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**CURRICULUM STOCKTAKE:
NATIONAL SCHOOL SAMPLING STUDY**

**TEACHERS' EXPERIENCES IN
CURRICULUM IMPLEMENTATION:
SCIENCE**

Report to the Ministry of Education

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RESEARCH DIVISION



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**TEACHERS' EXPERIENCES IN
IMPLEMENTING SCIENCE IN THE
NEW ZEALAND NATIONAL CURRICULUM**

NATIONAL SCHOOL SAMPLING STUDY

June 2003



**The
University
of Waikato**
*Te Whare Wānanga
o Waikato*

**Clive McGee, Alister Jones, Bronwen Cowie, Mary Hill,
Thelma Miller, Ann Harlow, Karen MacKenzie**

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SUMMARY

This report is part of the National School Sampling Study, a major Ministry of Education initiative to investigate how teachers work with the curriculum, and which collected data in 2001-2003. The study has aimed to elicit the views of teachers of a sample of 10 percent of New Zealand schools. Several Milestone reports have been produced over this time. The first report in June 2001 outlined how teacher focus group discussions informed the development of national questionnaires. Three questionnaires were constructed in 2001: a general questionnaire about teachers' experiences in implementing the New Zealand national curriculum; and questionnaires about *Mathematics in the New Zealand Curriculum*, and *Technology in the New Zealand Curriculum*. The research team reported on the first round of questionnaires in April 2002 for the general curriculum; mathematics; technology; and Māori Medium.

A report in June 2002 outlined the construction of the questionnaires for the second round to investigate teachers' experiences in teaching from the New Zealand national curriculum documents: *English in the New Zealand Curriculum*; *Languages in the New Zealand Curriculum* (Japanese, Spanish, Chinese, Korean and Samoan), *Science in the New Zealand Curriculum*, and *Social Studies in the New Zealand Curriculum*. The third and final round of questionnaires took place in 2003 comprising a general questionnaire, and questionnaires to investigate teachers' experiences in teaching from *The Arts in the New Zealand Curriculum*, and *Health and Physical Education in the New Zealand Curriculum*.

This report concentrates on the results of one questionnaire from the second round: *Science in the New Zealand Curriculum*. Many statistical tables are presented in this report, based upon frequencies and ratios, organised according to the school type at which the responding teacher taught. The questionnaire included many open-ended questions, which have been analysed qualitatively from a sub-sample of 100 random responses. Where appropriate, additional comments from a broad range of responses from 'other' categories have been presented.

ACKNOWLEDGEMENTS

Research of the kind in this project can only take place with the co-operation of teachers. The research team is very grateful for the willingness of principals of the sample schools to have their teachers participate in the three rounds of surveys in 2001, 2002 and 2003 and we are indebted to the thousands of teachers throughout New Zealand in both cities and outlying areas from as far away as the Chatham Islands who took time to complete questionnaires in all three rounds. Others took part in focus group discussions in 2001, and tried out draft versions of the questionnaires and made suggestions. The final round in 2003 should result in further valuable information. This has already been a valuable opportunity for teachers to have their say about their experiences when teaching from the national curriculum; information that should influence future policy to the benefit of teachers and students.

As this report focuses on the *Science in the New Zealand Curriculum* statement, we would like to thank all those teachers in the second round who took time to complete the Science questionnaire - a total of 875 questionnaires were analysed to make up this report.

The research team is also grateful for the support from leaders of teacher organisations, the New Zealand Principals' Federation (NZPF), the New Zealand Educational Institute Inc. (NZEI), the Post Primary Teachers' Association (PPTA), the Association of Proprietors of Integrated Schools, the Independent Schools of New Zealand (ISNZ), the New Zealand Association of Intermediate and Middle Schools (NZ AIMS), and the New Zealand School Trustees Association all of whom were represented on the Curriculum Stocktake Reference Group, who could see the value of the research, and encouraged teachers to take part.

From the National School Sampling Study the following publications can be found on the Ministry of Education website: <http://www.minedu.govt.nz/>

McGee, C., Jones, A., Bishop, R., Cowie, B., Hill, M., Miller, T., Harlow, A., Oliver, D., Tiakiwai, S., & MacKenzie, K. (2002, April). *Teachers' experiences in curriculum implementation: General curriculum, mathematics and technology.*

This report is available as separate publications:

McGee, C., Jones, A., Bishop, R., Cowie, B., Hill, M., Miller, T., Harlow, A., Oliver, D., Tiakiwai, S., & MacKenzie, K. (2002, April). *Teachers' experiences in curriculum implementation: General curriculum.*

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McGee, C., Jones, A., Cowie, B., Hill, M., Miller, T., Harlow, A., & MacKenzie, K. (2003, February). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: English, languages, science and social studies.*

This report is available as separate publications:

McGee, C., Jones, A., Cowie, B., Hill, M., Miller, T., Harlow, A., & MacKenzie, K. (2003, February). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: English.*

McGee, C., Jones, A., Cowie, B., Hill, M., Miller, T., Harlow, A., & MacKenzie, K. (2003, February). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: Languages.*

McGee, C., Jones, A., Cowie, B., Hill, M., Miller, T., Harlow, A., & MacKenzie, K. (2003, February). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: Science.*

McGee, C., Jones, A., Cowie, B., Hill, M., Miller, T., Harlow, A., & MacKenzie, K. (2003, February). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: Social studies.*

McGee, C., Harlow, A., Miller, T., Cowie, B., Hill, M., Jones, A., & Donaghy, A. (2003, August). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: General curriculum, the arts, and health and physical education.*

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McGee, C., Harlow, A., Miller, T., Cowie, B., Hill, M., Jones, A., & Donaghy, A. (2003, August). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: General curriculum.*

McGee, C., Harlow, A., Miller, T., Cowie, B., Hill, M., Jones, A., & Donaghy, A. (2003, August). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: The arts.*

McGee, C., Harlow, A., Miller, T., Cowie, B., Hill, M., Jones, A., & Donaghy, A. (2003, August). *Curriculum Stocktake: National School Sampling Study. Teachers' experiences in curriculum implementation: Health and physical education.*

McGee, C., Hill, M., Cowie, B., Miller, T., Lee, P., Milne, L., Earl, K., Donaghy, A., & Jones, A. (2004, March). *Curriculum Stocktake: National School Sampling Study. Case studies of schools: Implementation of national curriculum. Report to the Ministry of Education.*

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CHAPTER ONE: INTRODUCTION

BACKGROUND

This report outlines the findings from a survey of New Zealand teachers' experiences in implementing the science curriculum statement, *Science in the New Zealand Curriculum* (Ministry of Education, 1993). It also describes senior secondary teachers' experiences with the senior science curriculum statements - physics, chemistry and biology, years 11-13. It is part of the second major phase of the National School Sampling Study which is part of the New Zealand Ministry of Education Curriculum Stocktake. The purpose of the Curriculum Stocktake is to inform an agreed direction and process for the ongoing development of the New Zealand national curriculum. The Stocktake began in 2000.

This sampling study was designed to seek feedback from teachers about the effectiveness of the curriculum in practice. Its aim was to collect information by means of three rounds of questionnaires over two years. About ten percent of New Zealand primary and secondary schools were surveyed. In the first and third rounds of questionnaires there would be a general questionnaire which covers implementation experiences across the curriculum subjects taught by a teacher. In addition the following subjects were to be surveyed in the three rounds.

- 2001: Mathematics and technology.
- 2002: Languages, English, social sciences and science.
- 2003: Arts and health and physical education.

This report covers the 2002 questionnaire results for science.

This report outlines the samples and sampling procedures in the next chapter, followed by the construction of the questionnaire in chapter three. The findings for the science questionnaire, based on statistical tables with some commentary of major trends, and contrasts between teachers in different types of schools are presented in chapter four. Finally, the appendices contain a copy of the science questionnaire and the letters to school contacts.

CHAPTER TWO: SAMPLING AND SAMPLE

The Ministry of Education brief was for the researchers to draw up a sample of ten percent of New Zealand schools, state, private and integrated. There are about 2900 schools in New Zealand.

The procedure of drawing up the sample was as follows:

1. Factors taken into account when drawing the sample were:
 - randomisation and stratification
 - within each school type that the number of schools in the sample represented ten percent of all schools for the same type
 - decile approximation - that the sample for each school type represented as near as possible the national number of schools for each of the decile ranges
 - geographical coverage - to provide a regional and urban-rural coverage within each school type as possible
 - independent (private) schools - to include a representative number of independent schools
 - integrated schools - to include a representative number of integrated schools
 - over-sampling in some instances

In the sampling, the researchers were guided by data prepared by the Ministry of Education relating to New Zealand schools. Useful data from the Ministry included the regional location of the school and the school type (e.g., whether a school was classified as a full primary, contributing, intermediate, secondary, a composite/restricted composite or an area composite school, or if it was a special school, or the Correspondence School). In addition, the researchers referred to data prepared by the Ministry of Education which gave the school's decile ranking, the school status (i.e., a state school, a private or independent school, or a state/integrated school) and also other information. Other details taken into account which guided the research related to the school gender (co-educational or a single sex school), and the geographical status (urban or rural and geographical location). In the case of rural schools, the researchers adopted the Ministry guidelines which classified a rural school as a school situated in an area where the population was <1000 on census night. From the last census, a total of 868 schools are classified as rural schools.

2. The sampling process used Microsoft Excel:
 - to count the total number of schools in New Zealand and the total number of schools for each school type;
 - within each school type to count the total number of schools nationally for each decile;
 - to order the total number of schools of each school type from their geographical areas into sample groups and create a series of samples of ten percent of all schools for each of the school types. In this way, ten possible sample groups were randomly created using *Excel* thus spanning all geographical regions and locations (effectively equating to counting every tenth school beginning from the third school on the national list). Prior to the sample having been prepared, the researchers decided to work with sample three. Thus, if a particular school declined to take part and a replacement school was required, the researchers would borrow from sample four in the first instance or from one of the other sample groupings by selecting a school with similar characteristics.

3. Having prepared the sample, Excel was used to count the number of schools, order the sample into decile groups and count the number in each decile range, and order sample four and other sample groups in the same way (replacements for sample three if required).

General Principles

1. School replacement would take into account the need to stratify the deciles accordingly so that the sample reasonably matched the national total.

As mentioned, the sample was further stratified to include over-sampling. Accordingly, an adjustment was made to take into account full primary schools in regional districts where there was no intermediate school in the vicinity. Thus, every fourth full primary school was randomly selected in a regional district where there was no intermediate school for that district. Twenty-five full primary schools were redistributed across the decile ranges. This adjustment also had the effect of increasing the sample thereby increasing the number of respondents in some of the larger full primary schools. The reason for the oversampling was to ensure a large teacher sample for each questionnaire. Because there are many small full primary schools, some larger ones were worked into the sample.

Prior to sending out the questionnaires, they were stamp-coded with the school identification number according to the Ministry of Education guidelines. The stamp also indicated the school type.

For the survey, an envelope was attached to each questionnaire for the teacher/respondent to place their completed questionnaire. It was expected that each teacher would complete only one questionnaire - either the science questionnaire, social studies, languages, or the English questionnaire and upon completion they were to place it in an attached envelope and hand to the agent at the school who would collate the envelopes and return them to the research team.

Upon return of each questionnaire, it was noted that it had been received, and then it was number-coded further. The latter coding contained further demographic data about the school status and this was entered onto the *Statistical Package for Social Sciences (SPSS)* system to indicate whether the school was state, private or independent, or state/integrated, co-educational or single-sex school, decile ranking, and whether urban or rural. In addition each questionnaire was assigned a respondent number which was also entered on the system and identified each questionnaire as a 'case'. Data entry in *SPSS* mainly concentrated on quantitative data with qualitative analysis being on *Microsoft Word*.

2. Schools drawn in the sample were approached and invited to participate and in the case of secondary, area and intermediate schools, principals were contacted by telephone and letter; primary and other principals were contacted by letter with a follow-up telephone call made to those who did not respond within a week. The two Correspondence School principals were telephoned by the Project Director.
3. The rate of agreement to participate was high in all school categories, helped by reminders and explanations by telephone, and by support statements or letters from teacher leaders such as PPTA, NZEI, NZ Principals' Federation, NZ Post Primary Principals' Association. When a school declined there were usually understandable reasons such as the school being engaged in other surveys. A school that declined was replaced by another school that met the same group of variables mentioned above, thus preserving the stratification.
4. On agreeing to take part, a principal nominated a contact teacher to act as an agent to receive, distribute, collect and return questionnaires.

RESPONSE RATES

The questionnaires were mailed to schools during term 3, 2002 and later to replacement schools. It should be noted that this timeframe coincided with secondary teacher unrest over protracted employment contract negotiations. It was anticipated that return rates could be badly affected, since there had been

publicity of teachers' (generally speaking) refusal to do 'extras' to their usual work. However, the PPTA National President was supportive of this research and a letter from her encouraging teachers to complete a questionnaire was sent to schools with the questionnaire pack and it was suggested to the school agent that reference be made to the letter. It is difficult to assess the impact of these work conditions on returns, but it is probable that returns were lower because of them. However, perhaps the returns were higher than might have been the case without PPTA's official support.

Completed science questionnaires were returned from 82% of schools and 875 teachers.

Over-sampling

It should also be noted that in order to achieve a large sample, some categories were 'over-sampled' beyond the required 10%. This was because a decision had been taken by the Ministry of Education and the researchers that each teacher would complete one of the three questionnaires, rather than more than one as originally planned in the Ministry of Education research brief. Consequently, more extensive questionnaires in each subject were possible because teachers could focus upon one of them.

CHAPTER THREE: QUESTIONNAIRE CONSTRUCTION AND ANALYSIS

INTRODUCTION

The science questionnaire was constructed in the first half of 2002 and sent to a ten percent sample of New Zealand schools in Term 3. Construction included a pilot of drafts and interaction between the Ministry of Education and the research team. The finalised questionnaire was sent to schools in late August, 2002, and returns came to the researchers over the ensuing few weeks.

Three sources of information influenced questionnaire content and formats.

The content of these questionnaires came from three major sources. First, the Milestone 1 report (June 2001) of this National Schools Sampling Survey outlined how teachers, at a series of teacher focus groups, talked about their curriculum experiences which enabled the research team to identify important issues. Second, the questions posed by the Ministry of Education in the Request for Proposals were considered, and third, the views of subject experts were sought.

A small team of researchers and subject experts worked on the science questionnaire and interacted with Ministry of Education officials over the content and question forms. In constructing the questionnaire, there were several key considerations:

1. The content selected for inclusion had to be prioritised to meet Ministry of Education, project team, and teachers' preferences, so interaction between these three groups was necessary to achieve content validity.
2. There should be questions that were quantifiable and would provide 'broad-sweep' information, and questions that gave teachers the chance to elaborate their views and ideas.
3. The time to do a questionnaire should not normally exceed 30 minutes, thus the researchers needed to be highly selective about which questions would be included. The 'tick boxes' questions would be relatively quick for teachers to complete, but there needed to be plenty of opportunity for teachers to also add comments if they wished, which would take longer.

The development team undertook a rolling series of pilot studies of draft questionnaires with: subject experts at the School of Education; teachers in nearby schools; and subject association teachers in science.

The first round of questionnaires established the structure for the later ones such as science. A copy of the final version of the science questionnaire is in Appendix A. The content can be summarised as follows:

- Impact of Structure
- Contextual strands
- Integrating Strands
- General issues
- Achievement objectives
- Curriculum resourcing and support
- Professional development
- Curriculum implementation
- Essential skills
- Investigative approach
- Inclusiveness
- Assessment and reporting
- School review

The science questionnaire also asked questions about senior science at Years 11-13.

- Curriculum implementation
- Long-term investigations
- Professional development
- Effective practice

DISTRIBUTION

Packages of the three questionnaires in this second round (English, languages, science and social studies) were mailed to each sample school with instructions for them to be distributed as follows:

- One third of primary and intermediate school teachers were asked to complete the science questionnaire. Also within this group, teachers regarded as having responsibility or expertise in science, were asked to complete the science questionnaire.
- Secondary schools (and secondary sections of composite schools): all teachers whose main subject was science, were asked to complete the science questionnaire.

Instruction notes were included for the teacher who was nominated to distribute, collect and return questionnaires in a supplied postal package (see Appendix B). To encourage teachers to answer frankly, an envelope was attached to each questionnaire, in which the completed questionnaire could be placed, sealed and returned to the school agent. Reminders were sent by e-mail to those schools whose returns were later than the suggested date.

DATA ANALYSIS

In readiness for data entry and analysis the research project team prepared the questionnaire for the statistical package SPSS. Frequencies and ratios were calculated for each school type where appropriate (and across all types together where appropriate). It will be noted that in some tables, rows or columns may not compute to exactly 100.0% because of the calculation system of SPSS (but any difference is usually only 0.01%).

Qualitative data from free-response questions were coded into categories, based on a sub-sample of 100 for science. Frequencies and ratios were calculated, but reporting these data was designed to highlight particular trends and weighting to bring out the main categories being given by teachers. For each open-response question, all comments were studied to identify these categories and assign responses to them.

CHAPTER FOUR: SCIENCE QUESTIONNAIRE RESULTS

This chapter presents the findings from the questionnaire on teachers' experiences in teaching from the science curriculum statement, *Science in the New Zealand Curriculum* (Ministry of Education, 1993). The data are presented in the same question sequence and grouped under the same headings as in the science questionnaire (see Appendix). Quantitative data are presented in tables according to school type, on the basis of 875 science questionnaire responses received and processed from the end of October 2002. Where the question invited a comment, the total number of responses was counted. Qualitative data for those questions were taken from a random sub-sample of 100 questionnaires that were representative of the different school types. The respondents have been identified by school type.

It should be noted that many of the questions invited multiple responses, a factor that needs to be borne in mind when interpreting some of the table results.

PROFILE OF RESPONDENTS

The following tables present some baseline data on schools and teachers. The first table shows the schools for the sample n=875, upon which the data in the tables are based:

School Type (according to MOE code) n=875

	Frequency	Percent
Valid Cont. Prim. Year 1-6	288	32.9
Full Prim. Year 1-8	276	31.4
Intermed. Year 7-8	42	4.8
Secondary Year 7-15	39	4.5
Secondary Year 9-15	157	17.9
Comp./Restrict. Comp	25	2.9
Comp. Area School	13	1.5
Special School	11	1.3
Correspondence - primary	13	1.5
Correspondence - secondary	11	1.3
Total	875	100.0

The second table shows that most of the teachers worked in state schools:

Whether school is State/private or independent/or State and integrated

	Frequency	Percent
Valid State	773	88.4
Private or independent school	22	2.5
Integrated and State	80	9.1
Total	875	100.0

The third table shows how many teachers were in schools of different deciles. The Correspondence School has no decile listing, hence 24 teachers in this category:

Number of teachers by school and decile ranking

	Frequency	Percent
Decile 1	76	8.7
Decile 2	73	8.3
Decile 3	82	9.4
Decile 4	84	9.6
Decile 5	64	7.3
Decile 6	75	8.6
Decile 7	100	11.4
Decile 8	95	10.9
Decile 9	96	11.0
Decile 10	106	12.1
no decile	24	2.7
Total	875	100.0

Many teachers worked in co-educational schools – most primary schools and many state secondary schools are co-educational:

Number of teachers in co-educational/boys/girls schools

	Frequency	Percent
Valid Co-educational	801	91.6
Boys	36	4.1
Girls	38	4.3
Total	875	100.0

Most teachers were from urban schools:

Number of teachers in urban/rural schools

	Frequency	Percent
Urban	777	88.8
Rural	98	11.2
Total	875	100.0

INTRODUCTION

Q1 What is your position in your school?

		Q1 What is your position in your school?														Total
		Principal		Deputy/ Assistant/ Associate Principal		Curriculum/ Syndicate Leader		HOD/Head of Faculty		Classroom teacher/ Subject teacher		Teaching DP/AP		99		Count
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	
School Type - MOE code	Cont. Prim. Year 1-6	8	2.8%	36	12.5%	41	14.2%			200	69.4%	1	.3%	2	.7%	288
	Full Prim. Year 1-8	20	7.2%	29	10.5%	29	10.5%	5	1.8%	192	69.6%			1	.4%	276
	Intermed. Year 7-8	1	2.4%	5	11.9%	7	16.7%	3	7.1%	25	59.5%			1	2.4%	42
	Secondary Year 7-15	4	10.3%	3	7.7%	3	7.7%	9	23.1%	23	59.0%					39
	Secondary Year 9-15	2	1.3%	4	2.5%	1	.6%	43	27.4%	107	68.2%					157
	Comp./Restrict. Comp	2	8.0%	3	12.0%	1	4.0%	6	24.0%	13	52.0%					25
	Comp. Area School			1	7.7%	1	7.7%	1	7.7%	10	76.9%					13
	Special School	1	9.1%			1	9.1%			9	81.8%					11
	Correspondence - primary					2	15.4%			11	84.6%					13
	Correspondence - secondary					1	9.1%	1	9.1%	9	81.8%					11
Total		34	3.9%	82	9.4%	87	9.9%	68	7.8%	599	68.5%	1	.1%	4	.5%	875

Most respondents (68.5%) were classroom teachers. In both types of secondary schools and composite schools, about a quarter of the teachers responding were heads of departments (HODs) or faculties.

