



Mathematics

Stage 6

Writing Brief

**Courses: Mathematics General 1
Mathematics General 2**

2007

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1 Writing Brief

1 Writing Brief

Preparation of a writing brief takes place in Phase 2 of the Board of Studies' syllabus development process (see page 7).

1.1 Purpose

This writing brief will be used to guide the development of the new Mathematics Stage 6 courses Mathematics General 1 and Mathematics General 2. (A further writing brief has been developed for the new Mathematics Stage 6 courses: Mathematics Advanced, Mathematics Extension 1, and Mathematics Extension 2.) The writing brief will provide the detailed 'blueprint' for the development of the courses.

The final syllabus documents will be developed during the next phase (*Syllabus Development Phase*) of the syllabus development process.

1.2 Structure

The writing brief is structured as follows:

Sections 1 to 3 of the document provide background reading on the development of the writing brief. Sections 4 and 5 provide details of the proposed structure of the new Mathematics Stage 6 courses, the place of the courses in the K–12 curriculum, and proposed elements of the Mathematics General 1 and Mathematics General 2 courses. Section 6 is a glossary of syllabus terms for the assistance of teachers. Section 7 provides information in relation to proposed syllabus support materials, while Section 8 (Appendix) contains the Broad Directions for the Mathematics Stage 6 syllabus writing briefs.

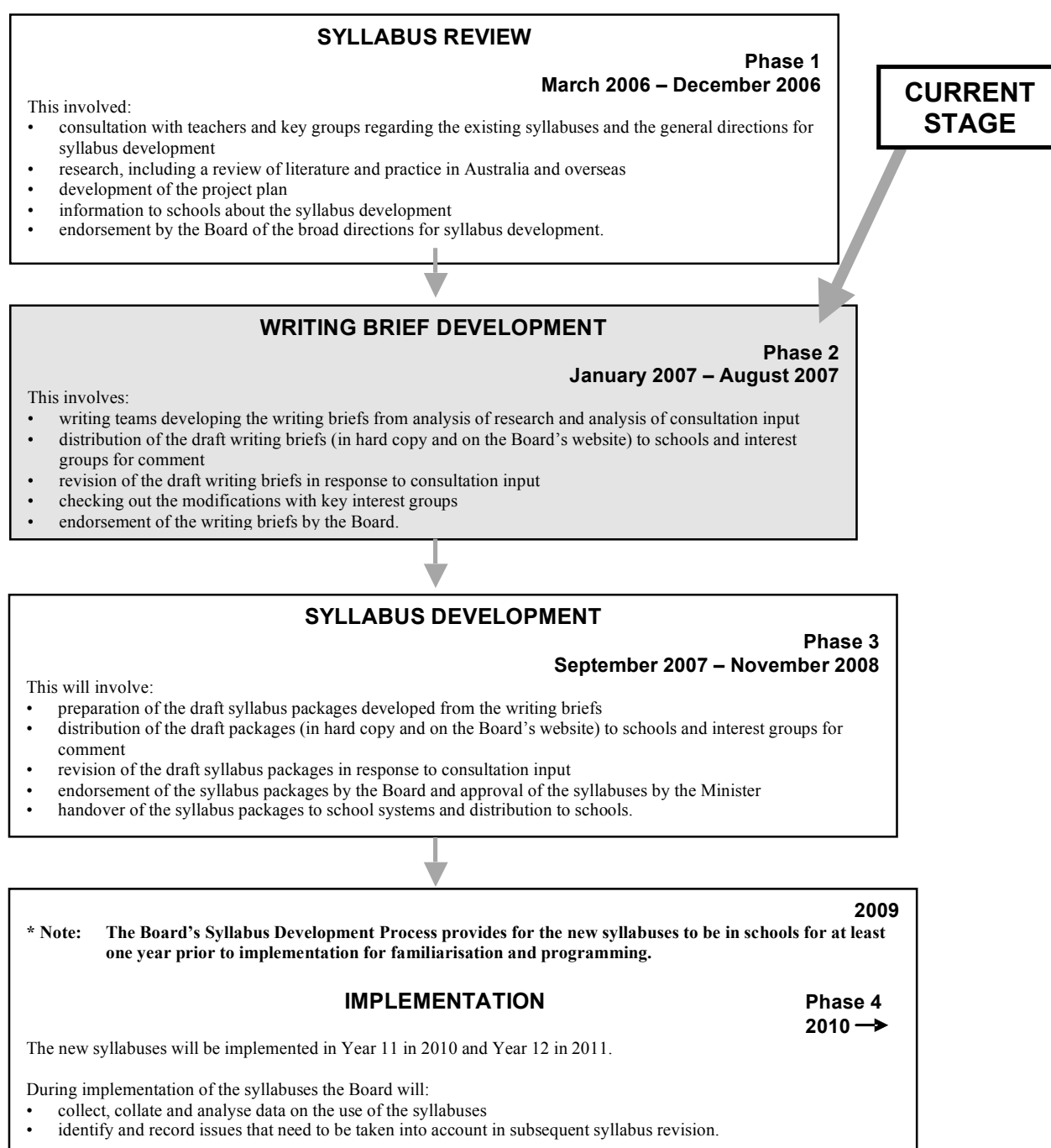
2 Syllabus Development

2 Syllabus Development

2.1 Mathematics Stage 6 syllabus development process

Syllabuses in New South Wales are developed in accordance with the Board of Studies' syllabus development process. This process is detailed in the Board's *Syllabus Development Handbook* (July 2006), which is available on the Board's website (www.boardofstudies.nsw.edu.au/manuals/#syl_develop_process).

