

Mathematics Standard

What's new, what stays the same.

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Based on Mathematics Standard Stage Syllabus, NESAs, 2017 and support material.
This is not an authorised NESAs document. It was developed for the purposes of planning.

Six Board-developed Mathematics courses:

Implement in Year 11 2018:

- Mathematics Standard 1
- Mathematics Standard 2
- Mathematics Life Skills

Delayed for Year 11 implementation 2019:

- Mathematics Advanced
- Mathematics Extension 1
- Mathematics Extension 2

Quick bits #1

Mathematics **General**

is now

Mathematics **Standard**

Quick bits #2

~~Preliminary~~

referred to as

Year 11

~~HSC~~

referred to as

Year 12

Quick bits #3

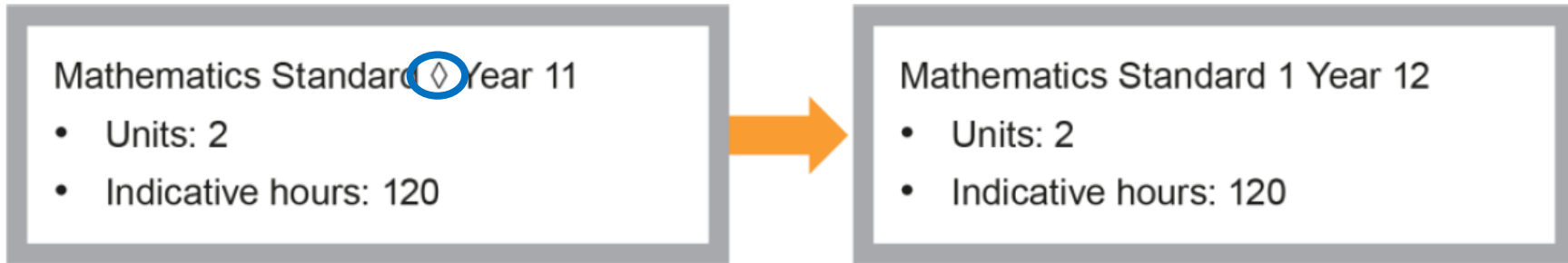
Mathematics General 1	CEC	✘ ATAR
Mathematics Standard 1	BDC†	✓ ATAR*

† 6 BDC units required for HSC

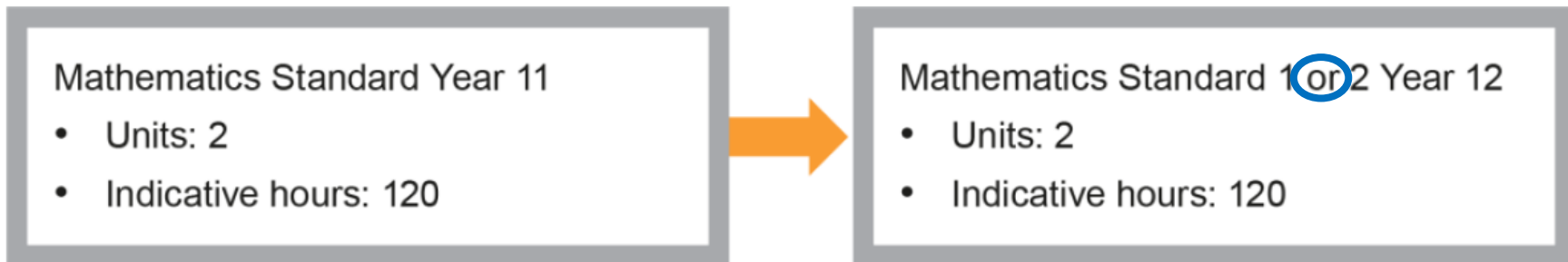
* See [HSC Examination](#) in this presentation

Three Standard Pathways

Mathematics Standard 1 – Year 11 and Year 12 course components



Mathematics Standard 1 or 2 – Year 11 and Year 12 course components



the Lozenge ◇ aka Coding of Year 11 Standard

In Year 11 Standard, content marked ◇ is required:

- to continue to the Year 12 Standard 1 course or
- to meet the Australian Core Skills Framework numeracy level 3

“Schools have flexibility in providing alternate approaches to Mathematics Standard in Year 11 to address material essential for Mathematics Standard 1 in Year 12.” Page 8








the Lozenge \diamond aka Coding of Year 11 Standard #2

Estimating by time...

...there is ~25% less content following only the \diamond content.