Q2 Do you have a leadership position in science?

Leadership positions in science were held by 256 teachers - 29.2% of respondents across the whole sample. There were higher ratios of teachers in composite/restricted composite schools holding positions of leadership (56.0%) and in secondary schools (33.4% in year 7-15, and 45.1% in year 9-15 held positions of leadership).

		Leadership positions in science												Total	
		HOD/ Curriculum/ Syndicate Leader		Curriculum Team member		Responsibility for budget		Deliver a science course		In-school facilitator		Responsibility for science area		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	41	14.2%	15	5.2%	4	1.4%	1	.3%	2	.7%	4	1.4%	288	100%
	Full Prim. Year 1-8	46	16.7%	11	4.0%	12	4.3%	4	1.4%	1	.4%	2	.7%	276	100%
	Intermed. Year 7-8	8	19.0%	1	2.4%					1	2.4%			42	100%
	Secondary Year 7-15	9	23.1%	1	2.6%							3	7.7%	39	100%
	Secondary Year 9-15	33	21.0%	1	.6%					1	.6%	36	22.9%	157	100%
	Comp./Restrict. Comp	7	28.0%					1	4.0%	1	4.0%	5	20.0%	25	100%
	Comp. Area School	2	15.4%											13	100%
	Special School													11	100%
	Correspondence - primary													13	100%
	Correspondence - secondary	2	18.2%									1	9.1%	11	100%
Total		148	16.9%	29	3.3%	16	1.8%	6	.7%	6	.7%	51	5.8%	875	100%

The 256 teachers who reported having a science leadership position were asked to state what position they held in their school:

The main science leadership position held by 16.9% of respondents was that of Head of Department/curriculum or syndicate leader. Secondary teachers were more likely to have responsibility for a science area than primary teachers, which was the second most popular type of leadership position held by 5.8% of the respondents.

Q3 How many years have you been teaching?

		Q3 How many years have you been teaching? (incl both part-time and full-time)										Total	
		Less than 2 years		2-5 years		6-10 years		11-15 years		More than 15 years		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	29	10.1%	56	19.5%	42	14.6%	44	15.3%	116	40.4%	287	100%
	Full Prim. Year 1-8	43	15.6%	42	15.3%	50	18.2%	32	11.6%	108	39.3%	275	100%
	Intermed. Year 7-8	9	21.4%	6	14.3%	7	16.7%	4	9.5%	16	38.1%	42	100%
	Secondary Year 7-15	4	10.3%	8	20.5%	4	10.3%	3	7.7%	20	51.3%	39	100%
	Secondary Year 9-15	19	12.2%	23	14.7%	20	12.8%	20	12.8%	74	47.4%	156	100%
	Comp./Restrict. Comp	4	16.0%			4	16.0%	4	16.0%	13	52.0%	25	100%
	Comp. Area School	2	15.4%	2	15.4%	1	7.7%	3	23.1%	5	38.5%	13	100%
	Special School					2	18.2%	1	9.1%	8	72.7%	11	100%
	Correspondence - primary					3	23.1%			10	76.9%	13	100%
	Correspondence - secondary									11	100%	11	100%
Total		110	12.6%	137	15.7%	133	15.3%	111	12.7%	381	43.7%	872	100%

The largest category of teachers (43.7%) had been teaching for more than 15 years; this figure includes over 50% of secondary year 7-15, composite/restricted composite, special school and the Correspondence School teachers.

Most of the teachers (56.5%) who had a leadership position in science had been teaching for more than 15 years:

		Q2a Do you have a leadership position in science: yes/no?				Total	
		Yes		No		Count	Col %
		Count	Col %	Count	Col %		
Q3 How many years have you been teaching? (incl both part-time and full-time)	Less than 2 years	10	4.0%	99	16.1%	109	12.6%
	2-5 years	30	11.9%	107	17.4%	137	15.8%
	6-10 years	32	12.6%	100	16.3%	132	15.2%
	11-15 years	38	15.0%	73	11.9%	111	12.8%
	More than 15 years	143	56.5%	235	38.3%	378	43.6%
Total		253	100.0%	614	100.0%	867	100.0%

Q4 How many years since 1993 have you been teaching?

		Q4 How many years since 1993 have you been teaching? (incl both part-time and full-time)										Total	
		Less than 2 years		2-3 years		4-5 years		6-7 years		8-9 years		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	33	11.7%	24	8.5%	40	14.2%	38	13.5%	146	52.0%	281	100%
	Full Prim. Year 1-8	43	15.8%	22	8.1%	24	8.8%	47	17.2%	137	50.2%	273	100%
	Intermed. Year 7-8	9	21.4%	1	2.4%	5	11.9%	7	16.7%	20	47.6%	42	100%
	Secondary Year 7-15	5	12.8%	2	5.1%	5	12.8%	3	7.7%	24	61.5%	39	100%
	Secondary Year 9-15	21	13.5%	9	5.8%	19	12.3%	11	7.1%	95	61.3%	155	100%
	Comp./Restrict. Comp	6	24.0%	1	4.0%	1	4.0%			17	68.0%	25	100%
	Comp. Area School	2	15.4%	1	7.7%	1	7.7%			9	69.2%	13	100%
	Special School							1	9.1%	10	90.9%	11	100%
	Correspondence - primary	1	7.7%					2	15.4%	10	76.9%	13	100%
	Correspondence - secondary									10	100%	10	100%
Total		120	13.9%	60	7.0%	95	11.0%	109	12.6%	478	55.5%	862	100%

Over half (55.5%) of the teachers answering this question had been teaching for 8-9 years since 1993.

Q5 How many years have you been teaching science?

		Q5 How many years have you been teaching science? (incl both part-time and full-time)										Total	
		Less than 2 years		2-5 years		6-10 years		11-15 years		More than 15 years		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	33	11.7%	57	20.1%	51	18.0%	34	12.0%	108	38.2%	283	100%
	Full Prim. Year 1-8	47	17.2%	49	17.9%	51	18.6%	31	11.3%	96	35.0%	274	100%
	Intermed. Year 7-8	11	26.2%	7	16.7%	7	16.7%	7	16.7%	10	23.8%	42	100%
	Secondary Year 7-15	5	12.8%	9	23.1%	4	10.3%	4	10.3%	17	43.6%	39	100%
	Secondary Year 9-15	20	12.7%	25	15.9%	21	13.4%	24	15.3%	67	42.7%	157	100%
	Comp./Restrict. Comp	4	16.0%	1	4.0%	4	16.0%	4	16.0%	12	48.0%	25	100%
	Comp. Area School	2	15.4%	2	15.4%	1	7.7%	3	23.1%	5	38.5%	13	100%
	Special School			1	9.1%	4	36.4%			6	54.5%	11	100%
	Correspondence - primary	1	9.1%			2	18.2%	1	9.1%	7	63.6%	11	100%
	Correspondence - secondary									11	100%	11	100%
Total		123	14.2%	151	17.4%	145	16.7%	108	12.5%	339	39.1%	866	100%

More teachers (39.1%) had been teaching science for over 15 years than for other periods. More than half of the secondary teachers reported that they had been teaching science since before the science curriculum statement was introduced.

Leadership positions in science were more often held by experienced science teachers (51.2% reported that they had taught science for more than 15 years):

		Q2a Do you have a leadership position in science: yes/no?				Total	
		Yes		No		Count	Col %
		Count	Col %	Count	Col %		
Q5 How many years have you been teaching science? (incl both part-time and full-time)	Less than 2 years	11	4.4%	111	18.1%	122	14.2%
	2-5 years	35	14.0%	116	19.0%	151	17.5%
	6-10 years	33	13.2%	111	18.1%	144	16.7%
	11-15 years	43	17.2%	65	10.6%	108	12.5%
	More than 15 years	128	51.2%	209	34.2%	337	39.1%
Total		250	100.0%	612	100.0%	862	100.0%

In the remainder of this chapter the data are presented in the question sequence of the questionnaire. Statistical tables are interpreted to show general trends and commentary is provided for the qualitative data.

Q6a What class year level(s) do you currently teach science?

		Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type -MOE code	Cont. Prim. Year 1-6	81	28.1%	77	26.7%	86	29.9%	80	27.8%	96	33.3%
	Full Prim. Year 1-8	58	21.0%	55	19.9%	70	25.4%	73	26.4%	77	27.9%	70	25.4%
	Intermed. Year 7-8												
	Secondary Year 7-15												
	Secondary Year 9-15												
	Comp./Restrict. Comp	2	8.0%	1	4.0%	2	8.0%	3	12.0%	1	4.0%	1	4.0%
	Comp. Area School	5	38.5%	4	30.8%	4	30.8%	2	15.4%	2	15.4%	2	15.4%
	Special School	9	81.8%	10	90.9%	10	90.9%	8	72.7%	8	72.7%	8	72.7%
	Correspondence - primary	5	38.5%	7	53.8%	8	61.5%	10	76.9%	11	84.6%	11	84.6%
	Correspondence - secondary												
Total		160	18.3%	154	17.6%	180	20.6%	176	20.1%	195	22.3%	170	19.4%

		Year 7		Year 8		Year 9		Year 10		Year 11		Year 12		Year 13		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	2	.7%	1	.3%										
	Full Prim. Year 1-8	74	26.8%	61	22.1%											276	100%
	Intermed. Year 7-8	32	76.2%	30	71.4%											42	100%
	Secondary Year 7-15	5	12.8%	13	33.3%	22	56.4%	19	48.7%	24	61.5%	25	64.1%	22	56.4%	39	100%
	Secondary Year 9-15					117	74.5%	116	73.9%	138	87.9%	115	73.2%	83	52.9%	157	100%
	Comp./ Restrict. Comp	4	16.0%	5	20.0%	14	56.0%	16	64.0%	17	68.0%	13	52.0%	11	44.0%	25	100%
	Comp. Area School	2	15.4%	2	15.4%	1	7.7%	1	7.7%	1	7.7%	1	7.7%			13	100%
	Special School	8	72.7%	8	72.7%	6	54.5%	6	54.5%	1	9.1%	1	9.1%			11	100%
	Correspondence - primary	11	84.6%	11	84.6%											13	100%
	Correspondence - secondary					6	54.5%	7	63.6%	9	81.8%	9	81.8%	9	81.8%	11	100%
Total		138	15.8%	131	15.0%	166	19.0%	165	18.9%	190	21.7%	164	18.7%	125	14.3%	875	100%

These tables offer a view of the year levels that were taught by teachers in the different types of school.

It must be remembered that many teachers teach at more than one year level.

Respondents were spread evenly throughout the year levels taught in their schools although there were fewer teachers teaching science at year 13 than at other levels in secondary schools. In one contributing primary school, two teachers were teaching year 7 and 8 in an adjacent restricted composite school.

Q6b If you teach science in Years 11, 12 or 13, what science subjects are you teaching?

		Biology		Chemistry		Physics		Science		agriculture/ horticulture		alt sci course		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6												
	Full Prim. Year 1-8													276	100%
	Intermed. Year 7-8													42	100%
	Secondary Year 7-15	13	33.3%	10	25.6%	10	25.6%	15	38.5%	5	12.8%			39	100%
	Secondary Year 9-15	69	43.9%	37	23.6%	29	18.5%	97	61.8%	4	2.5%	10	6.4%	157	100%
	Comp./Restrict. Comp	4	16.0%	6	24.0%	6	24.0%	14	56.0%					25	100%
	Comp. Area School	1	7.7%					1	7.7%			1	7.7%	13	100%
	Special School													11	100%
	Correspondence - primary													13	100%
	Correspondence - secondary	2	18.2%	3	27.3%	3	27.3%	4	36.4%	3	27.3%			11	100%
Total		89	10.2%	56	6.4%	48	5.5%	131	15.0%	12	1.4%	11	1.3%	875	100%

Across all school types a general science course was the most popular science area (15%) being taught by teachers who taught years 11, 12 and 13. Biology was the next most popular subject (10.2%), then chemistry (6.4%), and physics (5.5%).

Looking at the class year levels and the science areas taught it is possible to see the subject specialisation of the teacher respondents.

		Biology		Chemistry		Physics		Science		agriculture/ horticulture		alt sci course	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		Year 11	83	43.7%	49	25.8%	38	20.0%	125	65.8%	12	6.3%	11
Year 12	73	44.5%	49	29.9%	47	28.7%	93	56.7%	8	4.9%	9	5.5%	
Year 13	52	41.6%	32	25.6%	38	30.4%	71	56.8%	8	6.4%	3	2.4%	

A general science course, listed as 'science' in the above table, was the most frequently taught science subject at all senior year levels by the teachers responding to this question, followed by biology, chemistry and physics in year 11 and 12. In year 13 physics was more frequently taught than chemistry.

Q7 What formal qualifications in science do you hold? (n=861)

		Q7a What formal qualifications do you hold?											
		MSc or higher		BSc		3rd year university paper(s)		2nd year university paper(s)		1st year university paper(s)		Dip Tchg (science focus)	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
School Type - MOE code	Cont. Prim. Year 1-6	3	1.1%	7	2.5%	9	3.2%	13	4.6%	21	7.5%	23	8.2%
	Full Prim. Year 1-8	1	.4%	7	2.6%	10	3.6%	13	4.7%	18	6.6%	13	4.7%
	Intermed. Year 7-8			3	7.5%			1	2.5%	2	5.0%	3	7.5%
	Secondary Year 7-15	10	26.3%	23	60.5%	1	2.6%			1	2.6%		
	Secondary Year 9-15	27	17.3%	118	75.6%	2	1.3%	3	1.9%	1	.6%	2	1.3%
	Comp./Restrict. Comp	13	52.0%	4	16.0%					1	4.0%	2	8.0%
	Comp. Area School	1	7.7%										
	Special School							1	9.1%	1	9.1%	2	18.2%
	Correspondence - primary									1	8.3%	1	8.3%
Correspondence - secondary	2	18.2%	6	54.5%	1	9.1%			1	9.1%	1	9.1%	
Total		57	6.6%	168	19.5%	23	2.7%	31	3.6%	47	5.5%	47	5.5%

		Q7a What formal qualifications do you hold?								Total	
		University Bursary science subject(s)		6th Form Certificate science subject(s)		School Certificate science subject(s)		I have no formal qualifications in science		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	36	12.8%	79	28.1%	48	17.1%	42	14.9%	281	100%
	Full Prim. Year 1-8	44	16.1%	66	24.1%	49	17.9%	53	19.3%	274	100%
	Intermed. Year 7-8	8	20.0%	10	25.0%	7	17.5%	6	15.0%	40	100%
	Secondary Year 7-15	1	2.6%	1	2.6%	1	2.6%			38	100%
	Secondary Year 9-15	1	.6%	2	1.3%					156	100%
	Comp./Restrict. Comp	1	4.0%	1	4.0%	3	12.0%			25	100%
	Comp. Area School	1	7.7%	5	38.5%	4	30.8%	2	15.4%	13	100%
	Special School			2	18.2%	4	36.4%	1	9.1%	11	100%
	Correspondence - primary	2	16.7%	5	41.7%	2	16.7%	1	8.3%	12	100%
Correspondence - secondary									11	100%	
Total		94	10.9%	171	19.9%	118	13.7%	105	12.2%	861	100%

Of the 274 primary teachers who responded to this question, less than 5% had a qualification in science in any category above first year university papers. 7.5% of the 40 intermediate teachers held a BSc.

Secondary year 7-15 and year 9-15 science teachers were most likely to hold a BSc, (60.5% of the 38 year 7-15 teachers and 75.6% of the 156 year 9-15 teachers). Of the 156 year 9-15 teachers, 17.3% held an MSc or higher and 26.3% of the 38 year 7-15 teachers held an MSc or higher. Overall, 86.8% of the year 7-15 secondary teachers, and 92.9% of the year 9-15 secondary teachers held science degrees.

The most highly qualified science teachers in the sample were teaching in a composite/restricted composite school (52% of the 25 teachers held an MSc or higher).

Primary, intermediate, composite area school and primary Correspondence School teachers were most likely to have taken 6th Form Certificate science as their highest qualification in science.

Q8 What are the three major challenges you have faced in implementing the science curriculum?

Major challenges n=875

		Difficulties with resourcing, equipment		Crowded curriculum - finding time		Content knowledge		Understanding the curriculum statement		Modifying level of curriculum for student understanding	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	98	34.0%	58	20.1%	31	10.8%	22	7.6%
	Full Prim. Year 1-8	111	40.2%	44	15.9%	29	10.5%	16	5.8%	16	5.8%
	Intermed. Year 7-8	14	33.3%	6	14.3%	10	23.8%	3	7.1%	2	4.8%
	Secondary Year 7-15	10	25.6%	3	7.7%	1	2.6%	8	20.5%	2	5.1%
	Secondary Year 9-15	35	22.3%	31	19.7%	4	2.5%	18	11.5%	14	8.9%
	Comp./Restrict. Comp	6	24.0%	4	16.0%	1	4.0%	3	12.0%		
	Comp. Area School	5	38.5%	2	15.4%	2	15.4%	1	7.7%		
	Special School	5	45.5%	1	9.1%	3	27.3%	1	9.1%	4	36.4%
	Correspondence - primary	1	7.7%			1	7.7%			1	7.7%
	Correspondence - secondary	2	18.2%	2	18.2%			3	27.3%	2	18.2%
Total		287	32.8%	151	17.3%	82	9.4%	75	8.6%	63	7.2%

The main concern of teachers across all school types (32.8%) has been the difficulty of resourcing the equipment needed to implement the science curriculum:

Resourcing curriculum 'suggested activities' – equipment needed is often unavailable or too expensive – would like some suggested alternatives that could be used in place of. [primary]

Resourcing – Cost of new equipment, technology (computers, simulations, videos, etc) materials, transport for fieldtrips, cost of relief, time-out classes. Cheap alternatives used or a substitution. Most frequently costly activities avoided. Use of computers very limited access not readily available). A lot of simple ideas retained, e.g., water rockets, hot air balloons, radiation experiments. [secondary]

The “crowded curriculum” was found to be a barrier to successful implementation by almost one fifth of teachers across all school types:

Fitting in everything along with what is supposed to be taught in 6 other curriculum documents. [primary]

Some of these teachers indicated that the science curriculum was too crowded:

Having enough time to cover all strands to a satisfactory depth. [primary]

The science curriculum is simply too full/ many students would get a grasp of and succeed in if more time could be put into each topic. [secondary]

Concerns with their own level of content knowledge occupied more primary teachers than secondary teachers:

Lack of knowledge in specific areas – addressed through support from advisors. [primary]

My lack of scientific knowledge to answer questions [intermediate]

Secondary teachers commented on the need to develop understanding in content areas outside their degree specialisation:

Becoming familiar with the areas of science my degree did not cover, e.g., I have a chemistry degree so I needed to work with the physics teacher to become familiar with the physical world content. The support from my colleagues has helped to make this particular aspect less challenging. [secondary]

Some teachers had difficulty understanding the curriculum statement because of the way it was phrased:

Coming to grips with the broad nature of the document. [intermediate]

Understanding the jargon. Teasing out what they actually want us to achieve from the vague statements. [secondary]

Some found that they had to adapt what was in the curriculum statement to their students' level of understanding:

Bringing Science to my class's level of understanding. [primary – year 2 teacher]

Teaching the Y9 science curriculum to a class of low academic students. [secondary]

This was particularly so for teachers in special schools and the Correspondence School:

Simplifying it to suit special needs students with additional complex needs – blind, deaf-blind, non-verbal, tactile-resistant. [special]

Adaptation of science material to the distance situation (correspondence). Many face-to-face activities are not suitable in a long distance situation. [Correspondence School - secondary]

One teacher commented that a lack of specificity at junior levels resulted in diverse student understandings at a more senior level and that this was problematic at NCEA level:

Lack of uniform approach to the junior curriculum across schools. Therefore when they reach senior school, backgrounds are diverse and the students often struggle to cope with the demands of NCEA. [secondary]

Other challenges facing science teachers included ensuring adequate coverage of the strands and selecting meaningful topics for the students. Some secondary teachers, who were involved in the new national qualification – NCEA, had issues concerning changes in assessment:

Changes in assessment and in systems of reporting and testing. [secondary]

Implementing NCEA Level 1 and planning for Level 2 (and trying to give my students a decent deal despite the chaos happening nationwide). [secondary]

There were some teachers who found resourcing their science programme challenging. These were mainly secondary teachers:

Time to set up labs – labs not empty / lack of technician time to repair/monitor equipment and to set up labs. [secondary]

Science teachers need more technical help and more non-contact time to organise practical experiments, activities and equipment. [secondary]

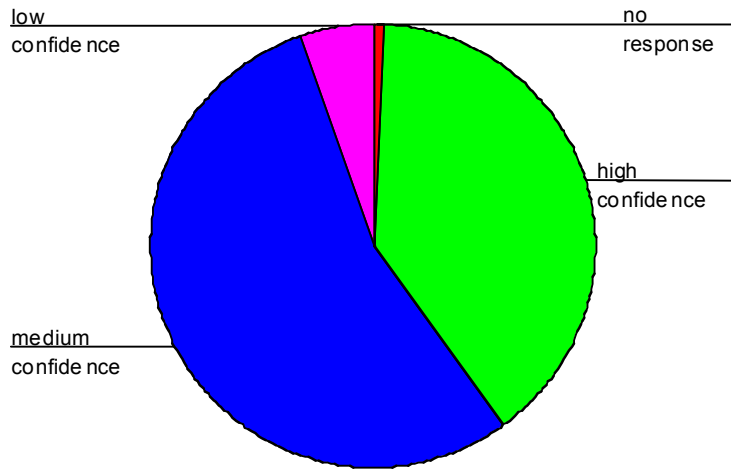
Availability, preparation and tidying up of the gear required for many of the activities. They are enjoyable and worthwhile, but without teacher aide or technician assistance very time consuming when doing the testing etc thoroughly for a group of 30 week after week. In our big school much of the material is purchased in bulk for everyone – e.g., 'Fixing and Foaming' = 10K baking soda, 100L vinegar (for 10 year 7 classes). [intermediate – HOD science]

Q9 Please indicate your degree of confidence in teaching science

		Q9 Please indicate your degree of confidence in teaching science...						Total	
		High		Medium		Low		Count	Row %
		Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	68	23.8%	200	69.9%	18	6.3%	286	100.0%
	Full Prim. Year 1-8	72	26.3%	186	67.9%	16	5.8%	274	100.0%
	Intermed. Year 7-8	15	36.6%	23	56.1%	3	7.3%	41	100.0%
	Secondary Year 7-15	29	76.3%	9	23.7%			38	100.0%
	Secondary Year 9-15	121	77.6%	35	22.4%			156	100.0%
	Comp./Restrict. Comp	18	72.0%	6	24.0%	1	4.0%	25	100.0%
	Comp. Area School	7	53.8%	4	30.8%	2	15.4%	13	100.0%
	Special School	1	9.1%	7	63.6%	3	27.3%	11	100.0%
	Correspondence - primary	4	30.8%	8	61.5%	1	7.7%	13	100.0%
	Correspondence - secondary	7	63.6%	3	27.3%	1	9.1%	11	100.0%
Total		342	39.4%	481	55.4%	45	5.2%	868	100.0%

Just over half of the teachers reported a medium degree of confidence. Primary and intermediate teachers tended to have a medium degree of confidence in teaching science, whereas secondary teachers reported a high degree of confidence. Very few teachers (5.2%) regarded their confidence as low.