Syllabus Review, the first phase of the development of new Mathematics Stage 6 syllabuses, is now complete. This phase involved several key data-collection strategies, including oral and written submissions, a symposium, a survey of a sample of schools, and a literature and curriculum review.



2.2 Timeline for the development of the syllabus packages for the Mathematics Stage 6 courses

The syllabus packages for the Mathematics Stage 6 courses will be developed in accordance with:

- the Board's *Syllabus Development Handbook*, a copy of which is available on the Board's website (www.boardofstudies.nsw.edu.au/manuals/#syl_develop_process).
- the syllabus development plan for the Mathematics Stage 6 syllabuses set out below.

Steps in the syllabus development process	Date
Syllabus Review <ul style="list-style-type: none"> • Oral submissions • Written submissions • Symposium • Surveys of a sample of schools • Literature and curriculum review 	24–25 May 2006 closed 30 June 2006 19 August 2006 closed 18 September 2006 August–September 2006
Writing Brief Development <ul style="list-style-type: none"> • Preparation of draft writing briefs and surveys • Consultation (five weeks) • Development of consultation reports and revision of draft writing briefs 	January 2007 – April 2007 1 May 2007 – 1 June 2007 June 2007 – August 2007
Syllabus Development <ul style="list-style-type: none"> • Development of draft syllabuses and surveys • Consultation (eight weeks) • Development of consultation reports and revision of draft syllabuses • Distribution of syllabuses • Development and distribution of specimen examination papers and marking guidelines 	September 2007 – April 2008 5 May 2008 – 27 June 2008 July 2008 – October 2008 November 2008 (Date to be determined)
Note: Support Materials The nature of proposed support materials is presented in section 7.	

3 Background Information

3 Background Information

3.1 Evaluation and review of the current Stage 6 Mathematics syllabuses

The current *Mathematics 2/3 Unit Syllabus – Years 11–12* was introduced in 1983, while the current *4 Unit Mathematics Syllabus* was introduced in 1980, with some amendment in 1989. The current General Mathematics course was introduced in 2000 as part of the New Higher School Certificate.

The Board of Studies initiated the revision of the suite of Stage 6 Mathematics courses, following the completion of new K–6 and Years 7–10 Mathematics syllabuses in 2002, to ensure an up-to-date and cohesive K–12 continuum of mathematics learning and teaching in New South Wales that meets the needs of the full range of students.

In 1998, the Board undertook the evaluation of all existing Higher School Certificate (HSC) courses against the specific criteria of the Government’s White Paper *Securing Their Future* (August 1997). For Stage 6 Mathematics, two evaluation reports were developed: *Mathematics 2/3/4 Unit* and *Non-Calculus-Based Mathematics (incorporates Mathematics in Society and Mathematics in Practice)*.

Following the release of these reports, the Board endorsed the development of a single, non-calculus-based course (which became General Mathematics) to replace Mathematics in Society and Mathematics in Practice and the maintenance of the 2, 3 and 4 Unit courses for the immediate future, with ‘minimal change to existing content’. The Board also agreed to ‘a longer-term, comprehensive review of the present 2/3/4 Unit courses by an appropriately constituted expert committee’.

The *General Mathematics Syllabus* was released to schools in June 1999, with the study of the Preliminary course undertaken for the first time in 2000, and the first HSC examination undertaken in 2001. As an interim arrangement for the introductory years of the new HSC, the Board of Studies maintained the course content, internal assessment arrangements and examination specifications of the 2, 3 and 4 Unit Mathematics courses from the previous HSC. The new HSC standards-referencing procedures that were introduced for all new HSC Board-developed courses were also put in place for these Mathematics courses, which were renamed Mathematics, Mathematics Extension 1 and Mathematics Extension 2 respectively.

In July 2000, the NSW Government announced the review of Years 7–10 Mathematics following its 1999 commitment in *Literacy and Numeracy Plan: Focusing on the basics* that ‘A new Years 7–10 Mathematics syllabus will be developed to ensure it provides students with the skills, knowledge and understanding required and appropriately prepares students for the New School Certificate and the New Higher School Certificate’. At about this time, the Board of Studies announced the review and development of the K–6 Mathematics syllabus.

The review and development of K–10 Mathematics consequently became the focus of Mathematics curriculum development in 2000–2002, with its completion a necessary prerequisite to the ‘longer term, comprehensive review of the present 2/3/4 Unit courses’ agreed to by the Board in 1998.

With the completion of the new K–6 and Years 7–10 syllabuses at the end of 2002, a plan was established for the review and development of the Stage 6 calculus-based Mathematics courses. In considering the plan, the Board felt that it would be necessary to review the full Stage 6 Mathematics provision, taking account of the needs of less able students as well as those who would undertake the higher-level calculus-based courses. The Board endorsed the plan for the review and development of the full Stage 6 Mathematics course provision in December 2004.

