



B O A R D O F S T U D I E S
NEW SOUTH WALES

Science and Technology K–6

Draft Writing Brief

Consultation Report

Contents

Executive Summary	3
1 Background	4
2 Profile of Respondents	5
2.1 Profile of Survey Respondents.....	5
2.2 Profile of Teacher Consultation Meetings	6
2.3 Profile of Key Groups and Interest Groups.....	6
2.4 Profile of Education Academics.....	7
2.5 Consultation Codes.....	7
3 Summary of Key Issues Raised and Actions Taken	8
4 Analysis	9
4.1 The Rationale	9
4.2 The Place of Science and Technology K–6 in K–12 Curriculum.....	11
4.3 The Aim	13
4.4 The Objectives	14
4.5 The Outcomes	16
4.6 The Content Organisation	18
4.7 The Sample Content.....	20
4.8 The Continuum of Learning in Science and Technology K–10	22
4.9 Assessment.....	23
4.10 Overall Evaluation	24

Executive Summary

This report presents data and findings gathered from 130 surveys, 11 teacher consultation meetings involving 271 individuals, 29 written responses (from university education academics, key groups and interest groups), a consultation meeting with the school sectors and key professional associations, and a consultation meeting with the Board Curriculum Committee. The profile of respondents reflects a range of teaching experience, school systems, school sizes and locations.

Quantitative findings

An analysis of quantitative data indicated that the majority of respondents agreed that, on balance, the contents and direction of the Draft Writing Brief was acceptable or better and suggested that some reworking and minor amendments were necessary.

Qualitative findings

Through survey commentary, written submissions, consultation meetings with teachers, key groups and the Board Curriculum Committee more detailed and critical feedback was obtained. Key issues raised included:

- the interrelationship between science and technology
- the nature of science and of technology in K–6
- explicit links to real life science and technology contexts and issues relevant to K–6
- student interest and enthusiasm for science and technology
- the specific intended student learning expressed in the Outcomes and the K–6 progression
- the number of Outcomes, especially for Early Stage 1, and in regard to the balance between *Processes* and *Areas of Study*.

Action resulting from consultation

In response to the feedback, the Draft Writing Brief has been amended to include specific advice to writers in relation to the key issues raised. The major actions include:

- the interrelationship between science and technology will be clearly and consistently addressed throughout the syllabus
- the nature and scope of science and of technology in K–6 will be made more explicit and consistently addressed throughout the syllabus
- the syllabus will explicitly link learning to the world beyond school, incorporating key science and technology issues and interests in the lives of K–6 students, their families and societies (including sustainability)
- the syllabus will give more emphasis to developing student interest and enthusiasm for science and technology
- the Outcomes will more clearly express the specific intended student learning for each stage and provide a clearer K–6 progression
- the number of Early Stage 1 Outcomes will be reduced
- the Outcomes will be reviewed and revised in terms of the balance between *Processes* and *Areas of Study*.

A summary of key issues and related actions is contained on page 8 of this report.

1. Background

The preparation of the *Science and Technology K–6 Syllabus Writing Brief* takes into account the broad directions established during the syllabus review phase and approved by the Board on 11 December 2007.

The *Science and Technology K–6 Syllabus Draft Writing Brief* and survey instrument were made available on the Board's website and in hard copy to a wide consultation network, including all primary schools in NSW, over the period 28 April – 6 June 2008. Consultations have also involved the following:

⇒ consultation meetings with teachers in each of the BOSLO regions at:

- Lithgow (Western region)
- Chatswood (Metropolitan North region)
- Kogarah (Metropolitan East region)
- Blacktown (Metropolitan North West region)
- Tumbi Umbi (Hunter region)
- Albury (Riverina region)
- Shellharbour (South Coast region)
- Dubbo (Western region)
- Liverpool (Metropolitan South West region)
- Ballina (North Coast region)
- Tamworth (North West region)

⇒ a meeting of key groups with representatives from:

- Department of Education and Training
- Association of Independent Schools
- Catholic Education Commission
- Science Teachers Association of NSW (STANSW)
- Technology in Primary Schools (TIPS)

⇒ the Board Curriculum Committee for Science and Technology K–6

⇒ written submissions from key stakeholders, academics and interest groups.

Modifications to the Writing Brief, following this widespread consultation, will enable the syllabus package to be developed for submission to the Board Curriculum Committee, and the Board.