Degree of confidence in teaching science (n=875)



Q10 Having indicated your degree of confidence, what factors have contributed to this? (n=875)

School Type - MOE code		My teaching experience		My knowledge of science		Units of work have been developed		My professional development in science		My school has translated the AOs into a school scheme		My school has translated the AOs into SLOs		My qualifications/specialist background in science		My school works directly from the achievement objectives	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		Cont. Prim. Year 1-6	233	80.9%	200	69.4%	152	52.8%	116	40.3%	91	31.6%	74	25.7%	46	16.0%	64
Full Prim. Year 1-8	205	74.3%	186	67.4%	134	48.6%	102	37.0%	83	30.1%	63	22.8%	50	18.1%	71	25.7%	
Intermed. Year 7-8	31	73.8%	37	88.1%	18	42.9%	19	45.2%	11	26.2%	14	33.3%	11	26.2%	7	16.7%	
Secondary Year 7-15	31	79.5%	35	89.7%	15	38.5%	19	48.7%	19	48.7%	23	59.0%	26	66.7%	9	23.1%	
Secondary Year 9-15	135	86.0%	136	86.6%	89	56.7%	79	50.3%	89	56.7%	95	60.5%	109	69.4%	47	29.9%	
Comp./ Restrict. Comp	23	92.0%	18	72.0%	10	40.0%	16	64.0%	10	40.0%	10	40.0%	16	64.0%	8	32.0%	
Comp. Area School	9	69.2%	10	76.9%	6	46.2%	6	46.2%	5	38.5%	2	15.4%	1	7.7%	1	7.7%	
Special School	8	72.7%	8	72.7%	4	36.4%	6	54.5%	3	27.3%	3	27.3%	2	18.2%	2	18.2%	
Correspondence - primary	11	84.6%	12	92.3%	7	53.8%	5	38.5%	3	23.1%	7	53.8%	2	15.4%	3	23.1%	
Correspondence - secondary	10	90.9%	9	81.8%	9	81.8%	7	63.6%	4	36.4%	3	27.3%	8	72.7%	4	36.4%	
Total		696	79.5%	651	74.4%	444	50.7%	375	42.9%	318	36.3%	294	33.6%	271	31.0%	216	24.7%

Teachers identified a number of factors that had contributed to their degree of confidence in teaching science. Teaching experience was the most commonly mentioned factor (79.5%). Most teachers (74.4%) also felt that their own knowledge of science was an important factor. Teachers were helped to feel confident in their teaching of science by some of the work that had been done by others in their schools, for example units of work that had been developed (50.7%), achievement objectives that had been translated into a school scheme (36.3%) and achievement objectives that had been translated into specific learning outcomes (33.6%). Professional development (42.9%) and the qualifications or specialist background of teachers (31.0%) were considered helpful to the degree of confidence felt. Under the 'other' category 38 teachers said that team planning sessions or support from colleagues was important and 36 teachers attributed their confidence to the fact that students "enjoyed science classes":

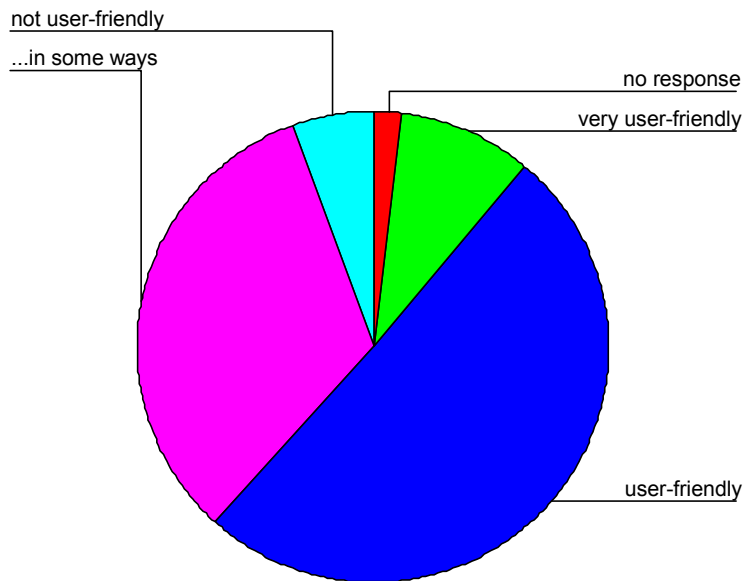
It's a fun topic, kids enjoy exploring and experimenting. [composite area]

IMPACT OF CURRICULUM STRUCTURE AND ASSESSMENT COMPLIANCE PRACTICES ON TEACHING AND LEARNING

Q11 How user-friendly have you found the science curriculum statement?

Half of the teachers responding to this question found the science curriculum statement ‘user-friendly’ and one third found it to be ‘user-friendly in some ways’.

Teachers’ perceptions of the user-friendliness of the science curriculum statement (n=875)



		Q11 How user-friendly have you found the science curriculum statement?								Total	
		Very user-friendly		User-friendly		User-friendly in some ways		Not user-friendly		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type -	Cont. Prim. Year 1-6	30	10.7%	158	56.4%	86	30.7%	6	2.1%	280	100.0%
MOE code	Full Prim. Year 1-8	35	12.8%	166	60.8%	65	23.8%	7	2.6%	273	100.0%
	Intermed. Year 7-8	4	9.5%	19	45.2%	17	40.5%	2	4.8%	42	100.0%
	Secondary Year 7-15	2	5.3%	20	52.6%	14	36.8%	2	5.3%	38	100.0%
	Secondary Year 9-15	1	.7%	45	29.4%	81	52.9%	26	17.0%	153	100.0%
	Comp./Restrict. Comp	4	16.0%	11	44.0%	7	28.0%	3	12.0%	25	100.0%
	Comp. Area School	2	15.4%	8	61.5%	2	15.4%	1	7.7%	13	100.0%
	Special School	2	18.2%	4	36.4%	5	45.5%			11	100.0%
	Correspondence - primary			7	58.3%	5	41.7%			12	100.0%
	Correspondence - secondary			3	30.0%	6	60.0%	1	10.0%	10	100.0%
Total		80	9.3%	441	51.5%	288	33.6%	48	5.6%	857	100.0%

Overall, 9.3% of teachers (more primary than secondary) found the science curriculum statement to be ‘very user-friendly’, 51.5% found it ‘user-friendly’ and 5.6% of teachers found it ‘not user-friendly’ (more so secondary than primary).

Q12 In your teaching of science, to what extent has the science curriculum statement with its strands, levels, achievement objectives, learning experiences, etc, assisted you in:

a) Planning your school/department programme?

		Q12a In your teaching of science, to what extent has the science curriculum statement with its technological areas, strands, achievement objectives, levels etc assisted you in: planning your school/department programme?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	168	59.8%	103	36.7%	3	1.1%	2	.7%	5	1.8%	281	100%
	Full Prim. Year 1-8	157	57.7%	100	36.8%	7	2.6%	5	1.8%	3	1.1%	272	100%
	Intermed. Year 7-8	22	52.4%	14	33.3%	2	4.8%	2	4.8%	2	4.8%	42	100%
	Secondary Year 7-15	15	40.5%	17	45.9%			2	5.4%	3	8.1%	37	100%
	Secondary Year 9-15	43	28.5%	76	50.3%	10	6.6%	15	9.9%	7	4.6%	151	100%
	Comp./Restrict. Comp	12	48.0%	9	36.0%	3	12.0%	1	4.0%			25	100%
	Comp. Area School	8	72.7%	3	27.3%							11	100%
	Special School	4	50.0%	3	37.5%	1	12.5%					8	100%
	Correspondence - primary	2	18.2%	9	81.8%							11	100%
	Correspondence - secondary	2	18.2%	5	45.5%	1	9.1%	1	9.1%	2	18.2%	11	100%
Total		433	51.0%	339	39.9%	27	3.2%	28	3.3%	22	2.6%	849	100%

b) planning your classroom programme?

		Q12b In your teaching of science, to what extent has the science curriculum statement..... assisted you in: planning your classroom programme?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	152	53.1%	124	43.4%	8	2.8%	1	.3%	1	.3%	286	100%
	Full Prim. Year 1-8	157	56.9%	107	38.8%	9	3.3%	3	1.1%			276	100%
	Intermed. Year 7-8	20	47.6%	18	42.9%	2	4.8%	2	4.8%			42	100%
	Secondary Year 7-15	9	23.7%	20	52.6%	6	15.8%	2	5.3%	1	2.6%	38	100%
	Secondary Year 9-15	14	9.2%	81	53.3%	26	17.1%	30	19.7%	1	.7%	152	100%
	Comp./Restrict. Comp	6	24.0%	12	48.0%	5	20.0%	2	8.0%			25	100%
	Comp. Area School	9	69.2%	4	30.8%							13	100%
	Special School	6	54.5%	3	27.3%	1	9.1%	1	9.1%			11	100%
	Correspondence - primary	5	41.7%	6	50.0%	1	8.3%					12	100%
	Correspondence - secondary	3	27.3%	4	36.4%	2	18.2%	1	9.1%	1	9.1%	11	100%
Total		381	44.0%	379	43.8%	60	6.9%	42	4.8%	4	.5%	866	100%

c) Gaining an overview of a progression of key scientific ideas?

		Q12c In your teaching of science, to what extent has the science curriculum statement..... assisted you in: gaining an overview of the progression of key scientific ideas?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	71	25.0%	164	57.7%	39	13.7%	6	2.1%	4	1.4%	284	100%
	Full Prim. Year 1-8	81	29.3%	152	55.1%	28	10.1%	10	3.6%	5	1.8%	276	100%
	Intermed. Year 7-8	11	26.2%	22	52.4%	7	16.7%	1	2.4%	1	2.4%	42	100%
	Secondary Year 7-15	7	18.4%	23	60.5%	6	15.8%	1	2.6%	1	2.6%	38	100%
	Secondary Year 9-15	18	11.9%	81	53.6%	27	17.9%	24	15.9%	1	.7%	151	100%
	Comp./Restrict. Comp	6	24.0%	11	44.0%	5	20.0%	3	12.0%			25	100%
	Comp. Area School	3	23.1%	5	38.5%	5	38.5%					13	100%
	Special School	4	36.4%	4	36.4%	1	9.1%	1	9.1%	1	9.1%	11	100%
	Correspondence - primary	5	41.7%	6	50.0%			1	8.3%			12	100%
	Correspondence - secondary	1	9.1%	4	36.4%	4	36.4%	2	18.2%			11	100%
Total		207	24.0%	472	54.7%	122	14.1%	49	5.7%	13	1.5%	863	100%

d) Developing (specific) learning outcomes?

		Q12d In your teaching of science, to what extent has the science curriculum statement..... assisted you in: developing (specific) learning outcomes?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	102	35.7%	152	53.1%	26	9.1%	5	1.7%	1	.3%	286	100%
	Full Prim. Year 1-8	104	37.7%	139	50.4%	25	9.1%	8	2.9%			276	100%
	Intermed. Year 7-8	10	23.8%	23	54.8%	6	14.3%	2	4.8%	1	2.4%	42	100%
	Secondary Year 7-15	9	23.7%	25	65.8%	2	5.3%	1	2.6%	1	2.6%	38	100%
	Secondary Year 9-15	39	25.5%	78	51.0%	17	11.1%	17	11.1%	2	1.3%	153	100%
	Comp./Restrict. Comp	8	32.0%	11	44.0%	4	16.0%	2	8.0%			25	100%
	Comp. Area School	8	61.5%	5	38.5%							13	100%
	Special School	5	45.5%	4	36.4%	2	18.2%					11	100%
	Correspondence - primary	4	30.8%	9	69.2%							13	100%
	Correspondence - secondary	1	9.1%	7	63.6%	1	9.1%	2	18.2%			11	100%
Total		290	33.4%	453	52.2%	83	9.6%	37	4.3%	5	.6%	868	100%

e) Achieving consistent understanding of the curriculum levels within your classroom/ school?

		Q12e In your teaching of science, to what extent has the science curriculum statement..... assisted you in: achieving consistent understanding of the curriculum levels within your classroom/school?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	80	28.0%	167	58.4%	24	8.4%	8	2.8%	7	2.4%	286	100%
	Full Prim. Year 1-8	86	31.5%	148	54.2%	29	10.6%	4	1.5%	6	2.2%	273	100%
	Intermed. Year 7-8	8	19.0%	26	61.9%	8	19.0%					42	100%
	Secondary Year 7-15	7	18.9%	19	51.4%	7	18.9%	3	8.1%	1	2.7%	37	100%
	Secondary Year 9-15	21	13.7%	71	46.4%	33	21.6%	24	15.7%	4	2.6%	153	100%
	Comp./Restrict. Comp	7	29.2%	11	45.8%	2	8.3%	4	16.7%			24	100%
	Comp. Area School	4	30.8%	6	46.2%	1	7.7%	1	7.7%	1	7.7%	13	100%
	Special School	3	37.5%	3	37.5%	2	25.0%					8	100%
	Correspondence - primary	3	25.0%	8	66.7%			1	8.3%			12	100%
	Correspondence - secondary	1	9.1%	5	45.5%	3	27.3%	2	18.2%			11	100%
Total		220	25.6%	464	54.0%	109	12.7%	47	5.5%	19	2.2%	859	100%

f) **Assessing student achievement?**

		Q12f In your teaching of science, to what extent has the science curriculum statement..... assisted you in: assessing student achievement?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	54	18.8%	162	56.4%	56	19.5%	12	4.2%	3	1.0%	287	100%
	Full Prim. Year 1-8	63	22.9%	155	56.4%	43	15.6%	10	3.6%	4	1.5%	275	100%
	Intermed. Year 7-8	4	9.5%	26	61.9%	8	19.0%	4	9.5%			42	100%
	Secondary Year 7-15	5	13.2%	17	44.7%	9	23.7%	4	10.5%	3	7.9%	38	100%
	Secondary Year 9-15	12	7.8%	60	39.2%	44	28.8%	35	22.9%	2	1.3%	153	100%
	Comp./Restrict. Comp	5	20.0%	8	32.0%	8	32.0%	4	16.0%			25	100%
	Comp. Area School	3	23.1%	9	69.2%	1	7.7%					13	100%
	Special School	3	30.0%	4	40.0%	3	30.0%					10	100%
	Correspondence - primary	4	30.8%	8	61.5%	1	7.7%					13	100%
	Correspondence - secondary	1	9.1%	4	36.4%	3	27.3%	3	27.3%			11	100%
Total		154	17.8%	453	52.2%	176	20.3%	72	8.3%	12	1.4%	867	100%

g) **Meting the needs of Māori students in your classroom/ school?**

		Q12g In your teaching of science, to what extent has the science curriculum statement..... assisted you in: meeting the needs of Māori students in your classroom/school?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	19	6.8%	98	35.1%	73	26.2%	37	13.3%	52	18.6%	279	100%
	Full Prim. Year 1-8	26	10.0%	85	32.6%	68	26.1%	29	11.1%	53	20.3%	261	100%
	Intermed. Year 7-8			18	43.9%	14	34.1%	8	19.5%	1	2.4%	41	100%
	Secondary Year 7-15	2	5.4%	16	43.2%	8	21.6%	4	10.8%	7	18.9%	37	100%
	Secondary Year 9-15	2	1.3%	41	26.8%	51	33.3%	43	28.1%	16	10.5%	153	100%
	Comp./Restrict. Comp	1	4.5%	5	22.7%	3	13.6%	4	18.2%	9	40.9%	22	100%
	Comp. Area School	3	23.1%	4	30.8%	1	7.7%	2	15.4%	3	23.1%	13	100%
	Special School	1	10.0%	5	50.0%	3	30.0%			1	10.0%	10	100%
	Correspondence - primary			8	66.7%	2	16.7%	1	8.3%	1	8.3%	12	100%
	Correspondence - secondary	1	9.1%			6	54.5%	4	36.4%			11	100%
Total		55	6.6%	280	33.4%	229	27.3%	132	15.7%	143	17.0%	839	100%

h) **Communicating student achievement to other teachers within your school?**

		Q12h In your teaching of science, to what extent has the science curriculum statement..... assisted you in: communicating student achievement to other teachers within your school?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	47	16.6%	135	47.7%	56	19.8%	36	12.7%	9	3.2%	283	100%
	Full Prim. Year 1-8	36	13.2%	145	53.1%	53	19.4%	28	10.3%	11	4.0%	273	100%
	Intermed. Year 7-8	5	11.9%	19	45.2%	10	23.8%	5	11.9%	3	7.1%	42	100%
	Secondary Year 7-15	4	10.5%	18	47.4%	7	18.4%	7	18.4%	2	5.3%	38	100%
	Secondary Year 9-15	9	6.0%	46	30.7%	38	25.3%	51	34.0%	6	4.0%	150	100%
	Comp./Restrict. Comp	3	12.0%	7	28.0%	8	32.0%	7	28.0%			25	100%
	Comp. Area School	4	30.8%	3	23.1%	1	7.7%	5	38.5%			13	100%
	Special School	3	30.0%	4	40.0%	3	30.0%					10	100%
	Correspondence - primary	3	25.0%	7	58.3%	2	16.7%					12	100%
	Correspondence - secondary	1	9.1%	4	36.4%	3	27.3%	3	27.3%			11	100%
Total		115	13.4%	388	45.3%	181	21.1%	142	16.6%	31	3.6%	857	100%

i) Reporting student achievement to parents and caregivers?

		Q12i In your teaching of science, to what extent has the science curriculum statement..... assisted you in: reporting student achievement to parents and caregivers?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	50	17.4%	137	47.7%	66	23.0%	29	10.1%	5	1.7%	287	100%
	Full Prim. Year 1-8	46	16.7%	152	55.1%	52	18.8%	18	6.5%	8	2.9%	276	100%
	Intermed. Year 7-8	7	16.7%	21	50.0%	8	19.0%	4	9.5%	2	4.8%	42	100%
	Secondary Year 7-15	9	23.7%	15	39.5%	5	13.2%	7	18.4%	2	5.3%	38	100%
	Secondary Year 9-15	17	11.2%	50	32.9%	35	23.0%	45	29.6%	5	3.3%	152	100%
	Comp./Restrict. Comp	3	12.0%	12	48.0%	5	20.0%	5	20.0%			25	100%
	Comp. Area School	2	15.4%	7	53.8%	1	7.7%	2	15.4%	1	7.7%	13	100%
	Special School	4	40.0%	5	50.0%	1	10.0%					10	100%
	Correspondence - primary	3	25.0%	7	58.3%	2	16.7%					12	100%
	Correspondence - secondary	3	27.3%	3	27.3%	4	36.4%	1	9.1%			11	100%
Total		144	16.6%	409	47.2%	179	20.7%	111	12.8%	23	2.7%	866	100%

j) Communicating student achievement to teachers at other schools?

