Mathematics
K–10

Australian Curriculum

Draft syllabus

Version 2

Consultation period
13 February – 30 April 2012

Published by
Board of Studies NSW
GPO Box 5300
Sydney NSW 2001
Australia

Phone: (02) 9367 8111
Fax: (02) 9367 8484
Internet: www.boardofstudies.nsw.edu.au

February 2012

201111226

Contents

Background information

The *Mathematics K–10 Syllabus* is being developed to deliver the Australian curriculum to NSW schools. The syllabus is being developed within the context of the NSW Board of Studies *K–10 Curriculum Framework*, using the Board's syllabus development process.

A draft syllabus was developed and consultation occurred from June to September 2011. Based on this feedback, a second version of the draft has been prepared for a second round of consultation. The intention in 2012 is to deliver a final syllabus together with initial support materials as part of the Board's syllabus handover processes.

The *Mathematics K–10 Syllabus* will challenge students to meet high, but realistic, expectations as they progress through the years of schooling. It clearly articulates standards that show what students are expected to know and be able to do at each stage from Kindergarten to Year 10. This provides the context for assessment for learning and meaningful reporting of student achievement.

The Board's syllabus development process

This project commenced at the draft syllabus development phase of the Board's syllabus development process. Broad consultation with teachers and other interest groups will precede the finalisation of the syllabus.

The process and timeline for the development of the syllabus follows.

Timeline for the development of the Mathematics K–10 syllabus

Syllabus development	Date
Draft syllabus version 2 released	Term 1 2012
Consultation	Term 1 2012
Publication of the syllabus	Term 3 2012
Initial support materials released	Term 3 2012
Additional support materials released	Term 4 2012

How to respond

As you read the document you will notice the following icons:

ⓘ for your information	This icon indicates general information that assists in reading or understanding the information contained in the document. Text introduced by this icon will not appear in the final syllabus.
✍ consult	This icon indicates material on which responses and views are sought through consultation.

Consultation

The *Mathematics K–10 Draft Syllabus* version 2 is accompanied by an online consultation survey on the Board of Studies website. The purpose of the survey is to obtain detailed comments from individuals and systems/organisations on the draft syllabus version 2. Please comment on both the strengths and the weaknesses of the draft syllabus version 2. Feedback will be considered when the draft syllabus version 2 is modified.

The consultation period is from 13 February to 30 April 2012.

Written responses may be forwarded to:

Curriculum Support Officer, Mathematics
GPO Box 5300
Sydney NSW 2001

Or emailed to: irene.potts@bos.nsw.edu.au

Or faxed to: (02) 9367 8476

The draft syllabus

1 Introduction

1.1 The K–10 curriculum

Board of Studies syllabuses have been developed with respect to some overarching views about education. These include the *K–10 Curriculum Framework*, the Board's *Statement of Equity Principles* and the *Melbourne Declaration on Educational Goals for Young Australians* (December 2008).

In accordance with *the K–10 Curriculum Framework* and the Board's *Statement of Equity Principles*, the *Mathematics K–10 Syllabus* takes into account the diverse needs of all students. It identifies essential knowledge, understanding, skills, values and attitudes. It outlines clear standards of what students are expected to know and be able to do in K–10. It provides structures and processes by which teachers can provide continuity of study for all students.

The framework also provides a set of broad learning outcomes that summarise the knowledge, understanding, skills, values and attitudes essential for all students in all learning areas to succeed in and beyond their schooling.

The continued relevance of the *K–10 Curriculum Framework* is consistent with the intent of the *Melbourne Declaration on Educational Goals for Young Australians (December 2008)* which sets the direction for Australian schooling for the next ten years. There are two broad goals:

> Goal 1: Australian schooling promotes equity and excellence
> Goal 2: All young Australians become successful learners, confident and creative individuals, and active and informed citizens.

The way in which learning in the *Mathematics K–10 Syllabus* will contribute to the curriculum and to the student's achievement of the broad learning outcomes is outlined in the draft syllabus rationale.

