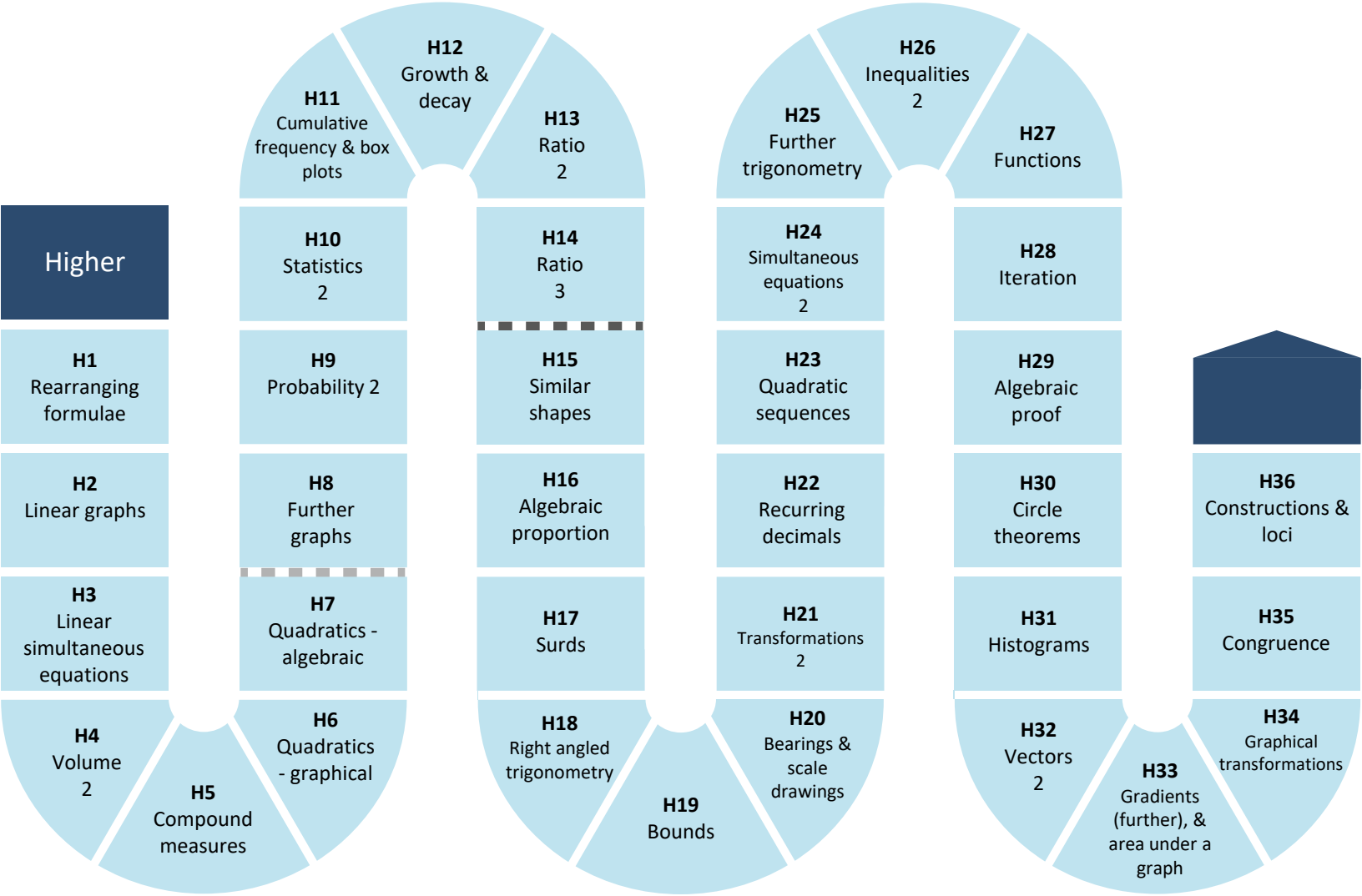
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Hard Work

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Kindness

Curriculum Five Year Journey – Mathematics (KS4 Higher)



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Curriculum Themes Map – Number

Theme/Big Idea/...	Description	Year 7	Year 8	Year 9	Year 10	Year 11
Number	Explores the properties, relationships and behaviour of numbers and quantities.	7.01 Numerical Skills; 7.02 Order of Operations; 7.04 Primes, Factors & Multiples; 7.06 Addition & Subtraction; 7.09 Multiplication & Division; 7.12 Adding & Subtracting Fractions; 7.13 Comparing & Ordering Fractions; 7.14 Fractions of Amounts	8.01 Powers & Roots; 8.02 Prime Factorisation; 8.03 Rounding; 8.04 Fractions; 8.09 FDP	9.01 Decimal Manipulation; 9.02 Estimation & Limits of Accuracy; 9.04 HCF & LCM of Large Numbers; 9.05 Fraction Calculations; 9.08 Standard Form	F5/H5 Compound Measures; H17 Surds; H19 Bounds; H22 Recurring Decimals	F12/H12 Growth & Decay

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Curriculum Themes Map – Geometry