		Q12j In your teaching of science, to what extent has the science curriculum statement..... assisted you in: communicating student achievement to teachers at other schools?										Total	
		Always		Sometimes		Not very often		Rarely		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	32	11.5%	96	34.4%	53	19.0%	62	22.2%	36	12.9%	279	100%
	Full Prim. Year 1-8	32	11.9%	106	39.3%	56	20.7%	51	18.9%	25	9.3%	270	100%
	Intermed. Year 7-8	3	7.3%	12	29.3%	5	12.2%	14	34.1%	7	17.1%	41	100%
	Secondary Year 7-15	3	8.1%	9	24.3%	6	16.2%	12	32.4%	7	18.9%	37	100%
	Secondary Year 9-15	5	3.3%	30	19.9%	43	28.5%	62	41.1%	11	7.3%	151	100%
	Comp./Restrict. Comp	1	4.0%	6	24.0%	8	32.0%	9	36.0%	1	4.0%	25	100%
	Comp. Area School	2	15.4%	5	38.5%			4	30.8%	2	15.4%	13	100%
	Special School	5	50.0%	3	30.0%	1	10.0%	1	10.0%			10	100%
	Correspondence - primary	3	25.0%	3	25.0%	2	16.7%	3	25.0%	1	8.3%	12	100%
	Correspondence - secondary			2	18.2%	5	45.5%	3	27.3%	1	9.1%	11	100%
Total		86	10.1%	272	32.0%	179	21.1%	221	26.0%	91	10.7%	849	100%

The science curriculum statement was of most help in planning the school or department programme (51.0% 'always'; 39.9% 'sometimes'), and in planning the classroom programme (44.0% 'always'; 43.8% 'sometimes'). The statement was helpful in developing specific learning outcomes and achieving consistent understanding of the curriculum levels within the school with many teachers. It also provided guidance for progression and assessment to over half of all teachers. The two areas where the statement had been of least help were in communicating student achievement to teachers at other schools (47.1% 'not very often' or 'rarely') and in meeting the needs of Māori students in the classroom 15.7% of respondents reported that the science curriculum statement 'rarely' helped and 27.3% 'not very often' helped them in these tasks.

CONTEXTUAL STRANDS

Q13 How do you ensure coverage of the contextual strands in the science curriculum statement?

		Cover each stand each year with some combination of strands		Cover each strand each year, usually separately		Cover each strand over a 2 year period, with some combination		Cover each strand over a 2 year period, usually separately		Teach in context across strands		Teach each strand separately		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	52	18.1%	64	22.2%	110	38.2%	55	19.1%	17	5.9%	17	5.9%
	Full Prim. Year 1-8	47	17.1%	74	26.8%	95	34.4%	53	19.2%	19	6.9%	20	7.2%	276	100%
	Intermed. Year 7-8	9	21.4%	10	23.8%	13	31.0%	8	19.0%	2	4.8%	5	11.9%	42	100%
	Secondary Year 7-15	12	30.8%	9	23.1%	8	20.5%	5	12.8%	5	12.8%	3	7.7%	39	100%
	Secondary Year 9-15	39	24.8%	45	28.7%	39	24.8%	17	10.8%	15	9.6%	9	5.7%	157	100%
	Comp./Restrict. Comp	6	24.0%	8	32.0%	8	32.0%	2	8.0%	2	8.0%	1	4.0%	25	100%
	Comp. Area School	6	46.2%	6	46.2%	1	7.7%			1	7.7%	1	7.7%	13	100%
	Special School	3	27.3%			1	9.1%	1	9.1%	1	9.1%	1	9.1%	11	100%
	Correspondence - primary	5	38.5%	2	15.4%	4	30.8%	1	7.7%	3	23.1%	1	7.7%	13	100%
	Correspondence - secondary	1	9.1%	5	45.5%	2	18.2%			1	9.1%	3	27.3%	11	100%
Total		180	20.6%	223	25.5%	281	32.1%	142	16.2%	66	7.5%	61	7.0%	875	100%

In answering question 13 teachers were able to choose more than one category, which should be borne in mind when interpreting the above table. The majority of primary and intermediate teachers tended to cover each strand over a two-year period with some combination or separately, with the remainder covering each strand each year. The majority of secondary teachers favoured covering each strand each year, usually separately.

A few teachers reported other ways of ensuring coverage, for example:

Our school has a science programme which gives coverage to all strands. [primary]

We have a major focus and a minor focus on the strands each year. [primary]

Some strands taught by science specialist, some by me. [intermediate]

Twenty-nine teachers reported having difficulty covering the contextual strands due to time restrictions or resource difficulties:

Time restrictions sometimes impact on coverage. [primary]

I'm sure we're not expected to cover everything in one year. Everyone went over the top when these docs came out. [primary]

Resources dictate lack of teaching on Material World. [secondary]

Q14 How easy is it for you to provide students with learning experiences in the contextual strands?

Making Sense of the Living World

		Q14a How easy is it for you to provide students with learning experiences in the contextual strand...Making Sense of the Living World?								Total	
		Easy		Manageable		Difficult		Not Applicable		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	178	62.5%	99	34.7%	8	2.8%			285	100%
	Full Prim. Year 1-8	177	65.1%	93	34.2%	1	.4%	1	.4%	272	100%
	Intermed. Year 7-8	21	51.2%	19	46.3%			1	2.4%	41	100%
	Secondary Year 7-15	24	63.2%	12	31.6%			2	5.3%	38	100%
	Secondary Year 9-15	68	46.3%	75	51.0%	3	2.0%	1	.7%	147	100%
	Comp./Restrict. Comp	11	44.0%	14	56.0%					25	100%
	Comp. Area School	10	76.9%	3	23.1%					13	100%
	Special School	5	45.5%	5	45.5%	1	9.1%			11	100%
	Correspondence - primary	4	30.8%	8	61.5%			1	7.7%	13	100%
	Correspondence - secondary	3	30.0%	6	60.0%			1	10.0%	10	100%
Total		501	58.6%	334	39.1%	13	1.5%	7	.8%	855	100%

Providing learning experiences in the Living World was found to be 'easy' for nearly 60% of teachers. Secondary and correspondence teachers found this less easy than teachers in other school types. The vast majority of teachers (97.7%) found it 'easy' or 'manageable'.

Making Sense of the Material World

		Q14b How easy is it for you to provide students with learning experiences in the contextual strand...Making Sense of the Material World?								Total	
		Easy		Manageable		Difficult		Not applicable		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	89	31.3%	173	60.9%	22	7.7%			284	100%
	Full Prim. Year 1-8	85	31.3%	168	61.8%	19	7.0%			272	100%
	Intermed. Year 7-8	14	34.1%	20	48.8%	5	12.2%	2	4.9%	41	100%
	Secondary Year 7-15	25	65.8%	11	28.9%	1	2.6%	1	2.6%	38	100%
	Secondary Year 9-15	75	50.7%	67	45.3%	5	3.4%	1	.7%	148	100%
	Comp./Restrict. Comp	10	40.0%	14	56.0%	1	4.0%			25	100%
	Comp. Area School	8	61.5%	3	23.1%	2	15.4%			13	100%
	Special School	1	9.1%	7	63.6%	3	27.3%			11	100%
	Correspondence - primary	3	23.1%	9	69.2%			1	7.7%	13	100%
	Correspondence - secondary	3	30.0%	5	50.0%	1	10.0%	1	10.0%	10	100%
Total		313	36.6%	477	55.8%	59	6.9%	6	.7%	855	100%

Over half (55.8%) of the teachers found providing learning experiences in this strand 'manageable' and more than one third (36.6%) found it 'easy'. Secondary teachers were more likely than primary teachers to find this task to be easy.

Making Sense of the Physical World

		Q14c How easy is it for you to provide students with learning experiences in the contextual strand...Making Sense of the Physical World?								Total	
		Easy		Manageable		Difficult		Not applicable		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School	Cont. Prim. Year 1-6	75	26.3%	183	64.2%	27	9.5%			285	100%
Type -	Full Prim. Year 1-8	80	29.4%	159	58.5%	32	11.8%	1	.4%	272	100%
MOE	Intermed. Year 7-8	11	26.8%	21	51.2%	7	17.1%	2	4.9%	41	100%
code	Secondary Year 7-15	24	63.2%	13	34.2%			1	2.6%	38	100%
	Secondary Year 9-15	68	45.9%	74	50.0%	5	3.4%	1	.7%	148	100%
	Comp./Restrict. Comp	8	32.0%	16	64.0%	1	4.0%			25	100%
	Comp. Area School	6	46.2%	6	46.2%	1	7.7%			13	100%
	Special School	1	9.1%	8	72.7%	2	18.2%			11	100%
	Correspondence - primary	3	23.1%	9	69.2%			1	7.7%	13	100%
	Correspondence - secondary	3	30.0%	5	50.0%	1	10.0%	1	10.0%	10	100%
Total		279	32.6%	494	57.7%	76	8.9%	7	.8%	856	100%

Over half of the teachers (57.7%) found providing learning experiences in the Physical World 'manageable' and a third (32.6%) found it 'easy'. Secondary teachers were more likely to find this task easy than primary and intermediate teachers, who found this to be the strand the most difficult to provide learning experiences in. One primary teacher who found this and other strands 'manageable' commented:

Using supplementary books with ideas and assessments makes it easier. [primary]

Making Sense of Planet Earth and Beyond

		Q14d How easy is it for you to provide students with learning experiences in the contextual strand...Making Sense of Planet Earth and Beyond?								Total	
		Easy		Manageable		Difficult		Not applicable		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School	Cont. Prim. Year 1-6	95	33.6%	171	60.4%	17	6.0%			283	100%
Type -	Full Prim. Year 1-8	96	35.4%	157	57.9%	18	6.6%			271	100%
MOE	Intermed. Year 7-8	14	33.3%	24	57.1%	3	7.1%	1	2.4%	42	100%
code	Secondary Year 7-15	13	35.1%	18	48.6%	5	13.5%	1	2.7%	37	100%
	Secondary Year 9-15	34	23.1%	79	53.7%	31	21.1%	3	2.0%	147	100%
	Comp./Restrict. Comp	5	20.0%	16	64.0%	4	16.0%			25	100%
	Comp. Area School	7	53.8%	6	46.2%					13	100%
	Special School	4	36.4%	5	45.5%	2	18.2%			11	100%
	Correspondence - primary	3	23.1%	9	69.2%			1	7.7%	13	100%
	Correspondence - secondary	2	20.0%	7	70.0%			1	10.0%	10	100%
Total		273	32.0%	492	57.7%	80	9.4%	7	.8%	852	100%

Planet Earth and Beyond was also found to be 'manageable' by more than half (57.7%) of the teachers and 'easy' by 32.0%. However this strand was the most difficult for secondary teachers to provide learning experiences in, with one fifth of year 9-15 teachers finding it 'difficult':

Difficult equates to costs involved with fieldwork and time to take students out of other classes for fieldtrips. Cost of resources – e.g., 'Stardome' is excellent but too expensive. [secondary]

Access to a planetarium makes a huge difference in the astronomy section – we are a remote school and do not have this. [secondary]

Much of astronomy is not able to be done practically – visits to observatories at night are not feasible. [secondary]

Q15 What has influenced the ease with which you are able to provide learning experiences in the contextual strands?

Living World

		Living World												Total	
		My interests		Interests of students		Facilities, resources		My confidence in teaching science skills		My depth of scientific knowledge		Timetabling, scheduling		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	196	68.1%	197	68.4%	173	60.1%	150	52.1%	137	47.6%	72	25.0%	288	100%
	Full Prim. Year 1-8	186	67.4%	183	66.3%	167	60.5%	142	51.4%	125	45.3%	60	21.7%	276	100%
	Intermed. Year 7-8	25	59.5%	20	47.6%	22	52.4%	24	57.1%	23	54.8%	12	28.6%	42	100%
	Secondary Year 7-15	22	56.4%	17	43.6%	15	38.5%	23	59.0%	27	69.2%	6	15.4%	39	100%
	Secondary Year 9-15	89	56.7%	64	40.8%	72	45.9%	94	59.9%	100	63.7%	31	19.7%	157	100%
	Comp./Restrict. Comp	7	28.0%	9	36.0%	8	32.0%	13	52.0%	10	40.0%	3	12.0%	25	100%
	Comp. Area School	10	76.9%	8	61.5%	8	61.5%	9	69.2%	8	61.5%	3	23.1%	13	100%
	Special School	8	72.7%	6	54.5%	4	36.4%	6	54.5%	6	54.5%	2	18.2%	11	100%
	Correspondence - primary	6	46.2%	6	46.2%	9	69.2%	4	30.8%	4	30.8%	2	15.4%	13	100%
	Correspondence - secondary	5	45.5%	3	27.3%	3	27.3%	6	54.5%	7	63.6%	1	9.1%	11	100%
Total		554	63.3%	513	58.6%	481	55.0%	471	53.8%	447	51.1%	192	21.9%	875	100%

Material World

		Material World												Total	
		Facilities, resources		My confidence in teaching science skills		My interests		Interests of students		My depth of scientific knowledge		Timetabling, scheduling		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	133	46.2%	113	39.2%	112	38.9%	117	40.6%	80	27.8%	59	20.5%	288	100%
	Full Prim. Year 1-8	143	51.8%	123	44.6%	110	39.9%	140	50.7%	78	28.3%	57	20.7%	276	100%
	Intermed. Year 7-8	21	50.0%	24	57.1%	16	38.1%	14	33.3%	15	35.7%	11	26.2%	42	100%
	Secondary Year 7-15	23	59.0%	26	66.7%	22	56.4%	14	35.9%	30	76.9%	8	20.5%	39	100%
	Secondary Year 9-15	77	49.0%	95	60.5%	73	46.5%	54	34.4%	97	61.8%	28	17.8%	157	100%
	Comp./Restrict. Comp	9	36.0%	12	48.0%	11	44.0%	5	20.0%	13	52.0%	2	8.0%	25	100%
	Comp. Area School	6	46.2%	8	61.5%	6	46.2%	4	30.8%	6	46.2%	3	23.1%	13	100%
	Special School	3	27.3%	6	54.5%	5	45.5%	3	27.3%	4	36.4%	2	18.2%	11	100%
	Correspondence - primary	8	61.5%	3	23.1%	4	30.8%	4	30.8%	1	7.7%	3	23.1%	13	100%
	Correspondence - secondary	4	36.4%	6	54.5%	3	27.3%	1	9.1%	5	45.5%	1	9.1%	11	100%
Total		427	48.8%	416	47.5%	362	41.4%	356	40.7%	329	37.6%	174	19.9%	875	100%

Physical World

		Physical World												Total	
		Facilities, resources		My confidence in teaching science skills		Interests of students		My interests		My depth of scientific knowledge		Timetabling, scheduling		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	131	45.5%	93	32.3%	123	42.7%	107	37.2%	80	27.8%	54	18.8%	288	100%
	Full Prim. Year 1-8	130	47.1%	124	44.9%	138	50.0%	104	37.7%	74	26.8%	53	19.2%	276	100%
	Intermed. Year 7-8	18	42.9%	20	47.6%	15	35.7%	16	38.1%	13	31.0%	9	21.4%	42	100%
	Secondary Year 7-15	16	41.0%	20	51.3%	12	30.8%	19	48.7%	24	61.5%	6	15.4%	39	100%
	Secondary Year 9-15	77	49.0%	94	59.9%	48	30.6%	73	46.5%	89	56.7%	30	19.1%	157	100%
	Comp./Restrict. Comp	11	44.0%	11	44.0%	6	24.0%	7	28.0%	12	48.0%	5	20.0%	25	100%
	Comp. Area School	5	38.5%	9	69.2%	7	53.8%	5	38.5%	6	46.2%	3	23.1%	13	100%
	Special School	3	27.3%	6	54.5%	3	27.3%	5	45.5%	4	36.4%	2	18.2%	11	100%
	Correspondence - primary	9	69.2%	5	38.5%	4	30.8%	4	30.8%	2	15.4%	2	15.4%	13	100%
	Correspondence - secondary	4	36.4%	6	54.5%	2	18.2%	2	18.2%	5	45.5%	1	9.1%	11	100%
Total		404	46.2%	388	44.3%	358	40.9%	342	39.1%	309	35.3%	165	18.9%	875	100%

Planet Earth and Beyond

		Planet Earth and Beyond												Total	
		Interests of students		My interests		My confidence in teaching science skills		Facilities, resources		My depth of scientific knowledge		Timetabling, scheduling		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	172	59.7%	144	50.0%	108	37.5%	134	46.5%	98	34.0%	60	20.8%	288	100%
	Full Prim. Year 1-8	180	65.2%	140	50.7%	116	42.0%	123	44.6%	87	31.5%	47	17.0%	276	100%
	Intermed. Year 7-8	22	52.4%	22	52.4%	23	54.8%	16	38.1%	16	38.1%	11	26.2%	42	100%
	Secondary Year 7-15	15	38.5%	21	53.8%	23	59.0%	12	30.8%	21	53.8%	7	17.9%	39	100%
	Secondary Year 9-15	58	36.9%	75	47.8%	78	49.7%	59	37.6%	71	45.2%	23	14.6%	157	100%
	Comp./Restrict. Comp	6	24.0%	10	40.0%	9	36.0%	5	20.0%	7	28.0%	4	16.0%	25	100%
	Comp. Area School	8	61.5%	7	53.8%	9	69.2%	7	53.8%	7	53.8%	3	23.1%	13	100%
	Special School	6	54.5%	6	54.5%	5	45.5%	4	36.4%	4	36.4%	2	18.2%	11	100%
	Correspondence - primary	4	30.8%	4	30.8%	3	23.1%	10	76.9%	2	15.4%	2	15.4%	13	100%
	Correspondence - secondary	3	27.3%	5	45.5%	5	45.5%	2	18.2%	5	45.5%	1	9.1%	11	100%
Total		474	54.2%	434	49.6%	379	43.3%	372	42.5%	318	36.3%	160	18.3%	875	100%

Facilities and resources were the most important factors influencing the ease with which teachers were able to provide learning experiences in the contextual strands - Material World (48.8%) and Physical World (46.2%). The confidence teachers had in their ability to teach science skills in these strands was also an important factor - Material World (47.5%) and Physical World (44.3%).

The 'interests of students' was the most important factor (54.2%) in providing experiences in Planet Earth and Beyond, and the second most important factor (58.6%) after 'teachers' own interests' (63.3%) in Living World. For all strands 'timetabling or scheduling' was the least important factor.

Under ‘other’ only two factors emerged – that of management support – 21 teachers mentioned how this had assisted them, and several teachers (11) commented on how the supporting documents had been useful to them in providing learning experiences in the contextual strands.

INTEGRATING STRANDS

Q16 ‘Making Sense of the Nature of Science and its relationship to Technology’ How do you incorporate this strand into your teaching of science?

