



**Investigating Science
Stage 6**

Draft Syllabus

**Consultation Report
February 2017**

© 2017 NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales.

The NESA website holds the ONLY official and up-to-date versions of these documents available on the internet. ANY other copies of these documents, or parts of these documents, that may be found elsewhere on the internet might not be current and are NOT authorised. You CANNOT rely on copies from any other source.

The documents on this website contain material prepared by NESA for and on behalf of the Crown in right of the State of New South Wales. The material is protected by Crown copyright.

All rights reserved. No part of the Material may be reproduced in Australia or in any other country by any process, electronic or otherwise, in any material form, or transmitted to any other person or stored electronically in any form without the prior written permission of NESA, except as permitted by the Copyright Act 1968.

When you access the material you agree:

- to use the material for information purposes only
- to reproduce a single copy for personal bona fide study use only and not to reproduce any major extract or the entire material without the prior permission of NESA.
- to acknowledge that the material is provided by NESA.
- to include this copyright notice in any copy made
- not to modify the material or any part of the material without the express prior written permission of NESA.

The material may contain third-party copyright materials such as photos, diagrams, quotations, cartoons and artworks. These materials are protected by Australian and international copyright laws and may not be reproduced or transmitted in any format without the copyright owner's specific permission. Unauthorised reproduction, transmission or commercial use of such copyright materials may result in prosecution.

NESA has made all reasonable attempts to locate owners of third-party copyright material and invites anyone from whom permission has not been sought to contact the Copyright Officer.

Phone: (02) 9367 8289

Fax: (02) 9279 1482

Email: copyright@nesa.nsw.edu.au

Published by
NSW Education Standards Authority
GPO Box 5300
Sydney NSW 2001
Australia

www.educationstandards.nsw.edu.au

DSSP-27609

D2016/80088

Contents

1	Background information	1
2	Executive summary.....	2
3	Key matters.....	3
4	Analysis	4
4.1	Rationale	4
4.2	Aim	5
4.3	Objectives.....	6
4.4	Outcomes	7
4.5	Course structure and requirements	8
4.6	Assessment.....	10
4.8	Learning across the curriculum	12
4.9	Diversity of learners, including Life Skills.....	13
4.10	Other comments	16
4.11	Student voice.....	17
5	Quantitative analysis of survey responses.....	18
6	Respondents.....	21
6.1	Consultation meetings	21
6.2	Online survey respondents.....	25
6.3	Written submissions	27

1 Background information

The NSW Education Standards Authority (NESA) replaced the Board of Studies, Teaching and Educational Standards NSW (BOSTES) on 1 January 2017.

The preparation of the Investigating Science Stage 6 Draft Syllabus took into account the broad directions for the learning area, which were developed following public consultation and endorsed by the NESA in December 2014. In 2015 NESA conducted consultation on the draft writing briefs. The draft writing briefs were endorsed by the Board in February 2016.

NESA conducted consultation on the draft syllabus in Term 3, 2016.

The consultation program from 20 July 2016 to 31 August 2016 included:

- a meeting of the Years 11–12 Science Board Curriculum Committee on 24 August 2016
- face-to-face consultation meetings
- targeted consultation meetings for:
 - Aboriginal education
 - Special education
 - Industry.
- student voice meetings
- an online survey on the NESA website
- written submissions.

Professional associations and schooling sectors conducted a range of activities during the consultation period to inform feedback to NESA.

Feedback from consultation was analysed and informed revisions to the draft syllabus. The final syllabus is available in an online interactive format on the NESA website.

2 Executive summary

The *Investigating Science Stage 6 Draft Syllabus Consultation Report* provides a description of the consultation process and a summary and analysis of feedback received. It details data and findings gathered from a meeting of the Years 11–12 Science Board Curriculum Committee, 4 metropolitan and 3 regional face-to-face consultation meetings, 6 targeted consultation meetings, 2 student voice meetings, 63 responses to an online survey and 15 written submissions.

Most respondents supported the course. However, some respondents raised matters about the course structure and content.

The inclusion of depth studies was largely supported; however, some respondents raised issues in regard to the clarity of their requirements for implementation and assessment.