2. Profile of Respondents

2.1 Profile of Survey Respondents

130 written responses were received. The profile of respondents is as follows:

Position	Total number of years teaching		
Classroom Teacher	48%	Up to 3 years	4%
Teaching Executive	25%	4–9 years	16%
Non-teaching Executive	4%	10–15 years	19%
Principal	3%	16–25 years	23%
Other	14%	26 years or more	30%
Nil Response	6%	Not applicable	9%

School System	Size of school		
Government school	54%	0–150	8%
Non-government (systemic) school	11%	151–300	24%
Independent school	23%	301–600	36%
Not applicable	12%	601–1000	10%
		More than 1000	4%
		Not applicable	16%

Type of school	Nature of school		
Primary school	67%	Significant representation of Aboriginal and/or Torres Strait Islander students	4%
Secondary school	2%	High percentage of students with language backgrounds other than English	14%
Central school	3%	Special School/SSP	2%
Other	15%	Priority School Funding	6%
Nil Response	13%	Other	13%
		Nil Response	61%

Location of school			
Metropolitan	44%	Non-metropolitan	44%
Nil Response	12%		

2.2 Profile of Teacher Consultation Meetings

11 consultation meetings were held across NSW, with meetings in each of the BOSLO regions. Meetings were held in:

- Lithgow (Western region)
- Chatswood (Metropolitan North region)
- Kogarah (Metropolitan East region)
- Blacktown (Metropolitan North West region)
- Tumby Umbi (Hunter region)
- Albury (Riverina region)
- Shellharbour (South Coast region)
- Dubbo (Western region)
- Liverpool (Metropolitan South West region)
- Ballina (North Coast region)
- Tamworth (North West region).

A total of 271 participants attended these consultation meetings with 132 teachers being from government schools and 112 teachers from non-government schools. 27 other educationalists also participated.

At each meeting, participants were divided into smaller discussion groups on three key aspects of the draft writing brief:

- The Rationale, Aim, Objectives and Outcomes
- The content organisation
- The sample content.

Each group then presented their key findings to the whole group in a feedback session. Recorded feedback was also collected from each discussion group. These data were analysed and developed into a set of key findings for each meeting and then for the teacher consultation overall.

2.3 Profile of Key Groups and Interest Groups

Key groups and interest groups were invited to provide a written and/or oral submission in responding to the Draft Writing Brief. The following key groups and interest groups responded to the Draft Writing Brief:

Board Curriculum Committee

Department of Education and Training

Association of Independent Schools

Catholic Education Commission

Science Teachers Association of NSW

Technology in Primary Schools

Primary Principals Association

Junior School Heads' Association of Australia and
Association of Heads of Independent Schools of Australia

Independent Education Union
NSW Teachers Federation
Australian Association of Special Education
Association of Technological Sciences and Engineering
Newcastle Primary Principals Association
Catholic Education, Diocese of Parramatta
Royal Australian Chemical Institute,
NSW Chemical Education Division
NSW Department of Primary Industries
Australian Museum
Engineers Australia, Sydney Division
Centre for Genetics Education, Royal North Shore Hospital
Australian Nuclear Science and Technology Organisation
NSW Farmers' Association.

2.4 Profile of Education Academics

University academic staff with expertise and interest in K–6 science and/or technology education were invited to respond to the Draft Writing Brief.

There were 9 written responses representing 15 education academics from 7 different academic institutions.

2.5 Consultation Codes

The following codes are used throughout the writing brief to identify the different consultation sources:

T1-T11: Teacher Consultation Meetings
S1-S130: Surveys
G1-G19: Key Groups and Interest Groups
A1-A9: Education Academics