3.2 Scope of Mathematics Stage 6 review and development

The implementation of the plan in 2006, with the commencement of the *Mathematics Stage 6 Review and Development Project*, recognised the importance of teachers having appropriate time to focus on the implementation of the new *Mathematics Years 7–10 Syllabus*, and the value of obtaining feedback following 2004 and 2005, the initial years of implementation.

The first phase of the project, *Syllabus Review*, commenced in March 2006. The main purpose in undertaking the *Syllabus Review* phase was to review the existing Mathematics course provision and to establish Broad Directions for revision and development.

A range of strategies was used to gather data in the *Syllabus Review* phase. The most significant of these were:

- oral submissions
- written submissions
- a survey of a sample of schools
- a symposium
- a literature and curriculum review.

The information obtained through the data-gathering strategies used in the *Syllabus Review* phase was analysed to identify issues that need to be considered in the revision and development of Stage 6 Mathematics courses. Key findings were synthesised from the data and a set of draft Broad Directions for the revision and development compiled.

The Board's endorsement of the Broad Directions at its December 2006 meeting represented the conclusion of the *Syllabus Review* phase of the project. The Broad Directions have guided the development of the draft Writing Briefs for the calculus-based, and non-calculus-based, Stage 6 Mathematics courses.

(See Appendix for the Broad Directions.)

4 Structure of the Proposed Mathematics Stage 6 Courses

4 Structure of the Proposed Mathematics Stage 6 Courses

In the review and development of the Mathematics Stage 6 courses, it is proposed that there be five Board-developed Mathematics courses of study for the Higher School Certificate (in increasing order of difficulty): Mathematics General 1, Mathematics General 2, Mathematics Advanced, Mathematics Extension 1, and Mathematics Extension 2.

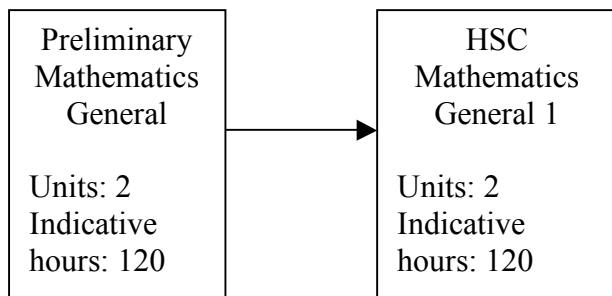
Mathematics General 1 represents an additional course of study in the suite of Mathematics Stage 6 courses, while Mathematics General 2 will replace the current General Mathematics course (on which it is largely modelled). The Mathematics General 1 course has been included in accordance with the Broad Direction (see section 8): ‘That the set of Stage 6 Mathematics courses include an additional offering to accommodate the purposes of students who wish to study a Board-developed Mathematics course in Stage 6 but who are currently choosing not to, as well as those whose purposes are not accommodated through the study of General Mathematics.’

It is proposed that students of the Mathematics General 1 and Mathematics General 2 courses study common Preliminary material within the course Preliminary Mathematics General, leading to the HSC Mathematics General 1 and HSC Mathematics General 2 courses.

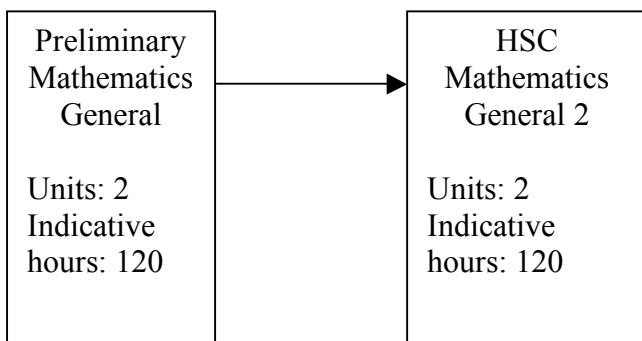
Mathematics Advanced replaces the current Mathematics (‘2 Unit’) course. It is proposed that it consist of the courses Preliminary Mathematics Advanced and HSC Mathematics Advanced. Mathematics Extension 1 and Mathematics Extension 2 replace the current Mathematics Extension 1 and Mathematics Extension 2 courses. It is proposed that students of these courses study Preliminary Extension course material prior to undertaking the study of HSC Mathematics Extension 1 and HSC Mathematics Extension 2.

The proposed Mathematics Stage 6 courses are illustrated below, in terms of their Preliminary and HSC course components.