In the data from the sub-sample (n=100), many teachers (39.7%), primary in particular, found that they were able to incorporate aspects of this strand into the science topic or units that they taught:

They go together. Look at scientific aspects of study: experimental work, trial and error to the final product, and marketing it is the technology part. E.g. ice-blocks what they are made of, when do they melt etc is science, trying them with different flavours for your customer is technology. [composite area – year 1 teacher]

Usually link our Science topic to technology topic, e.g., Science – minibeads; Technology – make a mini-beast enclosure. [primary]

Try to link whatever context we’re studying to some aspect of technology. [primary]

A lesson or two each unit relates to technology, e.g., electric motor. [secondary]

Some secondary schools incorporated this strand into the introduction to science at year 9 and 10 levels:

Y9 Science – 1st unit for the year is “Welcome to Science” and incorporates this area. [secondary]

More secondary than primary teachers taught this strand within or alongside a technology unit. In all 18.7% of teachers managed this way. At secondary level there was evidence of collaboration between the technology and science departments:

We are currently working with our head of technology to develop two units (in workbook format) at year 9 and 10 level. [secondary]

There was evidence of some confusion in teachers’ understandings of this strand as some teachers in full primary school (n=14) reported that students attended separate technology classes in years 7 and 8, so they did not incorporate this strand into their science teaching. They said that this strand was taught in separate technology classes:

Students go off site to Technology – no timetable for other or integrated units. [primary]

This was also occurring at secondary level:

Technology areas covered in Timetable as compulsory for all Yr 9 students. Not necessary for Science to cover as much. [secondary]

It is school policy for Technology to teach this. [Correspondence – secondary]

In addition, some teachers (n=18) admitted that they lacked the confidence to teach this strand:

I have a lack of confidence in my own skills in this area – I struggle with the technology curriculum. This is an area that I am focussing on in my own professional development. [primary]

Some teachers (n=18), particularly at intermediate level, encouraged their students to enter the technology section of the local science fair:

Full involvement in the Hawkes Bay Science Fair. (This covers Crystal growing, Projects, Musical Instrument, Science Quiz, Technology Challenge, and Observational Drawing.) Our school of 610 had 525 projects in the hall on display with 500 of these following fair testing practices. 3 projects went on to win at regional level with other placings in almost all sections. Many used or focused on a technological area. [intermediate]

At the secondary level, teachers talked about their students doing investigations to cover this strand (n=27):

Usually with research/investigation work i.e., project work rather than teacher-led learning. For example: technology – researching medical techniques used to treat human conditions. [secondary]

Although some teachers recognised the need to incorporate this strand into their teaching of science they were able to point out the difficulties this presented in the running of their programmes:

I am particularly involved in the biotechnology section. We put examples with our scheme. For example: worm farming and composting in year 10, reproductive technology in year 9, yoghurt and cheese-making in year 11, brewing in year 12, genetics in year 13. (However it is hard to find the time in junior classes and year 11. Also hard to 'experience' and 'do' rather than just learn about it – although we do quite well in year 10). [secondary]

The time factor was the most frequently described difficulty in incorporating the strand into science teaching (n=31) followed by the perception that this strand did not always relate to the topic:

Sometimes the topic does not lend itself or is difficult to relate. [primary]

Finding accessible examples relevant to contextual topics [composite/restricted composite]

At the secondary level, a few teachers (n=8) felt that access to resources was a barrier:

Booking time in computer rooms. [secondary]

It would be very useful to have more NZ resources. [composite/restricted composite]

Q17 How do you ensure coverage of the integrating strand ‘Developing Scientific Skills and Attitudes’ in the science curriculum statement?

		I teach the skills and attitudes as needed		I incorporate investigative work in each unit		Each unit focuses on a different skill/attitude		I have a separate unit on skills and attitudes		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	144	50.0%	139	48.3%	98	34.0%	4	1.4%
	Full Prim. Year 1-8	143	51.8%	161	58.3%	100	36.2%	6	2.2%	276	100%
	Intermed. Year 7-8	31	73.8%	21	50.0%	7	16.7%	4	9.5%	42	100%
	Secondary Year 7-15	29	74.4%	23	59.0%	5	12.8%	5	12.8%	39	100%
	Secondary Year 9-15	113	72.0%	85	54.1%	20	12.7%	45	28.7%	157	100%
	Comp./Restrict. Comp	14	56.0%	16	64.0%	5	20.0%	6	24.0%	25	100%
	Comp. Area School	7	53.8%	5	38.5%	5	38.5%	1	7.7%	13	100%
	Special School	5	45.5%	4	36.4%	3	27.3%			11	100%
	Correspondence - primary	4	30.8%	6	46.2%	5	38.5%			13	100%
	Correspondence - secondary	4	36.4%	3	27.3%	4	36.4%			11	100%
Total		494	56.5%	463	52.9%	252	28.8%	71	8.1%	875	100%

Teachers indicated that they adopted a variety of approaches. Secondary and intermediate teachers showed a preference for teaching scientific skills and attitudes as needed, whereas primary teachers reported no preference here although they were much more likely to focus on different skills/attitudes in different units. Secondary teachers were more likely to have a separate unit on skills and attitudes, e.g., 28.7% of secondary year 9-15 teachers.

Some teachers (n=33) commented on the difficulty of incorporating this strand. Primary teachers mentioned tracking progress as a barrier. Guidance on how to incorporate the strand appeared to be lacking in several cases:

Skills and Attitudes appears on our cumulative records under Science. There is no scheme for this and no guidance about how to assess this strand. [primary]

Need training here – attitudes are difficult to ‘teach’ and assess. [secondary]

Q18 Is there sufficient information in the science curriculum statement and supporting documents to enable you to teach the integrating strands?

		Q18a Is there sufficient information in the science curriculum statement and supporting documents to enable you to teach the integrating strands?				Total	
		Yes		No		Count	Row %
		Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	180	73.2%	66	26.8%	246	100.0%
	Full Prim. Year 1-8	171	71.5%	68	28.5%	239	100.0%
	Intermed. Year 7-8	29	74.4%	10	25.6%	39	100.0%
	Secondary Year 7-15	20	64.5%	11	35.5%	31	100.0%
	Secondary Year 9-15	67	54.5%	56	45.5%	123	100.0%
	Comp./Restrict. Comp	14	60.9%	9	39.1%	23	100.0%
	Comp. Area School	10	90.9%	1	9.1%	11	100.0%
	Special School	3	42.9%	4	57.1%	7	100.0%
	Correspondence - primary	9	81.8%	2	18.2%	11	100.0%
	Correspondence - secondary	4	44.4%	5	55.6%	9	100.0%
	Total	507	68.6%	232	31.4%	739	100.0%

Over two thirds of teachers responding to this question found that there was sufficient information in the science curriculum statement and supporting documents to enable them to teach the integrating strands, with nearly three quarters of primary teachers reaching this view

If you answered 'yes', what helped?

		Supporting documents are good		Examples/ exemplars show how this is done		Easy to follow and understand		Progression/ levels are clear		Pre-service training		Co-operative planning		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
School Type - MOE code	Cont. Prim. Year 1-6	94	32.6%	19	6.6%	9	3.1%	5	1.7%	7	2.4%	3	1.0%	288	100%
	Full Prim. Year 1-8	84	30.4%	13	4.7%	17	6.2%	9	3.3%	5	1.8%	6	2.2%	276	100%
	Intermed. Year 7-8	7	16.7%	3	7.1%	2	4.8%	1	2.4%			2	4.8%	42	100%
	Secondary Year 7-15	4	10.3%	5	12.8%	3	7.7%	2	5.1%	4	10.3%	1	2.6%	39	100%
	Secondary Year 9-15	8	5.1%	12	7.6%	5	3.2%	3	1.9%	3	1.9%	5	3.2%	157	100%
	Comp./ Restrict. Comp	1	4.0%	3	12.0%	2	8.0%	1	4.0%			1	4.0%	25	100%
	Comp. Area School	3	23.1%			1	7.7%							13	100%
	Special School	2	18.2%											11	100%
	Correspondence - primary	3	23.1%											13	100%
	Correspondence - secondary	1	9.1%	2	18.2%					1	9.1%			11	100%
	Total	207	23.7%	57	6.5%	39	4.5%	21	2.4%	20	2.3%	18	2.1%	875	100%

Three hundred and sixty-two teachers described how the science curriculum statement and supporting documents had helped them to teach the integrating strands. Their descriptions could be categorised into

the six categories shown in the above table. The percentage figures relate to the whole sample (n=875) showing the number of teachers related to the whole sample who gave these reasons. Nearly a quarter of the teachers - in particular primary teachers (about a third), found the supporting documents useful, and reported that they helped a lot with ideas and were very practical and user-friendly:

Having the support documents with the examples shown and practised by other schools and children. [primary]

Comments about the curriculum statement included the layout and how the examples in the statement were useful:

The layout makes it fairly straightforward to integrate the strands. [composite area]

The way that skills are set out in chart form with progressions clearly stated. [primary]

Explanatory notes in the curriculum document. [secondary]

Possible learning experiences – experiments etc. to provide ideas and give indication of what is expected. [secondary]

If you answered ‘no’, what additional support would you find helpful?

In the sub-sample (n=100), 62 teachers said they would like more detailed examples, and 54 teachers said that clear guidelines and exemplars at each level would help them to teach the integrating strands:

Had to develop own resources and rubrics. Exemplars and guidelines for each level would be helpful. [intermediate]

More specific examples of tasks for year 9 and 10 would be helpful. [secondary]

Document not easy to work from – just a guide. Left to department to make up the course and find suitable examples to cover the strands. [secondary]

Forty-one teachers asked for more funds or different resources:

More resources would be useful, e.g., the Learning Media ‘Applications’ books are very useful here. [composite/restricted composite]

Thirty-three teachers favoured a more prescriptive curriculum statement:

Often the statements are rather ‘vague’ and ‘open-ended’ – need more specific direction. [secondary]

Twenty-three teachers saw a need for further professional development in this area:

Need more professional development; this hasn’t been available to teachers. I feel some upper junior schoolteachers have great difficulty and PD would greatly help. [primary]

GENERAL ISSUES

Q19a Would you make any changes to the structure, organisation of the science curriculum statement?

		Q19a Would you make any changes to the structure, organisation of the science curriculum statement? (yes/no/don't know)						Total	
		Yes		No		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	52	18.7%	117	42.1%	109	39.2%	278	100.0%
	Full Prim. Year 1-8	52	19.3%	133	49.4%	84	31.2%	269	100.0%
	Intermed. Year 7-8	12	29.3%	13	31.7%	16	39.0%	41	100.0%
	Secondary Year 7-15	13	34.2%	18	47.4%	7	18.4%	38	100.0%
	Secondary Year 9-15	47	33.6%	43	30.7%	50	35.7%	140	100.0%
	Comp./Restrict. Comp	4	16.7%	11	45.8%	9	37.5%	24	100.0%
	Comp. Area School	1	8.3%	9	75.0%	2	16.7%	12	100.0%
	Special School	2	20.0%	2	20.0%	6	60.0%	10	100.0%
	Correspondence - primary			3	23.1%	10	76.9%	13	100.0%
	Correspondence - secondary	6	66.7%	1	11.1%	2	22.2%	9	100.0%
Total		189	22.7%	350	42.0%	295	35.4%	834	100.0%

Only 22.7% of teachers wanted changes to the structure and/or organisation of the science curriculum statement, however, one third of secondary teachers said they would like to see changes. One third of teachers (35.4%) did not know if they would make any changes. Suggestions for change were made by 195 teachers. Of the 100 respondents in the sub-sample, 28 teachers suggested changes to the structure/organisation of the science curriculum document. The main suggestion was that more detail be provided, particularly on the 'big ideas' as a support for teacher planning and to ensure that children changing schools were not disadvantaged. Another suggestion was that more support and/or ideas for implementation be included in the document. Two teachers mentioned the need for examples of cross-strand planning. One intermediate and two secondary teachers commented that the curriculum was overcrowded and so it was "...difficult to ensure coverage of everything that is expected."

[intermediate]

Q19b Would you make any changes to the content of the science curriculum statement?

		Q19b Would you make any changes to the content of the science curriculum document? (yes/no/don't know)						Total	
		Yes		No		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	38	13.8%	161	58.5%	76	27.6%	275	100%
	Full Prim. Year 1-8	36	13.9%	155	59.8%	68	26.3%	259	100%
	Intermed. Year 7-8	9	22.0%	18	43.9%	14	34.1%	41	100%
	Secondary Year 7-15	8	23.5%	17	50.0%	9	26.5%	34	100%
	Secondary Year 9-15	51	36.7%	53	38.1%	35	25.2%	139	100%
	Comp./Restrict. Comp	5	20.8%	11	45.8%	8	33.3%	24	100%
	Comp. Area School	3	25.0%	5	41.7%	4	33.3%	12	100%
	Special School	1	10.0%	4	40.0%	5	50.0%	10	100%
	Correspondence - primary	1	9.1%	3	27.3%	7	63.6%	11	100%
	Correspondence - secondary	6	60.0%	2	20.0%	2	20.0%	10	100%
Total		158	19.4%	429	52.6%	228	28.0%	815	100%

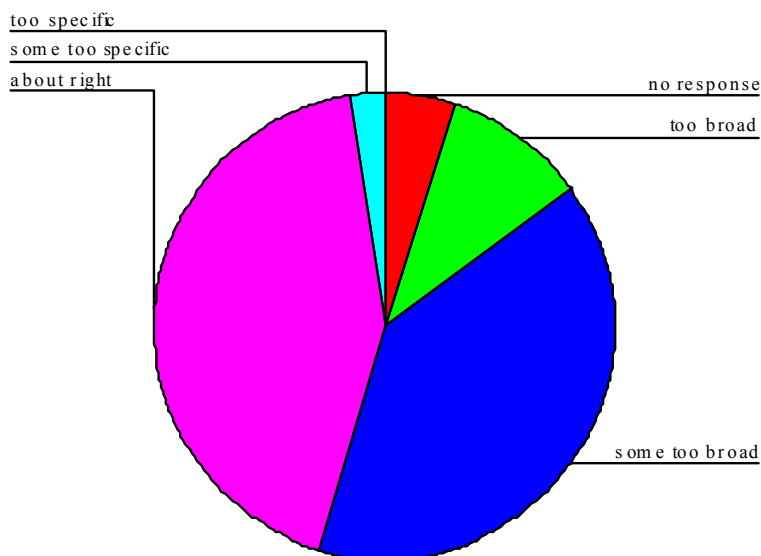
Suggestions for change to the content of the curriculum statement were made by 171 teachers. The 19 teachers in the sub-sample (n=100) who provided qualitative responses identified a range of changes they would make to the content of the science curriculum statement. These included clarifying the objectives, providing resources, clarifying and differentiating what is required at each level and reducing the overall content to allow time for “higher order thinking and problem solving”. One teacher suggested the deletion of the ‘Science and its Relationship to Technology’ strand and another that further consideration be given to progression from Level 3 to Level 4 in Planet Earth and Beyond.

ACHIEVEMENT OBJECTIVES

Q20 Generally speaking, the science achievement objectives are:

		Q20 Generally speaking, the science achievement objectives are:										Total	
		Too broad		Sometimes too broad		About right		Sometimes too specific		Too specific		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	18	6.5%	119	42.7%	136	48.7%	6	2.2%			279	100%
	Full Prim. Year 1-8	17	6.4%	107	40.4%	134	50.6%	6	2.3%	1	.4%	265	100%
	Intermed. Year 7-8	4	9.5%	20	47.6%	16	38.1%	2	4.8%			42	100%
	Secondary Year 7-15	8	22.2%	12	33.3%	16	44.4%					36	100%
	Secondary Year 9-15	30	21.3%	67	47.5%	38	27.0%	6	4.3%			141	100%
	Comp./Restrict. Comp	4	17.4%	8	34.8%	11	47.8%					23	100%
	Comp. Area School	1	9.1%	4	36.4%	6	54.5%					11	100%
	Special School	3	27.3%	2	18.2%	6	54.5%					11	100%
	Correspondence - primary	1	8.3%	3	25.0%	8	66.7%					12	100%
	Correspondence - secondary	2	18.2%	6	54.5%	2	18.2%	1	9.1%			11	100%
Total		88	10.6%	348	41.9%	373	44.9%	21	2.5%	1	.1%	831	100%

Teachers' perceptions of the breadth of the science achievement objectives. (n=875)



Nearly half the teachers (44.9%) found the achievement objectives to be 'about right', slightly more than 'sometimes too broad' (41.9%). However if the teachers who said they were 'too broad' (10.6%) are added to the latter figure, then it is evident that 52.5% teachers believed that the achievement objectives were 'too broad' or 'sometimes too broad'. A higher percentage of secondary teachers (about one fifth) felt that they were 'too broad'. Few teachers (0.1%) thought the objectives were too specific or 'sometimes too specific' (2.5%).

CURRICULUM RESOURCING AND SUPPORT

Q21 Which of the following Ministry of Education resources have you used to support your teaching of science?

		'Making Better Sense' series		TKI website		School Journal		'Connected' series		Building Science Concepts		Assessment in Science	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	249	86.5%	131	45.5%	189	65.6%	135	46.9%	89	30.9%
	Full Prim. Year 1-8	239	86.6%	158	57.2%	166	60.1%	138	50.0%	98	35.5%	66	23.9%
	Intermed. Year 7-8	35	83.3%	18	42.9%	17	40.5%	15	35.7%	6	14.3%	13	31.0%
	Secondary Year 7-15	21	53.8%	17	43.6%	7	17.9%	6	15.4%	3	7.7%	12	30.8%
	Secondary Year 9-15	34	21.7%	66	42.0%	12	7.6%	5	3.2%	12	7.6%	38	24.2%
	Comp./Restrict. Comp	10	40.0%	15	60.0%	4	16.0%	1	4.0%	4	16.0%	7	28.0%
	Comp. Area School	9	69.2%	10	76.9%	8	61.5%	2	15.4%	4	30.8%	4	30.8%
	Special School	8	72.7%	3	27.3%	7	63.6%	7	63.6%	1	9.1%	3	27.3%
	Correspondence - primary	5	38.5%	7	53.8%	8	61.5%	10	76.9%	5	38.5%	3	23.1%
	Correspondence - secondary	2	18.2%	6	54.5%								
Total		612	69.9%	431	49.3%	418	47.8%	319	36.5%	222	25.4%	192	21.9%

The most popular Ministry of Education resource was the *Making Better Sense* series and 69.9% of teachers had used booklets from the series to support their teaching of science. More than 80% of all primary and intermediate teachers had used this resource. The *TKI website* had been accessed by 49.3% of teachers, and was particularly popular with teachers in composite/restricted composite schools (60%) and composite area schools (76.9%). The *School Journal* was used mainly by primary (about two thirds) and intermediate schools (40.5% of teachers). Special school and primary Correspondence School teachers were the most frequent users of the *Connected* series; almost half of the primary teachers also used this series. *Building Science Concepts* was used by one quarter of the teachers – mainly primary teachers. One fifth of teachers across all school types used *Assessment in Science*.

		Programme Planning in Science		www.minedu.govt.nz		www.science.school.nz		'Applications' series		Assessment Resource Banks		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	41	14.2%	23	8.0%	24	8.3%	3	1.0%	7	2.4%
	Full Prim. Year 1-8	49	17.8%	45	16.3%	28	10.1%	3	1.1%	5	1.8%	276	100%
	Intermed. Year 7-8	9	21.4%	9	21.4%	5	11.9%	1	2.4%	1	2.4%	42	100%
	Secondary Year 7-15	2	5.1%	7	17.9%	7	17.9%	10	25.6%			39	100%
	Secondary Year 9-15	9	5.7%	18	11.5%	40	25.5%	16	10.2%	1	.6%	157	100%
	Comp./Restrict. Comp	3	12.0%	3	12.0%	3	12.0%	4	16.0%			25	100%
	Comp. Area School	6	46.2%	4	30.8%	4	30.8%	3	23.1%	1	7.7%	13	100%
	Special School	1	9.1%	3	27.3%	2	18.2%	4	36.4%			11	100%
	Correspondence - primary	3	23.1%	3	23.1%			3	23.1%			13	100%
	Correspondence - secondary	1	9.1%	2	18.2%	2	18.2%					11	100%
Total		124	14.2%	117	13.4%	115	13.1%	47	5.4%	15	1.7%	875	100%

The other Ministry of Education resources listed were not used to the same extent with less than 20% of teachers reporting their use. *Assessment Resource Banks* were little used (1.7%).

When asked in what ways they had found the Ministry of Education resources helpful, the most frequent response was from the 20.1% of teachers who said they had found practical ideas for activities in them:

		practical ideas for activities		'Great' teacher resource		Planning		Help with concepts		Assessment strategies		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	69	24.0%	26	9.0%	27	9.4%	31	10.8%	7	2.4%
	Full Prim. Year 1-8	78	28.3%	32	11.6%	33	12.0%	21	7.6%	13	4.7%	276	100%
	Intermed. Year 7-8	3	7.1%	3	7.1%	3	7.1%	4	9.5%	1	2.4%	42	100%
	Secondary Year 7-15	1	2.6%	4	10.3%			3	7.7%			39	100%
	Secondary Year 9-15	10	6.4%	8	5.1%	2	1.3%	5	3.2%	3	1.9%	157	100%
	Comp./Restrict. Comp	7	28.0%	3	12.0%	2	8.0%	1	4.0%			25	100%
	Comp. Area School	4	30.8%			3	23.1%	1	7.7%			13	100%
	Special School	3	27.3%	1	9.1%	2	18.2%	1	9.1%	2	18.2%	11	100%
	Correspondence - primary			1	7.7%							13	100%
	Correspondence - secondary	1	9.1%							1	9.1%	11	100%
Total		176	20.1%	78	8.9%	72	8.2%	67	7.7%	27	3.1%	875	100%

Teachers appreciated the clarity of some of these resources:

Nice clear division into strand ideas. Focus on teachable units. [primary]

There was a feeling of confidence in the use of these resources as teachers had developed them:

Planned by teachers who have trialled them. [primary]

Teachers liked the way they were set out and the way they could adapt them to suit their own needs:

Easy to follow and tie in with my units for my level. [composite area]

Q22 Are there any examples of other support materials you have found to be particularly helpful?