3. Summary of Key Issues Raised and Actions Taken

Key issues arising from consultation:	Action taken:
<p>Relationships between science and technology</p> <p>The interrelationship between science and technology should be clearly and consistently addressed throughout the document.</p>	<ul style="list-style-type: none"> • The Rationale will be revised to articulate the interrelationship between science and technology. • The content organisation (including Figure 1) and the proposed groupings in the Objectives will be revised to better reflect the interrelationship between science and technology. • Content will be revised to more explicitly incorporate links between knowledge, understanding, skills, values and attitudes.
<p>The nature of science and of technology</p> <p>The nature of science and of technology in K–6 for NSW should be more explicitly and consistently addressed throughout the document. The scope of the terms <i>working scientifically</i> and <i>working technologically</i> and their relationship to <i>investigating scientifically</i> and <i>designing and producing</i> need to be made more explicit.</p>	<ul style="list-style-type: none"> • The nature and scope of science and of technology in K–6 will be made more explicit and consistently addressed throughout the syllabus. Particular sections for revision are the Rationale, Aim and Objectives. • The terms <i>working scientifically</i> and <i>working technologically</i> will be revised to clarify the relationship with <i>investigating scientifically</i> and <i>designing and producing</i> respectively. Figure 1 will be revised to represent this.
<p>Real life contexts and issues</p> <p>The document should explicitly link learning to the world beyond school, incorporating key science and technology issues and interests in the lives of K–6 students, their families and societies (including sustainability).</p>	<ul style="list-style-type: none"> • The Rationale, Aim and <i>Science and Technology in Practice</i> objective will be revised to more clearly emphasise that students engage with real life science and technology issues and interests relevant to K–6, including social and environmental issues. • The Outcomes will be revised to more explicitly incorporate key science and technology issues in the lives of K–6 students, their families and societies (including sustainability). • Within Figure 1, <i>Science and Technology in Practice</i> will be presented to better reflect its overall importance in engaging students with real life issues and interests relevant to K–6, and to contextualise science and technology as interrelated and familiar. • Content will more explicitly incorporate science and technology contexts and issues relevant to K–6 students.
<p>Student interest and enthusiasm</p> <p>The document should give more emphasis to developing student interest and enthusiasm for science and technology.</p>	<ul style="list-style-type: none"> • The Values and Attitudes objective will be expanded to define more clearly the intentions of the syllabus in developing student interest and enthusiasm for science and technology. • The Outcomes will be revised to more clearly incorporate student interest and positive affect as intended results of learning.
<p>Outcomes</p> <p>The Outcomes should more clearly express the specific intended student learning for each stage and provide a clearer K–6 progression. The Outcomes should be reviewed for:</p> <ul style="list-style-type: none"> • the number at Early Stage 1 • the balance between <i>Processes</i> and <i>Areas of Study</i>. 	<ul style="list-style-type: none"> • The Outcomes will be revised to more clearly express the specific intended student learning for each stage and provide a clearer K–6 progression. • The number of Early Stage 1 Outcomes will be reduced. • The Outcomes will be reviewed and revised in terms of the balance between the <i>Processes</i> and <i>Areas of Study</i>.

4. Analysis

4.1 The Rationale

Summary

89% of survey respondents agreed that the draft writing brief provides a clear and appropriate Rationale for learning science and technology K–6.

Written feedback and consultation meetings supported the Rationale overall as addressing the Broad Directions. Particular strengths mentioned included an appropriate emphasis on an inquiry-based approach with students actively engaging in the processes of science and technology. Other positive aspects of the Rationale noted were its emphasis on fostering students' sense of wonder and curiosity through critically and creatively solving problems about the natural and made world. Other comments supported the emphasis on the syllabus's role in laying the foundations for the development of scientifically and technologically literate citizens.

Responses from a number of individuals and groups identified that the intent of the Rationale should be more consistently developed throughout the revised syllabus. Other comments highlighted that the Rationale should more clearly describe the nature of science and of technology and their interrelationship.

Quantitative analysis (Survey)

The Draft Writing Brief provides a clear and appropriate Rationale for learning science and technology in primary school.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
31%	58%	11%	0%	0%

Approval: 89%

Disapproval: 11%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
The intent of the Rationale is not developed consistently through the Aim, Objectives and Outcomes.	G5, G4, G6, A6, A1, A9, S68, S127	To be addressed in the development of the syllabus.
The Rationale does not adequately articulate the interrelationship between science and technology.	T5, G2, G5, G4, G6, G8, G12, A9, A1, S79, S129	To be addressed in the development of the syllabus.
The Rationale should more accurately reflect the nature of science and of technology in K–6 for NSW.	T6, G1, G2, G5, A6, A8, A9	To be addressed in the development of the syllabus. The Rationale will reflect the nature and scope of science and of technology in K–6 for NSW.
The Rationale should more clearly emphasise that students engage with real life science and technology issues and interests relevant to K–6, including social and environmental issues.	T5, G2, G5, G6, G17, A2, S117, S129	To be addressed in the development of the syllabus.
The Rationale should incorporate a clearer explanation of the place and purpose of Science and Technology K–6 in the curriculum and how it contributes to the <i>K–10 Curriculum Framework</i> broad learning Outcomes.	T4, G1, G2, A1	To be addressed in the development of the syllabus.

Science and Technology K–6 Draft Writing Brief Consultation Report

Issue	Source	Action
The Rationale should clarify the selection and use of technologies in science learning.	G1, G2, G9	To be addressed in the development of the syllabus.
Various suggestions for clearer wording or specific amendments.	T3, T4, T5, T6, T7, T8, T9, T10, G1, G4, G5, G2, A1, A8, A5, A2, A3, A6, S18, S38, S52, S79, S92, S105, S117, S125	Specific suggestions to be considered in the syllabus development phase. The syllabus will incorporate clear language.

4.2 The Place of Science and Technology K–6 in the K–12 Curriculum

Pathways of learning in Science and Technology K–12

Summary

92% of survey respondents agreed that the pathways of learning within Science and Technology are clearly outlined. This was generally supported by the findings from qualitative feedback.