1.2 Students with special education needs

The rationale, aim, objectives, outcomes and content of the *Mathematics K–10 Syllabus* have been designed to accommodate teaching approaches that support the learning needs of all students. The stage statements and the continuum of learning can help teachers identify the starting point for instruction for every student, including those with special education needs.

Collaborative curriculum planning will determine the most appropriate curriculum options for all students with special education needs in keeping with their learning needs, strengths, goals and interests.

Most students with special education needs will participate fully in learning experiences based on the regular syllabus outcomes and content. Students may require additional support, including adjustments to teaching, learning and assessment activities.

Adjustments are measures or actions taken in relation to teaching, learning and assessment that enable a student to access syllabus outcomes and content. These adjustments may involve:

- classroom organisation

- appropriate materials and resources to support teaching and learning activities
- the amount of content to be covered in a particular lesson or unit of work or the time allocated to complete work
- additional demonstration of key concepts and skills by the teacher, teacher's aide or a peer
- a range of appropriate learning activities with structured opportunities for guided and independent practice and effective feedback
- additional support through group work, peer or volunteer tutoring, and other individual assistance.

Kindergarten – Year 6

In Kindergarten to Year 6, it is important for all students to have the opportunity to participate fully in and progress through the curriculum. As they move through the developmental stages of learning, students demonstrate individual strengths and establish preferred ways of learning.

There are several curriculum options for students with special education needs in K–6. Students may:

- engage with selected outcomes and content appropriate to their learning needs
- engage with syllabus outcomes and content with adjustments,
- engage with outcomes from an earlier stage, using age-appropriate content.

All decisions regarding curriculum options for students with special education needs should be made through the collaborative curriculum planning process, to ensure that syllabus outcomes and content reflect the learning needs and priorities of individual students.

In addition, the NSW K–6 curriculum provides for students with special education needs through:

- inclusive syllabus outcomes and content accessible by the full range of students
- additional advice and programming support for teachers on how to assist students to access the outcomes of the syllabus
- specific support documents for students with special education needs as part of the overall syllabus package.

Years 7–10

Students build on their achievement in Kindergarten to Year 6 as they undertake courses to meet requirements of the Years 7–10 curriculum. Students with special education needs can access the Years 7–10 syllabus outcomes and content in a range of ways including:

- under regular course arrangements
- through outcomes from a different stage (ES1–S5), using age-appropriate content
- with adjustments to teaching, learning and/or assessment experiences
- through Years 7–10 Life Skills outcomes and content.

For some students with special education needs, particularly those students with an intellectual disability, it may be determined that the Stage 4 and Stage 5 outcomes are not appropriate to meet the needs of the student, even with adjustments to teaching, learning and assessment. For these students, the Years 7–10 Life Skills outcomes and content can provide the basis for developing a rigorous, relevant, accessible and meaningful age-appropriate program. A range of adjustments should be explored before a decision is made to access Years 7–10 Life Skills outcomes and content.

The Years 7–10 Life Skills outcomes and content are developed from the objectives of the *Mathematics K–10 Syllabus*. Further information about accessing and implementing Mathematics Years 7–10 Life Skills outcomes and content can be found in the Mathematics support document and *Life Skills Years 7–10: Advice on Planning, Programming and Assessment.*

School principals have the authority to approve student access to courses based on Years 7–10 Life Skills outcomes and content, and to determine the appropriateness of making adjustments to curriculum and assessment for individual students.

The Years 7–10 Life Skills outcomes and content are in section 8 of the syllabus. Assessment and reporting information for students with special education needs is in section 10.

2 Rationale

ⓘ for your information

The rationale describes the distinctive nature of the subject and outlines its relationship to the contemporary world and current practice. It explains the place and purpose of the subject in the curriculum and how Mathematics contributes to the achievement of the broad learning outcomes of the *K–10 Curriculum Framework*.

✍ consult

Mathematics is a reasoning and creative activity employing abstraction and generalisation to identify, describe and apply patterns and relationships. The symbolic nature of mathematics provides a powerful, precise and concise means of communication.

Mathematical ideas have evolved across all cultures over thousands of years and are constantly developing. Digital technologies facilitate this expansion of ideas, providing access to new tools for continuing mathematical exploration and invention. Mathematics is integral to scientific and technological advances in many fields of endeavour. In addition to its practical applications, the study of mathematics is a valuable pursuit in its own right, providing opportunities for originality, challenge and leisure.

