MATHEMATICS YEARS 7–10 ▶

BOARD OF STUDIES
NEW SOUTH WALES

GUIDE TO THE NEW NSW SYLLABUS

The Australian curriculum is being implemented in New South Wales through new syllabuses developed by the Board of Studies. The new *Mathematics K–10 Syllabus* will replace the current *Mathematics K–6 Syllabus* and *Mathematics Years 7–10 Syllabus*.

The new Mathematics syllabus includes agreed Australian curriculum content and content that clarifies learning for Mathematics from Kindergarten to Year 10. The stage statements for Early Stage 1 to Stage 5 reflect the intent of the Australian curriculum achievement standards.

The syllabus identifies the knowledge, skills, understanding, values and attitudes students are expected to develop at each stage, from Kindergarten to Year 10. Teachers will continue to have the flexibility to make decisions about the sequence of learning, the emphasis to be given to particular areas of content, and any adjustments required based on the needs, interests and abilities of their students.

The Years 7–10 section of the syllabus is designed to be taught within the existing NSW indicative time requirements.

Assessment for learning continues to be an essential component of the *Mathematics K–10 Syllabus*.

Learning across the curriculum areas include cross-curriculum priorities, general capabilities and other important learning for all students. These 13 areas are incorporated in the content of each syllabus and identified by icons. Teachers may identify additional opportunities for students to learn about these areas.

The structure and many of the features of the current Mathematics syllabus have been retained, including:

- objectives and outcomes
- content organised in stages from Early Stage 1 to Stage 5.

WHAT IS SIMILAR?

Students will continue to:

- engage in learning experiences that reflect a sequential and logical approach to learning in Mathematics
- learn at a level of challenge appropriate to their needs, facilitated by:
  - the organisation of content into stages
  - the retention of substages with multiple endpoints in Stage 5
- study much of the content in the current syllabus, such as linear relationships and equations
- develop their skills in Working Mathematically in an integrated way.

WHAT IS DIFFERENT?

- Content is organised into three strands:
  - Number and Algebra
  - Measurement and Geometry
  - Statistics and Probability.
- Substrands replace 'topics' to better reflect the continuum of learning from Early Stage 1 to Stage 5.
- There is some new material, such as:
  - transformations on the Cartesian plane
  - Venn diagrams
  - bivariate data analysis (Stages 5.2 and 5.3).

- Working Mathematically:
    - comprises five components: Communicating, Problem Solving, Reasoning, Understanding and Fluency
    - is embedded in each substrand
    - is related to specific outcomes for Communicating, Problem Solving and Reasoning.
- A K–10 glossary is included.
- Enhanced opportunities for the use of a range of technologies are provided. Related Life Skills outcomes are included with the Stage 4 and Stage 5 content.

HOW DOES THE SYLLABUS CATER FOR ALL STUDENTS?

The *Mathematics K–10 Syllabus* is inclusive of the learning needs of all students. Particular advice about supporting students with special education needs, gifted and talented students, and students learning English as an additional language or dialect is included in the syllabus.

Students with special education needs can access the *Mathematics K–10 Syllabus* outcomes and content in a range of ways, including:

- under regular course arrangements
- with adjustments to teaching, learning and/or assessment experiences.

For some students with special education needs, particularly those with an intellectual disability, Life Skills outcomes and content can provide a relevant and meaningful program.

WHAT IS THE PLAN FOR IMPLEMENTATION?

2013	Familiarisation and planning
2014	Start teaching Years 7 and 9
2015	Start teaching Years 8 and 10

WHAT SUPPORT IS THE BOARD PROVIDING?

Many existing resources will continue to be useful and relevant. Current units of work can be modified to meet the requirements of the new syllabus, and some existing units will form the bases of effective programs.

For the first time, the Mathematics syllabus will be available in an interactive online format. The interactive online format provides different ways to customise views of the syllabus. The online Mathematics syllabus can be viewed by stage, outcomes, content and strand, and provides links to support materials and other online resources.

Support materials will be distributed to assist teachers in understanding the syllabus and its associated assessment requirements.

Initial materials

Initial materials released with the syllabus include:

- this guide
- Schools' guides
- Parents' guide
- Advice on assessment.

Additional materials

Additional materials available later in 2012 and 2013 include:

- Advice on programming
- Sample units of work
- Further advice on assessment
- Program builder.

The Department of Education and Communities, the Catholic Education Commission, the Association of Independent Schools, and other school systems and professional associations will continue to assist and support the ongoing implementation of the syllabus.

Features of the Mathematics Years 7–10 content pages

Content is organised by strands and substrands.

Content is organised in stages.

STAGE 4

MEASUREMENT AND GEOMETRY

TIME

OUTCOMES

A student:

› communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols MA4-1WM

› applies appropriate mathematical techniques to solve problems MA4-2WM

› performs calculations of time that involve mixed units, and interprets time zones MA4-15MG

Related Life Skills outcomes: *MALS-20MG, MALS-21MG, MALS-22MG, MALS-23MG, MALS-24MG*

Life Skills outcomes related to Stage 4 and Stage 5 outcomes are included.