One hundred and fifty-two teachers listed various titles of books, workbooks and tests and 67 teachers suggested various Internet sites that they had used. Some teachers described trial units and units written by other teachers:

Practice assessment items produced by teachers. Units of work developed locally – fully resourced. Anything to save teachers the task of doing individually what should be done for us so there is more time. [secondary]

Less than 5% of teachers suggested the following as being useful resources: the National Library Service; field trips or visits from experts; TV/videos; the school library; the NZCER Resource Bank, and the Department of Conservation or the regional councils.

Q23 What do you believe is the most important resource to support effective implementation of the science curriculum?

		trialled guides, assessment examples		time for teachers to plan etc		units of work		professional texts		specialist/ knowledgeable science teachers		properly resourced labs		more resource funding		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	168	58.3%	125	43.4%	103	35.8%	12	4.2%	4	1.4%	2	.7%		
	Full Prim. Year 1-8	148	53.6%	100	36.2%	115	41.7%	19	6.9%	6	2.2%	2	.7%	2	.7%	276	100%
	Intermed. Year 7-8	30	71.4%	21	50.0%	17	40.5%	2	4.8%	1	2.4%					42	100%
	Secondary Year 7-15	22	56.4%	22	56.4%	12	30.8%	11	28.2%	1	2.6%					39	100%
	Secondary Year 9-15	84	53.5%	80	51.0%	50	31.8%	25	15.9%	1	.6%	2	1.3%	5	3.2%	157	100%
	Comp./ Restrict. Comp	18	72.0%	10	40.0%	6	24.0%	4	16.0%			1	4.0%			25	100%
	Comp. Area School	9	69.2%	5	38.5%	2	15.4%	1	7.7%	1	7.7%					13	100%
	Special School	5	45.5%	1	9.1%	5	45.5%	3	27.3%			1	9.1%			11	100%
	Correspondence - primary	6	46.2%	4	30.8%	4	30.8%									13	100%
	Correspondence - secondary	9	81.8%	7	63.6%	1	9.1%	1	9.1%							11	100%
Total		499	57.0%	375	42.9%	315	36.0%	78	8.9%	14	1.6%	8	.9%	7	.8%	875	100%

Over half (57%) of the teachers across all school types chose ‘resources, teachers’ guides and assessment examples that have been trialled and nationally distributed’ as the most important resource to support effective implementation of the science curriculum. ‘Time for teachers to plan, trial, implement, access and evaluate’ was seen by 42.9% of teachers as being the most important resource. Over a third (36%) of teachers thought a ‘nationally coordinated effort to develop units of work’ was the most important resource. Other suggestions received less than 10% of teachers’ support.

Q24 There is a comment in *Science in the New Zealand Curriculum* about the use of resources including apparatus, textbooks, technology and the community. Please indicate how often you use the following resources.

Household resources

										Total	
		used often		used sometimes		used rarely		not used at all		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	170	60.7%	104	37.1%	5	1.8%	1	.4%	280	100%
	Full Prim. Year 1-8	152	56.3%	112	41.5%	4	1.5%	2	.7%	270	100%
	Intermed. Year 7-8	20	50.0%	12	30.0%	8	20.0%			40	100%
	Secondary Year 7-15	11	30.6%	20	55.6%	4	11.1%	1	2.8%	36	100%
	Secondary Year 9-15	33	22.8%	89	61.4%	21	14.5%	2	1.4%	145	100%
	Comp./Restrict. Comp	8	34.8%	13	56.5%	2	8.7%			23	100%
	Comp. Area School	6	50.0%	6	50.0%					12	100%
	Special School	7	63.6%	4	36.4%					11	100%
	Correspondence - primary	5	45.5%	4	36.4%	1	9.1%	1	9.1%	11	100%
	Correspondence - secondary	6	60.0%	4	40.0%					10	100%
Total		418	49.9%	368	43.9%	45	5.4%	7	.8%	838	100%

Household resources were the most frequently used resource across most school types (49.9% 'often' and 43.9% 'sometimes'). Intermediate (20% 'rarely') and secondary schools (11.1% - 14.5% 'rarely') did not use household resources to the same extent as other schools.

Computer software/websites

										Total	
		used often		used sometimes		used rarely		not used at all		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	57	21.1%	138	51.1%	58	21.5%	17	6.3%	270	100%
	Full Prim. Year 1-8	66	25.7%	136	52.9%	42	16.3%	13	5.1%	257	100%
	Intermed. Year 7-8	10	26.3%	17	44.7%	7	18.4%	4	10.5%	38	100%
	Secondary Year 7-15	11	28.9%	21	55.3%	6	15.8%			38	100%
	Secondary Year 9-15	21	14.0%	83	55.3%	41	27.3%	5	3.3%	150	100%
	Comp./Restrict. Comp	10	40.0%	13	52.0%	2	8.0%			25	100%
	Comp. Area School	1	9.1%	7	63.6%	3	27.3%			11	100%
	Special School	1	10.0%	7	70.0%	1	10.0%	1	10.0%	10	100%
	Correspondence - primary	6	54.5%	4	36.4%			1	9.1%	11	100%
	Correspondence - secondary	3	30.0%	6	60.0%	1	10.0%			10	100%
Total		186	22.7%	432	52.7%	161	19.6%	41	5.0%	820	100%

Teachers in composite and restricted/composite schools made the most use of computer software/websites (40% 'often' and 52% 'sometimes'). Secondary year 9-15 teachers used these resources the least (27.3% 'rarely' and 3.3% 'not used at all').

Write-on resources

										Total	
		used often		used sometimes		used rarely		not used at all		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	35	13.9%	119	47.4%	55	21.9%	42	16.7%	251	100%
	Full Prim. Year 1-8	41	16.7%	119	48.6%	51	20.8%	34	13.9%	245	100%
	Intermed. Year 7-8	3	8.1%	18	48.6%	6	16.2%	10	27.0%	37	100%
	Secondary Year 7-15	7	18.4%	21	55.3%	7	18.4%	3	7.9%	38	100%
	Secondary Year 9-15	61	41.2%	60	40.5%	17	11.5%	10	6.8%	148	100%
	Comp./Restrict. Comp	8	33.3%	9	37.5%	7	29.2%			24	100%
	Comp. Area School	2	16.7%	6	50.0%	3	25.0%	1	8.3%	12	100%
	Special School	3	30.0%	4	40.0%	2	20.0%	1	10.0%	10	100%
	Correspondence - primary	5	45.5%	4	36.4%	1	9.1%	1	9.1%	11	100%
	Correspondence - secondary	8	88.9%	1	11.1%					9	100%
Total		173	22.0%	361	46.0%	149	19.0%	102	13.0%	785	100%

Secondary school teachers made the most use of write-on resources. Only 8.1% of intermediate school teachers used these resources ‘often’.

Visits to science centre, museums etc

										Total	
		used often		used sometimes		used rarely		not used at all		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	41	14.9%	164	59.4%	62	22.5%	9	3.3%	276	100%
	Full Prim. Year 1-8	39	14.7%	149	56.2%	61	23.0%	16	6.0%	265	100%
	Intermed. Year 7-8	6	15.0%	16	40.0%	9	22.5%	9	22.5%	40	100%
	Secondary Year 7-15	1	2.8%	11	30.6%	17	47.2%	7	19.4%	36	100%
	Secondary Year 9-15	2	1.4%	41	28.1%	78	53.4%	25	17.1%	146	100%
	Comp./Restrict. Comp	2	8.3%	15	62.5%	6	25.0%	1	4.2%	24	100%
	Comp. Area School			6	50.0%	4	33.3%	2	16.7%	12	100%
	Special School	1	11.1%	4	44.4%	2	22.2%	2	22.2%	9	100%
	Correspondence - primary			4	36.4%	5	45.5%	2	18.2%	11	100%
	Correspondence - secondary			4	57.1%	2	28.6%	1	14.3%	7	100%
Total		92	11.1%	414	50.1%	246	29.8%	74	9.0%	826	100%

Primary school teachers and teachers in composite/restricted composite schools made visits with their classes the most often. Intermediate teachers appeared to make visits the least often (22.5% ‘rarely’ and 22.5% ‘not used at all’).

Specialised laboratory equipment/resources

										Total	
		used often		used sometimes		used rarely		not used at all		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	9	3.4%	104	39.4%	110	41.7%	41	15.5%	264	100%
	Full Prim. Year 1-8	8	3.1%	108	42.0%	109	42.4%	32	12.5%	257	100%
	Intermed. Year 7-8	10	25.0%	12	30.0%	14	35.0%	4	10.0%	40	100%
	Secondary Year 7-15	27	71.1%	9	23.7%	2	5.3%			38	100%
	Secondary Year 9-15	109	73.6%	32	21.6%	6	4.1%	1	.7%	148	100%
	Comp./Restrict. Comp	10	40.0%	11	44.0%	3	12.0%	1	4.0%	25	100%
	Comp. Area School	2	18.2%	6	54.5%	3	27.3%			11	100%
	Special School	1	10.0%	4	40.0%	4	40.0%	1	10.0%	10	100%
	Correspondence - primary	1	11.1%	3	33.3%	2	22.2%	3	33.3%	9	100%
	Correspondence - secondary	2	20.0%	8	80.0%					10	100%
Total		179	22.0%	297	36.6%	253	31.2%	83	10.2%	812	100%

Over 90% of secondary teachers used specialised laboratory equipment and resources ‘often’ or ‘sometimes’ compared to less than 45% of primary teachers and 55% of intermediate teachers.

Textbooks

										Total	
		used often		used sometimes		used rarely		not used at all		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	40	15.1%	88	33.2%	80	30.2%	57	21.5%	265	100%
	Full Prim. Year 1-8	33	12.8%	77	30.0%	77	30.0%	70	27.2%	257	100%
	Intermed. Year 7-8	3	7.7%	10	25.6%	13	33.3%	13	33.3%	39	100%
	Secondary Year 7-15	25	67.6%	7	18.9%	5	13.5%			37	100%
	Secondary Year 9-15	105	69.1%	35	23.0%	10	6.6%	2	1.3%	152	100%
	Comp./Restrict. Comp	16	64.0%	7	28.0%			2	8.0%	25	100%
	Comp. Area School	3	27.3%	4	36.4%	1	9.1%	3	27.3%	11	100%
	Special School	4	40.0%	3	30.0%	3	30.0%			10	100%
	Correspondence - primary			5	45.5%	2	18.2%	4	36.4%	11	100%
	Correspondence - secondary	2	22.2%	6	66.7%			1	11.1%	9	100%
Total		231	28.3%	242	29.7%	191	23.4%	152	18.6%	816	100%

Approximately 90% of secondary teachers used textbooks ‘often’ or ‘sometimes’ compared to less than 50% of primary and intermediate teachers.

Community mentors

										Total	
		used often		used sometimes		used rarely		not used at all		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type	Cont. Prim. Year 1-6	11	4.2%	76	28.8%	110	41.7%	67	25.4%	264	100%
-MOE code	Full Prim. Year 1-8	10	4.0%	86	34.4%	98	39.2%	56	22.4%	250	100%
	Intermed. Year 7-8	3	8.3%	5	13.9%	11	30.6%	17	47.2%	36	100%
	Secondary Year 7-15			7	20.0%	19	54.3%	9	25.7%	35	100%
	Secondary Year 9-15	3	2.1%	22	15.5%	64	45.1%	53	37.3%	142	100%
	Comp./Restrict. Comp			3	13.0%	12	52.2%	8	34.8%	23	100%
	Comp. Area School	1	9.1%	4	36.4%	4	36.4%	2	18.2%	11	100%
	Special School			4	40.0%	4	40.0%	2	20.0%	10	100%
	Correspondence - primary			3	33.3%	2	22.2%	4	44.4%	9	100%
	Correspondence - secondary			3	37.5%	2	25.0%	3	37.5%	8	100%
	Total		28	3.6%	213	27.0%	326	41.4%	221	28.0%	788

Primary school teachers and teachers in area and special schools were more likely to use community mentors than teachers in other school types, but overall, 69.4% of teachers used them 'rarely' or 'not at all'.

PROFESSIONAL DEVELOPMENT

Q25 What sources of professional development have been very useful for your teaching of science?

		other teachers in the school		books and journals		School Support Services, advisors, resource teachers		teachers in other schools		MOE contracts		conferences		University or College of Education lecturers		community/ industry contacts		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	182	63.2%	186	64.6%	108	37.5%	49	17.0%	65	22.6%	21	7.3%	46	16.0%	37	12.8%
	Full Prim. Year 1-8	165	59.8%	167	60.5%	106	38.4%	50	18.1%	60	21.7%	27	9.8%	51	18.5%	28	10.1%	276	100%
	Intermed. Year 7-8	28	66.7%	19	45.2%	12	28.6%	8	19.0%	12	28.6%	12	28.6%	4	9.5%	7	16.7%	42	100%
	Secondary Year 7-15	29	74.4%	28	71.8%	12	30.8%	22	56.4%	5	12.8%	14	35.9%	5	12.8%	6	15.4%	39	100%
	Secondary Year 9-15	133	84.7%	94	59.9%	45	28.7%	59	37.6%	15	9.6%	60	38.2%	34	21.7%	16	10.2%	157	100%
	Comp./ Restrict. Comp	13	52.0%	17	68.0%	5	20.0%	6	24.0%	4	16.0%	14	56.0%	4	16.0%	2	8.0%	25	100%
	Comp. Area School	6	46.2%	8	61.5%	6	46.2%	2	15.4%	5	38.5%	1	7.7%	1	7.7%	2	15.4%	13	100%
	Special School	6	54.5%	7	63.6%	4	36.4%	4	36.4%	2	18.2%					1	9.1%	11	100%
	Correspondence - primary	8	61.5%	10	76.9%	6	46.2%	1	7.7%			3	23.1%	2	15.4%	2	15.4%	13	100%
	Correspondence - secondary	7	63.6%	7	63.6%	3	27.3%	2	18.2%			6	54.5%	3	27.3%	4	36.4%	11	100%
Total		577	65.9%	543	62.1%	307	35.1%	203	23.2%	168	19.2%	158	18.1%	150	17.1%	105	12.0%	875	100%

Two thirds of teachers (65.9%), particularly those in secondary schools (74.4% and 84.7%), said that other teachers in their school had been useful sources of professional development for their teaching of science. Books and journals were cited as being useful by 62.1% of teachers. Approximately one third of teachers had used School Support Services, advisors or resource teachers. Secondary school teachers had found that contact with teachers in other schools was useful. Over half the teachers in composite/restricted composite schools and over one third of teachers in secondary year 9-15 schools had found that conferences were useful.

Other sources of professional development included teacher associations, mainly listed by secondary school teachers. Private providers, the principal and TRCC (Teacher Refresher Course Committee) were listed by approximately 7% of teachers. Parents/Board of Trustees, own research interests and RSNZ fellowship were listed by approximately 3% of teachers.

There were 101 teachers (11.5%) who said they had not received any professional development in science; more primary and intermediate teachers said they had not received any professional development.

Q26a If you have had any professional development in science, in what ways has it helped you in your teaching of science?

Ways in which professional development helped (n=875)

		Gave me/shared ideas to plan/implement		Increased confidence/enthusiasm		Teaching approaches explained and clarified		Clarified concepts/knowledge		Familiarisation with the curriculum statement	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	59	20.5%	37	12.8%	27	9.4%	35	12.2%
	Full Prim. Year 1-8	66	23.9%	30	10.9%	29	10.5%	30	10.9%	32	11.6%
	Intermed. Year 7-8	7	16.7%	4	9.5%	2	4.8%	3	7.1%	5	11.9%
	Secondary Year 7-15	8	20.5%	1	2.6%	1	2.6%	5	12.8%	3	7.7%
	Secondary Year 9-15	50	31.8%	19	12.1%	32	20.4%	18	11.5%	5	3.2%
	Comp./Restrict. Comp	7	28.0%	3	12.0%	6	24.0%	1	4.0%		
	Comp. Area School	2	15.4%	4	30.8%	1	7.7%	1	7.7%	1	7.7%
	Special School							1	9.1%	1	9.1%
	Correspondence - primary	3	23.1%					2	15.4%	1	7.7%
	Correspondence - secondary	1	9.1%	2	18.2%	2	18.2%	3	27.3%		
Total		203	23.2%	100	11.4%	100	11.4%	99	11.3%	85	9.7%

The most frequent response to this question (23.2%) was that professional development had helped by providing an opportunity to share ideas for planning and implementing science lessons:

I gained ideas for units, planning, where to find useful resources. [primary]

It provided ideas, resources and inspiration. Keeps me up to date with current theory. [intermediate]

Sometimes I could share and bounce ideas off other teachers; swap ideas and resources. [secondary]

Enthusiasm and increased confidence resulted from contact with new ideas for 11.4% of teachers:

It gave me a refreshing change of ideas. The fellowship gave me TIME and I cannot speak highly enough of it. [secondary teacher who had been on a teaching fellowship]

Gives more experience, different viewpoints, and approaches. Good teacher networking experiences outside to enthuse/refresh/update. This energy is communicated to students and is important. [secondary]

The MEd (Science Education) was the best - forced me to confront my practice and beliefs in the light of research and theory. Everyone should be given the chance to do this. There is too much 'tin tack' professional development and not enough which causes teachers to question their own views e.g., on the nature of science, the meaning of science literacy etc. [secondary]

Professional development had helped to explain and clarify teaching approaches for 11.4% of teachers:

Clarifies issues and concerns/planning and teaching strategies were showed, new approaches were explained and clarified. [primary]

I gained a clearer understanding of how to approach science and methods to use in the classroom. [primary]

Kept up to date with new ideas/research being carried out/methods being used, contacts for resources etc. [secondary]

Scientific concepts and knowledge were clarified for 11.3% of teachers during their professional development:

I was given clarity or clarification of some concepts and other ways of doing things. [primary]

Contract courses – I had very little confidence with strategies and knowledge with physical science. It helped a lot. [composite area]

Professional development was found to be useful for familiarisation with the curriculum statement by 9.7% of teachers:

In the early stages gained familiarity with the document. [primary]

Clarified many curriculum concepts, particularly the integrating strands. [primary]

Networking with other teachers who had strengths in science, sharing resources and learning about recent research and the need to implement this were other ways in which professional development had helped teachers in their teaching of science.

Q26b If you have had any professional development in science, in what ways did it not help you in your teaching of science?

Fifty-eight teachers from the total sample of 875 reported ways in which professional development had not helped in their teaching of science. Twenty-two of these said they had been unable to find the time to implement the findings, twenty-one said it had only been a general overview. Twelve teachers had found the course ‘too narrow’. Three teachers thought that professional development was ‘too expensive’. Comments made by teachers included:

General overview - not at the level I am now teaching. [primary]

I did not have the time to implement the findings. [intermediate]

Too broad most of the time, but provides another viewpoint. [secondary]

Sometimes too idealistic and removed from the reality of the classroom/lab. [secondary]

Costs too high, not appropriate for school timetable – one-hour periods. [secondary]

Q27 If you have had any professional development in science, do you consider that it provided adequate support for you to improve the achievement of Māori students in your classroom/school?

		Q27a Do you consider that the professional development you have received in science has provided adequate support for you to improve the achievement of Māori students?								Total	
		Yes		No		Don't know		Not applicable (I don't teach any Māori students)		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	31	16.8%	57	30.8%	67	36.2%	30	16.2%	185	100%
	Full Prim. Year 1-8	32	16.8%	68	35.6%	60	31.4%	31	16.2%	191	100%
	Intermed. Year 7-8	8	26.7%	7	23.3%	11	36.7%	4	13.3%	30	100%
	Secondary Year 7-15	4	12.5%	17	53.1%	4	12.5%	7	21.9%	32	100%
	Secondary Year 9-15	21	15.9%	87	65.9%	20	15.2%	4	3.0%	132	100%
	Comp./Restrict. Comp	1	4.8%	6	28.6%	4	19.0%	10	47.6%	21	100%
	Comp. Area School	3	33.3%	2	22.2%	2	22.2%	2	22.2%	9	100%
	Special School			2	40.0%	3	60.0%			5	100%
	Correspondence - primary	2	25.0%	4	50.0%	2	25.0%			8	100%
	Correspondence - secondary			9	81.8%	2	18.2%			11	100%
Total		102	16.3%	259	41.5%	175	28.0%	88	14.1%	624	100%

Of the 875 teachers answering the questionnaire, 624 (71.3%) responded to this question. Of the 624 teachers, only 16.3% said they considered that professional development had provided adequate support for them to improve the achievement of Māori students. Teachers of secondary school students in particular found there had not been adequate support.

