# Mathematics Stage 5: Sample scope and sequence (Core and all 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 Extension.

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 1–3 | Weeks 4–7 | Weeks 8–10 |
| **Unit:** Compound interest and depreciation  **Focus area(s):** Financial mathematics B  solves financial problems involving compound interest and depreciation | **Unit:** Linear relationships  **Focus area(s):** Linear relationships A and Linear relationships B  determines the midpoint, gradient and length of an interval, and graphs linear relationships  graphs and interprets linear relationships using the gradient/slope-intercept form | **Unit:** Bivariate data analysis  **Focus area(s):** Data analysis B  displays and interprets datasets involving bivariate data |
| Outcomes: MA5-FIN-C-02  Life Skills outcomes: MALS-FIN-02 | Outcomes: MA5-LIN-C-01, MA5-LIN-C-02  Life Skills outcomes: MALS-POS-01 | Outcomes: MA5-DAT-C-02  Life Skills outcomes: MALS-DAT-02 |

## Year 9 – Term 2

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| Weeks 1–4 | Weeks 5–7 | Weeks 8–10 |
| **Unit:** Non-linear relationships  **Focus area(s):** Non-linear relationships A and Non-linear relationships B  identifies connections between algebraic and graphical representations of quadratic and exponential relationships in various contexts  identifies and compares features of parabolas and exponential curves in various contexts | **Unit:** Area and surface area  **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 A and Volume B (Stn, Adv)  solves problems involving the volume of composite solids consisting of right prisms and cylinders  applies knowledge of the volume of right pyramids, cones and spheres, including related composite solids |
| Outcomes: MA5-NLI-C-01, MA5-NLI-C-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: **MA5-ARE-P-01**  Life Skills outcomes: MALS-ARE-01 | Outcomes: MA5-VOL-C-01,  MA5-VOL-P-01  Life Skills outcomes: MALS-VOL-01 |

## Year 9 – Term 3

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| Weeks 1–2 | Weeks 3–5 | Weeks 6–8 | Weeks 9–10 |
| **Unit:** Algebraic techniques  **Focus area(s):** Algebraic techniques B (Adv)  simplifies algebraic fractions involving indices, and expands and factorises algebraic expressions | **Unit:** Algebraic techniques (continued)  **Focus area(s):** Algebraic techniques C (Adv)  selects and applies appropriate algebraic techniques used to operate with algebraic fractions, and expands, factorises and simplifies algebraic expressions | **Unit:** Properties of geometrical figures  **Focus area(s):** Properties of geometrical figures B (Ext)  establishes conditions for congruent and similar triangles, and properties of similar figures and plane shapes | **Unit:** Properties of geometrical figures (continued)  **Focus area(s):** Properties of geometrical figures C (Ext)  constructs proofs involving congruent triangles and similar triangles  **Note:** exclude proving properties of plane shapes at this point of learning. |
| Outcomes:  MA5-ALG-P-01  Life Skills outcomes:  Review and consolidate prior Life Skills outcomes | Outcomes: MA5-ALG-P-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-GEO-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes:  MA5-GEO-P-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 9 – Term 4

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| Weeks 1–2 | Weeks 3–5 | Weeks 6–8 | Weeks 9–10 |
| **Unit:** Equations  **Focus area(s):** Equations B (Adv)  solves monic quadratic equations, linear inequalities and cubic equations of the form | **Unit:** Equations (continued)  **Focus area(s):** Equations C (Adv)  solves linear equations of more than 3 steps, monic and non-monic quadratic equations, and linear simultaneous equations | **Unit:** Probability  **Focus area(s):** Probability B (Adv)  solves problems involving Venn diagrams, 2-way tables and conditional probability | **Revision** |
| Outcomes: MA5-EQU-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-EQU-P-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-PRO-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | **Revision** |

## Year 10 – Term 1

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| Weeks 1–4 | Weeks 5–8 | Weeks 9–10 |
| **Unit:** Indices and surds  **Focus area(s):** Indices B (Adv) and Indices C (Adv)  applies the index laws to operate with algebraic expressions involving negative-integer indices  describes and performs operations with surds and factional indices | **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:** Data analysis  **Focus area(s):** Data analysis C (Stn, Adv)  plans, conducts and reviews a statistical inquiry into a question of interest |
| Outcomes: MA5-IND-P-01, MA5-IND-P-02 | Outcomes: MA5-POL-P-01 | Outcomes: MA5-DAT-P-01 |

## Year 10 – Term 2

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| Weeks 1–2 | Weeks 3–5 | Weeks 6–7 | Weeks 8–10 |
| **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 | **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:** Linear relationships  **Focus area(s):** Linear relationships C (Adv)  describes and applies transformations, the midpoint, gradient/slope and distance formulas, and equations of lines to solve problems | **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 |
| Outcomes: MA5-TRG-P-01 | Outcomes: MA5-TRG-P-02 | Outcomes: MA5-LIN-P-01 | Outcomes: MA5-NLI-P-01 |

## Year 10 – Term 3

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| Weeks 1–4 | Weeks 5–7 | Weeks 8–10 |
| **Unit:** Logarithms  **Focus area(s):** Logarithms (Adv)  establishes and applies the laws of logarithms to solve problems | **Unit:** Variation and rates of change  **Focus area(s):** Variation and rates of change A (Stn, Adv) and Variation and rates of change B (Adv)  identifies and solves problems involving direct and inverse variation, and their graphical representations  analyses and constructs graphs relating to rates of change | **Unit:** Functions  **Focus area(s):** Functions and other graphs (Adv)  uses function notation to describe and graph a function of one variable and graphs inequalities in one and 2 variables |
| Outcomes: MA5-LOG-P-01 | Outcomes: MA5-RAT-P-01,  MA5-RAT-P-02 | Outcomes: MA5-FNC-P-01 |

## Year 10 – Term 4

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| Weeks 1–2 | Weeks 3–6 | Weeks 7–10 | |
| **Unit:** Properties of geometrical figures  **Focus area(s):** Properties of geometrical figures C (Ext)  constructs proofs involving congruent triangles and similar triangles and proves properties of plane shapes | **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-GEO-P-02 | Outcomes: MA5-CIR-P-01 | | **Revision and preparation for Year 11** |