Some respondents noted that Investigating Science did not cater for the full range of learners and that the removal of contexts was unnecessary. These issues were not identified or supported by the majority of respondents.

Some respondents also noted that the alignment of Science Life Skills with Investigating Science was not appropriate.

A number of respondents indicated their support for the new course and acknowledged the opportunities for differentiation and student engagement.

3 Key matters

Key matters	Actions
<p>The depth studies may become inequitable across systems and schools. Issues in regard to equity were raised in relation to available resources.</p>	<p>Information about depth studies and their implementation and assessment has been strengthened in the syllabus. Support materials will be provided in 2017 to address issues about resourcing and equity.</p>
<p>The content is unclear and therefore teachers from different schools could program the course differently. It might be difficult to adequately prepare students for the HSC Examination.</p>	<p>The course content has been revised to provide clarity, clear progression of ideas and to facilitate examining.</p>
<p>The alignment of Science Life Skills with Investigating Science should be extended to the other Science courses to enable students with disability to have a greater range of choice in Science.</p>	<p>Requirements for Science Life Skills have been revised.</p>
<p>The Science Life Skills outcomes and content do not cater for the full range of students.</p>	<p>The Science Life Skills outcomes and content have been revised to ensure scope for the full range of students for whom Life Skills is appropriate.</p>

4 Analysis

4.1 Rationale

Summary

The majority of survey respondents endorsed the proposed rationale.

Feedback affirming the rationale

Feedback	Sources
The rationale describes the nature of the course and is supported.	Campbelltown (CM) Canterbury (CM) SCS Survey (x49)

Key matters and actions

Key matters	Sources	Actions
The rationale for Investigating Science should build on Stage 5 and reflect the nature of learning within Science Life Skills.	Campbelltown (CM) STANSW Survey (x6)	The rationale has been reviewed and the Life Skills Science course has been restructured.

4.2 Aim

Summary

The majority of respondents supported the proposed aim.

Feedback affirming the aim

Feedback	Sources
The proposed aim provides an appropriate statement of the overall purpose of the syllabus.	AIS SCS Survey (x49)

Key matters and actions

No key matters were raised in relation to the aim.

4.3 Objectives

Summary

The majority of respondents affirmed the proposed objectives.

Feedback affirming the objectives

Feedback	Sources
The objectives define in broad terms the knowledge, skills, understanding, values and attitudes to be developed through study of the courses.	Survey (x45)

Key matters and actions

No key matters were raised in relation to the objectives.

4.4 Outcomes

Summary

The majority of survey respondents agreed or strongly agreed that the outcomes were appropriate.

Feedback affirming the outcomes

Feedback	Sources
The outcomes are relevant and appropriate.	Survey (x40)

Key matters and actions

Key matters	Sources	Actions
The breadth of the outcomes needs to be refined.	AIS SCS Survey (x10)	The outcomes have been reviewed and modified as appropriate. The skills outcomes have been rewritten and additional content has been added.

4.5 Course structure and requirements

Summary

The Investigating Science course structure was supported by the majority of respondents. Matters were raised in regard the broad nature of the outcomes and the content.

There was general support as well as uncertainty about the provision of depth studies. Respondents were unsure of the requirements and parameters of the depth study provision but saw them as tools for differentiation and avenues for teacher and student engagement.

Many respondents noted that the amount of content in the core study needs to be specified in further detail. Suggestions include reducing the breadth of the outcomes and extending the skills content.

There was support for the flexibility and practical opportunities provided by the course.

Feedback affirming the course structure and requirements

Feedback	Sources
The course is designed for all student levels who study Science and the course would best complement the study of one or more of the discipline-based courses.	CCSOBB Industry STANSW Survey (x25)
The outcomes can be differentiated well for all levels of Science.	Survey (x30)

Key matters and actions

Key matters	Sources	Actions
The content is very general.	AIS CCSOBB Epping (CM) NSWTF SCS STANSW Survey (x7)	The scope of content has been revised to provide clear direction of expectation.
Clarification is required regarding the depth study implementation, monitoring and assessment.	AIS Campbelltown (CM) CCSOBB Epping (CM) Manly (CM) NSWTF SCS STANSW Survey (x2)	Support materials will be developed in 2017 to support implementation and assessment of the depth studies.
The cross-curriculum capabilities of Aboriginal and Torres Strait Islander histories and cultures are not clearly identified.	Survey (x10)	Examples of Aboriginal and Torres Strait Islander content have been included and reviewed for appropriateness and are indicated by a specific icon.

