



Science and Technology K–6 Syllabus

Evaluation Report and Broad Directions

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1. Executive Summary

Process

The Evaluation of the *Science and Technology K–6 Syllabus* takes account of:

- a survey of 474 teachers
- 11 consultation meetings with 301 teachers throughout NSW
- consultation with university education academics
- written and oral submissions from 20 key stakeholder groups and interest groups
- discussions with 543 students from 31 schools throughout NSW
- the proceedings of the K–6 Science and Technology symposium
- a literature review of national and international research and practice.

The report provides an analysis of the current syllabus against the criteria for approval of syllabuses described in the Board of Studies' *K–10 Curriculum Framework* (2002). There was some evidence from consultation and research that the current *Science and Technology K–6 Syllabus* provides a sound basis for the revision. The report proposes broad directions to guide revision of the *Science and Technology K–6 Syllabus*. The broad directions will be further developed in a draft writing brief for the revised syllabus.

Broad directions for syllabus revision

Broad direction 1: building on natural wonder and curiosity to develop lifelong interest in science and technology

The Rationale will be revised to explicitly emphasise the importance of developing in students the knowledge and understanding, skills, values and attitudes to willingly and actively engage in issues and with ideas related to science and technology as informed, reflective and responsible, scientifically and technologically literate citizens. The syllabus will emphasise the importance of engaging students' natural wonder and curiosity in the world around them to develop lifelong interest in science and technology.

Broad direction 2: manageable, explicit content for deep understanding

The syllabus will describe staged content incorporating the knowledge, understandings and skills essential to this learning area. The processes currently called *Investigating* and *Designing and Making* are central to this learning area. The content will extend and deepen student learning and will be able to be taught within the Board's guidelines for the proportion of time allocated to each key learning area.

Broad direction 3: relationships between science and technology

The syllabus will explicitly incorporate the nature of science and the nature of technology and will describe the relationships that can exist between science and technology. The syllabus will be consistent with the Board's *K–12 Technology Statement* and will retain consistency with the national Statements of Learning for Science and for Information and Communication Technologies (ICT).

Broad direction 4: user-friendly structure and organisation

The structure and organisation of the syllabus will be made more user-friendly. The processes currently called *Investigating* and *Designing and Making* will be central to the organisation of the revised syllabus. The revised structure will give careful consideration to the NSW Primary Curriculum Foundation Statements.

Broad direction 5: clear continuum of learning

The syllabus will describe the continuum of learning in Science and in Technology from K–10.

Broad direction 6: flexibility

The syllabus will provide flexibility for schools to select contexts that challenge and deepen students' understanding of the world around them from the perspectives of science and technology.

Broad direction 7: use of readily available resources

Knowledge and skills in the use of materials, tools, equipment and techniques will be embedded within the syllabus. The syllabus will give careful consideration to the necessary resources including materials, equipment and facilities reasonably expected to be available to schools.

Broad direction 8: inclusive curriculum

The syllabus will be inclusive of all students and their diversity of needs.

2. Introduction

Background

The current *Science and Technology K–6 Syllabus* was published by the NSW Board of Studies in 1991.

A limited evaluation of the syllabus was undertaken by the Board of Studies in 1996, interviewing 555 teachers from 38 primary schools for their feedback regarding the structure of the syllabus, their experience with using the syllabus, and any additional support they required. A report on the limited evaluation of the syllabus was published in 1997, finding:

- the syllabus outcomes were considered too numerous, too broad and vague
- the support document, not the syllabus, was the primary document used for programming and planning
- content relating to Technology received less emphasis in classrooms
- teachers required support in the following areas:
 - accessing supplies of resource materials
 - background conceptual information on science and technology content
 - ongoing professional development in science and technology.

Following the Eltis Review, *Focus on Learning: Report of the Review of Outcomes and Profiles in New South Wales Schooling* (1995), the *Science and Technology K–6 Outcomes and Indicators* (1999) were published by the Board of Studies, to improve manageability of the syllabus.

In 2002–2003, the Board of Studies consulted teachers across the state as part of its Primary Curriculum Project, receiving evaluation of all primary syllabuses and support documents. Feedback identified review and revision of the current *Science and Technology K–6 Syllabus* (1991) and supporting documents as a strategic priority in primary education.