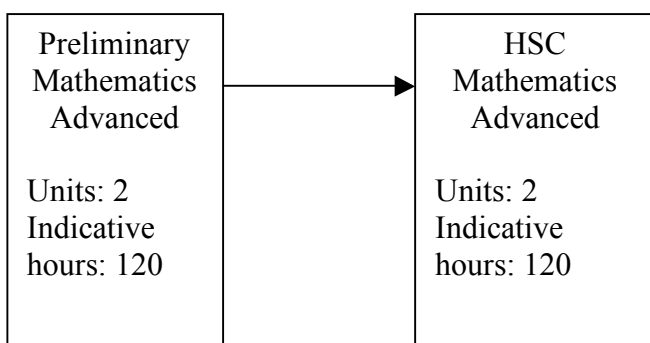
Mathematics General 1



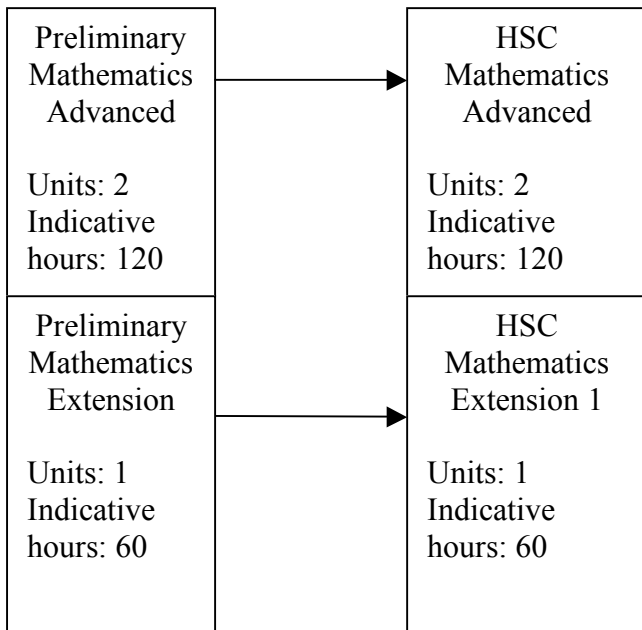
Mathematics General 2



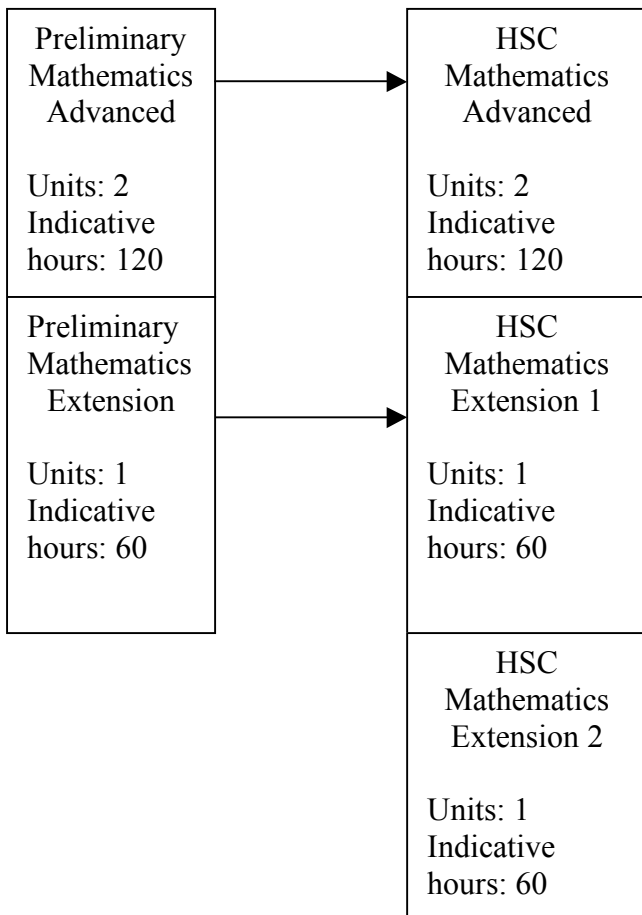
Mathematics Advanced



Mathematics Extension 1



Mathematics Extension 2



5 Mathematics General 1, Mathematics General 2 Courses

– course elements

5 Mathematics General 1, Mathematics General 2 Courses

– course elements

This section of the writing brief is structured to address the course elements for the Mathematics General 1 and Mathematics General 2 courses:

- Rationale
- Aim
- Objectives
- Content organisation
- Outcomes
- Content
- Use of technology
- Assessment and HSC examination.

The material presented here in relation to the course elements has been amended in accordance with feedback received during consultation on the draft writing brief for these courses. Further revision of the material will occur as the full syllabus is developed in the next phase (*Syllabus Development Phase*) of the syllabus development process.

5.1 Rationale

*The **rationale** describes the nature of the subject and relevant courses in broad terms. It explains the place and purpose of the subject and relevant courses in the curriculum.*

Mathematics is deeply embedded in modern society. From the numeracy skills required to manage personal finances, to making sense of data in various forms, to leading-edge technologies in the Sciences and Engineering, Mathematics provides the framework for interpreting, analysing and predicting, and the tools for effective participation in an increasingly complex society.

The need to interpret the large volumes of data made available through technology draws on skills in logical thought and the ability to check claims and assumptions in a systematic way. Mathematics is the appropriate training ground for the development of these skills and abilities. The thinking required to enhance further the power and usefulness of technology in real-world applications requires advanced mathematical training. The rapid advances in technology experienced in recent years have driven, and been driven by, advances in the discipline of Mathematics.