Quantitative analysis (Survey)

The Draft Writing Brief clearly outlines pathways of learning in Science and Technology K–12.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
30%	62%	6%	1%	1%

Approval: 92%

Disapproval: 7%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
Needs to more clearly represent the pathways for learning in Science and Technology K–12.	G1, G2, S129	To be addressed in the development of the syllabus.
Various suggestions for clearer wording or specific amendments.	G2, S129	Specific suggestions to be considered in the syllabus development phase. The syllabus will incorporate clear language.

Description of cross-curriculum content

Summary

Many commented on the lack of information provided on cross-curriculum content. There was concern that this section should clearly identify how cross-curriculum content is explicitly embedded in the syllabus content.

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
This section needs to clearly identify how cross-curriculum content is explicitly embedded in the content of the syllabus	T2, T7, T11, G2, G13, A1, A2, S12, S129	To be addressed in the development of the syllabus.

Description of relationships with other syllabuses

Summary

78% of survey respondents agreed that this section clearly addresses areas of equivalent and complementary content in other syllabuses. The inclusion of the *KLA Connections* within the content was generally supported. However, dividing them into *Complementary* and *Supplementary* Connections was regarded as unnecessary.

Quantitative analysis (Survey)

The Draft Writing Brief clearly addresses how the syllabus will identify areas of equivalent and complementary content in other syllabuses.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
15%	63%	17%	2%	3%

Approval: 78%

Disapproval: 19%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
The differentiation of <i>KLA Connections</i> into <i>Complementary</i> and <i>Supplementary</i> Connections is unnecessary.	T2, T4, T5, T6, T8, T10, T11, G1, G2, G11, G8, G14, S52, S78, S79, S84, S129	To be addressed in the development of the syllabus.
The <i>KLA Connections</i> need to incorporate a wider range of KLAs, including explicit links to literacy and numeracy K–6 Outcomes.	T2, T5, G1, G5, G7, S12, S18, S51, S59, S78, S79, S104, S129	To be addressed in the development of the syllabus.

4.3 The Aim

Summary

87% of survey respondents found the Aim to be a clear, succinct and appropriate statement of the overall purpose of the syllabus. Qualitative feedback supported this overall finding.

A number of respondents commented favourably on the engagement and development of students' sense of wonder and curiosity about the world around them as an appropriate Aim. Many respondents also noted that the terms *making sense* and *making stuff* simplified the terms *working scientifically* and *working technologically*. However, the argument was strong in consultation that the terms oversimplify and inaccurately convey the scope of the processes.

Other suggested amendments to the Aim included more accurately reflecting the nature of K–6 science and of K–6 technology.

Quantitative analysis (Survey)

The Draft Writing Brief provides a clear Aim that describes an appropriate overall purpose for the syllabus.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
36%	51%	10%	3%	1%

Approval: 87%

Disapproval: 13%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
The terms <i>making sense</i> and <i>making stuff</i> oversimplify and inaccurately convey the scope of the processes.	T2, T3, T5, T6, T9, G1, G2, G3, G5, G4, G6, G7, G14, A1, A2, A3, A9, A5, S42, S46, S76, S78, S79, S81, S83, S97, S98, S99, S100, S104, S105, S127, S129	The terms will not be used in the syllabus.
The Aim should more accurately reflect the nature of science and of technology in K–6 for NSW.	T5, T6, G5, G3, G8, A9, A8, S53	To be addressed in the development of the syllabus. The Aim will reflect the nature and scope of science and of technology in K–6 for NSW.
The terms <i>Working Scientifically</i> and <i>Working Technologically</i> and their interrelationship need to be clarified and consistently used throughout the document.	T4, G1, G2, G12, A6, A8	To be addressed in the development of the syllabus.
The Aim should more clearly emphasise that students engage with real life science and technology issues and interests relevant to K–6, including social and environmental issues.	A1, A6, S117	To be addressed in the development of the syllabus.
Various suggestions for clearer wording or specific amendments.	T5, A1, A6, A9, G12, G5, S92	Specific suggestions to be considered in the syllabus development phase. The syllabus will incorporate clear language.

4.4 The Objectives

Summary

86% of survey respondents agreed that the Objectives appropriately describe the specific intentions of the syllabus.

Some qualitative feedback, however, found that the proposed groupings are unclear. There was also some concern that the Objectives do not reflect and amplify the Aim. In particular, it was noted that the Objectives could more accurately reflect the scope of *working scientifically* and *working technologically*, including the selection and use of technologies in both *working scientifically* and *working technologically*. There was also significant concern that the *values and attitudes* objective should be expanded to more clearly focus on the affective domain to develop student interest and enthusiasm for science and technology.