4.6 Assessment

Summary

The majority of respondents indicated that school-based assessment was well supported. The general consensus was that fewer assessment tasks were required. Some respondents requested further guidance in relation to school-based assessments, especially the assessment of depth studies.

Several respondents commented on the logistics of practical assessment tasks and potential issues for Distance Education students. Many respondents raised matters about the possibility of increased plagiarism due to the mandated assessment tasks.

Feedback affirming the information on assessment

Feedback	Sources
The school-based assessment information is supported.	Survey (x38)

Key matters and actions

Key matters	Sources	Actions
The assessment of depth studies is unclear.	AIS CCSOBB NSWTF SCS STANSW	Support materials will be developed to support implementation and assessment of depth studies.
The assessment of practical tasks for Distance Education students might not be possible.	Survey (x13)	The requirements for assessing practical investigations for Year 11 have been removed and flexibility for practical tasks provided for all students.
Clarification is needed on the assessment of Year 12 course and which outcomes will be assessed in both school-based assessment and the HSC Examination.	Campbelltown (CM) Canterbury (CM) DoE Epping (CM) Manly (CM) SCS STANSW	Assessment advice will be provided with support materials in 2017.

4.7 Content

Summary

Just over half of the respondents agreed that the flexibility of the content allows for differentiated learning and the selection of authentic engaging experiences in individual classroom contexts. Differentiation and flexibility were regarded as strengths.

Matters were raised about the content being broad and vague. Some respondents commented that the content was inappropriate for the Stage level and that some of the modules in the Year 11 course seemed disjointed.

Feedback affirming content

Feedback	Sources
Greater differentiation capabilities and greater flexibility for all students.	Campbelltown (CM) Survey (x26)

Key matters and actions

Key matters	Sources	Actions
The course content is general and requires clarification.	AIS Epping (CM) NSWTF SCS STANSW Survey (x4)	Syllabus content has been refined and reviewed to provide further direction about depth and breadth of learning in each of the other modules.
The depth of course content is not clear.	AIS CCSOBB NSWTF SCS STANSW Survey (x2)	Syllabus content has been revised in all modules to increase clarity surrounding depth.

4.8 Learning across the curriculum

Summary

The majority of respondents agreed that the Learning across the curriculum content, including opportunities for students to develop their understanding and appreciation of Aboriginal and Torres Strait Islander histories and cultures, was authentic and appropriate.

The majority of respondents also agreed that there was sufficient Learning across the curriculum content embedded within the new syllabus. However, some respondents preferred literacy to be explicitly embedded in the syllabus rather than be represented by an icon.

Some respondents raised matters about the availability of resources to teach effectively the Aboriginal and Torres Strait Islander content and the possibility that the resulting teaching and learning would not be authentic.

Feedback affirming Learning across the curriculum

Feedback	Sources
The Learning across the curriculum content is authentic and well structured.	Campbelltown (CM) Epping (CM) Survey (x43)

Key matters and actions

Key matters	Sources	Actions
There are not sufficient resources to effectively teach Aboriginal and Torres Strait Islander histories and cultures content.	AIS BCC NSWTF Submission 1 Survey (x13)	Support materials will be developed to support teaching of Aboriginal and Torres Strait Islander histories and cultures content in 2017.
Literacy skills need to be more explicit in the syllabus, rather than simply an icon.	AIS Submission 1 Survey (x7)	The content has been revised to allow for the development of specific scientific literacy skills in all modules.

4.9 Diversity of learners, including Life Skills

Summary

Most respondents commented that depth studies facilitated open-ended investigations and other experimental work and provided opportunities to cater for the diversity of learners. Some indicated that the course would not cater for the diversity of students. This was not supported by the majority of respondents.

Feedback was received in relation to the role of the K–10 Curriculum Framework in the development of Stage 6 syllabuses, the inclusion of Australian curriculum content within Science Life Skills, reference to the course completion criteria and use of the terminology ‘special education’ in the syllabus. This feedback was not supported by the wide range of respondents.