The Board of Studies completed review and revision of all Year 7–10 syllabuses in 2004, to strengthen the K-10 continuum of learning, address all cross-curriculum content and to include Life Skills outcomes and content, consistent with its *K–10 Curriculum Framework* (2002). The *Science Stages 4-5 Syllabus* (1998) was reviewed in 2002 and the *Science Years 7–10 Syllabus* (2003) was implemented in 2005 for Years 7 and 9, and in 2006 for Years 8 and 10. The *Design and Technology Mandatory Years 7–10 Syllabus* (1991) was revised in response to the Board's *K–12 Technology Statement* (2002). It was replaced by the *Technology (Mandatory) Years 7–8 Syllabus* (2003), which was implemented for Year 7 in 2005.

In response to the recommendations of the Eltis evaluation, *Time to Teach Time to Learn, Report on the Evaluation of Outcomes Assessment and Reporting in NSW Government Schools* (2003) and the findings of consultation around the Board of Studies paper, *Defining Mandatory Outcomes in the K–6 Curriculum* (2004), the Board published the *NSW Primary Curriculum Foundation Statements* in 2005 to describe the common curriculum requirements in each KLA. For the Science and Technology learning area this involved combining of the syllabus strands. The NSW

Primary Curriculum Foundation Statements replace the Stage Statements in the current *Science and Technology K–6 Outcomes and Indicators* (1999).

In 2006, the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) published the *Statement of Learning for Science* and *Statement of Learning for ICT* as a result of the National Consistency in Curriculum Outcomes (NCCO) project (2003–2005). The Statements of Learning were developed as a means of achieving greater national consistency in curriculum outcomes across the eight states and territories. The *Statements of Learning* describe essential skills, knowledge, understandings and capacities that all young Australians should have the opportunity to learn by the end of Years 3, 5, 7 and 9. In August 2006, Ministers approved the Statements of Learning and MCEETYA has endorsed a process for the implementation of the Statements of Learning from 1 January 2008. The Board has recommended to the Minister that NSW is able to meet the process for compliance for the implementation of the Statements of Learning and that NSW syllabuses are consistent with the Statements of Learning.

The NSW Board of Studies scheduled the *NSW Science and Technology K–6 Syllabus* (1991) and the *Science and Technology K–6 Outcomes and Indicators* (1999) for review and revision in 2007–2009.

Current situation

The Board of Studies K–10 Curriculum Framework (2002) outlines the purpose of the curriculum and a set of criteria for the establishment and maintenance of syllabuses. These criteria were used to evaluate the current *Science and Technology K–6 Syllabus*. In preparing this report data from the following sources was collected and analysed:

- a survey of 474 teachers
- 11 consultation meetings with 301 teachers throughout NSW
- consultation with university education academics
- written and oral submissions from 20 key stakeholder groups and interest groups
- discussions with 543 students from 31 schools throughout NSW
- the proceedings of the K–6 Science and Technology symposium
- a literature review of national and international research and practice.

The report provides the quantitative data from the teacher survey and commentary in relation to each of the criteria for approval of Board of Studies syllabuses. It proposes the broad directions to guide revision of the *Science and Technology K–6 Syllabus*.

Endorsement of the broad directions for syllabus revision by the Board of Studies concludes the *Syllabus Review* phase of the syllabus development process. The broad directions will be further developed in a draft writing brief that will be distributed widely for comment in May 2008. The draft syllabus will be written and distributed for comment in January 2009. A final syllabus package is planned for distribution in 2010 for mandatory implementation in 2011.

3. Consultation Process

Teacher survey

Two hundred schools were randomly selected and individual teachers invited to participate in a survey evaluating the current syllabus. Voluntary participation in the survey was also invited from all teachers in NSW. A total of 474 individual teachers responded to the survey.

The random sample of 200 schools was drawn from all NSW schools which had a registered cohort in K–6 in 2007. There were 2546 schools in this category.

The sample was stratified according to two school features: school location and sector. Schools were divided into three sectors: Government, Catholic Systemic and Independent. Four location categories were defined, based on the Board of Studies Liaison Officer (BOSLO) regions: Eastern Sydney (Metropolitan North and Metropolitan East), Western Sydney (Metropolitan North West and Metropolitan South West), Coastal Country (North Coast, Hunter and South Coast) and Inland Country (North West, Western and Riverina).