Quantitative analysis (Survey)

The Draft Writing Brief provides appropriate Objectives that describe the specific intentions of the syllabus.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
25%	61%	11%	1%	2%

Approval: 86%

Disapproval: 12%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
The proposed groupings need to be revised to: <ul style="list-style-type: none"> indicate more clearly in broad terms the knowledge, understanding, skills, values and attitudes fundamental to Science and Technology K–6 better reflect the interrelationship between science and technology. 	T7, T8, T10, T11, G2, G4, G3, G12, G14, A1, A3, A9, S125, S129	To be addressed in the development of the syllabus.
The Objectives should more appropriately reflect and amplify the Aim.	G1, G2, G5, A3, A6, A2, S109	To be addressed in the development of the syllabus.
The Objectives do not reflect the scope of <i>working scientifically</i> and <i>working technologically</i> , including the selection and use of technologies in science learning.	G5, G4, G14, A1, S105 G1, G2, G3, G9, A8, S76, S79, S129	To be addressed in the development of the syllabus.
The <i>Science and Technology in Practice</i> objective should emphasise the importance of students engaging with real life issues and interests relevant to K–6, including social and environmental issues, that present science and technology as interrelated and familiar.	T3, A3, A8, G12, G1 G5, G7, A3, S117, S129	To be addressed in the development of the syllabus.

Science and Technology K–6 Draft Writing Brief Consultation Report

Issue	Source	Action
The <i>Values and Attitudes</i> objective should be expanded to define more clearly the intentions of the syllabus in developing student interest and enthusiasm for science and technology.	T3, T4, T9, T11, G2, G3, A2, A1, A9, S129	To be addressed in the development of the syllabus.
Various suggestions for clearer wording or specific amendments.	G1, G2, G12, A9, A1, A3, A8, S92, S117	To be considered in the syllabus development phase. The syllabus will incorporate clear language.

4.5 The Outcomes

Summary

79% of survey respondents agreed that the Outcomes describe appropriate standards of student achievement expected by the end of each stage. Noted positively in qualitative comments was the attempt to integrate content with processes through embedding the *Processes* within the *Area of Study* Outcomes. Also commented on favourably was the addition of the *Science and Technology in Practice* outcome to emphasise the relationships between science and technology and the world beyond the classroom. Most survey respondents (84%) agreed that the Aim, Objectives and Outcomes are coherently linked.

21% of survey respondents, however, disagreed that the Outcomes describe appropriate standards of student achievement expected by the end of each stage. Qualitative feedback noted in particular that many of the Outcomes could more clearly express the specific intended student learning for each stage and could describe a clearer progression across stages. The use of the verb 'helps' in the process Outcomes was regarded as particularly inappropriate. The 'demonstrates an understanding of...through...' stem in the *Area of Study* Outcomes was also noted as needing review for clarity and consistency. A number of respondents also commented that the Outcomes should be reviewed to better reflect stage-appropriateness and the scope of intended learning.

Also noted was the number of Outcomes, particularly the large number for Early Stage 1, and the balance between *Processes* and *Areas of Study*. There was some suggestion that learning in the areas of matter/materials and sustainability might be made more explicit. Some respondents also commented that there should be more focus on the affective domain to develop student interest and enthusiasm for science and technology.

Quantitative analysis (Survey)

The Draft Writing Brief provides Outcomes that describe appropriate standards of student achievement expected by the end of each stage.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
24%	55%	17%	4%	0%

Approval: 79%

Disapproval: 21%

The Draft Writing Brief coherently links the Aim, Objectives and Outcomes.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
23%	61%	13%	2%	0%

Approval: 84%

Disapproval: 15%

Qualitative Analysis: Issues raised and writing team action

Issue	Source	Action
Review and revise the number of Outcomes, particularly at Early Stage 1 and in terms of the balance between <i>Processes</i> and <i>Areas of Study</i> .	T2, T3, G1, G2, G3, G5, G6, G9, G4, G8, A3, A1, A6, A8, A9, S20, S46, S52, S76, S79, S104, S105, S129	To be addressed in the development of the syllabus.
The Outcomes need to be clearer in expressing the specific intended student learning for each stage.	T2, T3, T4, T5, T6, T7, T8, T10, G1, G2, G3, G4, G14, G5, G6, G7, G11, A3, A9, A8, A6, S1, S27, S30, S46, S49, S50, S53, S65, S68, S79, S81, S84, S92, S105, S106, S129	To be addressed in the development of the syllabus.
The Outcomes should provide a clearer progression K–6 that reflects stage-appropriateness and the scope of intended learning.	T3, T4, T5, T7, T8, T9, T11, G1, G2, G5, G6, G4, G7, A6, A3, A9, A8, S27, S44, S46, S52, S55, S57, S68, S71, S79, S81, S84, S92, S97, S105	To be addressed in the development of the syllabus.
The Outcomes should more explicitly incorporate key science and technology issues in the lives of K–6 students, their families and societies (including sustainability).	A1, S68, S81, S82, S117, S126	To be addressed in the development of the syllabus.
Should more clearly incorporate student interest and positive affect as intended results of learning.	A1, A2, G4	To be addressed in the development of the syllabus.
Learning in the area of matter/materials should be more explicit.	T4, G2, G3, G14, G15, A8, A9, S46, S76	To be addressed in the development of the syllabus.
Various suggestions for clearer wording, layout or specific amendments.	T2, T3, T4, T5, T7, T8, T9, T10, T11, G1, G2, G4, G3, G9, G7, G14, G5, G6, G12, G16, G18, A3, A1, A8, A6, A9, S18, S24, S27, S44, S46, S52, S55, S59, S60, S68, S76, S77, S78, S79, S81, S82, S84, S92, S93, S105, S106, S109, S116, S117, S125, S126, S129	To be considered in the syllabus development phase.

