# Mathematics Stage 4: Sample scope and sequence(Core and selected Paths)

The Core–Paths structure is designed to encourage aspiration in students and provide the flexibility needed to enable teachers to create pathways for students working towards Stage 6. The structure is intended to extend students as far along the continuum of learning as possible and provide solid foundations for the highest levels of student achievement. The structure allows for a diverse range of endpoints up to the end of Stage 5.

This scope and sequence is one example of a pathway towards Stage 6 Mathematics Advanced/Extension. It includes Core content and a selection of Paths introduced in Stage 4.

Students should not be locked into a definitive pathway in Stage 4. Teachers are best placed to make programming decisions about pathways towards Stage 6 courses in the middle of students’ Stage 5 learning.

In Mathematics 7–10 there is one overarching **Working mathematically outcome.**

A student develops understanding and fluency in mathematics through: exploring and connecting mathematical concepts; choosing and applying mathematical techniques to solve problems; and communicating their thinking and reasoning coherently and clearly.

## Year 7 – Term 1

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| Weeks 1–3 | Weeks 4–10 |
| **Unit:** Computation with integers**Focus area(s):** Computation with integerscompares, orders and calculates with integers to solve problems | **Unit:** Fractions, decimals and percentages**Focus area(s):** Fractions, decimals and percentagesrepresents and operates with fractions, decimals and percentages to solve problems |
| Outcomes: MA4-INT-C-01Life Skills outcomes: MALS-LAN-01, MALS-COU-01, MALS-REP-01,MALS-COM-01, MALS-ADS-01, MALS-MDI-01 | Outcomes: MA4-FRC-C-01Life Skills outcomes: MALS-FRC-01, MALS-DEP-01 |

## Year 7 – Term 2

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| Weeks 1–3 | Weeks 4–7 | Weeks 8–10 |
| **Unit:** Algebraic techniques**Focus area(s):** Algebraic techniquesgeneralises number properties to operate with algebraic expressions | **Unit:** Equations**Focus area(s):** Equationsapplies algebraic techniques to solve problems involving simple linear and quadratic equations | **Unit:** Probability**Focus area(s):** Probabilitysolves problems involving the probabilities of simple chance experiments |
| Outcomes: MA4-ALG-C-01Life Skills outcomes: MALS-PAT-01 | Outcomes: MA4-EQU-C-01Life Skills outcomes: MALS-ADS-01, MALS-MDI-01 | Outcomes: MA4-PRO-C-01Life Skills outcomes: MALS-PRO-01 |

## Year 7 – Term 3

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| Weeks 1–3 | Weeks 4–7 | Weeks 8–10 |
| **Unit:** Data classification and visualisation**Focus area(s):** Data classification and visualisationclassifies and displays data using a variety of graphical representations | **Unit:** Indices**Focus area(s):** Indicesoperates with primes and roots, positive-integer and zero indices involving numerical bases and establishes the relevant index laws | **Unit:** Angle relationships**Focus area(s):** Angle relationshipsapplies angle relationships to solve problems, including those related to transversals on sets of parallel lines |
| Outcomes: MA4-DAT-C-01Life Skills outcomes: MALS-DAT-01 | Outcomes: MA4-IND-C-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA4-ANG-C-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 7 – Term 4

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| Weeks 1–4 | Weeks 5–6 | Weeks 7–8 | Weeks 9–10 |
| **Unit:** Ratios and rates**Focus area(s):** Ratios and ratessolves problems involving ratios and rates, and analyses distance–time graphs | **Unit:** Perimeter of plane shapes**Focus area(s):** Lengthapplies knowledge of the perimeter of plane shapes and the circumference of circles to solve problems | **Unit:** Area of plane shapes**Focus area(s):** Areaapplies knowledge of area and composite area involving triangles, quadrilaterals and circles to solve problems | **Unit:** Volume**Focus area(s):** Volumeapplies knowledge of volume and capacity to solve problems involving right prisms and cylinders |
| Outcomes: MA4-RAT-C-01Life Skills outcomes: MALS-ADS-01, MALS-MDI-01 | Outcomes: MA4-LEN-C-01Life Skills outcomes: MALS-LEN-01 | Outcomes: MA4-ARE-C-01Life Skills outcomes: MALS-ARE-01 | Outcomes: MA4-VOL-C-01Life Skills outcomes: MALS-VOL-01 |