Theme/Big Idea/...	Description	Year 7	Year 8	Year 9	Year 10	Year 11
Geometry	Explores the properties and relationships of shape, space and measurement.	7.07 Perimeter; 7.10 Area of Triangles & Quadrilaterals; 7.15 Polygons; 7.16 Angles; 7.17 Coordinates; 7.18 Time	8.06 Angles in Parallel Lines; 8.07 Circumference; 8.12 Area of Circles; 8.15 3D Visualisation; 8.16 Volume	9.16 Pythagoras; 9.17 Interior & Exterior Angles; 9.18 Vectors; 9.19 Transformations; 9.20 Plans & Elevations; 9.21 Arcs & Sectors; 9.22 Surface Area	F4/H4 Volume 2; F13 Pythagoras Review; F14/H20 Bearings & Scale Drawings; F16/H18 Right Angled Trigonometry; H21 Transformations 2	F17 Similar Shapes; F18/H35 Congruence; F19/H36 Constructions & Loci; H25 Further Trigonometry; H30 Circle Theorems; H32 Vectors 2; H34 Graphical Transformations

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Curriculum Themes Map – Probability and Statistics

Theme/Big Idea/...	Description	Year 7	Year 8	Year 9	Year 10	Year 11
Probability	Explores chance and uncertainty and the likelihood of events occurring.	9.12 Probability 1	F9/H9 Probability 2			
Statistics	Explores the collection, analysis and interpretation of data to draw conclusions.	7.08 Mean	8.13 Statistics 1; 8.14 Averages & Spread	F10/H10 Statistics 2; H11 Cumulative Frequency & Box Plots	H31 Histograms	

Curriculum Themes Map – Algebra and Proportion

Theme/Big Idea/...	Description	Year 7	Year 8	Year 9	Year 10	Year 11
Algebra	Explores mathematical relationships and generalisations through symbols and notation.	7.03 Introduction to Algebra; 7.05 Expanding & Factorising 1	8.05 Solving Equations 1	9.06 Algebraic Manipulation; 9.09 Expanding & Factorising 2; 9.10 Forming Expressions & Substitution; 9.13 Solving Equations 2; 9.14 Inequalities 1; 9.15 Sequences	F1/H1 Rearranging Formulae; F2/H2 Linear Graphs; F3/H3 Linear Simultaneous Equations; F6/H6 Quadratics Graphical; F7/H7 Quadratics Algebraic; F8/H8 Further Graphs	F15 Algebra Review; H23 Quadratic Sequences; H24 Simultaneous Equations 2; H26 Inequalities 2; H27 Functions; H28 Iteration; H29 Algebraic Proof; H33 Gradients & Area Under a Graph
Proportion	Explores relationships and comparisons between quantities and variables.	8.08 Direct Proportion; 8.10 Percentage Calculations; 8.11 Ratio 1	9.03 Related Calculations; 9.11 Direct & Inverse Proportion	F11/H13 Ratio 2; H14 Ratio 3; H16 Algebraic Proportion		

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Careers opportunities – *Mathematics (KS3)*

Year	Specific opportunities for teaching about carers linked to Science
7	• Statistician. Linked to 7.08 Mean. Statisticians use averages to summarise and interpret large sets of data. • Structural Engineer. Linked to 7.15 Polygons. Structural engineers use properties of shapes, particularly triangles and polygons, when designing stable structures. • Cartographer. Linked to 7.17 Coordinates. Cartographers use coordinate systems to accurately plot locations and create maps.
8	• Water Systems Engineer. Linked to 8.07 Circumference. Engineers working with pipes and circular systems calculate dimensions of circular components. • Pharmacist. Linked to 8.11 Ratio 1. Pharmacists use ratios when calculating medicine concentrations and dosages. • Quantity Surveyor. Linked to 8.16 Volume. Quantity surveyors calculate the volume of concrete, soil and building materials.
9	• Economist. Linked to 9.11 Direct & Inverse Proportion. Economists model relationships where one variable changes in response to another. • Surveyor. Linked to 9.16 Pythagoras. Surveyors use right-angled triangles to determine distances and inaccessible measurements. • Animator / Game Programmer. Linked to 9.18 Vectors. Vectors are used to control direction and movement of objects in games and animation.

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Careers opportunities – *Mathematics (KS4)*

Year	Specific opportunities for teaching about carers linked to Science
10	• Quantity Surveyor Linked to F4 Volume 2 Quantity surveyors calculate the volume of concrete, soil and materials needed for construction projects. • Laboratory Technician Linked to F5 Compound Measures Laboratory technicians use measures such as density, speed and pressure during investigations and testing.
11	• Land Surveyor Linked to F16 Right Angled Trigonometry Land surveyors use trigonometry to calculate heights and distances that cannot be measured directly. • Aerospace Engineer Linked to H32 Vectors 2 Aerospace engineers use vectors to model forces, velocity and direction when designing aircraft and spacecraft. • Cryptographer Linked to H29 Algebraic Proof Cryptographers rely on mathematical proof to show that systems and algorithms work securely.

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