BOSTES
BOARD OF STUDIES TEACHING & EDUCATIONAL STANDARDS NSW

Chemistry
Stage 6

Draft Writing Brief

Consultation Report
February 2016

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1. Background information

The preparation of the *Chemistry Stage 6 Draft Writing Brief* took into account the broad directions for the learning area, which were developed following public consultation and endorsed by BOSTES in December 2014.

BOSTES conducted consultation in Term 4, 2015 to engage stakeholders in the syllabus development process and to seek their feedback on options and proposals in the draft writing brief.

The consultation program included:

- a meeting of the Years 11–12 Board Curriculum Committee for Science on 18 November 2015
- afternoon consultation meetings at:
  - Parramatta on 26 October 2015
  - Albury on 27 October 2015
  - Port Macquarie on 29 October 2015
  - Merimbula on 2 November 2015
  - Hurstville on 4 November 2015
  - Asquith on 5 November 2015
  - Sydney on 26 November 2015
- an online survey on the BOSTES website from 19 October to 29 November 2015
- written submissions from:
  - NSW Department of Education
  - Catholic Education Office Sydney
  - Communities of Catholic Schools – Diocese of Broken Bay
  - Association of Independent Schools of NSW
  - Association of Heads of Independent Schools of Australia
  - NSW Teachers Federation
  - Science Teachers' Association of NSW
  - University of Sydney
  - Blue Mountains Grammar School Science Faculty
  - Gosford High School
  - Sydney Grammar School
  - 3 individuals.

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

Feedback from consultation was analysed and informed revisions to the draft writing brief. The final writing brief will be used to develop the draft syllabus.

2. Executive summary

The *Chemistry Stage 6 Draft Writing Brief Consultation Report* provides a description of the consultation process and a summary and analysis of feedback received. The summary analysis outlines confirmation of the general directions of the draft writing brief as well as key matters raised and proposed actions and amendments.

The Consultation Report presents data and findings gathered through 159 survey responses, 14 written submissions, a Board Curriculum Committee meeting and 7 consultation meetings.

The *Chemistry Stage 6 Draft Writing Brief* provided three course options for analysis and feedback. Stakeholders indicated that Option 2, with a four-topic structure, no options and a focus on practical expectations, was preferred. There was strong agreement that depth studies incorporating investigative projects could provide for deeper learning and cater for the needs of a broad range of students (Option 3). Insufficient information and detail about the structures, requirements and assessment of the depth studies was cited as the reason Option 3 was not selected. There is sufficient evidence that depth studies should form part of the future syllabus structure.

Other significant matters raised included: an overall desire for further refinement of the rationale, aim, objectives and outcomes along with a reduction in the content to allow for depth of study and to support students' learning about contemporary science as it is practised. Respondents also supported development of an extension course/s in science. It was indicated that course assessment requirements be clarified and that there was a need for teacher professional development and learning support materials.

Key matters

The key matters to emerge from the consultation included:

- Option 2 is preferred. However, there is strong support for Option 3 with its depth study component
- the rationale, aim and objectives require some revision to provide more clarity and consistency of purpose about the principles of chemistry
- there is a need for quantitative, analytical emphasis in the course, with a focus on physical understanding, modelling, and problem-solving using data analysis
- the concept of depth studies is supported. However, assessment for the HSC requires clarification
- the Chemistry syllabus should emphasise learning science as it is practised and promote practical investigations and activities
- development of an Extension course(s) for Science should be considered
- Senior Years assessment policies, procedures and requirements should be reviewed and clarified.

Actions in response to key matters

- Aspects of Options 2 and 3 will be incorporated.
- The rationale, aim and objectives will be reviewed and amended to provide clarity and consistency.
- Quantitative analytical aspects will be included and addressed through a review of the modules and areas of study.
- Depth studies will be included, and details about their nature and structure will be provided.
- Where appropriate, practical investigations and activities will enhance and complement the content.
- An Extension course(s) in science will be considered for development following draft syllabus development in the science courses.
- Senior Years assessment policies and procedures will be reviewed during draft syllabus development.

A summary of key matters and related actions is contained in Section 4 of this report.