4.6 The Content Organisation

Summary

Most survey respondents supported the proposed organisation of content as being user-friendly (88%), appropriate (85%) and providing sufficient flexibility for teachers to meet students' needs (83%). Qualitative feedback supported these findings. In particular, feedback commented positively on the usefulness of Figure 1 for teachers and its emphasis on the processes of *investigating scientifically* and *designing and producing* as being central to learning in Science and Technology. The *Science and Technology in Practice* strand was noted by many as an important addition in inter-relating science and technology and making real-world connections beyond the classroom. Also noted positively by some was the close correlation with the organisation of the current syllabus, moving teachers forward without being overwhelming.

There was significant concern, however, that the content organisation and Figure 1 in particular should better reflect the interrelationship between science and technology, and between the strands/organisers. There was also significant concern that *Science and Technology in Practice* should be presented to emphasise its overall importance in engaging students with real life issues and interests relevant to K–6, to contextualise science and technology as interrelated and familiar.

Quantitative analysis (Survey)

The Draft Writing Brief provides a user-friendly organisation of content.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
36%	52%	12%	0%	0%

Approval: 88%

Disapproval: 12%

The Draft Writing Brief provides an appropriate organisation of content.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
26%	59%	13%	2%	1%

Approval: 85%

Disapproval: 15%

The Draft Writing Brief provides an organisation of content that is sufficiently flexible for teachers to meet students' needs.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
27%	56%	15%	2%	1%

Approval: 83%

Disapproval: 17%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
The content organisation and Figure 1 should better reflect the interrelationship between science and technology, and between the strands/organisers.	T2,T3, T4, T5, T6, T7, T9, T10, T11, G1, G2, G3, G5, G4, G6, G8, G11, G12, G14, A1, A8, A9, S3, S44, S45, S69, S76, S79, S81, S84, S127, S129	To be addressed in the development of the syllabus.
<i>Science and Technology in Practice</i> should be presented to better reflect its overall importance in engaging students with real life issues and interests relevant to K–6, including social and environmental issues, to contextualise science and technology as interrelated and familiar.	T2, T3, T4, T6, T7, T8, T9, T10, G1, G2, G5, G6, G8, G9, G12, A3, A6, A8, A1, S46, S68, S77, S84, S93, S109, S127, S129	To be addressed in the development of the syllabus.
The scope of the terms <i>working scientifically</i> and <i>working technologically</i> and their relationship to <i>investigating scientifically</i> and <i>designing and producing</i> need to be made more explicit.	G2, G5, A6, A1, S76	To be addressed in the development of the syllabus.
The organisation of the <i>Areas of Study</i> should be reviewed and revised for clarity and simplicity.	T4, G1, G2, G9, G5, G14, A8, S76	To be addressed in the development of the syllabus.
This section should incorporate overviews of each of the strands/organisers.	G2, G6, S71	To be addressed in the development of the syllabus.
Content should be mandatory.	A9, G2, S76, S81, S129	Noted. The requirements under the <i>Education Act 1990</i> (NSW) for registration of primary schools include that schools have an educational program based on, and taught in accordance with, the Outcomes of Board of Studies syllabuses for the six KLAs.
The status of content should be clarified, including the flexibility teachers have to select from the content in addressing Outcomes.	T6, T10, G1, G14, S64, S84	To be addressed in the development of the syllabus.
Could more clearly describe the implications of the content organisation for planning and programming.	T2, T3, T4, T11, G1, G2, G3, G14, G7, G6, A6, A3, A8, S78, S84, S105, S127, S129	To be addressed in the development of support materials.
Various suggestions for clearer wording or specific amendments.	T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, G1, G2, G3, G9, G4, G7, G14, G6, G5, G11, G12, A9, A3, A1, A8, A6, S3, S65, S68, S69, S75, S76, S77, S78, S79, S84, S105, S109, S116, S117, S127, S129	To be considered in the syllabus development phase.