A total of 12 school categories were specified (3 sectors by 4 locations). The number of schools selected in each category was determined by the proportion of schools in that particular category. For example, in Eastern Sydney (Metropolitan North and Metropolitan East) there were a total of 257 government schools. This represented 10% of the total number of NSW schools (2546) and thus 20 schools (10% of the sample of 200 schools) were selected from Eastern Sydney government schools. Table 1 shows the number of schools selected from each category.

Table 1: Sample Structure – Schools in Each Sector and Location

Location	Sector			Total
	Government	Catholic Systemic	Independent	
Eastern Sydney	20	8	8	36
Western Sydney	28	7	6	41
Coastal Country	51	10	8	69
Inland Country	40	10	4	54
Total	139	35	26	200

Within each category, schools were selected randomly. For instance, in the sample from the Eastern Sydney/Government category, since 20 schools were required from the 257 eligible schools, every thirteenth school was selected from a list. As well as reflecting the distribution of NSW primary schools across different locations and school sectors, the selected sample also included a diversity of other school features, such as school type (eg comprehensive, selective, specialist), gender (boys, girls, co-educational), socio-economic status and significant enrolment of Aboriginal students and students of non-English speaking background.

Consultation forums with teachers

Eleven consultation forums were held during Terms 2 and 3 in 2007 with teachers across NSW, with a meeting in each of the BOSLO regions. Forums were held in:

- Mittagong (South Coast region)
- Armidale (North West region)
- Chatswood (Metropolitan North region)
- Campbelltown (Metropolitan South West region)
- Balmain (Metropolitan East region)
- Coffs Harbour (North Coast region)
- Dubbo (Western region)
- Parkes (Western region)
- Penrith (Metropolitan North West region)
- Wagga Wagga (Riverina region)
- Newcastle (Hunter region)

A total of 301 participants attended these consultation meetings with 135 teachers from government schools and 130 teachers from non-government schools. A total of 36 academics and sector consultants also participated.

At each forum, small discussion groups of participants provided feedback on three areas relating to the existing syllabus:

- overall organisation
- ease of implementation in the classroom
- other comments.

Each discussion group presented their feedback to the whole group at the end of each meeting. Recorded feedback was also collected from each discussion group. These data were analysed and a summary of the findings was developed.

Consultation with university education academics

Participation of academic staff with expertise and interest in K–6 science and/or technology education was invited from all NSW universities registered as providers of teacher education courses by the NSW Institute of Teachers. Seventeen academic educators attended from the following universities:

- The University of Sydney
- Macquarie University
- The University of Technology, Sydney
- The University of Western Sydney
- The University of Wollongong
- Charles Sturt University
- The Australian Catholic University
- The University of Newcastle.

The forum was chaired by the Director of Curriculum Branch, Office of the Board of Studies, and focused on various issues including:

- the organisation and content of the current syllabus
- the implications of major state and national initiatives in science and technology education on the revision of the NSW *Science and Technology K–6 Syllabus*
- the implications of developing a syllabus for the future
- the implications of developing a syllabus for the generalist primary teacher.

Written and oral submissions from key groups and interest groups

Written and/or oral submissions regarding the NSW *Science and Technology K–6 Syllabus* review were received from 20 groups in total. Submissions were invited from key stakeholder organisations as well as other groups with a potential interest in science and/or technology education.

Discussions with students

‘Student voice’ consultation forums with Year 5, 6 and 7 students were organised to obtain feedback on students’ experiences with science and technology learning in primary school. The forum questions were either answered collectively by small groups of students or used as discussion points for a whole-group workshop.

Forums were organised in 31 selected schools (15 government schools and 16 non-government schools). The total number of students involved was 543, with 293 boys and 250 girls attending. There were 22 forums held with Year 5 students, 53 with Year 6 students and 17 with Year 7 students respectively.

The sample of schools selected from within each BOSLO region incorporated approximately equal representation of:

- sectors (Government, Catholic systemic, Independent)
- gender
- socio-economic status (a range of SES school contexts).

Symposium

A symposium on the NSW *Science and Technology K–6 Syllabus* was held involving 88 nominated representatives from a range of stakeholder groups.