3. Summary of respondents

Consultation stakeholder and teacher meetings

1 Board Curriculum Committee (BCC), 7 teacher meetings

BCC members	8	Government sector	72	Catholic sector	25
Independent sector	56	Other	6		

Online survey respondents

159 online survey responses

Respondent:					
Academic	5	Parent	0	Pre-service teacher	2
Principal	0	School executive	6	School faculty	14
Student	11	Teacher	121	Other	0
I am:					
An Aboriginal person	1	A Torres Strait Islander person	1		
An Aboriginal and Torres Strait Islander person	0	Not an Aboriginal and/or Torres Strait Islander person	157		
Sector:					
Government	72	Catholic	25		
Independent	56	Non-school based	6		
Area of NSW:					
Metropolitan	93	Regional	66		
Number of people contributing to this survey:					
1	140	2–5	12	6 or more	7

4. Key matters

Key matters	Actions
Option 2 is preferred. However, there is strong support for Option 3 with its depth study component.	Aspects of Options 2 and 3 will be incorporated.
The rationale, aim and objectives require some revision to provide more clarity and consistency of purpose around the principles of chemistry.	The rationale, aim and objectives will be reviewed and amended to provide consistency and clarity.
There is a need for a quantitative, analytical emphasis in the course, with a focus on physical understanding, modelling and problem- solving using data analysis.	Quantitative analytical aspects will be included and addressed through a review of the modules and areas of study.
The concept of depth studies is supported. However, assessment for the HSC required further investigation	Depth studies will be included, and details about their nature and structure will be provided.
The Chemistry syllabus should emphasise learning science as it is practised and promote practical investigations and activities.	Where appropriate, practical investigations and activities will enhance and complement the content.
Development of an Extension course(s) for Science should be considered.	An Extension course(s) in Science will be considered for development following syllabus development in the science courses.
Senior Years assessment policies, procedures and requirements should be reviewed and clarified.	Senior Years assessment policies and procedures will be reviewed during draft syllabus development.

5. Analysis

5.1 Rationale

Summary

The majority of survey respondents agreed that the proposed rationale describes the nature of the course, explains its purpose in the curriculum and reflects a contemporary view.

Several respondents stated that the rationale was not inclusive of all students.

Feedback affirming the rationale

Feedback	Sources
The rationale is broad and attempts to emphasise the importance of the skills.	AHISA Albury (CM) BCC DoE Survey (x5)
The rationale correctly emphasises one of the roles of the course as a preparation for tertiary studies.	AHISA STANSW Submissions 1, 3 Survey (x4)

Key matters and actions

Key matters	Sources	Actions
The rationale does not clearly relate to the aim and objectives.	AIS CEOSYD STANSW Survey (x8)	The purpose of the rationale is to describe the distinctive nature of the subject and outline its relationship to the contemporary world and current practice. The rationale will be reviewed during syllabus development.

5.2 Aim

Summary

The majority of respondents agreed that the proposed aim provides a statement of the overall purpose of the syllabus.

Respondents supported the emphasis on the practice of science to develop students' understanding of the content.

Feedback affirming the aim

Feedback	Sources
The inclusion of practical work and skills are an integral part of learning and this emphasis is supported.	AHISA AIS BCC DoE STANSW Survey (x3)

Key matters and actions

Key matters	Sources	Actions
The aim requires greater detail.	AIS Survey (x6)	The detail of the aim will be reviewed during syllabus development.

5.3 Objectives

Summary

The majority of respondents agreed that the proposed objectives define in broad terms the knowledge, understanding, skills, values and attitudes developed through studying this course.

Some respondents stated that the objectives required more detail about specific areas of chemistry.

Feedback affirming the objectives

Feedback	Sources
The objectives define the course in terms of knowledge, understanding, skills, value and attitudes.	AHISA BCC Parramatta (CM) Port Macquarie (CM) Survey (x3)

Key matters and actions

Key matters	Sources	Actions
The objectives provide insufficient detail and the skills objectives need further development.	AIS CEOSYD Survey (x5)	The detail of all objectives will be reviewed during syllabus development. However, the outcomes provide further detail of objectives.

5.4 Outcomes

Summary

Most respondents agreed that the sample of outcomes is appropriate.

The samples of outcomes show a progression of ideas from the Year 11 to the Year 12 course.

Some respondents stated that more detail was required with regard to statements about scientific literacy, ethical behaviour and the value of models theories and laws.

Feedback affirming the outcomes

Feedback	Sources
The focus on skills before knowledge and understanding is welcomed.	AHISA BCC DoE Survey (x3)

Key matters and actions

Key matters	Sources	Actions
The outcomes need to include specific statements about scientific literacy and the value of models, theories and laws.	Hurstville (CM) Survey (x2)	The outcomes will be reviewed to consider inclusion of specific statements about scientific literacy and the value of models, theories and laws.

5.5 Diversity of learners

Summary

Respondents commented that the inclusion of the depth studies would cater for the needs of the diversity of learners in Chemistry.

Some respondents commented that a reduction in content and an increase in the emphasis on practical work would cater more effectively for the diversity of learners and promote deeper engagement.