## Year 8 – Term 1

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| --- | --- | --- |
| Weeks 1–3 | Weeks 4–7 | Weeks 8–10 |
| **Unit:** Pythagoras’ theorem**Focus area(s):** Right-angled triangles (Pythagoras’ theorem)applies Pythagoras’ theorem to solve problems in various contexts | **Unit:** Linear relationships**Focus area(s):** Linear relationshipscreates and displays number patterns and finds graphical solutions to problems involving linear relationships | **Unit:** Properties of geometrical figures**Focus area(s):** Properties of geometrical figuresidentifies and applies the properties of triangles and quadrilaterals to solve problems |
| Outcomes: MA4-PYT-C-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes (for Year 7) | Outcomes: MA4-LIN-C-01Life Skills outcomes: MALS-POS-01 | Outcomes: MA4-GEO-C-01Life Skills outcomes: MALS-GEO-01 |

## Year 8 – Term 2

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| --- | --- | --- | --- |
| Weeks 1–4 | Weeks 5–6 | Week 7 | Weeks 8–10 |
| **Unit:** Data analysis**Focus area(s):** Data analysisanalyses simple datasets using measures of centre, range and shape of the data | **Unit:** Surface area of solids(Stage 5 content)**Focus area(s):** Area and surface area Asolves problems involving the surface area of right prisms and practical problems involving the area of composite shapes and solids | **Unit:** Volume(Stage 5 content)**Focus area(s):** Volume Asolves problems involving the volume of composite solids consisting of right prisms and cylinders | **Unit:** Introduction to networks(Stage 5 content)**Focus area(s):** Introduction to networks (Stn) (Stage 5)solves problems involving the characteristics of graphs/networks, planar graphs and Eulerian trails and circuits |
| Outcomes: MA4-DAT-C-02Life Skills outcomes: MALS-DAT-02 | Outcomes: MA5-ARE-C-01Life Skills outcomes:MALS-ARE-01 | Outcomes: MA5-VOL-C-01Life Skills outcomes: MALS-VOL-01 | Outcomes: MA5-NET-P-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 8 – Term 3

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| --- | --- | --- | --- |
| Weeks 1–3 | Weeks 4–5 | Weeks 6–7 | Weeks 8–10 |
| **Unit:** Algebraic techniques(Stage 5 content)**Focus area(s):** Algebraic techniques Asimplifies algebraic fractions with numerical denominators and expands algebraic expressions | **Unit:** Indices(Stage 5 content)**Focus area(s):** Indices Asimplifies algebraic expressions involving positive-integer and zero indices, and establishes the meaning of negative indices for numerical bases | **Unit:** Indices (continued)(Stage 5 content)**Focus area(s):** Indices B (Adv) (Stage 5)applies the index laws to operate with algebraic expressions involving negative-integer indices | **Unit:** Earning and making money(Stage 5 content)**Focus area(s):** Financial mathematics Aapplies algebraic and numerical techniques to solve financial problems involving simple interest, earning money and spending money |
| Outcomes: MA5-ALG-C-01Life Skills outcomes: MALS-PAT-01 | Outcomes: MA5-IND-C-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-IND-P-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-FIN-C-01Life Skills outcomes: MALS-FIN-01, MALS-FIN-02 |

## Year 8 – Term 4

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| Weeks 1–3 | Weeks 4–5 | Weeks 6–7 | Weeks 8–10 |
| **Unit:** Data analysis (Stage 5 content)**Focus area(s):** Data analysis A and Data analysis C (Stn, Adv) (Stage 5)plans, conducts and reviews a statistical inquiry into a question of interestcompares and analyses datasets using summary statistics and graphical representations | **Unit:** Numbers of any magnitude(Stage 5 content)**Focus area(s):** Numbers of any magnitudesolves measurement problems by using standard form to represent numbers and rounding to a given number of significant figures | **Unit:** Properties of geometrical figures (Stage 5 content)**Focus area(s):** Properties of geometrical figures Aidentifies and applies the properties of similar figures and scale drawings to solve problems | **Revision** |
| Outcomes: MA5-DAT-C-01, MA5-DAT-P-01Life Skills outcomes: MALS-DAT-02 | Outcomes: MA5-MAG-C-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-GEO-C-01Life Skills outcomes: MALS-GEO-01 | **Revision** |

# Mathematics Stage 5: Sample scope and sequence (Core and selected Paths)

The Core–Paths structure is designed to encourage aspiration in students and provide the flexibility needed to enable teachers to create pathways for students working towards Stage 6. The structure is intended to extend students as far along the continuum of learning as possible and provide solid foundations for the highest levels of student achievement. The structure allows for a diverse range of endpoints up to the end of Stage 5.