4.7 The Sample Content

Summary

Most survey respondents supported the sample content as providing a user-friendly page layout (95%), clearly expressing what students will learn about and will learn to do in order to achieve the relevant Outcomes (81%) and as being stage-appropriate (87%). Qualitative feedback supported these findings. Also noted positively were the *Background Information*, *Language* and *KLA Connections* sections.

Although there was some comment that there is too much explicit content detail provided for some Outcomes, there was strong argument in the consultation for the provision of explicit and specific content detail. Some respondents also reported that content should more explicitly incorporate links between knowledge, understanding, skills, values and attitudes.

Quantitative analysis (Survey)

The Draft Writing Brief provides provides a user-friendly page layout for sample content.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
43%	52%	3%	1%	1%

Approval: 95%

Disapproval: 4%

The Draft Writing Brief provides sample content that clearly expresses what students will learn about and will learn to do in order to achieve the relevant Outcomes.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
33%	48%	15%	2%	2%

Approval: 81%

Disapproval: 17%

The Draft Writing Brief provides sample content that is appropriate for Stage 1.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
22%	65%	8%	2%	3%

Approval: 87%

Disapproval: 10%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
Should provide explicit and specific content detail that is accurate and stage-appropriate.	T2, T3, T6, T7, T8, T11, G1, G4, G7, A9, A6, A8, S18, S19, S30, S49, S51, S52, S53, S55, S69, S73, S80, S84, S105, S108, S122, S126, S128	To be addressed in the development of the syllabus.
Should more explicitly incorporate: <ul style="list-style-type: none"> • links between knowledge, understanding, skills, values and attitudes • cross-curriculum content • suggested science and technology contexts and issues relevant to K–6 students • content inclusive of students with special education needs 	T4, T5, T7, T9, T10, T11, G1, G2, G7, G11, G4, G6, G19, A2, A6, A8, S44, S68, S78, S79, S84, S117, S122, S129	To be addressed in the development of the syllabus.
<i>KLA Connections</i> issues: see section 4.2		To be addressed in the development of the syllabus.
Various suggestions for clearer wording, layout or specific amendments.	T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, G1, G9, G12, G5, G6, G4, G18, G11, G14, A7, A6, A8, A9, S18, S19, S41, S42, S46, S52, S59, S60, S71, S78, S79, S80, S83, S84, S105, 106, S116, S125, S129	To be considered in the syllabus development phase.

4.8 The Continuum of Learning in Science and Technology K–10

Summary

76% of respondents agreed that the Draft Writing Brief provides a clear continuum of learning in Science and Technology across K–10. Qualitative feedback generally supported this.

However, some feedback was reported that the K–10 continuum should describe more clearly the differences between stages. There were also comments that there should be a clearer articulation of the progression from Stage 3 to Stage 4.

Quantitative analysis (Survey)

The Draft Writing Brief provides a clear continuum of learning in Science and Technology across K–10.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
15%	61%	12%	2%	10%

Approval: 76%

Disapproval: 14%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
The K–6 continuum should describe more clearly the differences between stages.	T3, T5, T7, T8, T9, T11, G5, G4, G7, G15, G14, S4	To be addressed in the development of the syllabus.
There needs to be a clearer articulation of the progression from Stage 3 to Stage 4.	G2, G7, G1, G15, A6, S30, S46, S76, S84, S105, S128	To be addressed in the development of the syllabus.

4.9 Assessment

Summary

70% of survey respondents agreed that the Draft Writing Brief provides clear advice for teachers in effectively assessing student achievement. Some qualitative feedback supported this finding.

Feedback reported that the proposed advice is not specific enough in supporting the requirements of K–6 Science and Technology in NSW.

Quantitative analysis (Survey)

The Draft Writing Brief provides clear advice for teachers in effectively assessing student achievement.

Strongly Agree	Agree	Disagree	Strongly Disagree	Nil Response
15%	55%	16%	2%	11%

Approval: 70%

Disapproval: 18%

Qualitative analysis: Issues raised and writing team action

Issue	Source	Action
The assessment advice is not specific enough in supporting the requirements of K–6 Science and Technology in NSW.	T2, T5, T6, T9, G1, G2, G6, A2, S4, S28, S41, S44, S46, S76, S78, S80, S93, S105, S127, S128	Noted. To be considered in the syllabus development phase. To be addressed in the development of the support materials.
Should incorporate specific advice on reporting, with reference to student work samples.	G7, G6, S20, S24, S28, S46, S65, S76, S79, S128	Noted. To be considered in the development of the support materials. The Assessment Resource Centre will also provide this support.
Should incorporate specific strategies for assessing students with special education needs.	G11, G14	To be addressed in the development of the support materials.
Various suggestions for clearer wording or specific amendments.	G1, G2, G4, G14, G11, A2, S127	To be considered in the syllabus development phase. The syllabus will incorporate clear language.