Many respondents noted that an Extension course in Chemistry would cater for the needs of high-achieving students

Feedback about the diversity of learners and Life Skills outcomes and content

Feedback	Sources
The course provides the basis of developing the required understandings in chemistry.	Survey (x8)
An increased emphasis on practical experiences will enable students to better engage with the content.	AHISA Survey (x9)
Project-based work and an Extension Science course to cater for different ability levels and interests are supported.	AHISA BCC DoE STANSW Survey (x23)

Key matters and actions

Key matters	Sources	Actions
Heavily prescribed content and the inclusion of contexts in the current syllabus hinder the teacher's ability to provide for the diversity of learners.	Survey (x7)	Course structures and requirements will be reviewed.
The course rationale indicates that it caters for students who have substantial achievement in Stage 5.	AIS CEOSYD Survey (x10)	The rationale will be reviewed to clarify why students would study the subject and how it contributes to the purpose of the Stage 6 curriculum and prepares students for post-school pathways.

5.6 Course structure and options

Summary

Preferred option

Option 2 was the preferred choice of the majority of respondents. Many respondents supported the principle of the depth studies component in Option 3 but required further detail regarding how depth studies would be implemented and assessed.

It was suggested that Option 3 should be considered for the Year 11 course and Option 2 for the Year 12 course to include depth studies.

Course content

The majority of survey respondents agreed that the sequence of content and areas of study presented in Options 2 and 3 is logical, appropriate and contemporary and will meet the needs and interests of a range of students.

A common multidisciplinary unit

Most survey respondents indicated that a multidisciplinary unit was not required as this was well catered for in Stage 4 and Stage 5 Science.

Depth studies

A number of respondents noted that the proposed depth studies needed further clarification.

Additional quantitative aspects for consideration

Some respondents suggested that modern instrumentation and analytical techniques be included in the course.

An Extension course

Most respondents supported the development of an Extension course in Chemistry. There was support for consideration of an Extension course(s) for Science.

Respondents also indicated that the nature of the proposed Extension course(s) required greater clarification.

Other structures and options

The majority of survey respondents indicated that the course structures and options provided were appropriate.

Feedback affirming the course structure and options

Feedback	Sources
Content organisation and structure The major ideas of chemistry are in a logical sequence and grouped by central concepts rather than contexts.	DoE Submission 2 Survey (x28) Sydney (CM)
Practical-based learning activities drive the learning of content.	AHISA AIS Submission 6 Survey (x10) Sydney (CM)
Depth studies Depth studies are supported, including opportunities for students to research and learn about an area of personal interest, promoting engagement.	AHISA Merimbula (CM) STANSW Survey (x28)
The inclusion of depth studies is supported.	AHISA AIS BCC CEOSYD Submissions 2, 6 Survey (x10) Sydney (CM)

Key matters and actions

Key matters	Sources	Actions
Content organisation and structure The Year 11 course should be reduced to 3 terms.	Albury (CM) DoE Hurstville (CM) Submissions 2, 3 Survey (x4) Sydney (CM)	The content will be reduced to provide opportunities for depth of learning.
Content should be reduced and address the continuum of learning from Stage 5.	AIS NSWTF Submissions 2, 6 Survey (x2)	Content will be reduced and the continuum of learning will be reviewed and strengthened.
Depth studies Details about the requirements surrounding depth studies are required.	DoE Hurstville (CM) Merimbula (CM) Parramatta (CM) Submission 4 Survey (x3)	Advice about the nature, structure and requirements of depth studies will be developed for the draft syllabus.
Extension course An Extension course in Chemistry or an Extension course(s) for Science is supported.	AHISA AIS Asquith (CM) BCC DoE Hurstville (CM) NSWTF Parramatta (CM) Submissions 1, 2, 4, 5, 6 Survey (x42) Sydney (CM) USYD	An Extension course/s in Science will be considered for development following syllabus development in the science courses.
The nature of any Extension course requires greater clarification.	AIS BCC STANSW Submissions 2, 3 Survey (x20) UNSW USYD	Clarification about the scope of an Extension course will be developed with the draft syllabus.

5.7 Assessment and reporting

Summary

Most respondents indicated that school-based assessment is well supported.

Some respondents indicated that there should be less emphasis on written exams while others believed that there should be a mandatory practical task that would mirror what is required in other subjects.

There was feedback that the final HSC Examination should contain more questions requiring understanding and application rather than direct factual recall.