The development of Mathematics throughout history has been catalysed by its utility in explaining real-world phenomena and its inherent beauty. In this way, the discipline has continued to evolve through a process of observation, conjecture, proof and application.

Effective participation in a changing society is enhanced by the development of mathematical competence in contextualised problem-solving. Experience in such problem-solving is gained by students gathering, analysing and interpreting mathematical information, and applying Mathematics to model situations.

The opportunities for creative thinking, communication and contextualised problem-solving provided by the Mathematics General 1 and Mathematics General 2 courses, assist students to find solutions for the broad range of problems encountered in life beyond secondary schooling.

The purpose of the courses is to provide an appropriate mathematical background for students who wish to enter occupations that require the use of a variety of mathematical and statistical techniques. The direction taken by the courses, in focusing on mathematical skills and techniques that have direct application to everyday activity, contrasts with the more abstract approach taken by the Mathematics Stage 6 calculus-based courses.

The study of the courses provides students with valuable support in a range of concurrent Stage 6 subjects and in fostering development of mathematical skills and techniques that assist students who undertake associated research and projects.

The courses provide a strong foundation for vocational pathways, either in the workforce or in further training. In the case of the higher course, Mathematics General 2, this includes a strong foundation for university courses in the humanities, nursing and paramedical sciences.

5.2 Aim

*The **aim** states the overall purpose of the courses. It indicates the educational benefits that are intended to accrue for students who satisfactorily complete programs of study based on the courses.*

The Mathematics General 1 and Mathematics General 2 courses are designed to promote the development of knowledge, skills and understanding in areas of Mathematics that have direct application to the broad range of human activity.

Students will learn to use a range of techniques and tools, including relevant technologies, in order to develop solutions to a wide variety of problems relating to their present and future needs and aspirations.

5.3 Objectives

***Objectives** provide more specific statements of the intent of the courses. They amplify the aim and provide direction to teachers on the learning and teaching process emerging from the course(s). They define in broad terms the knowledge, skills, understanding and values and attitudes fundamental to the key learning area/subject. They act as organisers of the intended outcomes. The same objectives may apply across Stages in a key learning area/subject.*

Knowledge, skills and understanding

Students will develop:

- the ability to apply reasoning, and the use of appropriate language, in the evaluation and construction of arguments and models based on mathematical and statistical concepts
- the ability to use concepts and apply techniques to the solution of problems in algebra and modelling, measurement, financial mathematics, data analysis, and probability
- the ability to use mathematical skills and techniques, aided by appropriate technology, to organise information and interpret practical situations
- the ability to interpret and communicate mathematics in a variety of written and verbal forms, including diagrams and statistical graphs.

Values and attitudes

Students will develop:

- appreciation of the relevance of Mathematics.

5.4 Content organisation

The Content organisation section describes how the course content is to be organised.

It is proposed that the course content for the Mathematics General 1 and Mathematics General 2 courses be organised into *areas of study* and *focus studies*, and that each of the areas of study (Financial Mathematics, Data Analysis, Measurement, Probability, and Algebra and Modelling) be divided into *units of work* that lead into the focus studies.

The focus studies are designed to be programmed over a continuous time period as they provide students with the opportunity to apply and develop further the knowledge, skills and understanding initially developed in the areas of study, as well as introducing some new mathematical content. It is intended that students develop, through the focus studies, the capacity to integrate their knowledge, skills and understanding across the areas of study.

It is proposed that students of the Mathematics General 1 and Mathematics General 2 courses study common Preliminary material within the course Preliminary Mathematics General, including the focus studies Mathematics and Communication and Mathematics and Driving.

Four focus studies are proposed for the HSC course for Mathematics General 1: Mathematics and Design, Mathematics and Household Finance, Mathematics in the Health and Leisure Industries and Mathematics and Resource Management, while two focus studies are proposed for the HSC course for Mathematics General 2: Mathematics and Health and Mathematics and Resource Management.

It is proposed that the course content for the Mathematics General 1 and Mathematics General 2 courses be organised into units of work (within an area of study) and focus studies, and be presented in the following format:

Name of area of study and unit of work or Name of focus study

A brief summary of the content/purpose of the unit or focus study.

Assumed Stage 4 and Stage 5 outcomes [This section only appears for units of work in the Preliminary course].

Outcomes from Stage 4/Stage 5 that students should have achieved to engage successfully with the unit.

Outcomes addressed

A list of the course outcomes that will be addressed in the study of the unit or focus study.

Students learn and acquire the following knowledge, skills and understanding

The mathematical content to be addressed in the unit or focus study.

Terminology introduced in this unit/focus study

A list of words and/or phrases that may be new to students, and which may be used in relevant assessment tasks.

Technology that may be used in support of this unit/focus study

Advice about the nature and use of technology that is appropriate to the unit or focus study.

Applications, considerations, examples

The provision of examples defining the range and style of applications used to introduce and illustrate the mathematical content of the unit or focus study, as well as important considerations for the learning and teaching of the unit or focus study.

5.5 Outcomes

Syllabus outcomes express the specific intended student learning that results from the teaching of the course(s). They are derived from the objectives and content of the syllabus. Outcomes provide clear statements of the knowledge, skills and understanding expected to be gained by most students as a result of effective learning and teaching by the end of a Stage.