While the alignment of the Science Life Skills course with the Investigating Science course was supported, respondents indicated that this had not been successfully achieved and that the Science Life Skills outcomes and content present a level of complexity that may exclude access for students with significant disabilities.

Feedback about the diversity of learners, including Life Skills

Feedback	Sources
The alignment of Science Life Skills with Investigating Science provides an inclusive and equitable approach.	AASE AIS CEDOW DoE NSWTF Special Ed Submission 3 Survey (x2)
Assessment advice is inclusive of students with special education needs.	AIS DoE

Key matters and actions

Key matters	Sources	Actions
The statements should be clearer in relation to the options students with disability have in accessing the curriculum and the possibility of students having more than one characteristic.	AIS DoE	The advice in relation to the Diversity of Learners has been reviewed in response to consultation feedback.
The content for Investigating Science needs to be more specific in order to cater for a broad range of learners.	AIS NSWTF SCS STANSW Submission 1 Survey (x4)	Knowledge and Understanding content has been revised and modified throughout the syllabus.
The flexibility for students to undertake more than one course within the Science KLA makes the alignment of Science Life Skills to a single Science course problematic and inappropriate.	AASE BCC Survey (x1)	The syllabus has been reviewed to clarify the status of the Science Life Skills course within the Stage 6 Science curriculum and to strengthen the relationship between Investigating Science and Science Life Skills.
The relationship between Investigating Science and Science Life Skills requires clarification.	AIS CEDOW DoE NSWTF Special Ed Submission 3 Survey (x1)	
The scope and complexity of Science Life Skills outcomes are not appropriate for the range of students accessing the course.	AASE AIS BCC DoE NSWTF Special Ed Submission 3 Survey (x6)	The Science Life Skills outcomes and content have been reviewed to ensure scope for the full range of students for whom Life Skills is appropriate.
The Science Life Skills outcomes should demonstrate a systematic breadth of progression in learning both within the Stage as well as between Stage 5 and Stage 6.	AASE AIS DoE Special Ed Survey (x1)	The Science Life Skills outcomes have been revised to allow for appropriate progression from Years 7–10 Science Life Skills.
The new units presented for Science Life Skills are not as relevant and meaningful for students as the modules within the existing <i>Science Stage 6 Life Skills Syllabus</i> .	NSWTF Special Ed	The Science Life Skills units have been reviewed to ensure relevance for the full range of students for whom Life Skills is appropriate.

Key matters	Sources	Actions
<p>Assessment of Life Skills outcomes requires clarification and review. Advice should reflect the formative and ongoing nature of assessment required for students with special education needs.</p>	<p>AIS CEDOW NSWTF Special Ed Submission 3 Survey (x2)</p>	<p>Assessment advice in relation to students with special education needs, including students undertaking Life Skills courses, will be reviewed.</p>
<p>Advice is needed in the Investigating Science syllabus regarding eligibility, collaborative planning and accessing a combination of Life Skills and regular courses.</p>	<p>AIS CEDOW DoE NSWTF SCS</p>	<p>Advice on the NESA website regarding planning, programming and assessment for students with special education needs will be reviewed.</p>
<p>Further advice and direction is needed to guide teachers in developing meaningful and appropriate learning experiences.</p>	<p>AIS SCS Special Ed STANSW</p>	<p>Support materials and sample units of work will be developed to illustrate appropriate and meaningful teaching, learning and assessment opportunities for students.</p>

4.10 Other comments

Summary

Several respondents were strongly supportive of the course with a focus on the development of students' scientific skills.

Feedback affirming the draft syllabus

Feedback	Sources
This course gives teachers great scope to develop scientific skills with their students.	Survey (x20)

Key matters and actions

Key matters	Sources	Actions
Teaching and assessment of this course may be problematic due to the non-specific course content.	NSWTF SCS STANSW Survey (x3)	The content in all modules has been revised to provide clarity and to facilitate examination of the course.

4.11 Student voice

Targeted consultation meetings with students were held to gather feedback about Science. These meetings focused on discussion of courses within the Year 11 and Year 12 Science learning area, including: aspects of Science most and least liked; how the course could be improved; and the value and interest in a Science Extension course.