Mathematics in K–10 provides students with knowledge, understanding and skills in Number and Algebra, Measurement and Geometry and Statistics and Probability. It focuses on developing increasingly sophisticated and refined mathematical understanding, fluency, logical reasoning, analytical thought and problem-solving skills. These capabilities enable students to respond to familiar and unfamiliar situations by employing strategies to make informed decisions and solve problems relevant to their further education and everyday lives.

The Mathematics curriculum makes clear the links between the various components of mathematics, as well as the relationship between mathematics and other disciplines. Students learn to apply their mathematical knowledge, understanding and skills in a broad range of contexts beyond the mathematics classroom, including in such core learning areas as science, geography, history and English.

The study of mathematics provides opportunities for students to appreciate the elegance and power of mathematical reasoning and apply mathematical understanding creatively and efficiently. The study of the subject enables students to develop a positive self-concept as learners of mathematics, obtain enjoyment from mathematics, and become self-motivated learners through inquiry and active participation in challenging and engaging experiences.

The ability to make informed decisions and to interpret and apply mathematics in a variety of contexts, is an essential component of students' preparation for life in the 21st century. To participate fully in society students need to develop the capacity to critically evaluate ideas and arguments that involve mathematical concepts or that are presented in mathematical form.

3 The place of the Mathematics K–10 syllabus in the K–12 curriculum

ⓘ for your information

This section of the syllabus demonstrates the relationship between the K–10 syllabus and other associated courses. It shows the possible pathways of learning in the learning area.

✍ consult

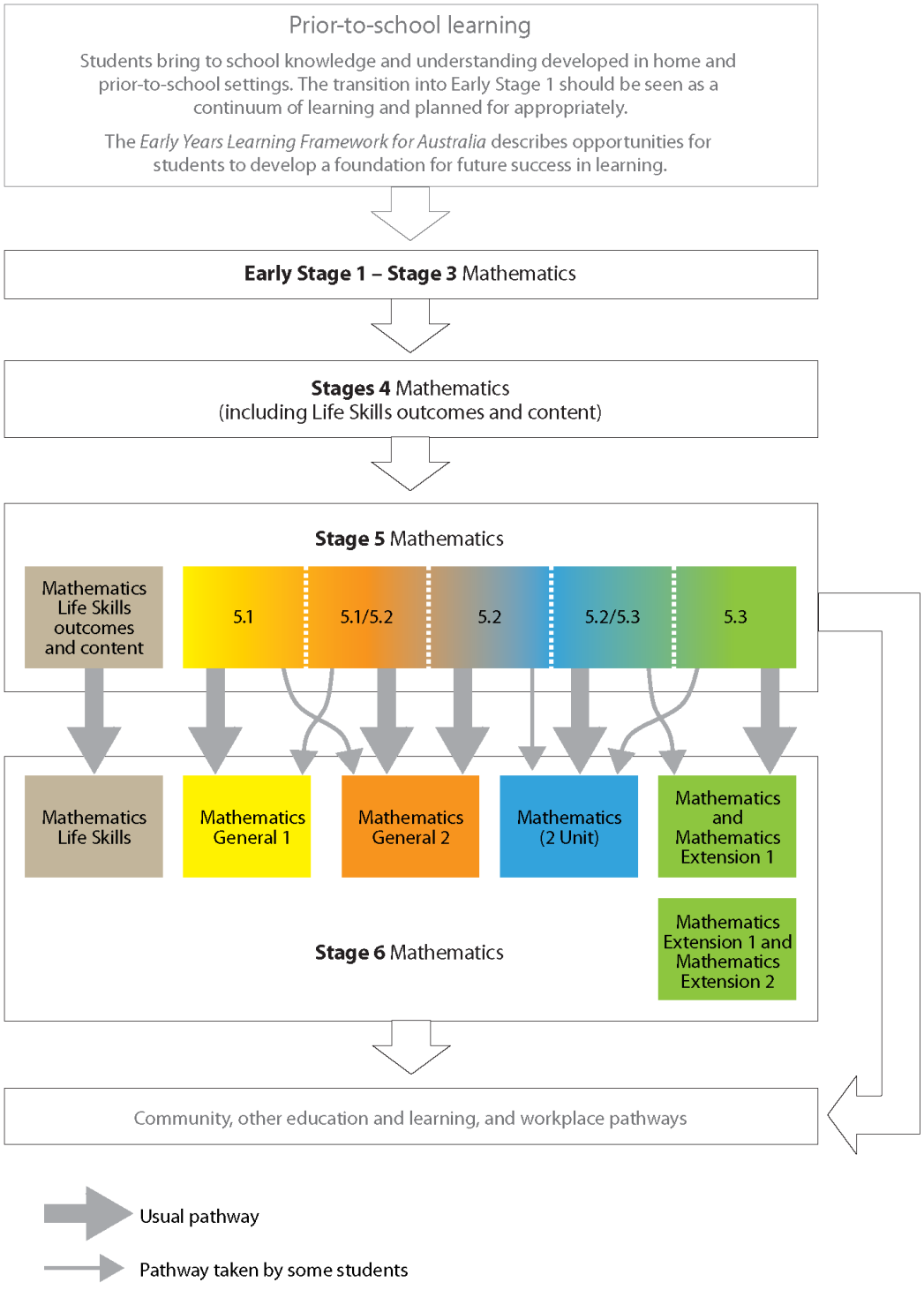
The *Mathematics K–10 Syllabus* describes a continuum of mathematics learning from Kindergarten to Year 10. The Stage 6 syllabuses describe the Preliminary and HSC courses in Years 11 and 12 and therefore represent the mathematics learning for all students who study mathematics in those years.