Comment was invited for this question and looking at the total sample (n=875) the most frequent comment (n=53) was that no specific reference had been made to Māori students:

Support for mainstream viewpoints, not for (Māori viewpoints. [primary]

No structured support- it is needed. [primary]

No PD ever focuses on this- we are told to 'improve' it but not given effective resources. [secondary]

Most courses include very little Māori content or advice on teaching Māori students. [secondary]

Twenty-seven teachers said that there had been some ideas given, but not enough:

Yes for ideas, no for access to resources. [secondary]

Some PD but improvement in achievement hard to gauge because of a mobile school population. [secondary]

The feeling that Māori students were no different from other students was evident in 21 responses:

The achievement of Māori students at my school is on a par with others and therefore don't need extra support. [primary]

No difference between achievement of Māori, non-Māori, girls, boys at our school- they all achieve at a similar level. [primary]

However, 15 teachers commented on the 'generally helpful' nature of the courses and four teachers spoke of the professional development in this area being taken by Māori providers, which they found helpful:

Generally helpful – run by Māori Dept, University of Waikato. [intermediate]

Have had PD in previous schools from Māori perspective, which I found great, but none at present school. [primary]

Some did, but this was given by Māori providers, e.g., Māori resource teacher, Māori Ministry, Māori Curriculum Development. [primary]

Had PD at a specific course for Māori student achievement. [secondary]

Other comments came from teachers who had no Māori students or who would like to have access to the Pūtaiao statement. There was evidence that teachers would appreciate more help in this area:

Still struggling to reach areas of mutual interest, and learning styles. [secondary]

I can help individual Māori students if the teacher/student ratio is increased. That is the difficulty – size of class in Y11. [composite/restricted composite]

Q28 In what aspects of science would you most like to receive professional development to support your teaching of science?

Teachers were invited to make comments about the focus of future professional development. The main ideas that emerged may be seen in the following table:

Most frequent suggestions for professional development in science

		Specific science area/strand		Ideas/access to resources for teaching units		Planning, teaching skills/ approaches		Progression, assessment and reporting achievement		Practicals/ using apparatus appropriately	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	61	21.2%	50	17.4%	41	14.2%	41	14.2%
	Full Prim. Year 1-8	77	27.9%	52	18.8%	34	12.3%	19	6.9%	22	8.0%
	Intermed. Year 7-8	7	16.7%	10	23.8%	6	14.3%	4	9.5%	2	4.8%
	Secondary Year 7-15	8	20.5%	2	5.1%	3	7.7%	1	2.6%	4	10.3%
	Secondary Year 9-15	16	10.2%	29	18.5%	17	10.8%	7	4.5%	17	10.8%
	Comp./Restrict. Comp	2	8.0%	4	16.0%	1	4.0%	3	12.0%	2	8.0%
	Comp. Area School	3	23.1%	1	7.7%			1	7.7%	2	15.4%
	Special School	1	9.1%	1	9.1%						
	Correspondence - primary			1	7.7%	1	7.7%				
	Correspondence - secondary	2	18.2%	1	9.1%	1	9.1%	3	27.3%		
Total		177	20.2%	151	17.3%	104	11.9%	79	9.0%	77	8.8%

The most frequent response was for professional development in a specific science area or strand (20.2%). Ten of the teachers in the sub-sample (n=100) requested assistance with Physics or The

Physical World. Six requested help with Chemistry or The Material World. Several requests were for Planet Earth and Beyond, Environmental Sciences and Making Sense of the Nature of Science and its Relationship to Technology.

Teachers across all year levels asked for “increased access to resources”:

More support books, e.g., Classroom practices, MOE. [primary]

Knowledge base, availability of units/resource kits. [primary]

Increasing my knowledge of good resources to use. [intermediate]

Good resources/material to stimulate students and maintain motivation. [secondary]

How to use materials now available, updating in each area, overview, today’s frontiers. [secondary]

Planning and teaching skills and approaches to science teaching were requested by 11.9% of teachers:

Hands-on approach to teaching science; to cater for small group/inquiry approach. [primary]

New Ideas on how to implement and deliver science lessons. [secondary]

Unit planning with other teachers/schools so as to broaden one’s scope – see different ideas and resources to help make science ‘live’ for students. [secondary]

Writing SLOs. Ways to get teachers to start using new activities or techniques. [secondary]

Progression and assessment were aspects that 9.0% of teachers asked for assistance with:

Being able to teach Level 2 – Level 5 program within a single class situation. [intermediate]

Assessment ideas other than pen and paper. [intermediate]

Relating assessment activities to achievement objectives. [intermediate]

Development of relevant formative assessment tasks. [secondary]

Several teachers across all year levels asked for help with practical work:

Using apparatus appropriately, efficiently, expertly. [primary]

Good practical ideas using non-sophisticated equipment, and background notes for teacher on why. [intermediate]

Managing the resources for a teaching session. Getting the most out of a 1-hour teaching session - trying not to let it drag on. [secondary]

Physics, Astronomy – learning new practical activities and demonstrations. [secondary]

Other suggestions for professional development, from the total sample, included time to work with others to develop resources (n=57), specific concepts (n=56), ways to incorporate the integrating strands (n=49), science investigations (n= 39), all aspects of the curriculum (n=35), NCEA courses (n=34), how

to improve Māori achievement (n=32), ways to tie in skills and attitudes (n=31) and leadership skills (n=13).

Of note were requests to address the needs for improving the achievement of Māori students:

Improving the achievement of Māori students/students with poor literacy skills. [secondary]

Improving Māori achievement. [secondary]

Teaching of Māori to give Māori success, success for boys. [secondary]

Individual learning programmes; Māori learning styles – programmes applicable in mainly Pākehā classes; motivation of those with learning and motivation difficulties. [secondary]

Integration of Māori knowledge – ideas which are culturally acceptable e.g., use of dyes or not, and medicinal plants. [composite/restricted composite]

CURRICULUM IMPLEMENTATION

Q29 How do you implement the science curriculum?

		Integrated into other learning areas		As a subject with its own timetable slots		In blocks/modules		As a stand alone subject with various teachers delivering parts		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	227	78.8%	88	30.6%	152	52.8%	5	1.7%
	Full Prim. Year 1-8	197	71.4%	94	34.1%	149	54.0%	5	1.8%	276	100%
	Intermed. Year 7-8	27	64.3%	27	64.3%	18	42.9%	6	14.3%	42	100%
	Secondary Year 7-15	5	12.8%	35	89.7%	5	12.8%	5	12.8%	39	100%
	Secondary Year 9-15	6	3.8%	143	91.1%	22	14.0%	7	4.5%	157	100%
	Comp./Restrict. Comp	6	24.0%	20	80.0%	4	16.0%	1	4.0%	25	100%
	Comp. Area School	9	69.2%	5	38.5%	7	53.8%			13	100%
	Special School	9	81.8%	3	27.3%	3	27.3%	1	9.1%	11	100%
	Correspondence - primary	8	61.5%	6	46.2%	4	30.8%	2	15.4%	13	100%
	Correspondence - secondary	1	9.1%	9	81.8%	1	9.1%	1	9.1%	11	100%
Total		495	56.6%	430	49.1%	365	41.7%	33	3.8%	875	100%

Over half of the teachers responding to the questionnaire were integrating science with other learning areas, however most of these were primary or intermediate teachers. Primary teachers also favoured Block or module teaching of science. Secondary school teachers were mostly teaching science as a subject with its own timetable slots. Very few (3.8%) teachers reported teaching science as a stand-alone subject with various teachers delivering parts.

The following table shows which curriculum areas science was integrated with:

School Type - MOE code		Integrated into Technology		Integrated into English		Integrated into The Arts		Integrated into Social Studies		Integrated into Mathematics		Integrated into Health and Phys Well-being		Integrated into Te Reo Māori		Integrated into Pacific Languages & International Languages	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		Cont. Prim. Year 1-6	196	68.1%	183	63.5%	126	43.8%	98	34.0%	103	35.8%	73	25.3%	51	17.7%	8
Full Prim. Year 1-8	179	64.9%	166	60.1%	117	42.4%	106	38.4%	90	32.6%	62	22.5%	51	18.5%	11	4.0%	
Intermed. Year 7-8	16	38.1%	17	40.5%	12	28.6%	11	26.2%	9	21.4%	5	11.9%	4	9.5%	1	2.4%	
Secondary Year 7-15	3	7.7%	1	2.6%			2	5.1%	3	7.7%	1	2.6%					
Secondary Year 9-15	3	1.9%	1	.6%			1	.6%	1	.6%	4	2.5%					
Comp./Restrict. Comp. Area School	6	24.0%	2	8.0%	2	8.0%	1	4.0%	2	8.0%	2	8.0%					
Comp. Area School	8	61.5%	8	61.5%	5	38.5%	4	30.8%	3	23.1%	4	30.8%	2	15.4%	2	15.4%	
Special School	7	63.6%	6	54.5%	6	54.5%	3	27.3%	4	36.4%	4	36.4%	4	36.4%	2	18.2%	
Correspondence - primary	6	46.2%	6	46.2%	4	30.8%	4	30.8%	3	23.1%	3	23.1%	2	15.4%			
Correspondence - secondary	1	9.1%															
Total	425	48.6%	390	44.6%	272	31.1%	230	26.3%	218	24.9%	158	18.1%	114	13.0%	24	2.7%	

Science was most likely to be integrated with technology especially at the primary level, where about two thirds of teachers said this occurred. English was the second most favoured learning area for science to be integrated with. Overall, secondary teachers reported little integration.

Q30 What systems has your school established to support your teaching of science?

School Type - MOE code		Team/syndicate planning		Well developed school scheme for science		Access to professional development		Lab technician support		Lesson units written by specialist science teacher/science committee		Other		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		Cont. Prim. Year 1-6	253	87.8%	145	50.3%	119	41.3%	1	.3%	18	6.3%	15	5.2%	288
Full Prim. Year 1-8	197	71.4%	134	48.6%	116	42.0%	1	.4%	21	7.6%	10	3.6%	276	100%	
Intermed. Year 7-8	25	59.5%	23	54.8%	14	33.3%	7	16.7%	17	40.5%	1	2.4%	42	100%	
Secondary Year 7-15	17	43.6%	29	74.4%	28	71.8%	33	84.6%	18	46.2%	3	7.7%	39	100%	
Secondary Year 9-15	57	36.3%	120	76.4%	119	75.8%	150	95.5%	78	49.7%	8	5.1%	157	100%	
Comp./Restrict. Comp. Area School	11	44.0%	17	68.0%	18	72.0%	14	56.0%	11	44.0%	2	8.0%	25	100%	
Comp. Area School	7	53.8%	8	61.5%	6	46.2%	1	7.7%	2	15.4%	1	7.7%	13	100%	
Special School	3	27.3%	3	27.3%	3	27.3%					1	9.1%	11	100%	
Correspondence - primary	1	7.7%	2	15.4%	6	46.2%			8	61.5%	3	23.1%	13	100%	
Correspondence - secondary	6	54.5%	6	54.5%	9	81.8%			10	90.9%	1	9.1%	11	100%	
Total	577	65.9%	487	55.7%	438	50.1%	207	23.7%	183	20.9%	45	5.1%	875	100%	

Primary teachers and less so intermediate teachers were well supported by team and syndicate planning and approximately half of primary and intermediate teachers taught in schools where there was a well-developed school scheme for science.

Secondary teachers tended to be supported by a well-developed school scheme for science and to have good access to professional development. They had good lab technician support and were more likely to have access to lesson units written by specialist science teachers. In primary schools, lab technician support was virtually non-existent.

Forty-five teachers listed other forms of support offered by their schools that included: at primary level an appropriate level of funding for resources, professional development and school trips; at intermediate level bulk purchasing of gear and half classes during science time; at secondary level resources on school intranet and trips to agricultural and horticultural practitioners.

Q31 Tick which of the essential skills you emphasise in your teaching of science. (Put two ticks beside those which you emphasise the most) (n=875)

School Type - MOE code		Emphasise Communication Skills the most (two ticks)				Emphasise Information Skills the most (two ticks)				Emphasise Numeracy Skills the most (two ticks)				Emphasise Physical Skills the most (two ticks)			
		Emphasis on Communication Skills (one tick)		Emphasise Communication Skills the most (two ticks)		Emphasis on Information Skills (one tick)		Emphasise Information Skills the most (two ticks)		Emphasis on Numeracy Skills (one tick)		Emphasise Numeracy Skills the most (two ticks)		Emphasis on Physical Skills (one tick)		Emphasise Physical Skills the most (two ticks)	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
Cont. Prim. Year 1-6	160	55.6%	79	27.4%	157	54.5%	98	34.0%	80	27.8%	5	1.7%	51	17.7%	8	2.8%	
Full Prim. Year 1-8	137	49.6%	73	26.4%	149	54.0%	86	31.2%	81	29.3%	8	2.9%	54	19.6%	6	2.2%	
Intermed. Year 7-8	23	54.8%	8	19.0%	28	66.7%	5	11.9%	10	23.8%	3	7.1%	8	19.0%	3	7.1%	
Secondary Year 7-15	20	51.3%	7	17.9%	20	51.3%	5	12.8%	16	41.0%	2	5.1%	15	38.5%	3	7.7%	
Secondary Year 9-15	87	55.4%	27	17.2%	90	57.3%	28	17.8%	73	46.5%	11	7.0%	69	43.9%	17	10.8%	
Comp./Restrict. Comp. Area School	16	64.0%	6	24.0%	16	64.0%	4	16.0%	14	56.0%	2	8.0%	8	32.0%	1	4.0%	
Comp. Area School	5	38.5%	8	61.5%	4	30.8%	9	69.2%	5	38.5%			4	30.8%			
Special School	5	45.5%	2	18.2%	8	72.7%	1	9.1%	5	45.5%			3	27.3%	1	9.1%	
Correspondence - primary	7	53.8%			7	53.8%	2	15.4%	2	15.4%			3	23.1%			
Correspondence - secondary	8	72.7%	1	9.1%	10	90.9%	1	9.1%	8	72.7%			5	45.5%	1	9.1%	
Total	468	53.5%	211	24.1%	489	55.9%	239	27.3%	294	33.6%	31	3.5%	220	25.1%	40	4.6%	

School Type - MOE code		Emphasise Problem-solving Skills the most (two ticks)				Emphasise Self-Management & Competitive Skills the most (two ticks)				Emphasise Social & Co-operative Skills the most (two ticks)				Emphasise Work and Study Skills the most (two ticks)			
		Emphasis on Problem-solving Skills (one tick)		Emphasise Problem-solving Skills the most (two ticks)		Emphasis on Self-Management & Competitive Skills (one tick)		Emphasise Self-Management & Competitive Skills the most (two ticks)		Emphasis on Social and Co-operative Skills (one tick)		Emphasise Social & Co-operative Skills the most (two ticks)		Emphasis on Work and Study Skills (one tick)		Emphasise Work and Study Skills the most (two ticks)	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
Cont. Prim. Year 1-6	145	50.3%	93	32.3%	101	35.1%	18	6.3%	154	53.5%	67	23.3%	153	53.1%	47	16.3%	
Full Prim. Year 1-8	144	52.2%	95	34.4%	101	36.6%	23	8.3%	152	55.1%	58	21.0%	150	54.3%	36	13.0%	
Intermed. Year 7-8	21	50.0%	11	26.2%	21	50.0%	3	7.1%	27	64.3%	7	16.7%	22	52.4%	7	16.7%	
Secondary Year 7-15	19	48.7%	3	7.7%	13	33.3%	3	7.7%	21	53.8%	1	2.6%	19	48.7%	6	15.4%	
Secondary Year 9-15	91	58.0%	38	24.2%	80	51.0%	12	7.6%	83	52.9%	19	12.1%	87	55.4%	31	19.7%	
Comp./Restrict. Comp. Area School	18	72.0%	7	28.0%	13	52.0%	5	20.0%	10	40.0%	5	20.0%	11	44.0%	7	28.0%	
Comp. Area School	4	30.8%	7	53.8%	7	53.8%	3	23.1%	6	46.2%	5	38.5%	8	61.5%	2	15.4%	
Special School	6	54.5%	3	27.3%	6	54.5%			4	36.4%	2	18.2%	5	45.5%	2	18.2%	
Correspondence - primary	9	69.2%	1	7.7%	5	38.5%	1	7.7%	3	23.1%			6	46.2%			
Correspondence - secondary	8	72.7%	1	9.1%	6	54.5%	2	18.2%	3	27.3%	1	9.1%	9	81.8%	2	18.2%	
Total	465	53.1%	259	29.6%	353	40.3%	70	8.0%	463	52.9%	165	18.9%	470	53.7%	140	16.0%	

Across the different school types the most emphasis was placed on *problem solving skills* (53.1% one tick, 29.6% two ticks) and *information skills* (55.9% one tick, 27.3% two ticks). *Communication skills* (53.5% one tick, 24.1% two ticks) and *social and co-operative skills* (52.9% one tick, 18.9% two ticks) were also emphasised. The least emphasis was placed on *physical skills* (25.1% one tick, 4.6% two ticks).

Q32 An investigative approach to teaching and learning science is recommended in the *Science in the New Zealand Curriculum* statement. Do you use an investigative approach to teaching and learning in your science programme?

		Q32a Do you use an investigative approach to teaching and learning in your science programme(s)? (Yes/No/Sometimes/Don't Know)								Total	
		Yes		No		Sometimes		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	132	47.0%	8	2.8%	138	49.1%	3	1.1%	281	100%
	Full Prim. Year 1-8	148	54.8%	2	.7%	116	43.0%	4	1.5%	270	100%
	Intermed. Year 7-8	23	54.8%			17	40.5%	2	4.8%	42	100%
	Secondary Year 7-15	17	45.9%	1	2.7%	17	45.9%	2	5.4%	37	100%
	Secondary Year 9-15	61	40.4%	5	3.3%	82	54.3%	3	2.0%	151	100%
	Comp./Restrict. Comp	11	44.0%			12	48.0%	2	8.0%	25	100%
	Comp. Area School	9	69.2%			4	30.8%			13	100%
	Special School	6	54.5%	1	9.1%	4	36.4%			11	100%
	Correspondence - primary	6	54.5%			5	45.5%			11	100%
	Correspondence - secondary	3	33.3%			6	66.7%			9	100%
Total		416	48.9%	17	2.0%	401	47.2%	16	1.9%	850	100%

Most teachers said that they used, or ‘sometimes used’ an investigative approach in their science programme. 634 (72.5%) teachers provided examples of an investigative approach that included “investigations”, experiments, practical work or “hands-on activities”. For this commentary, responses were taken from a representative sample of 96 of these teachers in order to obtain as full a picture of how teachers were providing for the investigative approach as possible.

Eleven teachers indicated that the science fair provided a context for the investigative approach in their classroom. Five teachers stated they included fair testing as an investigative activity.

In terms of specific topics for investigations, 30 respondents described activities that involved concepts from Material World concepts such as acid-base reactions, corrosion and rusting, rates of reactions and separating mixtures. In two instances the teachers described a sequence of activities in which the students went on to use the knowledge and skills that had developed to solve a further problem:

I created a Y9 resource for separating mixtures, which involved the students investigating a ‘crime’ and working out how they could separate a mixture for their particular crime -teacher only facilitated - did no ‘teaching’ as such. [secondary]

Four teachers described the making of plant dyes, including the use of mordants.

Fourteen teachers provided examples that related to concepts included in the Living World strand. These included pond and river/water studies, growing plants, investigating yeast and worm farming.

Eleven of the teachers who specified a topic described activities, which may be seen to be derived from the Physical World strand. These included the properties of lenses, and investigations of electricity, magnetism, flight and floating and sinking.

Eighteen of the respondents provided examples of an investigative approach, which did not specify or seem to include practical work. Of these eighteen teachers, three linked an investigative approach with resource-based learning whilst others described research-based investigations, which involved the use of Infolink and the Internet:

We are studying dinosaurs, so the children researched one of their own using books and the Internet. [primary]

A year 1-2 teacher reported that a “hands-on investigative approach is not always appropriate for the topics covered at Junior level”. Another explained that students worked with a “mentor from the university” [secondary]

Overall, eighteen teachers provided responses that indicated they viewed research as a component of an investigative approach, for example:

Flight. Children have been involved in constructing experiments and using results to redesign models and increase understanding of air pressure and wing design, writing reports and presenting results. Homework research projects on an aspect of flight. [primary]

Sixteen teachers, ten of them from primary schools, described investigations as involved with answering questions. The questions could be posed by the teacher or by the student(s). One primary teacher commented that children’s own questions provided the most appropriate investigations for young children. Others said that science fairs provided contexts for students to pose and investigation their own questions.

Twenty-eight teachers commented on why they found it difficult to use an investigative approach. Half of these were primary teachers who cited their own lack of confidence or difficulties with managing a whole class who are at different levels of understanding:

I find it is better to direct and lead the learning experiences of 5-year olds. [primary]

Not confident enough in my own understanding of scientific concepts. [primary]

Difficult to manage safety – sometimes I feel that I don’t know what I’m doing. [primary]

Children love exploring and testing at their own personal pace, especially in the field (where I have no problems with this approach). Investigations in the classroom can be messy and noisy. [secondary]

Difficult to manage with multi-level planning and teaching. Groups are co-operative or social rather than ability based. Doesn’t encourage children to investigate or problem solve. [primary]

Ten secondary teachers also had difficulties with the investigative approach – student lack of interest, low ability classes, lack of resources or technician support, inadequate facilities and time restraints were reasons given for not using an investigative approach.