This means that using a Standard 1 pathway in Year 11 will allow those students to spend extra time on that content.

the Lozenge aka Coding of Year 11 Standard #3

		Year 11	Year 11 
Aqua	Algebra	15%	14%
MS-A1	Formulae and equations		5 / 10
MS-A2	Linear Relationships		
Mint	Measurement	24%	15%
MS-M1	Applications of Measurement		
M1.1	Practicalities of measurement		
M1.2	Perimeter, area and volume		2 / 10
M1.3	Units of energy and mass		---
MS-M2	Working with Time		7 / 9
Fuchsia	Financial Mathematics	20%	27%
MS-F1	Money Matters		
F1.1	Interest and depreciation		
F1.2	Earning and managing money		
F1.3	Budgeting and household expenses		
Saffron	Statistical Analysis	41%	44%
MS-S1	Data Analysis		
S1.1	Classifying and representing data		
S1.2	Exploring and describing data		15 / 20
MS-S2	Relative Frequency and Probability		12 / 17

the Focus Studies gone but not forgotten

Some of the Focus Study content integrated into the Standard syllabus.

Marked as **AAM**, Applications and Modelling.

However **AAM** is not limited to past Focus Study content.

See [open-ended](#) syllabus later.

the Focus Studies recognise these?

S1.1

construct and interpret tables and graphs related to real-world contexts, including but not limited to: motor vehicle safety including driver behaviour, accident statistics, blood alcohol content over time, running costs of a motor vehicle, costs of purchase and insurance, vehicle depreciation, rainfall graphs, hourly temperature, household and personal water usage

Preliminary
Mathematics and Driving

HSC General 1
Mathematics and Personal Resource
Usage

Similar but different

K-10

Standard

Learning Across the Curriculum [more...](#)

Identified

Identified

Working Mathematically [more...](#)

Identified

Embedded but
not identified

Australian Curriculum [more...](#)

Identified

Identified




Learning Across the Curriculum

As per K-10, identified by icons in the syllabus.








Learning Across the Curriculum Icons

Learning across the curriculum content, including cross-curriculum priorities, general capabilities and other areas identified as important learning for all students, is incorporated and identified by icons in the syllabus.




Cross-curriculum priorities

-  Aboriginal and Torres Strait Islander
-  Asia and Australia's engagement
-  Sustainability

General capabilities

-  Critical and creative thinking
-  Ethical understanding
-  Information and communication technology capability
-  Intercultural understanding
-  Literacy
-  Numeracy
-  Personal and social capability

Other learning across the curriculum areas

-  Civics and citizenship
-  Difference and diversity
-  Work and enterprise

Working Mathematically

K-10 Syllabus

Communicating

Problem Solving

Reasoning

Understanding

Fluency

Standard Stage 6 Syllabus

Communicating

Problem Solving

Reasoning

Understanding

Fluency

+Justification

The Australian Curriculum

Australian Curriculum Courses

Essential Mathematics

General Mathematics

Mathematical Methods

Specialist Mathematics

The Australian Curriculum

Australian Curriculum Course	Content Items	NSW Standard		NSW Advanced (DRAFT)	
Essential Mathematics	175	64	(37%)	24	(14%)
General Mathematics	111	57	(51%)	21	(19%)
Mathematical Methods	180	11	(6%)	132	(73%)
Specialist Mathematics	144			8	(6%)

Course Requirements

Mathematics General (2012)

All of the **Stage 5.1** content of the Mathematics 7-10 Syllabus (2002)

Page 17 G2

G2 = Mathematics General Stage 6
Syllabus 2012

http://www.boardofstudies.nsw.edu.au/syllabus_hsc/mathematics-general.html/

Revised in 2012...

Mathematics 7-10 2012

All substrands of Stage 5.1 and the following Stage 5.2 substrands:

- Financial Mathematics
- Non-Linear Relationships
- Right-Angled Triangles (Trigonometry)
- Single Variable Data Analysis

Page 17 7-10

7-10 = Mathematics K-10 Syllabus (2012)
<http://syllabus.nesa.nsw.edu.au/mathematics/mathematics-k10/mathematics-learning-in-stage-5/>

Building on Mathematics Learning in Stage 5

Mathematics Standard

All substrands of Stage 5.1 and with the following substrands of Stage 5.2:

- Financial mathematics
- **Linear relationships**
- Non-linear relationships,
- Right-angled triangles (Trigonometry)
- Single variable data analysis
- **Probability**

Page 11

Considered implicit in this syllabus

BUT Topic Guidance Measurement Year 11:

Prior learning

- “... builds on ... Stage 5.2 substrands of...”
- **Area and Surface Area and Volume”**

TG = Topic guidance: Measurement
<http://syllabus.nesa.nsw.edu.au/mathematics-standard-stage6/>

TG Page 1

School-based Assessment

“NESA provides a consistent approach to Stage 6 school-based assessment requirements for all Board Developed Courses.”