The following diagram represents available pathways of learning in mathematics from Early Stage 1 to Stage 6.

Students exhibit a wide range of mathematical skills, abilities and aspirations. Some students may be aiming to develop the mathematical skills necessary to function in daily life and various work contexts. Other students may seek to address more challenging mathematics to prepare them for the highest-level courses in Year 11 and Year 12.

For this reason three of the multiple pathways available in Stage 5 have been expressed in terms of the (sub)Stages 5.1, 5.2 and 5.3. These pathways are not designed as prescribed courses. As well as studying the Stage 5.1 content, the majority of students will study some or all of the Stage 5.2 content. Similarly, as well as studying the Stage 5.2 content, many students will study some or all of the Stage 5.3 content.

The Mathematics Life Skills outcomes and content are designed to provide a relevant and meaningful program of study for a small percentage of students with special education needs, for whom the Stage 4 and/or Stage 5 outcomes and content of the *Mathematics K–10 Syllabus* are not appropriate.


Prior-to-school learning
Students bring to school knowledge and understanding developed in home and prior-to-school settings. The transition into Early Stage 1 should be seen as a continuum of learning and planned for appropriately.
The *Early Years Learning Framework for Australia* describes opportunities for students to develop a foundation for future success in learning.
Early Stage 1 – Stage 3 Mathematics
Stages 4 Mathematics
(including Life Skills outcomes and content)
Stage 5 Mathematics
Mathematics Life Skills outcomes and content
5.1
5.1/5.2
5.2
5.2/5.3
5.3
Mathematics Life Skills
Mathematics General 1
Mathematics General 2
Mathematics (2 Unit)
Mathematics and Mathematics Extension 1
Mathematics Extension 1 and Mathematics Extension 2
Stage 6 Mathematics
Community, other education and learning, and workplace pathways
Usual pathway
Pathway taken by some students

4 Aim

ⓘ for your information

The aim provides a succinct statement of the overall purpose of the syllabus. It indicates the general educational benefits for students from programs based on the syllabus.

✍ Consult

The aim of Mathematics in K–10 is for students to:

- be confident, creative users and communicators of mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens
- develop an increasingly sophisticated understanding of mathematical concepts and fluency with processes, and be able to pose and solve problems and reason in Number and Algebra, Measurement and Geometry and Statistics and Probability
- recognise connections between the areas of mathematics and other disciplines and appreciate mathematics as an accessible, enjoyable discipline to study, and an important aspect of lifelong learning.