Summary

Student comments focused on the study of Stage 5 and Stage 6 Science. The majority of students supported a more flexible approach to the study of science, including opportunities to do their own research, and a move away from learning a large amount of prescribed content.

Feedback from student voice on Science

Feedback	Sources
Students enjoy the open-ended nature of tasks.	Armidale (SV) Wagga Wagga (SV)
Students dislike learning extensive content for an examination and preferred the application of knowledge.	Armidale (SV) Wagga Wagga (SV)
Students indicate that there was much more content in the Stage 6 course compared to Stage 5.	Armidale (SV) Wagga Wagga (SV)
Students support the inclusion of more independent research tasks and having time dedicated to exploring Science in depth.	Armidale (SV) Wagga Wagga (SV)
Students strongly endorse the development of a Science Extension course.	Armidale (SV) Wagga Wagga (SV)

5 Quantitative analysis of survey responses

Note: Due to rounding, some percentages may not total 100%.

Survey item	Number of responses	Strongly agree	Agree	Disagree	Strongly disagree
Rationale					
1. The rationale describes the nature and purpose of the course in the curriculum.	56	19%	68%	11%	2%
Aim					
2. The aim provides a succinct statement of the overall purpose of the course.	56	15%	73%	11%	2%
Objectives					
3. The objectives define the intended learning and the knowledge, understanding, skills, values and attitudes through study of the course.	54	19%	65%	15%	2%
Outcomes					
4. The outcomes and content describe what students are expected to achieve in relation to what they know, understand and can do from studying the course.	52	15%	62%	19%	4%
5. The outcomes provide an appropriate continuum of learning from Stage 5 to Stage 6.	51	18%	57%	18%	8%
Course structure					
6. The course structure and requirements are clear, manageable and appropriate.	51	18%	35%	27%	20%
7. The requirements for programming of a depth study are clear.	49	10%	42%	27%	20%

Survey item	Number of responses	Strongly agree	Agree	Disagree	Strongly disagree
School-based assessment					
8. The school-based assessment requirements are manageable.	49	16%	63%	14%	6%
9. The school-based assessment requirements provide opportunities for students to develop and demonstrate their learning.	50	18%	58%	18%	6%
10. The requirements for the assessment of a depth study are clear.	51	14%	41%	33%	12%
HSC assessment					
11. Please comment on the HSC examination specifications.	35	9%	40%	34%	17%
Content					
12. The content describes the scope and depth of learning.	49	16%	35%	41%	8%
13. The course content is appropriate.	50	16%	36%	30%	18%
Learning across the curriculum					
14. The Learning across the curriculum content, including opportunities for students to develop their understanding and appreciation of Aboriginal and Torres Strait Islander histories and cultures, is authentic and appropriate.	51	14%	59%	22%	6%
Modules					
15. The modules provide a clear progression and development of concepts.	50	18%	50%	20%	12%
16. Sufficient time has been allocated to cover the course outcomes and content for each module.	49	6%	63%	24%	6%

Survey item	Number of responses	Strongly agree	Agree	Disagree	Strongly disagree
17. Working Scientifically is appropriately incorporated in the content.	50	34%	54%	6%	6%
18. There is sufficient scope for a variety of practical experiences.	51	33%	57%	8%	2%
19. There are sufficient opportunities to apply quantitative and analytical skills in the course.	51	29%	61%	8%	2%
Diversity of learners					
20. The syllabus meets the needs of the diversity of learners.	47	21%	38%	26%	15%
Life Skills					
21. The alignment of the course structure and the Life Skills outcomes and content is appropriate.	45	15%	67%	13%	4%
22. The relationship between the course objectives and the Life Skills outcomes is appropriate.	45	13%	73%	9%	4%
23. The Life Skills outcomes and content provide scope for developing programs for students with special needs.	43	7%	74%	16%	2%
24. The Life Skills outcomes provide the basis for assessing and reporting student achievement.	44	9%	70%	18%	2%

6 Respondents

6.1 Consultation meetings

Board Curriculum Committee consultation meeting at NESAs on 24 August 2016 (code: BCC)