A proposed arrangement and set of outcomes for the Mathematics General 1 and Mathematics General 2 courses are presented in the table below. The outcomes, together with the content, determine the breadth and depth of study to be undertaken by students in a course.

Objectives	Preliminary Outcomes	HSC Outcomes General Mathematics 1	HSC Outcomes General Mathematics 2
Students will develop:	A student:	A student:	A student:
<ul style="list-style-type: none"> the ability to apply reasoning, and the use of appropriate language, in the evaluation and construction of arguments based on mathematical and statistical concepts 	PG1 uses Mathematics and statistics to compare alternative solutions to contextual problems	HG1.1 uses Mathematics and statistics to evaluate and construct arguments in a range of familiar contexts	HG2.1 uses Mathematics and statistics to evaluate and construct arguments in a range of familiar and unfamiliar contexts
	PG2 represents information in symbolic, graphical and tabular forms	HG1.2 analyses representations of data in order to make predictions	HG2.2 analyses representations of data in order to make inferences, predictions and conclusions

<ul style="list-style-type: none"> the ability to use concepts and apply techniques to the solution of problems in algebra and modelling, measurement, financial mathematics, data analysis, and probability 	<p>PG3 represents the relationships between changing quantities in algebraic and graphical form</p>	<p>HG1.3 makes predictions about everyday situations based on simple mathematical models</p>	<p>HG2.3 makes predictions about situations based on mathematical models</p>
	<p>PG4 performs calculations in relation to two-dimensional and three-dimensional figures</p>	<p>HG1.4 analyses two-dimensional and three-dimensional models to solve practical problems</p>	<p>HG2.4 analyses two-dimensional and three-dimensional models to solve practical problems, including those involving spheres and non-right-angled triangles</p>
	<p>PG5 demonstrates awareness of issues in practical measurement, including accuracy, and the choice of relevant units</p>	<p>HG1.5 interprets the results of measurements and calculations and makes judgements about reasonableness, including conversion to appropriate units</p>	<p>HG2.5 interprets the results of measurements and calculations and makes judgements about reasonableness, including the degree of accuracy of measurements and calculations and conversion to appropriate units</p>

	PG6 models financial situations relevant to the student's current life using appropriate tools	HG1.6 makes informed decisions about financial situations they are likely to encounter post-school	HG2.6 makes informed decisions about financial situations including annuities and loan repayments
	PG7 determines an appropriate form of organisation and representation of collected data	HG1.7 develops and carries out statistical processes to answer questions which she/he and others have posed	HG2.7 answers questions requiring statistical processes and knowledge, including the use of the normal distribution, and the correlation of bivariate data
	PG8 performs simple calculations in relation to the likelihood of familiar events	HG1.8 solves problems involving uncertainty using basic counting techniques	HG2.8 solves problems requiring knowledge of counting techniques, multi-stage probability and financial expectation
<ul style="list-style-type: none"> the ability to use mathematical skills and techniques, aided by appropriate technology, to organise information and interpret practical situations 	PG9 uses appropriate technology to organise information from a limited range of practical and everyday contexts	HG1.9 chooses and uses appropriate technology to organise information from a range of practical and everyday contexts	HG2.9 chooses and uses appropriate technology to locate and organise information from a range of contexts`
<ul style="list-style-type: none"> the ability to interpret and communicate Mathematics in a variety of written and verbal forms, including diagrams and statistical graphs 	PG10 justifies his/her response to a given problem using appropriate mathematical terminology	HG1.10 uses mathematical argument and reasoning to evaluate conclusions drawn from other sources, communicating a position clearly to others	HG2.10 uses mathematical argument and reasoning to evaluate conclusions drawn from other sources, communicating a position clearly to others, and justifies a response
<p>(Values and attitudes)</p> <ul style="list-style-type: none"> appreciation of the relevance of Mathematics 	PG/VA develops a positive attitude to Mathematics and appreciates its capacity to provide enjoyment and recreation	HG1/VA appreciates the importance of Mathematics in her/his own life and its usefulness in contributing to society	HG2/VA appreciates the importance of Mathematics in her/his own life and its usefulness in contributing to society

5.6 Content

Content describes the knowledge, skills, understanding and values and attitudes to be studied and developed by students over a Stage or Stages in a course and the development of processes of learning so that students are encouraged to be effective learners.