5 Objectives

ⓘ for your information

Objectives provide specific statements of the intention of a syllabus and amplify its aims. They act as organisers for the intended outcomes and define, in broad terms, the knowledge, understanding, skills and values and attitudes to be developed through study in the subject.

Objectives will be organised under the areas of:

- knowledge, understanding and skills
- values and attitudes.

✍ consult

Knowledge, understanding and skills

Students:

Working Mathematically
- understand and connect related mathematical concepts, choosing, applying and communicating approaches in order to investigate and solve problems

Number and Algebra
- develop efficient strategies for numerical calculation, recognise patterns, describe relationships and apply algebraic techniques and generalisation

Measurement and Geometry
- identify, visualise and quantify time, location and shape, applying formulas, strategies and geometric reasoning

Statistics and Probability
- collect, represent, analyse, interpret and evaluate data, assign and use probabilities, and make sound judgements.

Values and attitudes

Students:

- appreciate mathematics as an essential and relevant part of life, recognising that its cross-cultural development has been largely in response to human needs
- demonstrate interest, enjoyment and confidence in the pursuit and application of mathematical knowledge, understanding and skills to solve everyday problems
- develop and demonstrate perseverance in undertaking mathematical challenges.

6 Outcomes

ⓘ for your information

Syllabus outcomes provide detail about what students are expected to achieve at the end of each stage in relation to the objectives. They indicate the knowledge, understanding and skills expected to be gained by most students as a result of effective teaching and learning by the end of a stage. They are derived from the objectives of the syllabus.

✍ consult

Early Stage 1 – Stage 3

Table of objectives and outcomes

Objective – Working Mathematically Students: • understand and connect related mathematical concepts, choosing, applying and communicating approaches in order to investigate and solve problems			
Early Stage 1 outcomes A student:	**Stage 1 outcomes** A student:	**Stage 2 outcomes** A student:	**Stage 3 outcomes** A student:
MAe-1WM describes mathematical situations using everyday language, actions, materials and informal recordings	MA1-1WM describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols	MA2-1WM uses appropriate terminology to describe, and symbols to represent, mathematical ideas	MA3-1WM describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions
MAe-2WM uses objects, actions, technology and/or trial and error to explore mathematical problems	MA1-2WM uses objects, diagrams and technology to explore mathematical problems	MA2-2WM selects and uses appropriate mental or written strategies, or technology, to solve problems	MA3-2WM selects and applies appropriate problem-solving strategies, including technological applications, in undertaking investigations
MAe-3WM uses concrete materials and/or pictorial representations to support conclusions	MA1-3WM supports conclusions by explaining or demonstrating how answers were obtained	MA2-3WM checks the accuracy of a statement and explains the reasoning used	MA3-3WM gives a valid reason for supporting one possible solution over another

Objective – Number and Algebra
Students:
- develop efficient strategies for numerical calculation, recognise patterns, describe relationships and apply algebraic techniques and generalisation

Early Stage 1 outcomes A student:	**Stage 1 outcomes** A student:	**Stage 2 outcomes** A student:	**Stage 3 outcomes** A student:
MAe-4NA counts to 30, and orders, reads and represents numbers in the range 0 to 20	MA1-4NA counts, orders, reads and represents two- and three-digit numbers	MA2-4NA orders, reads and represents numbers of up to five digits	MA3-4NA orders, reads and represents numbers of any size
MAe-5NA combines, separates and compares collections of objects, describes using everyday language and records using informal methods	MA1-5NA uses a range of mental strategies and informal recording methods for addition and subtraction involving one- and two-digit numbers	MA2-5NA uses mental and written strategies for addition and subtraction involving two-, three- and four-digit numbers	MA3-5NA selects and applies appropriate strategies for addition and subtraction with counting numbers of any size
MAe-6NA groups, shares and counts collections of objects, describes using everyday language and records using informal methods	MA1-6NA uses a range of mental strategies and concrete materials for multiplication and division	MA2-6NA uses mental and informal written strategies for multiplication and division	MA3-6NA selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation
MAe-7NA describes two equal parts as halves	MA1-7NA represents and models halves, quarters and eighths	MA2-7NA represents, models and compares commonly used fractions and decimals	MA3-7NA compares, orders and calculates with decimals, simple fractions and simple percentages
MAe-8NA recognises, describes and continues repeating patterns and number patterns that increase or decrease	MA1-8NA creates, represents and continues a variety of patterns, and builds and completes number relationships	MA2-8NA generates number patterns and completes simple number sentences by calculating missing values	MA3-8NA analyses and creates geometric and number patterns, and constructs and completes number sentences involving the four operations