This scope and sequence is an example of a pathway towards Stage 6 Mathematics Advanced/Extension. It includes Core content and a selection of Paths introduced in Stage 4.

Teachers are best placed to make programming decisions about pathways towards Stage 6 courses in the middle of students’ Stage 5 learning.

In Mathematics 7–10 there is one overarching **Working mathematically outcome.**

A student develops understanding and fluency in mathematics through: exploring and connecting mathematical concepts; choosing and applying mathematical techniques to solve problems; and communicating their thinking and reasoning coherently and clearly.

Stn (Standard), Adv (Advanced) and Ext (Extension) have been used to suggest Paths for related Stage 6 courses.

## Year 9 – Term 1

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| Weeks 1–4 | Weeks 5–7 | Weeks 8–10 |
| **Unit:** Algebraic techniques**Focus area(s):** Algebraic techniques B (Adv) and Algebraic techniques C (Adv)simplifies algebraic fractions involving indices, and expands and factorises algebraic expressionsselects and applies appropriate algebraic techniques to operate with algebraic fractions, and expands, factorises and simplifies algebraic expressions | **Unit:** Equations**Focus area(s):** Equations Asolves linear equations of up to 3 steps, limited to one algebraic fraction | **Unit:** Linear simultaneous equations**Focus area(s):** Equations C (Adv)solves linear simultaneous equations**Note:** exclude study ofcomplex linear, quadratic and simple cubic equations at this point of learning.  |
| Outcomes: MA5-ALG-P-01, MA5-ALG-P-02Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-EQU-C-01Life Skills outcomes: MALS-ADS-01, MALS-MDI-01 | Outcomes: MA5-EQU-P-02Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 9 – Term 2

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| --- | --- | --- | --- |
| Weeks 1–2 | Weeks 3–4 | Weeks 5–8 | Weeks 9–10 |
| **Unit:** Surface area of curved solids**Focus area(s):** Area and surface area B (Stn, Adv)applies knowledge of the surface area of right pyramids and cones, spheres and composite solids to solve problems | **Unit:** Volume**Focus area(s):** Volume B (Stn, Adv)applies knowledge of the volume of right pyramids, cones and spheres to solve problems involving related composite solids | **Unit:** Probability**Focus area(s):** Probability A and Probability B (Adv)solves problems involving probabilities in multistage chance experiments | **Unit:** Right-angled trigonometry**Focus area(s):** Trigonometry Asolves problems involving Venn diagrams, 2-way tables and conditional probability |
| Outcomes: MA5-ARE-P-01Life Skills outcomes:MALS-ARE-01 | Outcomes: MA5-VOL-P-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-PRO-C-01, MA5-PRO-P-01Life Skills outcomes: MALS-PRO-01 | Outcomes: MA5-TRG-C-01Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 9 – Term 3

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| Weeks 1–2 | Weeks 3–7 | Weeks 8–10 |
| **Unit:** Right-angled trigonometry**Focus area(s):** Trigonometry Bapplies trigonometry to solve problems, including bearings and angles of elevation and depression | **Unit:** Linear relationships**Focus area(s):** Linear relationships A, Linear relationships B and Linear relationships C (Adv)determines the midpoint, gradient and length of an interval, and graphs linear relationships with and without digital toolsgraphs and interprets linear relationships using the gradient/slope-intercept formapplies the midpoint, gradient/slope and distance formulas; solves further linear equation problems; and describes symmetry, translations, reflections and rotations on the Cartesian plane | **Unit:** Bivariate data analysis**Focus area(s):** Data analysis Bdisplays and interprets datasets involving 2-variable data |
| Outcomes: MA5-TRG-C-02Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-LIN-C-01, MA5-LIN-C-02, MA5-LIN-P-01Life Skills outcomes: MALS-POS-01 | Outcomes: MA5-DAT-C-02Life Skills outcomes: MALS-DAT-02 |