Mathematics General 1

Proposed areas of study and focus studies:

1. Areas of study

- Financial Mathematics
- Data Analysis
- Measurement
- Probability
- Algebra and Modelling

2. Focus studies

- Mathematics and Communication
- Mathematics and Driving
- Mathematics and Design
- Mathematics and Household Finance
- Mathematics in the Health and Leisure Industries
- Mathematics and Natural Resource Management

Proposed units of work within the areas of study, and the focus studies:

- Financial Mathematics
 - Earning money
 - Investing money
 - Taxation
 - Purchasing
- Data Analysis
 - Statistics and society (incorporates material from ‘Data collection and sampling’ from the current General Mathematics course)
 - Displaying single data sets
 - Summary statistics
 - Interpreting sets of data
 - Distributions
 - Statistical reasoning
- Measurement
 - Units of measurement and applications
 - Similarity of two-dimensional figures
 - Right-angled triangles
 - Further applications of area and volume
- Probability
 - The language of chance
 - Relative frequency and probability
 - Multi-stage events
 - Applications of probability

- Algebra and Modelling
 - Algebraic skills and techniques
 - Modelling linear and non-linear relationships

- Focus Study: Mathematics and Communication
- Focus Study: Mathematics and Driving
- Focus Study: Mathematics and Design
- Focus Study: Mathematics and Household Finance
- Focus Study: Mathematics in the Health and Leisure Industries
- Focus Study: Mathematics and Natural Resource Management

(Note: Appropriate arrangement of the proposed course topics into Preliminary/HSC courses will be undertaken in the next phase (*Syllabus Development Phase*) of the syllabus development process.)

Mathematics General 2

Proposed areas of study and focus studies:

1. Areas of study

- Financial Mathematics
- Data Analysis
- Measurement
- Probability
- Algebra and Modelling

2. Focus studies

- Mathematics and Communication
- Mathematics and Driving
- Mathematics and Health
- Mathematics and Natural Resource Management

Proposed units of work within the areas of study, and the focus studies:

- Financial Mathematics
 - Earning money
 - Investing money
 - Taxation
 - Credit and borrowing
 - Annuities and loan repayments
- Data Analysis
 - Statistics and society (incorporates ‘Data collection and sampling’ from the current General Mathematics course)
 - Displaying single data sets
 - Summary statistics
 - Interpreting sets of data
 - The normal distribution
 - Correlation
- Measurement
 - Units of measurement and applications
 - Similarity of two-dimensional figures
 - Right-angled triangles
 - Further applications of area and volume
 - Applications of trigonometry
 - Spherical geometry
- Probability
 - The language of chance
 - Relative frequency and probability
 - Multi-stage events
 - Applications of probability
- Algebra and Modelling
 - Algebraic skills and techniques
 - Modelling linear and non-linear relationships
- Focus Study: Mathematics and Communication
- Focus Study: Mathematics and Driving
- Focus Study: Mathematics and Health
- Focus Study: Mathematics and Natural Resource Management

(Note: Appropriate arrangement of the proposed course topics into Preliminary/HSC courses will be undertaken in the next phase (*Syllabus Development Phase*) of the syllabus development process.)

5.7 Use of technology

(a) in learning and teaching, and school-based assessment

The appropriateness, viability and level of use of different types of technology in the learning and teaching of courses within the Mathematics Key Learning Area are decisions for students, teachers and schools. However, the Broad Directions developed during the first phase of the *Mathematics Stage 6 Review and Development Project* included: ‘That the use of technology with capabilities beyond the level of scientific calculators be encouraged in the learning and teaching, and school-based assessment, of all Stage 6 Board-developed Mathematics courses.’

The final syllabuses will provide a range of opportunities for the use of calculators and computer software packages in learning and teaching. This will include opportunities to utilise the graphing functions and financial and statistical capabilities of calculators, and dynamic geometry and statistics software packages.

(b) in the HSC examinations

The Broad Directions include: ‘That the non-calculus-based Stage 6 Mathematics courses be developed with the view that technology with capabilities beyond the level of scientific calculators will need to be utilised for aspects of the associated HSC examinations.’ In accordance with this Broad Direction, it is proposed that in HSC examinations for these courses, candidates be permitted to use only calculators manufactured to meet a clear set of Board-prescribed calculator functions and capabilities. These functions and capabilities, which will be beyond the level of scientific calculators, will be consistent with and support the knowledge and skills that students should be able to demonstrate after completing the Mathematics General 1 and Mathematics General 2 courses. For this reason, the functions and capabilities will be determined in parallel with the development of the content for the courses in the next phase (*Syllabus Development Phase*) of the syllabus development process.

5.8 Assessment and HSC examination

The general assessment and reporting advice in the Mathematics General 1 and Mathematics General 2 courses will focus on the role of assessment in improving learning and teaching.

The following requirements and advice in relation to internal assessment and external examinations will be contained in the syllabus:

- Preliminary course components and weightings (advisory) and HSC course components and weightings (mandatory). The components will be based on related outcome groupings (eg knowledge and skills, interpretation and communication), and the associated weightings will reflect the relative importance of the outcomes within the courses.
- HSC examination specifications.

The following materials will be developed for each course:

- performance band descriptions
- a specimen HSC examination, including a mapping grid linking specimen examination questions to syllabus outcomes, content and targeted performance bands, and sample marking guidelines.

There will be separate HSC examination papers for each of the Mathematics General 1 and Mathematics General 2 courses and the students' HSC results will be reported against separate performance descriptions.

6 Glossary

6 Glossary

The **Glossary** explains terms that will assist teachers in the interpretation of the Mathematics Stage 6 non-calculus-based syllabus.

Syllabus terminology

Content

Content describes the knowledge, skills, understanding and values and attitudes to be studied and developed by students over a Stage or Stages in a syllabus and the development of processes of learning so that students are encouraged to be effective learners.