The three keynote addresses examined the topics:

- Science Education for the Future
- Technology Education for the Future
- Primary Science and Technology – Lessons from the Classroom in Informing Best Practice.

The keynote addresses were followed by discussion groups, in which participants discussed matters raised in the presentations and their implications for the revision of the *Science and Technology K–6 Syllabus*.

Members of the Science and Technology K–6 Board Curriculum Committee or the Primary Curriculum Committee chaired and recorded each group’s discussion.

Each discussion group presented their feedback to the whole group. Recorded feedback was also collected from each discussion group. These data were analysed and a summary of the findings was developed.

Literature review

An independent academic researched and reviewed national and international research and practice in primary science and technology education.

The literature review reported on Australian and international science and technology syllabuses for the relevant stages of compulsory schooling in NSW as well as significant literature on issues relating to science and technology education that have occurred both nationally and internationally over the last five years. The review also included material of particular significance produced outside this period.

4. Teacher Survey Findings

The total number of survey respondents was 474 (235 from randomly sampled participants and 239 from voluntary participants). Since there was no significant difference between the findings from the voluntary participants and the randomly sampled participants on any survey issue, the data is combined in the analysis below. Also, 285 teachers (60% of survey respondents) included individual comments on their survey form. Some of the main consistent comments are also included where appropriate in the analysis of each survey issue.

Survey section A: general information

1. Indicate the description most appropriate to you

a) Position		b) Total number of years teaching	
Classroom teacher	63.7%	Up to 3 years	10.3%
Teaching Executive	19.6%	4–9 years	17.5%
Non-teaching Executive	1.1%	10–15 years	21.7%
Principal	6.5%	16–25 years	22.5%
		26 years or more	27.8%

2. Indicate the description most appropriate to your school

a) School System		b) Size of school	
Government school	75.3%	0–150	13.0%
Non-government (systemic) school	5.7%	151–300	23.8%
Independent school	16.6%	301–600	40.5%
		601–1000	17.0%
		More than 1000	0.6%

c) Type of school		d) Nature of school	
Primary school	91.9%	Significant representation of Aboriginal and/or Torres Strait Islander students	7.0%
Secondary school	0.8%	High percentage of students with language backgrounds other than English	20.8%
Central school	0.6%	Special School/SSP	0.2%
		Priority School Funding	4.6%

e) Location of school			
Metropolitan	55.9%	Non-metropolitan	41.5%

3. Indicate how Science and Technology is taught in your classroom

As separate <i>Science and Technology</i> Units	15.8%	As RFF	7.0%
As integrated units with other KLAs	44.7%	Other (please specify)	31.2%
By a specialist teacher	1.3%		

The 31.2% who responded with ‘Other’ taught Science and Technology as a combination of both separate Science and Technology Units and as integrated units with other KLAs.

4. Indicate how many hours per week (on average) Science and Technology is taught in your classroom

Less than 0.5 hours	4.2%	1 – 1.5 hours	52.3%
0.5 – 1 hours	33.5%	More than 1.5 hours	9.9%

Survey section B: evaluation of *Science and Technology K–6 Syllabus*

See Diagram 1 (p.16) for a graphical display of data.

1. The syllabus provides a clear rationale and statement of purpose for learning science and technology in primary school.

Strongly	Agree	Agree	Unsure	Disagree	Strongly Disagree
6.1%	70.4%	9.5%	11.3%	1.1%	

Respondents agreed that the syllabus provides a clear rationale and statement of purpose for learning science and technology in primary school.

2. The syllabus’s aim, objectives, outcomes and content are clearly and coherently linked.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
5.1%	52.5%	12.6%	25.3%	4.2%

Respondents agreed that the syllabus’s aim, objectives, outcomes and content are clearly and coherently linked.

However, written comments identified that the syllabus’s organisation could be made more user-friendly.

3. The syllabus describes a clear and coherent core of essential knowledge and understanding, skills, values and attitudes that students are expected to learn.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
5.5%	54.8%	11.8%	24.6%	2.5%

Respondents agreed that the syllabus describes a clear and coherent core of essential knowledge and understanding, skills, values and attitudes that students are expected to learn.