## Year 9 – Term 4

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| --- | --- | --- |
| Weeks 1–3 | Weeks 4–6 | Weeks 7–10 |
| **Unit:** Indices and surds**Focus area(s):** Indices C (Adv)describes rational and irrational numbers and performs operations with surds and fractional indices | **Unit:** Compound interest and depreciation**Focus area(s):** Financial mathematics Bsolves financial problems involving compound interest and depreciation | **Unit:** Equations**Focus area(s):** Equations B (Adv) and Equations C (Adv)solves monic quadratic equations, linear inequalities and cubic equations of the form $ax^{3}=k$solves complex linear, quadratic and simple cubic equations (excluding simultaneous equations) |
| Outcomes: MA5-IND-P-02Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-FIN-C-02Life Skills outcomes: MALS-FIN-01, MALS-FIN-02 | Outcomes: MA5-EQU-P-01, MA5-EQU-P-02Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 10 – Term 1

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| Weeks 1–3 | Weeks 4–7 | Week 8 | Weeks 9–10 |
| **Unit:** Polynomials**Focus area(s):** Polynomials (Adv, Ext)defines, operates with and graphs polynomials and applies the factor and remainder theorems to solve problems | **Unit:** Non-linear relationships**Focus area(s):** Non-linear relationships A and Non-linear relationships Bidentifies connections between algebraic and graphical representations of quadratic and exponential relationships in various contextsidentifies and compares features of parabolas and exponential curves in various contexts | **Unit:** Variation and rates of change**Focus area(s):** Variation and rates of change A (Stn, Adv)identifies and solves problems involving direct and inverse variation and their graphical representations | **Unit:** Variation and rates of change (continued)**Focus area(s):** Variation and rates of change B (Adv)analyses and constructs graphs relating to rates of change |
| Outcomes: MA5-POL-P-01 | Outcomes: MA5-NLI-C-01, MA5-NLI-C-02 | Outcomes: MA5-RAT-P-01 | Outcomes: MA5-RAT-P-02 |

## Year 10 – Term 2

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| Weeks 1–4 | Weeks 5–7 | Weeks 8–10 |
| **Unit:** Properties of geometrical figures**Focus area(s):** Properties of geometrical figures B (Ext), and Properties of geometrical figures C (Ext)establishes conditions for congruent triangles and similar triangles and solves problems relating to properties of similar figures and plane shapesconstructs proofs involving congruent triangles and similar triangles and proves properties of plane shapes | **Unit:** Non-linear relationships**Focus area(s):** Non-linear relationships C (Adv)interprets and compares non-linear relationships and their transformations, both algebraically and graphically | **Unit:** Non-right-angled trigonometry**Focus area(s):** Trigonometry C (Stn, Adv)applies Pythagoras’ theorem and trigonometry to solve 3-dimensional problems, and applies the sine, cosine and area rules to solve 2-dimensional problems, including bearings |
| Outcomes: MA5-GEO-P-01, MA5-GEO-P-02 | Outcomes: MA5-NLI-P-01 | Outcomes: MA5-TRG-P-01 |

## Year 10 – Term 3

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| Weeks 1–3 | Weeks 4–6 | Weeks 7–10 |
| **Unit:** Trigonometric functions and equations**Focus area(s):** Trigonometry D (Adv)establishes and applies the properties of trigonometric functions and finds solutions to trigonometric equations | **Unit:** Logarithms**Focus area(s):** Logarithms (Adv)establishes and applies the laws of logarithms to solve problems | **Unit:** Functions**Focus area(s):** Functions and other graphs (Adv)uses function notation to describe and graph functions of one variable and graphs inequalities in one and 2 variables |
| Outcomes: MA5-TRG-P-02 | Outcomes: MA5-LOG-P-01 | Outcomes: MA5-FNC-P-01 |

## Year 10 – Term 4

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| Weeks 1–3 | Weeks 4–10 |
| **Unit:** Circle geometry**Focus area(s):** Circle geometry (Ext)applies deductive reasoning to prove circle theorems and solve related problems | **Revision and preparation for Year 11** |
| Outcomes: MA5-CIR-P-01 | **Revision and preparation for Year 11** |