Outcomes

Syllabus outcomes express the specific intended student learning that results from the teaching of the course(s). They are derived from the objectives and content of the syllabus. Outcomes provide clear statements of the knowledge, skills and understanding expected to be gained by most students as a result of effective learning and teaching by the end of a Stage.

Standards

The term *standards* refers to the knowledge, skills and understanding expected to be learned by:

- students as a result of studying a subject – the *content standards*
- the levels of achievement of the knowledge, skills and understanding – the *performance standards*.

Both *content standards* and *performance standards* are based on the aims, objectives, outcomes and content of a course. Together they specify what is to be learned and how well it is to be achieved.

Content standards specify what students are expected to know, understand and be able to do as a result of studying a course. Teacher understanding of *content standards* comes from their consideration of the aims, objectives, outcomes and content of the syllabus.

Performance standards are the different levels of achievement demonstrated by students.

Subject

A subject is a name given to a defined area of knowledge. There may be several courses offered in a subject.

Syllabus

A document that describes for a key learning area or a course of study what students are expected to learn in terms of aims, objectives, outcomes, content and assessment requirements.

A **syllabus package** includes a syllabus document with additional information on assessment and examination, and support materials.

7 Support Materials

7 Support Materials

It is proposed that a range of support materials be produced to assist teachers with the implementation of the new Mathematics General 1 and Mathematics General 2 courses.

In accordance with the Broad Direction: ‘That the syllabus documents within the Stage 6 Mathematics syllabus package incorporate applications, implications and considerations for the teaching of the syllabus content, including in relation to depth of coverage’, it is proposed that each of the courses include an ‘applications, considerations and examples’ section within the syllabus document for each of the topic areas.

The support materials could include:

- sample learning and teaching units
- advice on programming
- program overviews
- advice in relation to teaching ‘new’ areas of course content
- teaching suggestions to assist the development of meaningful and engaging units of work
- sample HSC assessment programs
- advice on the utilisation of different types of assessment tasks
- sample assessment tasks
- suggestions for the utilisation of technology in learning and teaching
- suggested applications that relate to real-world problems.

8 Appendix

8 Appendix

Broad Directions for the Mathematics Stage 6 Writing Briefs – endorsed by the Board of Studies on 12 December 2006.

Note: *The Board of Studies endorsed these Broad Directions on 12 December 2006. They reflect the consultation undertaken in Phase 1 of the syllabus development process and inform the development of Section 4 of the Draft Writing Brief, which is subject to consultation. The Broad Directions are not subject to consultation.*

Broad Directions for the Mathematics Stage 6 Writing Briefs:

- That the set of Stage 6 Mathematics courses include an additional offering to accommodate the purposes of students who wish to study a Board-developed Mathematics course in Stage 6 but who are currently choosing not to, as well as those whose purposes are not accommodated through the study of General Mathematics.
- That in the revision, due attention be given to clarifying the purpose of each course and identifying future learning or vocational pathways of the intended candidatures.
- That the nested structure of the current Mathematics ('2 Unit'), Mathematics Extension 1 and Mathematics Extension 2 courses, and the calculus-basis to these courses, be retained.
- That any revision or development of the calculus-based courses maintain the current rigour and level of challenge of the courses.
- That the amount of content prescribed for Stage 6 Mathematics courses reflect the amount that can be taught, and learnt by the typical student, in the indicative time.
- That in reviewing the content of Stage 6 Mathematics courses, particular attention be given to the purpose of the Mathematics ('2 Unit') course for Mathematics ('2 Unit')-only students, and the appropriateness and relevance of the course content for those students.
- That the inclusion of additional study of statistics be considered, while addressing implications in relation to the extent of relevant teacher expertise, professional development, future pathways of students, school Mathematics staffing, and school timetabling.
- That the current General Mathematics course material be largely maintained within the structure of Stage 6 non-calculus-based Mathematics courses.
- That, in reviewing the content of the calculus-based courses, the appropriateness and relevance of the applications within the courses be explored, with a view to ensuring that they are contemporary and that they meet the needs of students.
- That, in the consideration of the use of technology in Stage 6 Mathematics courses, due regard must be given to the related access and equity issues.
- That the use of technology with capabilities beyond the level of scientific calculators be encouraged in the learning and teaching, and school-based assessment, of all Stage 6 Board-developed Mathematics courses.

- That the non-calculus-based Stage 6 Mathematics courses be developed with the view that technology with capabilities beyond the level of scientific calculators will need to be utilised for aspects of the associated HSC examinations.
 - That the use of technology in HSC examinations for the calculus-based courses be further investigated and clarified in the Writing Brief phase.
 - That the appropriateness of the current processes for the examination of Stage 6 Mathematics courses be reviewed, with particular emphasis on the examination of Mathematics ('2 Unit')-only candidates.
 - That the syllabus documents within the Stage 6 Mathematics syllabus package incorporate applications, implications and considerations for the teaching of the syllabus content, including in relation to depth of coverage.
 - That each Stage 6 Mathematics course be named so as to avoid confusion with the discipline itself.
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