Objective – Measurement and Geometry
Students:
- identify, visualise and quantify time, location and shape, applying formulas, strategies and geometric reasoning

Early Stage 1 outcomes A student:	**Stage 1 outcomes** A student:	**Stage 2 outcomes** A student:	**Stage 3 outcomes** A student:
MAe-9MG describes and compares lengths and distances using everyday language	MA1-9MG estimates, measures, compares and records lengths and distances using informal units, metres and centimetres	MA2-9MG estimates, measures, compares and records lengths, distances and perimeters in metres, centimetres and millimetres	MA3-9MG selects and uses the appropriate unit and device to measure lengths, distances and perimeters, and converts between units of length
MAe-10MG describes and compares areas using everyday language	MA1-10MG estimates, measures, compares and records areas using informal units	MA2-10MG estimates, measures, compares and records areas using square centimetres and square metres	MA3-10MG selects and uses the appropriate unit to calculate areas, including the areas of squares, rectangles and triangles
MAe-11MG describes and compares the capacities of containers and the volumes of objects or substances using everyday language	MA1-11MG estimates, measures, compares and records capacities and volumes using informal units	MA2-11MG estimates, measures, compares and records capacities and volumes using litres, millilitres and cubic centimetres	MA3-11MG selects and uses the appropriate unit to estimate, measure and calculate volumes and capacities, and converts between units of capacity
MAe-12MG describes and compares masses of objects using everyday language	MA1-12MG estimates, measures, compares and records masses of objects using informal units	MA2-12MG estimates, measures, compares and records masses of objects using kilograms and grams	MA3-12MG selects and uses the appropriate unit and device to measure masses of objects, and converts between units of mass
MAe-13MG sequences events, using everyday language to describe the durations of activities, and reads hour time on clocks	MA1-13MG describes, compares and orders durations of events, and reads half- and quarter-hour time	MA2-13MG reads and records time in one-minute intervals and converts between hours, minutes and seconds	MA3-13MG uses twenty-four hour time and am and pm notation in real-life situations, and constructs timelines
MAe-14MG manipulates, sorts and represents three-dimensional objects and describes them using everyday language	MA1-14MG sorts, describes, represents and recognises three-dimensional objects	MA2-14MG makes, compares, sketches and names three-dimensional objects, and describes their features	MA3-14MG identifies three-dimensional objects on the basis of their properties, and visualises, sketches and constructs them given drawings of different views
MAe-15MG manipulates, sorts and describes representations of two-dimensional shapes using everyday language	MA1-15MG manipulates, sorts, represents, describes and explores two-dimensional shapes	MA2-15MG manipulates, classifies and sketches two-dimensional shapes, including quadrilaterals, and describes their features	MA3-15MG manipulates, classifies and draws two-dimensional shapes, including triangles, and describes their properties
MAe-16MG describes position and gives and follows simple directions using everyday language	MA1-16MG represents and describes the position of objects in everyday situations and on maps	MA2-16MG identifies, compares and describes angles	MA3-16MG classifies, measures and constructs angles
		MA2-17MG uses simple maps and grids to represent position and follow routes, including directions using a compass	MA3-17MG locates and describes position on maps using a grid reference system

