The Australian Curriculum

Senior Secondary Mathematics – Information Sheet

What are the subjects in the senior secondary Australian Curriculum for Mathematics?

There are **FOUR** senior secondary subjects for Mathematics as part of the Australian Curriculum:

Essential Mathematics focuses on using mathematics effectively, efficiently and critically to make informed decisions. It provides students with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings.

General Mathematics focuses on using the techniques of discrete mathematics to solve problems in contexts that include financial modelling, network analysis, route and project planning, decision making, and discrete growth and decay. It enables students to analyse and solve a wide range of geometrical problems in areas such as measurement, scaling, triangulation and navigation; and to develop systematic strategies to answer statistical questions that involve comparing groups, investigating associations and analysing time series.

Mathematical Methods focuses on the development of the use of calculus and statistical analysis. The study of calculus provides a basis for an understanding of the physical world involving rates of change, and includes the use of functions, their derivatives and integrals, in modelling physical processes. The study of statistics develops the ability to describe and analyse phenomena involving uncertainty and variation.

Specialist Mathematics provides opportunities, beyond those presented in *Mathematical Methods*, to develop rigorous mathematical arguments and proofs, and to use mathematical models more extensively. It contains topics in functions and calculus that build on and deepen the ideas presented in *Mathematical Methods* as well as demonstrate their application in many areas. *Specialist Mathematics* also extends students' knowledge and understanding of probability and statistics and introduces the topics of vectors, complex numbers, matrices and recursive methods.

How are the senior secondary Australian Curriculum mathematics subjects structured?

The senior secondary Australian Curriculum for each mathematics subject specifies content and achievement standards:

- The content describes the knowledge, understanding and skills that are to be taught and learned within a given subject.
- The achievement standards describe the quality of learning (the depth of understanding, extent of knowledge and sophistication of skill) expected of students who have studied the content for the subject.

The curriculum for each senior secondary subject is organised into four units with the last two units cognitively more challenging than the first two. Each unit is designed to be taught in about half a 'school year' of senior secondary studies.

Content has been specified for each unit, and achievement standards are described for each pair of units, that is, Units 1 and 2, and Units 3 and 4.

The curriculum also includes a rationale and a set of aims for the subject, a description of how the subject is organised, how general capabilities and cross-curriculum priorities are represented, and a glossary of key terms used.

How do the senior secondary mathematics subjects align with the F-10 Australian Curriculum?

Each of the Australian Curriculum mathematics subjects provide students with a breadth of mathematical experience that encompasses and builds on all three strands of the F-10 curriculum. The Number and Algebra strand focuses on using the techniques of discrete mathematics to solve problems in contexts. The Measurement and Geometry strand focuses on analysing and solving a wide range of geometrical problems. The Probability and Statistics strand focuses on acquiring systematic strategies based on the statistical investigation process for answering statistical questions.

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There is also an emphasis throughout the subjects on the use and application of information and communication technologies.

The senior secondary subjects continue to develop the general capabilities and cross-curriculum priorities introduced across Foundation to Year 10. Each subject includes a description of the opportunities for students to continue to develop their general capabilities and understanding of cross-curriculum priorities in ways that are relevant to the subject.

How do the senior secondary mathematics subjects relate to each other?

The Australian Curriculum mathematics subjects are hierarchical by the nature of the content and their intended purpose.

Essential Mathematics focuses on using mathematics to make sense of the world. *General Mathematics* is designed for students who wish to undertake further studies where mathematics knowledge facilitates problem solving and decision making. *Mathematics Methods* is designed for students with an interest in mathematics and whose future paths may involve mathematical studies at university. *Specialist Mathematics* can be taken in conjunction with *Mathematical Methods* and is designed for students with a strong interest in mathematics.

How do the senior secondary mathematics subjects differ from senior secondary courses in states and territories?

The Australian Curriculum mathematics subjects contain content similar to that of state and territory mathematics courses. There are some variations in content and emphasis, for example there is an emphasis on calculus and statistics in the Mathematical Methods and Specialist Mathematics subjects that may not be as evident in some state and territory courses. The structure, content and purpose may be different from current course structures in each state and territory where, for example, there may exist a numeracy type course in some states and territories to support students who may not have mastered all of the content descriptions up to Year 10.

As states and territories have continuing responsibility for pedagogy, assessment and reporting, their mathematics courses may also include detailed assessment information and eligibility requirements where appropriate.

What national and international curricula and research was drawn upon to develop the senior secondary mathematics subjects?

In developing the senior secondary Australian Curriculum for Mathematics, ACARA reviewed state and territory Mathematics curriculum. ACARA's work was further guided by some key international and national references that included:

- Mathematics curriculum from Finland, Singapore, Hong Kong and the United Kingdom
- *Foundation Numeracy in Context* 2006, David Tout and Gary Motteram
- *Maths? Why Not? Final Report prepared for the Department of Education, Employment and Workplace Relations,* DEEWR, March 2008
- International research on the inclusion of statistics in Mathematics curriculum including:
  - *Guidelines for Assessment and Instruction in Statistics Education Project*, funded by the American Statistical Association, GAISE College Report, GAISE Group (2004)
  - *Teaching Statistics in School-Mathematics-Challenges for Teaching and Teacher Education: A Joint ICMI/IASE Study,* Springer Science+Business Media B.V., 2011

In addition, as part of ACARA's curriculum development process and a focus on quality curriculum, the senior secondary subjects were reviewed by eminent overseas experts and international curriculum authorities.