School-based Assessment

Year 11/12

Component	Weighting %
Understanding, fluency and communication	50
Problem solving, reasoning and justification	50
	100

* See [Working Mathematically](#)

School-based Assessment

Year 11

- three assessment tasks
- weighting of 20% – 40%
- one task must be an assignment or investigation-style, weighting of 20% – 30%

NESA Examples:

1. Assignment/investigation
2. In-class open book test
3. Yearly Examination

1. Mathematical experiment and report
2. Assignment/investigation
3. Yearly Examination

1. Extended modelling and problem-solving task
2. Assignment/investigation
3. Yearly Examination

School-based Assessment

Year 12

- a maximum of four assessment tasks
- Weighting of 10% – 40%
- one task may be a formal written examination with a maximum weighting of 30%
- one task must be an assignment or investigation-style with a weighting of 15% – 30%

NESA Examples:

1. In-class test
 2. Assignment/investigation
 3. Extended modelling and problem-solving task
-
1. Assignment/investigation
 2. In-class supervised test
 3. Field study activity and report
 4. Trial HSC Examination
-
1. In-class project or stimulus activity
 2. Assignment/investigation
 3. In-class open-book test
 4. Trial HSC Examination

HSC internal assessment mark

“Up to 30% of the internal assessment mark submitted to the Board of Studies may be based on the Preliminary Mathematics General course.”

Page 7 ARG2

*ARG2 = Assessment and Reporting in the HSC Mathematics General 2 Course
2012*

https://www.boardofstudies.nsw.edu.au/syllabus_hsc/mathematics-general.html

“The collection of information for the Year 12 school-based assessment mark must not begin before the completion of the Year 11 course.”

Page 7 A&R

A&R = Assessment and Reporting in Mathematics Standard Stage 6

<http://syllabus.nesa.nsw.edu.au/mathematics-standard-stage6/>

HSC Examination

Students studying **Mathematics Standard 1** may elect to undertake an **optional HSC examination**. The examination mark may be used by the Universities Admissions Centre (UAC) to contribute to the student's Australian Tertiary Admission Rank (**ATAR**).

All students studying Mathematics Standard 2 will sit for an HSC examination.

Examination specifications for Mathematics Standard 1 and Mathematics Standard 2 will be available in **Term 3 2017**.

HSC Examination - Technology

Which calculators are approved for use in the HSC examination for ANY Mathematics syllabus (Standard 1, Standard 2, Advanced, Extension 1, Extension 2)?

Candidates may use a 'Board-approved calculator' that appears on the Board's list of [Approved Scientific Calculators for the Higher School Certificate Examinations](#) (updated annually).

Curriculum Development - Stage 6 Mathematics Advanced and Extension Syllabuses
Frequently asked questions

<http://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/Understanding-the-curriculum/curriculum-development/senior-years/mathematics-advanced-extension>

Open-ended Syllabus

- “including but not limited to” 11 times

Syllabus:

- solve problems involving surface area of solids **including but not limited to** prisms, cylinders, spheres and composite solids

Topic Guidance:

Students should be extended to calculate:

– the surface area of:

- prisms and **pyramids**
- cylinders (without ‘top’ and/or ‘bottom’) and closed cylinders
- Spheres

“Whilst the syllabus does not specifically name the various shapes mentioned in the topic guidance, the points from the syllabus do allow for such shapes to be assessed. ”

Email: Anna Wethereld, 10/042017

- “for example” 49 times
similar in use to “but not limited to” in many places

Mathematics Standard vs Mathematics General

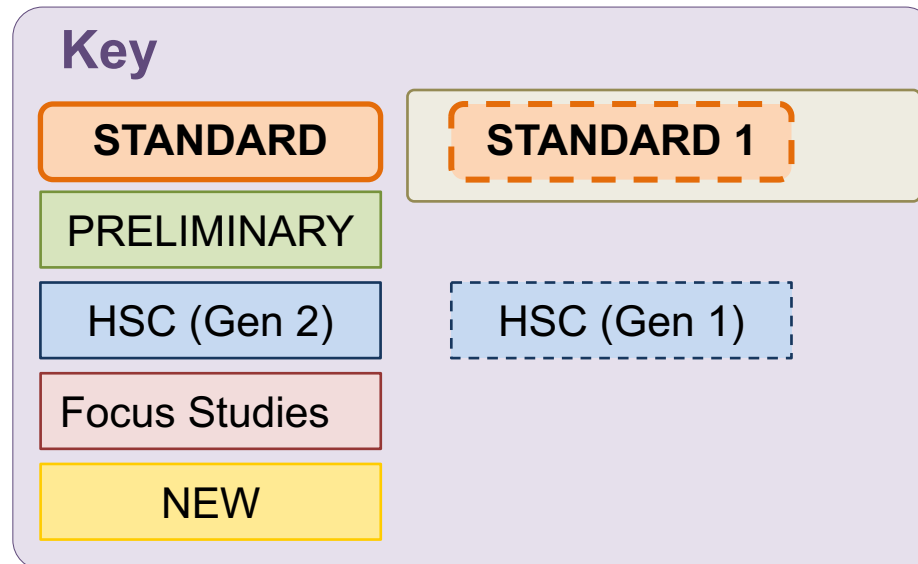
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By Simon Job. Correction/omissions to simon.job@det.nsw.edu.au

15/04/2017

No guarantee of accuracy or correctness.