16 members

Name	Organisation
Dr Timothy Wright	Chair
Mr Vatche Ansourian	NSW Department of Education
Dr Alison Beavis	NSW/Territories Committee of Chairs of Academic Boards/Senates
Ms Olivia Belshaw	Professional Teachers' Council NSW
Mr John Cairns	Australian Association of Special Education NSW Chapter
Ms Karen Daffy	NSW Teachers Federation
Ms Fiona Davies	NSW Parents' Council
Mr Robert Farr	Association of Independent Schools of NSW
Ms Catherine Garrett-Jones	Council of Catholic School Parents NSW
Mr Peter Harold	Independent Education Union NSW/ACT
Ms Alice Leung	NSW Department of Education
Mr Mike Morgan	NSW Teachers Federation
Mr Paul Reilly	TAFE NSW
Mr Timothy Spencer	Federation of Parents and Citizens Associations of NSW
Mr Paul Stenning	Catholic Education Commission NSW
Dr Louise Sutherland	NSW/Territories Committee of Chairs of Academic Boards/Senates

Face-to-face consultation meetings (code: CM)

480 attendees

Location	Date (2016)	Number of attendees
Campbelltown	28 July	65
Canterbury	2 August	82
Gosford	4 August	44
Manly	9 August	59
Epping	11 August	174
Armidale	18 August	35
Wagga Wagga	23 August	21

Targeted consultation meetings

Aboriginal Education (code: Aboriginal Ed)

15 attendees

Location	Date (2016)	Number of attendees
Sydney (am)	28 July	8
Sydney (pm)	28 July	7

Special Education (code: Special Ed)

57 attendees

Location	Date (2016)	Number of attendees
Sydney	11 August	19
Sydney	16 August	21
Newcastle	22 August	17

Industry (code: Industry)

28 attendees

Location	Date (2016)	Number of attendees
Sydney	11 August	28

Student voice meetings (code: SV)

30 attendees

Location	Date (2016)	Number of attendees
Armidale	18 August	19
Wagga Wagga	23 August	11

Consultation meeting attendees

Attendees	Number of attendees
Academic	11
Parent	0
Pre-service teacher	5
School executive	62
Teacher	326
Student	1
Other	14

Attendees identified as	Number of attendees
An Aboriginal person	2
A Torres Strait Islander person	0
An Aboriginal and Torres Strait Islander person	0
Not an Aboriginal and/or Torres Strait Islander person	417

Sector	Number of attendees
Government	218
Catholic	62
Independent	173
Non-school based	27

Area of NSW	Number of attendees
Metropolitan	380
Regional	100

Note: The data listed above was gathered from meeting attendance registrations. It may not include all data for those who attended without first registering. Some data may not reflect the total number of attendees.

6.2 Online survey respondents

63 responses

Respondents	Number of respondents
Academic	0
Parent	0
Pre-service teacher	0
Principal	0
School executive	6
School faculty/department	4
Teacher	53
Student	0
Other	0

Respondents identified as	Number of respondents
An Aboriginal person	1
A Torres Strait Islander person	0
An Aboriginal and Torres Strait Islander person	0
Not an Aboriginal and/or Torres Strait Islander person	62

Sector	Number of respondents
Government	37
Catholic	7
Independent	18
Non-school based	1

Area of NSW	Number of respondents
Metropolitan	33
Regional	30

Number of people contributing to the survey	Number of respondents
1	50
2–5	10
6 or more	3

6.3 Written submissions

Organisations, groups and individuals	Code
Australian Association of Special Education NSW Chapter	AASE
Association of Heads of Independent Schools of Australia	AHISA
Association of Independent Schools of NSW	AIS
Catholic Schools Office Armidale	CSOArm
Catholic Schools Office Diocese of Lismore	CSOLism
Catholic Education Diocese of Wollongong	CEDOW
Community of Catholic Schools Diocese of Broken Bay	CCSOBB
NSW Department of Education	DoE
NSW Teachers Federation	NSWTF
Science Teachers' Association of NSW	STANSW
Sydney Catholic Schools, Archdiocese of Sydney	SCS
Individual respondent	Submission 1
Australian Christian Lobby	Submission 2
St Ignatius College Riverview	Submission 3
Individual respondent	Submission 4