However, some written comments suggested that the treatment of materials and their properties in the core of essential knowledge and understanding described in the syllabus should be strengthened.

4. The syllabus provides content that clearly expresses what students will learn about and will learn to do in order to achieve the core of essential knowledge and understanding, skills, values and attitudes.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
2.7%	44.0%	14.9%	33.5%	4.4%

Respondents were inconsistent in their views regarding whether the syllabus provides content that clearly expresses what students will learn about and will learn to do in order to achieve the core of essential knowledge and understanding, skills, values and attitudes.

Written comments indicated that the syllabus should provide more detailed content regarding the core of knowledge and understanding (conceptual content) and skills (processes) essential to this learning area.

5. The syllabus provides a clear and coherent continuum of learning across K–6 .

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
4.4%	45.5%	17.0%	28.0%	4.6%

Respondents were inconsistent in their views regarding whether the syllabus provides a clear and coherent continuum of learning across K–6 .

Written comments suggested that the K–6 Science and Technology continuum could be strengthened to provide a clearer progression of developmentally appropriate learning. Written comments also suggested that content language needs to be appropriate to specific stages in the K–6 Science and Technology learning area.

6. The syllabus provides an appropriate foundation in knowledge and understanding, skills, values and attitudes for further learning beyond Stage 3.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
2.7%	30.8%	32.9%	27.2%	5.9%

Respondents were inconsistent in their views regarding whether the syllabus provides an appropriate foundation in knowledge and understanding, skills, values and attitudes for further learning beyond stage 3.

Written comments indicated that the existing continua in Science and Technology could be strengthened to more clearly describe a transition between Stages 3 and 4.

7. The syllabus provides content that develops students' ability to make responsible and informed decisions about social and environmental issues involving science and technology.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
2.3%	48.5%	17.3%	28.2%	3.0%

Respondents were inconsistent in their views regarding whether the syllabus provides content that develops students' ability to make responsible and informed decisions about social and environmental issues involving science and technology.

Written comments identified that the syllabus could be updated to reflect current social and environmental contexts relevant to science and technology.

8. The syllabus avoids overcrowding and unnecessary overlap within the K–6 curriculum.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
2.1%	30.8%	26.7%	34.6%	5.5%

Respondents were inconsistent in their views regarding whether the syllabus avoids overcrowding and unnecessary overlap within the K–6 curriculum.

Written comments suggested the revised syllabus should give careful consideration to the NSW Primary Curriculum Foundation Statements.

9. The syllabus provides sufficient flexibility to allow individual teachers and schools to maximise student learning.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
5.1%	51.6%	16.6%	23.4%	2.1%

Respondents agreed that the syllabus provides sufficient flexibility to allow individual teachers and schools to maximise student learning.

10. The knowledge and understanding, skills, values and attitudes described in the syllabus are inclusive of the diverse needs of all students in NSW.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
2.3%	38.8%	29.7%	24.4%	4.0%

Respondents were inconsistent in their views regarding whether the knowledge and understanding, skills, values and attitudes described in the syllabus are inclusive of the diverse needs of all students in NSW.

Written comments stated that the syllabus should include outcomes and content which provide for all students.

11. The syllabus clearly describes standards of student achievement expected by the end of each stage.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
2.7%	39.9%	16.5%	36.1%	4.4%

Respondents were inconsistent in their views regarding whether the syllabus clearly describes standards of student achievement expected by the end of each stage.

Written comments identified that the syllabus should provide clearer standards for effectively assessing student achievement.

12. The syllabus provides support for teachers in effectively assessing student achievement.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
0.8%	23.6%	15.4%	49.3%	10.5%

Responses suggested that the syllabus does not provide adequate support for teachers in effectively assessing student achievement.

Written comments indicated that the syllabus should provide more support for teachers regarding assessment.

13. The syllabus can be taught within the time reasonably expected to be available to schools.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
1.9%	34.0%	15.4	39.5%	9.1%

Respondents identified that the syllabus cannot always be taught within the time reasonably expected to be available to schools.

14. The syllabus can be taught within the resources reasonably expected to be available to schools.

Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
0.6%	34.0%	14.1%	38.2%	13.1%

Respondents identified that the syllabus cannot always be taught within the resources reasonably expected to be available to schools.