4.10 Overall Evaluation

Summary

Overall, the majority (89%) of survey respondents found the draft writing brief to be acceptable or better, with most (66%) agreeing it requires only some minor changes at most. Qualitative feedback generally supported these findings but also provided more detailed and critical feedback on some emerging issues.

In particular, feedback noted that overall the draft writing brief does not clearly and consistently address the interrelationship between science and technology. Comments also reported that the document could more explicitly and consistently address the nature of science and of technology in K–6 for NSW. There was also some comment that there could be more emphasis on linking science and technology learning to the world beyond school, incorporating key science and technology issues and interests in the lives of K–6 students, their families and societies (including sustainability).

There was a significant amount of feedback that emphasised the importance of support materials and professional development to accompany the syllabus.

Quantitative analysis (Survey)

On balance, the draft writing brief is:

Very Good	Good (some minor changes needed)	Acceptable (some re-working necessary)	Unsatisfactory (major re-working of some significant issues necessary)	Nil Response
27%	39%	23%	9%	2%

Approval: 89%

Disapproval: 9%

Qualitative analysis: Issues raised and writing team action

Representative Positive Comments	Source
'We applaud the Board of Studies for its efforts and for the improvements the Draft is likely to bring to the teaching of Science and Technology K–6. In particular we see it laying a more comprehensive foundation for a more rigorous approach to the teaching and learning of Science and technology in the early years.'	G8
'In general the Science and Technology K–6 Draft Writing Brief provides a solid framework for the syllabus... (it) shows forward thinking in emphasising future citizenship and responsibility for environmental and social issues, at a practical level.'	G9
'There is strong support for the document in its present form... Most teachers and principals who contributed to this response were very positive about the draft writing brief... (and) generally endorsed (it) as a good model for the new syllabus... Many responses noted the simplicity of the document compared to the old syllabus.'	G7
'... members recognise the value of building on the current syllabus, especially in terms of reinforcing the... processes and their central role in providing a forward looking approach to both Science and Technology education.'	G6
'This appears to be an excellent rewrite of the syllabus, bringing it much	

more in line with, for example, the maths syllabus, in terms of teachability and practicality of ideas.'	S1
'I found the Draft Writing Brief comprehensive and straight forward... It appears to be easy to follow, with clear links between <i>Areas of Study</i> and <i>Processes</i> . It gives teachers a clearer view of how to approach each of the <i>Areas of Study</i> . I agree with... the addition of a <i>Science and Technology in Practice</i> outcome. Overall I found the Draft made significant improvements on the current syllabus... it addresses the Broad Directions well.'	S29
'Excellent, bravo! The... content organisation is very user-friendly and is structured in a most practical way that teachers can modify to suit their level of teaching expertise. Well done! Thank you – can't wait to use this new document.'	S65
'The writing draft is very well written. It is addressing essential 21st century skills... fosters creativity and intellectual curiosity. This draft displays easy readability and will be an excellent document for all teachers both experienced and beginning. I feel all the broad directions have been met... Really looking forward to the finished product as it addresses an essential need.'	S118

Issues

Overall Issue	Source	Action
Should clearly and consistently address the interrelationship between science and technology.	G12, A1, A2, A6, S129	To be addressed in the development of the syllabus.
Should explicitly and consistently address the nature of science and of technology in K–6 for NSW.	T5, G6, G5, G4, G14, A2, A6, A1	To be addressed in the development of the syllabus. The nature and scope of science and of technology in K–6 for NSW will be made more explicit and consistently addressed throughout the syllabus.
Should explicitly link learning to the world beyond school, incorporating key science and technology issues and interests in the lives of K–6 students, their families and societies (including sustainability).	G4, G5, G14, G13, G17, A2, S12, S68, S78, S81, S82, S116, S117, S126, S129, S130	To be addressed in the development of the syllabus.
Should give more emphasis to developing student interest and enthusiasm for science and technology.	G7, A1, A2, S80, S104	To be addressed in the development of the syllabus.
Could include a glossary of terms used.	T1, T2, G2, G11, A7, S19, S80	To be considered in the development of the syllabus and support materials.
Support materials to accompany the syllabus are essential in facilitating effective syllabus implementation.	T2, T3, T4, T5, T6, T7, T8, G3, G11, G8, G9, G7, G16, G17, G19, S4, S11, S12, S21, S23, S40, S47, S50, S65, S75, S76, S78, S95, S97, S98, S105, S110, S119, S125, S127, S128, S129	Noted. Support materials to be developed.
Professional development is crucial in supporting implementation of the syllabus.	T7, T9, G9, S44, S109, S130	Noted.