Year 11

MS-A1
Formulae and Equations

AM1

AM3

FSDr

FShE

MS-A2
Linear Relationships

AM2

AM4

Year 12

MS-A4
Types of Relationships

Simultaneous linear equations

AM2

AM4

Non-linear equations

AM5

NEW

MS-A3
Types of Relationships

Simultaneous linear equations

AM2

AM4
CEC

Graphs of practical situations

AM4
CEC

NEW

Year 11

MS-M1

Applications of Measurement

Practicalities of measurement

MM1

MM4

NEW

Perimeter, area and volume

MM2

MM4

NEW

Units of energy and mass

MM2

FSHe

FSRe

NEW

MS-M2

Working with Time

MM6

NEW

Year 12

MS-M6

Non-right-angled Trigonometry

MM3

MM5

MS-M7

Rates and Ratios

MM1

MM3

FSRe

FS*
CEC

MS-M3

Right-angled Triangles

MM3

MM5

G2

MS-M4

Rates

MM1

FSDr

FSHu
CEC

MS-M5

Scale Drawings

MM1

MM3

FS*
CEC

Year 11

MS-F1

Money Matters

Interest and depreciation

FM2

FSDr

FM3

NEW

Earning and managing money

FM1

FM3

Budgeting and household expenses

FSDr

FSRe

NEW

Year 12

MS-F4

Investments and Loans

Investments

FM2

FM3

Depreciation and loans

FM4
CEC

FSDr

NEW

MS-F5

Annuities

FM2

FM5

NEW

MS-F2

Investment

FM2

MS-F3

Depreciation and Loans

FM4
CEC

FSDr

Year 11

MS-S1

Data Analysis

Classifying and representing data (grouped and ungrouped)

DS1

DS4

NEW

DS2

Exploring and describing data arising from a single continuous

DS2

DS4

NEW

DS3

DS4
CEC

MS-S2

Relative Frequency and Probability

PB1

PB2

Year 12

MS-S4

Bivariate Data Analysis

DS1

FShE

MS-S5

The Normal Distribution

DS5

MS-S3

Further Statistical Analysis

The statistical investigation process for a survey

DS1

Exploring and describing data arising from two quantitative variables

FShE

FShu
CEC

Year 11

Year 12

MS-N2

Network
Concepts

NEW

MS-N3

Critical Path
Analysis

NEW

MS-N1

Networks and
Paths

NEW

What is gone?

Compound interest tables

Graphs of tax rates

Radar charts

Manipulating algebraic terms

Algebraic fractions

Expand and factorise algebraic expressions

Digital downloads

A new style of syllabus

2012 General

- Preliminary: 46 pages
- Content:
 - Preliminary and HSC
- Considerations
 - Examinable
 -
- Preliminary content repeated in HSC

2017 Standard

- Year 11: 15 pages
- Content:
 - TBA
 - Considerations
 - Not examinable*
 - 16 times we are told to “review” content
 - Content not repeated
 - Glossary

* “Materials contained outside this document are for consideration and guidance only, unlike in the current General Mathematics Syllabus.”

Email: Anna Wethereld, 10/042017

No repeats

Content	General		Standard	
	Prelim	HSC	Year 11	Year 12
ALGEBRA				
Equations and Formulae	AM1	AM3	MS-A1	
Linear Relationships	AM2	AM4	MS-A2	
MEASUREMENT				
Ratios and Rates	MM1	FS		MS-M7
Perimeter, Area and Volume / SA	MM2	MM4	MS-M1	
FINANCIAL MATHEMATICS				
Compound Interest Formula	FM2	FM4		MS-F4

There are more examples of this!

Credit to Stuart Palmer for finding these. Based on a document shared in the [WINDSSM course](#).

Continuum of Learning

Stage 6 Standard is more a continuation of Stage 5 (5.2) than the General 1 course was.

No longer do we have items in the syllabus that were part of Stage 5, like there were in General. We have to decide for our students what assumed prior learning we may need to review.

Support Materials

Sample Scope and Sequence

Sample Assessment Schedules

Topic guidance: Measurement (Year 11)

Time?

LAC

AAM

WM

Building a Scope and Sequence

Year 11

- Year 11 120 indicative hours
- Last year: 96 hours of teaching time in Terms 1-3
That is, excluding other activities and assessment times.
- Year 11 needs to extend beyond first three terms.
The NESAs sample S&S does
- Year 11 is the only time students will see core concepts. ([no repeats](#))