Outcomes are coded and linked to content.

CONTENT

Students:

Solve problems involving duration, including using 12-hour and 24-hour time within a single time zone (ACMMG199)

• add and subtract time mentally using bridging strategies, eg from 2:45 to 3:00 is 15 minutes and from 3:00 to 5:00 is 2 hours, so the time from 2:45 until 5:00 is 15 minutes + 2 hours = 2 hours 15 minutes ⚙

Australian curriculum content descriptions are identified by codes.

Content describes the intended learning.

Solve problems involving international time zones

• compare times in, and calculate time differences between, major cities of the world, eg 'Given that London is 10 hours behind Sydney, what time is it in London when it is 6:00 pm in Sydney?' ⚙

▸ interpret and use information related to international time zones from maps (Problem Solving) ⚙

▸ solve problems involving international time as it relates to everyday life, eg determine whether a particular soccer game can be watched live on television during normal waking hours (Problem Solving)

Learning across the curriculum content is incorporated and identified by icons.

Working Mathematically components (Communicating, Problem Solving, Reasoning) are integrated.

Background Information

Calculations involving time can be made on a scientific calculator either by using fractions and decimals or by using the 'degrees, minutes, seconds' button. Students should be familiar with both approaches.

Purpose/Relevance of Substrand

The relevance of this substrand to everyday situations has been seen in earlier stages, as it has involved sequencing events; describing, comparing and ordering the durations of events; reading the time on analog and digital clocks (including 24-hour time); converting between hours, minutes and seconds; using am and pm notation in real-life situations; and constructing timelines. In Stage 4, students learn the very important everyday-life skills of adding and subtracting time in mixed units (both mentally and by using a calculator) and solve related problems, as well as problems involving international time zones. The ability to compare times in, and calculate time differences between, major cities and areas of the world is of fundamental importance in international travel and also in everyday and work situations, such as communicating with people in other countries, watching overseas sporting events live on television, and conducting international business.

Background Information and Language sections are provided to assist student engagement and understanding.

Language

The words 'minute' (meaning 'small') and 'minute' (a time measure), although pronounced differently, are really the same word. A minute (time) is a minute (small) part of one hour. A minute (angle) is a minute (small) part of a right angle.

Features of the Mathematics Years 7–10 Life Skills content pages

Mathematics Life Skills outcomes and content:

- are developed from the Mathematics K–10 objectives
- are selected based on students' needs, interests and abilities.

Students are not required to complete all content to demonstrate achievement of an outcome.

Content is optional and is organised by strands and substrands linked to the Stage 4 and Stage 5 strands.

Stage 4 and/or Stage 5 outcomes related to Life Skills outcomes are included.

Content describes the scope and depth of learning.

Working Mathematically components (Communicating, Problem Solving, Reasoning, Understanding, Fluency) are integrated.

Outcomes are coded and linked to content.

Learning across the curriculum content is incorporated and identified by icons.

LIFE SKILLS

MEASUREMENT AND GEOMETRY

TIME: CALCULATING AND MEASURING TIME

OUTCOMES

A student:

› responds to and uses mathematical language to demonstrate understanding MALS-1WM

› applies mathematical strategies to solve problems MALS-2WM

› uses reasoning to recognise mathematical relationships MALS-3WM

› calculates and measures time and duration in everyday contexts MALS-23MG

Related Stage 4/5 outcome: *MA4-15MG*

CONTENT

Students:

- identify the duration of a range of activities and events for a variety of purposes
  - ▶ select a track of music to fit a time frame, eg for a dance piece, a multimedia presentation (Problem Solving)
  - ▶ identify the length of time needed to watch a movie to determine if the activity fits into a personal schedule (Problem Solving)
- measure and calculate the time taken for a variety of activities or events, eg use a stopwatch to time a race
  - ▶ record starting and finishing times to calculate the duration of an activity or event (Communicating, Understanding, Fluency)
  - ▶ use addition/subtraction strategies to calculate the duration of an activity or event (Fluency)
- recognise that there are different time zones around the world
  - ▶ identify countries in the Asia–Pacific region that are in the same time zone as Australia (Understanding)
- compare and calculate the local times in a range of places nationally and internationally
  - ▶ identify time differences between various locations, eg London is 10 hours behind Sydney (Understanding)
  - ▶ use appropriate addition/subtraction strategies to calculate the local time in a particular location, eg given that London is 10 hours behind Sydney, find the time in London when it is 6 pm in Sydney (Fluency)
  - ▶ solve problems about international time in everyday contexts, eg determine whether a soccer game in another country can be watched live on television in the daytime (Problem Solving)
  - ▶ recognise the effect of daylight saving on local time (Reasoning, Understanding)