Feedback affirming the information on assessment and reporting

Feedback	Sources
The number of school-based assessment tasks and examinations are appropriate.	Port Macquarie (CM) Survey (x8)

Key matters and actions

Key matters	Sources	Actions
The use of technology in Chemistry could be enhanced.	BCC Survey (x5)	The use of technology in assessment will be considered.
Assessment requirements and structures need to be reviewed along with the syllabus.	Albury (CM) Asquith (CM) BCC CCSOBB Hurstville (CM) Merimbula (CM) NSWTF Parramatta (CM) Submissions 1, 2 Survey (x3)	Internal and external assessment specifications, including HSC assessment policies and procedures, will be reviewed during syllabus development.
Clarification is required as to whether both the Year 11 and Year 12 courses will be assessed.	DoE	
The importance of the assessment of the practical components of chemistry should be enhanced.	AIS Submission 6	

5.8 Other comments

Summary

Respondents commented that more consultation around the detail of the two options presented with specific examples for depth study projects as well as details in relation to their assessment is required.

An Extension course in Chemistry is welcome; however, a multidisciplinary Extension Science course should be considered.

Feedback affirming the draft writing brief

Feedback	Sources
The draft writing brief provides a basis for the development of the syllabus	AIHSA BCC DoE Submissions 1, 2

6. 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	Yes	No
Rationale 1. The proposed rationale describes the nature of the course in broad terms and explains its purpose in the curriculum.	135	20%	76%	4%	0%		
2. The proposed rationale reflects a contemporary view of the course.	132	18%	77%	5%	0%		
Aim 3. The proposed aim provides a statement of the overall purpose of the syllabus.	129	22%	75%	3%	0%		
Objectives 4. The proposed objectives define in broad terms the knowledge, understanding, skills, values and attitudes to be developed through study in this course.	129	23%	70%	6%	1%		
Outcomes 5. The sample of outcomes is appropriate.	128	22%	64%	12%	2%		
Course structure and options 6. Option 1 is preferred.	22					20%	
7. Option 2 is preferred.	56					51%	
8. Option 3 is preferred.	32					29%	
9. The sequence of content and areas of study presented in the options are logical and appropriate	108	32%	47 %	19%	2%		
10. The content and areas of study in the options are contemporary	106	16%	61%	21%	2%		
11. The content and areas of study provide learning opportunities to prepare students to undertake further study	106	32%	62%	4%	2%		
12. The structure and content provides flexibility to meet the needs and interests of the range of students	105	17%	62%	20%	1%		

Survey Item	Number of responses	Strongly agree	Agree	Disagree	Strongly disagree	Yes	No
13. A common multidisciplinary unit to commence the study of Stage 6 Science courses would focus students on the disciplines, and further develop common skills to assist students to choose appropriate discipline pathways	106	19%	41%	27%	13%		
14. Depth studies incorporating investigative projects provide opportunities for students to apply their scientific knowledge, understanding and skills.	106	28%	42%	17%	12%		
15. Are there additional quantitative analytical aspects that should be considered for inclusion in this course?	93					42%	58%
16. Is there another structure or option for Chemistry that BOSTES should consider?	88					22%	78%
General 17. The draft writing brief provides a sound basis for developing the final writing brief, which is the blueprint for the development of the draft syllabus.	98	14%	69%	16%	0%		

7. Respondents

7.1 Consultation meetings

Afternoon consultation meetings (code: CM)

Location	Date (2015)	Total
Parramatta	26 October	73
Albury	27 October	8
Port Macquarie	29 October	14
Merimbula	2 November	5
Hurstville	4 November	60
Asquith	5 November	39
Sydney	26 November	26

Board Curriculum Committee consultation meeting at the BOSTES on 18 November 2015 (code: BCC)

Name	Organisation
Dr Timothy Wright	Chair
Mr Vatche Ansourian	NSW Department of Education
Ms Olivia Belshaw	Science Teachers' Association of NSW
Mr Robert Farr	Association of Independent Schools of NSW
Ms Regina Menz	Catholic Education Commission NSW
Mr Mike Morgan	NSW Teachers Federation
Mr Paul Reilly	NSW Department of Industry – TAFE NSW
Mr Tim Spencer	Federation of Parents and Citizens' Association NSW

7.2 Written submissions

Organisations, groups and individuals	Code
Association of Heads of Independent Schools of Australia	AHISA
Association of Independent Schools of NSW	AIS
Blue Mountains Grammar School Science Faculty	Submission 4
Catholic Education Office Sydney	CEOSYD
Communities of Catholic Schools – Diocese of Broken Bay	CCSOBB
Gosford High School Science Faculty	Submission 5
NSW Department of Education	DoE
NSW Teachers Federation	NSWTF
Science Teachers' Association of NSW	STANSW
Sydney Grammar School Science Faculty	Submission 2
University of Sydney	USYD
Individual Respondent	Submission 1
Individual Respondent	Submission 3
Individual Respondent	Submission 6