15. The syllabus can be taught within the knowledge, skills and understanding that can be reasonably expected of generalist primary school teachers.

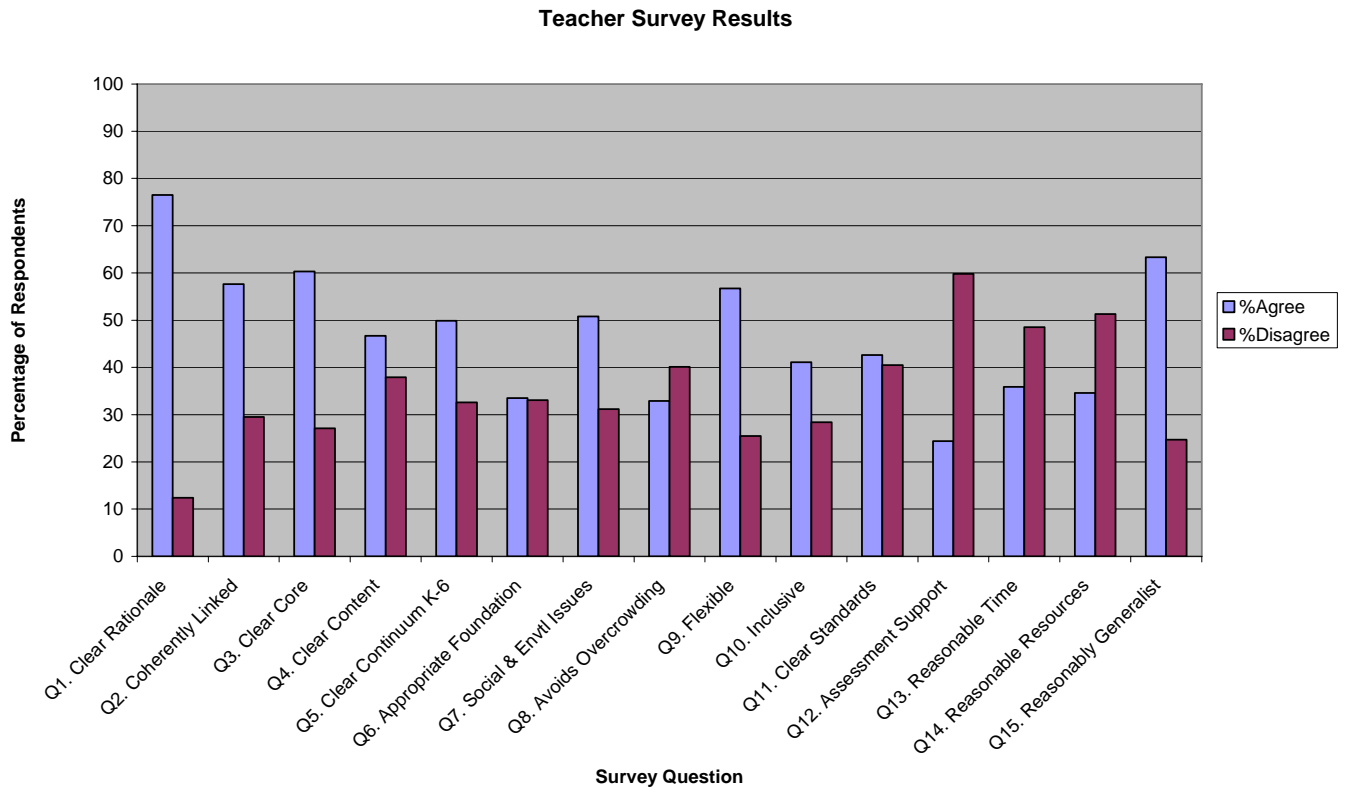
Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
3.4%	59.9%	11.4%	20.5%	4.2%

Respondents supported the view that the syllabus can be taught within the knowledge, skills and understanding that can be reasonably expected of generalist primary school teachers.

However, written comments indicated that the Syllabus Support Material should include models of activities and/or learning sequences that incorporate scaffolds and strategies demonstrating appropriate pedagogy and some advice on integration.

Diagram 1

The following graph of the teacher survey results combines the *strongly agree* and *agree* categories into one category named *agree*. The *strongly disagree* and *disagree* categories are similarly combined into one category named *disagree*.