Objective – Statistics and Probability Students: • collect, represent, analyse, interpret and evaluate data, assign and use probabilities, and make sound judgements			
Early Stage 1 outcomes A student:	**Stage 1 outcomes** A student:	**Stage 2 outcomes** A student:	**Stage 3 outcomes** A student:
MAe-17SP represents data and interprets data displays made from objects and pictures	MA1-17SP gathers and organises data, represents data in column and picture graphs, and interprets the results	MA2-18SP selects appropriate data collection methods and constructs, compares and interprets data displays	MA3-18SP uses appropriate data collection methods, constructs and interprets data displays, and analyses sets of data
	MA1-18SP recognises and describes the elements of chance in everyday events	MA2-19SP describes and compares chance events in social and experimental contexts	MA3-19SP orders the likelihood of simple events using fractions

Stage 4 – Stage 5

Table of objectives and outcomes

Objective – Working Mathematically Students: • understand and connect related mathematical concepts, choosing, applying and communicating approaches in order to investigate and solve problems			
Stage 4 outcomes	**Stage 5 outcomes**		
A student:	**Stage 5.1** A student:	**Stage 5.2** A student:	**Stage 5.3** A student:
MA4-1WM communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols	MA5.1-1WM uses appropriate terminology, diagrams and symbols in mathematical contexts	MA5.2-1WM selects appropriate notations and conventions to communicate mathematical ideas and solutions	MA5.3-1WM uses and interprets formal definitions and generalisations when explaining solutions and/or conjectures
MA4-2WM applies appropriate mathematical techniques to solve problems	MA5.1-2WM selects and uses appropriate strategies to solve problems	MA5.2-2WM interprets mathematical or real-life situations, systematically applying appropriate strategies to solve problems	MA5.3-2WM generalises mathematical ideas and techniques to analyse and solve problems efficiently
MA4-3WM recognises and explains mathematical relationships using reasoning	MA5.1-3WM provides reasoning to support conclusions which are appropriate to the context	MA5.2-3WM constructs arguments to prove and justify results	MA5.3-3WM uses deductive reasoning in presenting arguments and formal proofs

Objective – Number and Algebra
Students:
- develop efficient strategies for numerical calculation, recognise patterns, describe relationships and apply algebraic techniques and generalisation

Stage 4 outcomes A student:	**Stage 5.1 outcomes** A student:	**Stage 5.2 outcomes** A student:	**Stage 5.3 outcomes** A student:
MA4-4NA compares, orders and calculates with integers, applying a range of strategies to aid computation	MA5.1-4NA solves financial problems involving earning, spending and investing money	MA5.2-4NA solves financial problems involving compound interest	MA5.3-4NA draws, interprets and analyses graphs of physical phenomena
MA4-5NA operates with fractions, decimals and percentages	MA5.1-5NA operates with algebraic expressions involving positive-integer and zero indices, and establishes the meaning of negative indices for numerical bases	MA5.2-5NA recognises direct and indirect proportion, and solves problems involving direct proportion	MA5.3-5NA selects and applies appropriate algebraic techniques to operate with algebraic expressions
MA4-6NA solves financial problems involving purchasing goods	MA5.1-6NA determines the midpoint, gradient and length of an interval, and graphs linear relationships	MA5.2-6NA simplifies algebraic fractions, and expands and factorises quadratic expressions	MA5.3-6NA performs operations with surds and indices
MA4-7NA operates with ratios and rates, and explores their graphical representation	MA5.1-7NA graphs simple non-linear relationships	MA5.2-7NA applies index laws to operate with algebraic expressions involving integer indices	MA5.3-7NA solves complex linear, quadratic and simultaneous equations, and rearranges literal equations
MA4-8NA generalises number properties to operate with algebraic expressions		MA5.2-8NA solves linear and simple quadratic equations, linear inequalities and linear simultaneous equations, using analytical and graphical techniques	MA5.3-8NA uses formulas to find midpoint, gradient and distance, and applies standard forms of the equation of a straight line
MA4-9NA operates with positive-integer and zero indices of numerical bases		MA5.2-9NA uses the gradient-intercept form to interpret and graph linear relationships	MA5.3-9NA sketches and interprets a variety of non-linear relationships
MA4-10NA uses algebraic techniques to solve simple linear equations		MA5.2-10NA connects algebraic and graphical representations of simple non-linear relationships	MA5.3-10NA recognises, describes and sketches polynomials, and applies the factor and remainder theorems to solve problems
MA4-11NA creates and displays number patterns; graphs and analyses linear relationships; and performs transformations on the Cartesian plane			MA5.3-11NA uses the definition of a logarithm to establish and apply the laws of logarithms
			MA5.3-12NA uses function notation to describe and sketch functions