5. Evaluation Against Criteria for Approval of Board of Studies Syllabuses

The Board of Studies *K–10 Curriculum Framework* (2002) outlines the purpose of the curriculum and a set of criteria for the establishment and maintenance of syllabuses. These criteria were used to evaluate the current *Science and Technology K–6 Syllabus* using the data collected from the widespread consultation and research described in Section 3 of this report.

1. The extent to which the syllabus meets the learning-centred principles in the K–10 Curriculum Framework

The syllabus describes a clear and coherent core of essential knowledge and understanding, skills, values and attitudes to which all students are entitled.

Consultation comments suggested that the syllabus could provide clearer standards that allow recognition of student achievement and planning for further learning with more explicit support provided for teachers in effective assessment and reporting of student achievement.

The syllabus could describe knowledge and understanding, skills, values and attitudes that are more inclusive of the diverse needs of students in NSW.

The syllabus provides sufficient flexibility to enable teachers, schools and systems to decide how to maximise student learning. This flexibility should be retained to provide opportunities for schools to select contexts that challenge and deepen students' understanding of the world around them from the perspective of science and technology.

2. A clear rationale and statement of purpose

The current syllabus provides a clear rationale and statement of purpose. However, consultation and research suggested that the rationale could be revised to explicitly emphasise the importance of developing students' knowledge and understanding, skills, values and attitudes to willingly and actively engage in issues and with ideas as informed, reflective, responsible, scientifically and technologically literate citizens. Consultation also suggested that the syllabus could emphasise the importance of engaging students' natural wonder and curiosity in the world around them to develop lifelong interest in science and technology.

The Board of Studies also requires that the syllabus include an explanation of how Science and Technology K–6 contributes to the Board's K–10 Curriculum Framework Purpose Statement and Broad Learning Outcomes.

3. A review of national and international research and practice.

An independent academic reviewed and reported on national and international research and practice in primary science and technology education.

The literature review included Australian and international science and technology syllabuses for the relevant stages of compulsory schooling in NSW as well as significant literature on issues relating to science and technology education that have occurred both nationally and internationally over the last five years. The review also included material of particular significance produced outside this period.

The principle aim of major national and international reform documents in science education is advocacy for the development of scientific literacy as a key outcome of a student's experiences in school science. A number of science educators hold the view that teaching and learning experiences in science during the primary years should be a foundation for the development of scientific literacy and they propose developing scientific 'awareness' or 'capability' in these primary years. Although the NSW *Science and Technology K–6 Syllabus* was written before widespread international advocacy for scientific and technological literacy, it contains many key elements of both. However, consultation identified that the syllabus could be updated to reflect current social and environmental issues relevant to science and technology.

Research suggests that the teaching of science and technology should be contextualised, relating learning to students' real-life experiences wherever possible. The current syllabus incorporates the appropriate flexibility but could be more explicit in relating learning to the nature of Science and Technology and the range of relationships between them.

4. Its place in a K–12 continuum, including consideration of prior and subsequent learning

The existing K–10 continua in Science and Technology need to be strengthened to ensure the syllabus provides a progression of developmentally appropriate learning that provides an appropriate foundation in knowledge and understanding, skills, values and attitudes for further learning beyond Stage 3.

Content language appropriate to specific stages in the K–6 Science and Technology learning area could also be clearly identified to promote their consistent use.

5. The extent to which the aim, objectives, outcomes and content are linked and clearly expressed

The aim, objectives and outcomes are coherently linked and clearly expressed in the syllabus.

However, consultation feedback suggested that the syllabus's structural organisation could be made more user-friendly, giving careful consideration to the NSW Primary Curriculum Foundation Statements.

Research and consultation also suggested that the learning processes currently called *Investigating* and *Designing and Making* should be central in the structure of the revised syllabus. The existing *Using Technology* learning process could be removed but knowledge and skills in the use of materials, tools, equipment and techniques should be embedded within the content of the new syllabus. Technology should be explicitly defined as including the process of *Designing and Making*. It should be treated within the syllabus content as being broader than *ICTs* and *technologies*.

There could also be more explicit differentiation between the nature of Science and the nature of Technology within the syllabus.

6. What students will learn about and will learn to do in order to achieve the syllabus outcomes

The syllabus does not adequately describe what students will learn about and will learn to do in order to achieve the outcomes.