Objective – Measurement and Geometry
Students:
- identify, visualise and quantify time, location and shape, applying formulas, strategies and geometric reasoning

Stage 4 outcomes A student:	**Stage 5.1 outcomes** A student:	**Stage 5.2 outcomes** A student:	**Stage 5.3 outcomes** A student:
MA4-12MG calculates the perimeter of plane shapes and the circumference of circles	MA5.1-8MG calculates the area of composite shapes, and the surface area of rectangular and triangular prisms	MA5.2-11MG calculates the surface area of right prisms, cylinders and related composite solids	MA5.3-13MG applies formulas to find the surface area of right pyramids, right cones, spheres and related composite solids
MA4-13MG uses formulas to calculate the area of quadrilaterals and circles, and converts between units of area	MA5.1-9MG interprets very small and very large units of measurement, uses scientific notation, and rounds to significant figures	MA5.2-12MG applies formulas to calculate the volume of composite solids composed of right prisms and cylinders	MA5.3-14MG applies formulas to find the volume of right pyramids, right cones, spheres and related composite solids
MA4-14MG uses formulas to calculate the volume of prisms and cylinders, and converts between units of volume	MA5.1-10MG applies trigonometry, given diagrams, to solve problems, including problems involving angles of elevation and depression	MA5.2-13MG applies trigonometry to solve problems, including problems involving bearings	MA5.3-15MG applies Pythagoras' theorem, trigonometric relationships, the sine rule, the cosine rule and the area rule, to solve problems, including problems involving three dimensions
MA4-15MG performs calculations of time that involve mixed units, and interprets time zones	MA5.1-11MG describes and applies the properties of similar figures and scale drawings	MA5.2-14MG calculates the angle sum of any polygon and uses minimum conditions to prove triangles are congruent	MA5.3-16MG proves triangles are similar, and uses formal geometric reasoning to establish properties of triangles and quadrilaterals
MA4-16MG applies Pythagoras' theorem to calculate side lengths in right-angled triangles, and solves related problems			MA5.3-17MG applies deductive reasoning to prove circle theorems and to solve related problems
MA4-17MG classifies, describes and uses the properties of triangles and quadrilaterals, and determines congruent triangles to find unknown side lengths and angles			
MA4-18MG identifies and uses angle relationships, including those related to transversals on sets of parallel lines			

Objective – Statistics and Probability Students: • collect, represent, analyse, interpret and evaluate data, assign and use probabilities, and make sound judgements			
Stage 4 outcomes A student:	**Stage 5.1 outcomes** A student:	**Stage 5.2 outcomes** A student:	**Stage 5.3 outcomes** A student:
MA4-19SP collects, represents and interprets single sets of data, using appropriate statistical displays	MA5.1-12SP uses statistical displays to compare sets of data, and evaluates statistical claims made in the media	MA5.2-15SP uses quartiles and box plots to compare sets of data, and evaluates sources of data	MA5.3-18SP uses standard deviation to analyse data
MA4-20SP analyses single sets of data using measures of location and range	MA5.1-13SP calculates relative frequencies to estimate probabilities of simple and compound events	MA5.2-16SP investigates relationships between two statistical variables, including their relationship over time	MA5.3-19SP investigates the relationship between numerical variables using lines of best fit, and explores how data is used to inform decision making processes
MA4-21SP represents probabilities of simple and compound events		MA5.2-17SP describes and calculates probabilities in multi-step chance experiments	

Years 7–10 Life Skills outcomes

For some students with special education needs, particularly those students with an intellectual disability, it may be determined that the Stage 4 and 5 outcomes and content are not appropriate. For these students, Life Skills outcomes and content can provide a relevant and meaningful program. Refer to section 1 for further information about curriculum options for students with special education needs. Years 7–10 Life Skills outcomes and content are in section 8.