The syllabus needs to clearly indicate content regarding the foundation in knowledge, understanding and skills that is essential for all students in this key learning area. Within the core of essential knowledge and understanding described in the syllabus, the treatment of materials and their properties should be strengthened.

Consultation feedback also indicated that the syllabus should emphasise active hands-on and student-centred learning.

The syllabus content could be made more specific to support effective measuring and reporting on student achievement.

7. Ways in which student achievement of the syllabus outcomes can be assessed

The current syllabus provides some advice on assessment strategies to assist teachers in identifying student achievement in a range of ways. Consultation comments suggested that this should be revised to focus on supporting assessment for learning and assisting teachers in reporting to students, parents, other teachers and the wider community.

8. The relationship of the syllabus with the content of other syllabuses

Consultation suggested that the teaching of the syllabus content results in some unnecessary overlap and overcrowding within the K–6 curriculum, particularly in relation to Human Society and Its Environment.

The syllabus or support material could include advice for meaningful integration of cross-curricular content, while ensuring the integrity of Science and Technology outcomes and content is not compromised. Comments identified areas that could be included as ICT, numeracy, literacy and sustainability of the environment for future generations.

9. Actual or potential demand for the syllabus.

Science and Technology is one of six mandatory key learning areas of the NSW K–6 curriculum. The *Science and Technology K–6 Syllabus* must be implemented by all registered primary schools in NSW.

10. Evidence that the syllabus can be taught within the time and resources reasonably expected to be available to schools

The consultation findings identified that the syllabus cannot always be taught within the time and resources reasonably expected to be available to schools.

Consultation comments suggested the scope of the syllabus content should provide opportunities to extend and deepen student learning and should be able to be taught within the Board’s guidelines for the proportion of time allocated to each key learning area.

Consultation suggested that the syllabus give careful consideration to the resources including materials, equipment and facilities reasonably expected to be available to schools.

6. Broad Directions for Syllabus Revision

The findings from the evaluation of the current syllabus against the criteria for approval of Board syllabuses have been aggregated to form a series of broad directions to guide revision of the *Science and Technology K–6 Syllabus*. The broad directions will be further developed in a draft writing brief for the revised syllabus.

Broad direction 1: building on natural wonder and curiosity to develop lifelong interest in science and technology

The Rationale will be revised to explicitly emphasise the importance of developing in students the knowledge and understanding, skills, values and attitudes to willingly and actively engage in issues and with ideas related to science and technology as informed, reflective and responsible, scientifically and technologically literate citizens. The syllabus will emphasise the importance of engaging students' natural wonder and curiosity in the world around them to develop lifelong interest in science and technology.

Broad direction 2: manageable, explicit content for deep understanding

The syllabus will describe staged content incorporating the knowledge, understandings and skills essential to this learning area. The processes currently called *Investigating* and *Designing and Making* are central to this learning area. The content will extend and deepen student learning and be able to be taught within the Board's guidelines for the proportion of time allocated to each key learning area.

Broad direction 3: relationships between science and technology

The syllabus will explicitly incorporate the nature of science and the nature of technology and will describe the relationships that can exist between science and technology. The syllabus will be consistent with the Board's *K–12 Technology Statement* and will retain consistency with the National Statements of Learning in Science and in ICT.

Broad direction 4: user-friendly structure and organisation

The structure and organisation of the syllabus will be made more user-friendly. The processes currently called *Investigating* and *Designing and Making* will be central to the organisation of the revised syllabus. The revised structure will give careful consideration to the NSW Primary Curriculum Foundation Statements.

Broad direction 5: clear continuum of learning

The syllabus will describe the continuum of learning in Science and in Technology from K–10.

Broad direction 6: flexibility

The syllabus will provide flexibility for schools to select contexts that challenge and deepen students' understanding of the world around them from the perspective of science and technology.

Broad direction 7: use of readily available resources

Knowledge and skills in the use of materials, tools, equipment and techniques will be embedded within the syllabus. The syllabus will give careful consideration to the necessary resources including materials, equipment and facilities reasonably expected to be available to schools.

Broad direction 8: inclusive curriculum

The syllabus will be inclusive of all students and their diversity of needs.