Time, pressure of getting through courses of work, the need to keep rotations of units going in a large school, some students much slower than others. (Y12, 13 it is part of the course). [secondary]

Time limitations! We are given all these fancy ideas on how to be an effective 'facilitator', but then have ERO/Principal/HOD breathing down our back because assessment is all that matters. [secondary]

Sorely limited by lack of resources and technician support. [secondary]

Impractical with 35 students in a room designed for 25, without adequate resources. [secondary]

Sometimes students not interested enough. Takes more time[secondary]

Large, low-ability class is not capable of carrying out an investigation. [secondary]

Q33 The curriculum statement refers to ensuring that students carry out 'extended investigations'. What opportunities do you give your students to meet this requirement?

		Different investigative skills developed in different units		One or more major investigation per year		Science Fairs for all students		Investigation in each contextual strand		Science Fairs for selected students	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	117	40.6%	81	28.1%	42	14.6%	55	19.1%
	Full Prim. Year 1-8	135	48.9%	91	33.0%	82	29.7%	61	22.1%	32	11.6%
	Intermed. Year 7-8	16	38.1%	17	40.5%	32	76.2%	8	19.0%	3	7.1%
	Secondary Year 7-15	13	33.3%	18	46.2%	21	53.8%	12	30.8%	10	25.6%
	Secondary Year 9-15	69	43.9%	70	44.6%	46	29.3%	35	22.3%	59	37.6%
	Comp./Restrict. Comp	13	52.0%	12	48.0%	4	16.0%	8	32.0%	6	24.0%
	Comp. Area School	8	61.5%	3	23.1%	1	7.7%	3	23.1%		
	Special School	3	27.3%	1	9.1%	2	18.2%	1	9.1%	2	18.2%
	Correspondence - primary	8	61.5%	6	46.2%			5	38.5%	3	23.1%
	Correspondence - secondary	6	54.5%	4	36.4%			2	18.2%	1	9.1%
	Total	388	44.3%	303	34.6%	230	26.3%	190	21.7%	140	16.0%

Almost half (44.3%) of the teachers (n=875) made provision for developing different investigative skills in different units, although secondary teachers tended to favour including one or more major investigation per year. Participation in Science Fairs was often a vehicle for long-term investigations at the intermediate level. Some schools (16%) actually limited participation in Science Fairs to selected students, in particular secondary year 9-15 schools.

Other provisions for extended investigations made by teachers included the Crest Award scheme (n=63) and Science Badge (n=27).

Some teachers had difficulty providing opportunities for students to carry out extended investigations. They cited time constraints (n=82), resource difficulties (n=35) or student level of understanding/literacy/motivation (n=70) as reasons for the difficulty.

Q34 Describe an example from your classroom work that has been effective for you in improving your students' learning in science.

About two thirds of the teachers (63.8%) shared their experiences of classroom work. Overwhelmingly, the activities they described required active student participation; many teachers indicated that 'hands-on' activities were effective in enhancing student learning. The examples detailed by the teachers included experiments and investigations; visits; science tables; card matching, barrier and bingo-type games; roles plays and making models.

Hands-on, practical and experimental tasks were considered effective:

Hands-on experience: most recently pouring water down hill to show erosion, development of waterways. [primary]

Doing experiments; visits to the Zoo, Miranda, and Kelly Tarlton's; making a worm farm; making and erupting volcanoes; making soda rockets; going to camp; cooking; magnet experiments; light and sound/ making gardens. [primary - Māori bilingual]

Two junior school teachers stated having a science table encouraged student experimentation:

Having a hands-on Science table that encourages children to experiment in their own time. [composite area]

Barrier, card matching and bingo-type games were said to be effective for learning vocabulary and the learning of knowledge and facts:

Co-operative learning strategies such as barrier games help students to increase their knowledge when they have to learn facts and figures. [primary]

I have used learning through language activities, such as matching activities for teaching the language of science. [secondary]

Use of games to enhance learning of Elements and symbols (Bingo). Self-assessment and peer assessment of different skills, e.g., Lighting a Bunsen burner. [secondary]

The benefits to student understanding from group work and interaction were attested to both implicitly and explicitly:

Practical experiments – great to work with children in small groups – to talk with them and to see their reactions. A much better understanding is gained by the children working in a smaller number. [intermediate]

Using the LISP approach – what do we already know about? What do we want to find out? Using the questions as a focus. Discussing the above before and after the study. [primary]

In-school science fair, study of pinecones, experimenting and discussing the effect of variables to find out more about them, e.g., effect of water/heat on the openness. [primary]

Models and role-plays were described as helpful in enhancing student understanding of concepts:

Role-play in teaching the movement of chromosomes during cell division, deletion of bases during mutation of chromosomes. [secondary]

Role-play in school grounds – the planets' orbits and size with balls of different sizes. Role-play in class to see when the sun and planets can be seen. [secondary]

Some teachers described units or sequences of activities, which included a range of teaching approaches. Typically these teachers indicated that the activities engaged student interest by incorporating an experimental component and/or linking the activity or the science to a real life context:

Students learn best when the subject interests them. We did an insects unit – a topic, which interested the students. Children developed their observational skills through watching the insects, they also found out about insects through Internet and books. I felt their learning improved through studying something that interested them. [primary]

Working on a good unit of work on bikes and gears at present. [primary]

Because of the background of these students – no prior knowledge, due to arrival in NZ, using lots of information in cloze activities, asking questions, debating answers, using problem solving skills e.g., can of coke, what info on it, what it means, investigating what the info means to them, health issues etc. [secondary]

The development of a level 4 science course for Y9 and 10 aimed at underachievers, reluctant learners and students lacking motivation. The teaching on video and audiotape reduces the size of workbooks, helps poor readers and makes units manageable for students. The variety of tasks and topics caters for a range of learning styles. Success increases self-esteem and often makes science their favourite subject. Use of peers doing science on the videos has also been an advantage. [Correspondence – secondary]

Many of the teachers indicated the activities they viewed as effective not only fostered student understanding and engaged student interest but also had a positive impact on student confidence and attitude to science. This was the case for teachers of both junior and senior students:

Having a science table regularly changing so that children at this very early stage develop an inquiring attitude to science. [primary]

Thinking of children's needs, confidence, self-esteem, group dynamics, size. attitude; its OK to get it wrong, make a mistake, have a go; observations and predictions accepted without judgment; hands-on; children come to own conclusions; its OK to change our minds. [primary]

Active participation in experimental work is encouraged, the ability to ask questions and guesswork is OK – it's part of the learning curve. [secondary]

Carry out formative practical investigations from Y9-11 NCEA. Students develop their own ability to investigate a problem considering given variables. By Y11 much more able to work with minimal guidance. [secondary]

Q35 How often have you been able to include Māori knowledge about the natural and physical worlds in your science programme?

										Total	
		Often included		Included sometimes		Rarely included		Never included		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	28	10.0%	113	40.2%	108	38.4%	32	11.4%	281	100%
	Full Prim. Year 1-8	28	10.6%	115	43.6%	94	35.6%	27	10.2%	264	100%
	Intermed. Year 7-8			12	31.6%	19	50.0%	7	18.4%	38	100%
	Secondary Year 7-15	2	5.6%	12	33.3%	16	44.4%	6	16.7%	36	100%
	Secondary Year 9-15	4	2.6%	57	37.7%	82	54.3%	8	5.3%	151	100%
	Comp./Restrict. Comp			5	21.7%	13	56.5%	5	21.7%	23	100%
	Comp. Area School	3	23.1%	4	30.8%	3	23.1%	3	23.1%	13	100%
	Special School	1	10.0%	5	50.0%	3	30.0%	1	10.0%	10	100%
	Correspondence - primary	3	27.3%	7	63.6%	1	9.1%			11	100%
	Correspondence - secondary			4	36.4%	7	63.6%			11	100%
Total		69	8.2%	334	39.9%	346	41.3%	89	10.6%	838	100%

Less than half of the teachers (48.1%) said they were able to include Māori knowledge about the natural and physical worlds in their science programme. Primary teachers said they managed to include Māori knowledge more often than secondary teachers said they didn't. (Fifteen of these teachers were teaching in a bi-lingual/Rumaki unit).

Teachers were asked to give reasons for their answers to this question: some teachers (13.5%) found it was not always relevant to their units of work and said that when it was relevant they tried to include it; only 4% of teachers said they felt they had the relevant/ appropriate knowledge and expertise; very few teachers made use of community expertise (n=7).

The main reason given for not including Māori knowledge was that of limited teacher knowledge (15.1%), followed by "lack of resources for Māori students" (5%). Twenty-one teachers said they did not teach any Māori students and 13 claimed that "there was no robust theory" (Māori knowledge). Other reasons included students who were not interested, time constraints, and "Māori is taught by others".

Q36 What if any, issues have arisen for you in providing adequate and appropriate science education experiences for different groups of students, and how have you dealt with these?

Teachers were asked to comment on any issues that had arisen for them in implementing the science curriculum for different groups of students. The following table shows the main categories of student for whom teachers had issues and how many responses were given for each category of student in the total sample (n=875). The table is followed by a short summary of these and other issues and the ways these have been dealt with by the sub-sample of 100 teachers.

		issues for gifted and talented students		issues for NESB students		issues for girls		issues for boys		issues for Māori students		issues for students with disabilities	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	87	30.2%	62	21.5%	64	22.2%	56	19.4%	58	20.1%
	Full Prim. Year 1-8	86	31.2%	47	17.0%	57	20.7%	54	19.6%	32	11.6%	43	15.6%
	Intermed. Year 7-8	11	26.2%	10	23.8%	11	26.2%	10	23.8%	11	26.2%	7	16.7%
	Secondary Year 7-15	17	43.6%	14	35.9%	13	33.3%	9	23.1%	12	30.8%	11	28.2%
	Secondary Year 9-15	73	46.5%	63	40.1%	32	20.4%	31	19.7%	48	30.6%	49	31.2%
	Comp./Restrict. Comp	9	36.0%	12	48.0%	4	16.0%	5	20.0%	3	12.0%	3	12.0%
	Comp. Area School	4	30.8%	1	7.7%	5	38.5%	5	38.5%	2	15.4%	3	23.1%
	Special School	2	18.2%	1	9.1%	3	27.3%	2	18.2%	1	9.1%	3	27.3%
	Correspondence - primary	2	15.4%	2	15.4%	2	15.4%	2	15.4%	3	23.1%	2	15.4%
	Correspondence - secondary	2	18.2%			2	18.2%	2	18.2%	3	27.3%	3	27.3%
Total		293	33.5%	212	24.2%	193	22.1%	176	20.1%	173	19.8%	165	18.9%

Issues for gifted and talented students:

More teachers (33.5%) had issues with gifted and talented students than with other categories of student. Primary teachers found that various extra activities provided extension but these activities took time. Leadership roles, Science Fairs, the investigative approach and plenty of variety enabled these children to express their ability. Some teachers had difficulties providing for gifted and talented students:

Lack of own knowledge and specialised functional equipment. [primary]

Secondary teachers found that limited time in class restricted their ability to provide for gifted and talented students. Class size, resources and space for experiments were also issues:

*Difficult – we incorporate extension exercise in each topic, but most teaching is to the ‘middle’.
Overall class sizes too big in Junior school – difficult enough to do the basics. [secondary]*

In some instances, specialist groups, specialist teachers, special programmes and individual projects provided the extra challenges needed.

Issues for NESB students:

Almost one quarter (24.2%) of teachers had issues relating to NESB students. Primary teachers were able to deal with these issues more easily than secondary teachers by using ESOL teachers, teacher aides, peer helpers, glossaries and visual presentations. They found that encouragement and a practical approach worked well with these students. One intermediate teacher commented:

NESB students prefer a structured programme.... not finding the answers for themselves. [intermediate]

Secondary teachers found that a lack of English fluency affected students' understanding of science concepts and safety issues:

Difficulty in mastering specialist language, while still coping with basic language. [composite/restricted composite]

Extra ESOL staff, peers, diagrammatic notes and word lists were used to help. Teachers reported that resources were badly needed with simpler language but at an appropriate level.

Issues for girls:

Just over one fifth (22.1%) of teachers had issues related to girls in their science classes. Primary teachers found that girls needed encouragement to participate, accept leadership and assert their ideas. Grouping them together was one way of facilitating this. At the intermediate level one teacher found that girls were very keen students of science:

Our girls have had greater success rates than the boys and are keener to participate in extra activities. [intermediate]

Secondary teachers were able to encourage girls to enjoy science subjects by finding relevant topics and science career role models. They found that by managing grouping choices they were able to facilitate full participation by girls:

Can be left out of practicals, I change groupings to prevent this. [secondary]

Issues for boys:

One fifth (20.1%) of teachers reported on issues regarding boys. Primary teachers found they needed to make science as 'hands-on' as possible for boys to maintain interest.

To motivate boys, secondary teachers took science subjects outside the classroom altogether whenever possible or ensured there was a hands-on component to the lessons:

Increased number of outside physical activity, exercises, experiments. [secondary]

Try and relate some examples or practicals to events they relate to. [secondary]

Enjoy learning more by active participation. [secondary]

Issues for Māori students:

Just under one fifth (19.8%) of teachers described the challenges they had teaching science to Māori students. One teacher commented:

Very interested but short attention span. [primary]

Primary teachers often attempted to add a Māori perspective to science by making use of community knowledge and sometimes allowing students to work co-operatively.

Issues for secondary teachers included motivation, learning styles and literacy:

Poorer literacy levels mean more time is needed. [secondary]

Reluctance to be at school – not resolved. [secondary]

Using local resource people, use of Te Reo and finding relevant topics, helped to address these areas, but information/resources were often hard to find and some teachers felt they should be including more Māori knowledge:

I do not know enough Māori culture and am unfamiliar with traditional Māori knowledge/folklore to include much. [secondary]

Issues for students with disabilities:

Some teachers (18.9%) felt there were issues in their science classes for students with disabilities – more secondary than primary teachers made comments. Primary teachers were assisted by teacher aides to address the level of ability and the safety needs of students with disabilities. They also made appropriate adaptations or simplifications to their science lessons.

Same/similar topic, so still feel part of the class. [primary]

Secondary teachers utilised teacher aide or peer support, and/or adaptation of the classroom or seating, to meet the needs of students with disabilities (which can be very diverse). Some may need different notes; others different equipment. Some of the ideas suggested to help students with disabilities were: small lower ability classes; adequate supervision during practical activities; suitable seating in laboratory; use of laptop computers; adapted worksheets; and making the classroom more accessible.

Other issues:

Other issues related to Pacific Island students (n=95), special needs (n=53), and to all students (n=74). Teachers dealt with issues for Pacific students by including help with language where needed, and special themes e.g., “Pacific Week” that could help to include Pacific Island children. At the secondary level teachers allowed co-operative work, language help and made use of familiar contexts, they found that this helped to keep science subjects relevant to Pacific Island students.

Special needs that were identified included SPELD, hyperactivity, sight and hearing problems, newness and distance:

I have students in hospital, in prison, on a yacht in the Pacific, in the Gobi desert, in PNG, all over the world. They all get personal letters, if possible e-mail contact. [Correspondence School – secondary]

Very new children - keep activities short with no written work, oral reporting. [composite area]

Primary teachers felt that all children should be seen as individuals, with individual needs and background experiences. At the secondary level teachers found that choice allowed students to succeed by studying as and what met their individual needs.

Any attempts to celebrate diversity and to acknowledge and accommodate a student’s unique situation were found to enhance feelings of worth, belonging in the class and therefore learning. However time, resources and staff were needed to support these efforts.

Q37 How do you assess student learning in science?**a) Assessment Resource Banks (ARBs)**

		Q37a How do you assess student learning in science... Assessment Resource Banks?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	16	9.1%	57	32.4%	42	23.9%	61	34.7%	176	100%
	Full Prim. Year 1-8	21	11.2%	79	42.0%	42	22.3%	46	24.5%	188	100%
	Intermed. Year 7-8	3	10.7%	12	42.9%	5	17.9%	8	28.6%	28	100%
	Secondary Year 7-15	5	19.2%	8	30.8%	5	19.2%	8	30.8%	26	100%
	Secondary Year 9-15	22	21.8%	28	27.7%	21	20.8%	30	29.7%	101	100%
	Comp./Restrict. Comp	4	25.0%	6	37.5%	5	31.3%	1	6.3%	16	100%
	Comp. Area School			4	44.4%	1	11.1%	4	44.4%	9	100%
	Special School			1	25.0%	2	50.0%	1	25.0%	4	100%
	Correspondence - primary	1	14.3%	2	28.6%	3	42.9%	1	14.3%	7	100%
	Correspondence - secondary	3	60.0%	2	40.0%					5	100%
Total	75	13.4%	199	35.5%	126	22.5%	160	28.6%	560	100%	

b) class discussion with students

		Q37b How do you assess student learning in science... class discussion with students?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type -	Cont. Prim. Year 1-6	142	53.6%	106	40.0%	10	3.8%	7	2.6%	265	100.0%
	Full Prim. Year 1-8	130	52.0%	107	42.8%	13	5.2%			250	100.0%
MOE code	Intermed. Year 7-8	17	44.7%	15	39.5%	5	13.2%	1	2.6%	38	100.0%
	Secondary Year 7-15	10	29.4%	18	52.9%	3	8.8%	3	8.8%	34	100.0%
	Secondary Year 9-15	60	45.1%	49	36.8%	16	12.0%	8	6.0%	133	100.0%
	Comp./Restrict. Comp	9	45.0%	8	40.0%	3	15.0%			20	100.0%
	Comp. Area School	8	61.5%	3	23.1%	1	7.7%	1	7.7%	13	100.0%
	Special School	5	71.4%	2	28.6%					7	100.0%
	Correspondence - primary	1	14.3%	2	28.6%	2	28.6%	2	28.6%	7	100.0%
	Correspondence - secondary					1	25.0%	3	75.0%	4	100.0%
Total		382	49.5%	310	40.2%	54	7.0%	25	3.2%	771	100.0%

c) concept mapping

		Q37c How do you assess student learning in science... concept mapping?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type -	Cont. Prim. Year 1-6	28	16.2%	71	41.0%	35	20.2%	39	22.5%	173	100%
	Full Prim. Year 1-8	19	10.7%	87	49.2%	43	24.3%	28	15.8%	177	100%
MOE code	Intermed. Year 7-8	6	25.0%	8	33.3%	4	16.7%	6	25.0%	24	100%
	Secondary Year 7-15	1	3.4%	13	44.8%	6	20.7%	9	31.0%	29	100%
	Secondary Year 9-15	9	8.1%	50	45.0%	32	28.8%	20	18.0%	111	100%
	Comp./Restrict. Comp	2	10.5%	10	52.6%	7	36.8%			19	100%
	Comp. Area School			3	37.5%	3	37.5%	2	25.0%	8	100%
	Special School	2	28.6%	2	28.6%	2	28.6%	1	14.3%	7	100%
	Correspondence - primary	1	12.5%	3	37.5%	3	37.5%	1	12.5%	8	100%
	Correspondence - secondary			3	75.0%	1	25.0%			4	100%
Total		68	12.1%	250	44.6%	136	24.3%	106	18.9%	560	100%

d) group investigations/research

		Q37d How do you assess student learning in science... group investigations/research?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type -	Cont. Prim. Year 1-6	75	32.3%	130	56.0%	19	8.2%	8	3.4%	232	100%
	Full Prim. Year 1-8	82	34.7%	140	59.3%	12	5.1%	2	.8%	236	100%
MOE code	Intermed. Year 7-8	15	44.1%	18	52.9%	1	2.9%			34	100%
	Secondary Year 7-15	8	23.5%	22	64.7%	3	8.8%	1	2.9%	34	100%
	Secondary Year 9-15	37	27.4%	84	62.2%	11	8.1%	3	2.2%	135	100%
	Comp./Restrict. Comp	6	28.6%	13	61.9%	2	9.5%			21	100%
	Comp. Area School	3	27.3%	6	54.5%	2	18.2%			11	100%
	Special School	2	40.0%	3	60.0%					5	100%
	Correspondence - primary	1	14.3%	4	57.1%	1	14.3%	1	14.3%	7	100%
	Correspondence - secondary			1	20.0%	1	20.0%	3	60.0%	5	100%
Total		229	31.8%	421	58.5%	52	7.2%	18	2.5%	720	100%

e) individual investigations/research

		Q37e How do you assess student learning in science... individual investigations/research?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	62	27.0%	133	57.8%	29	12.6%	6	2.6%	230	100%
	Full Prim. Year 1-8	60	26.7%	135	60.0%	22	9.8%	8	3.6%	225	100%
	Intermed. Year 7-8	19	47.5%	20	50.0%	1	2.5%			40	100%
	Secondary Year 7-15	7	19.4%	25	69.4%	4	11.1%			36	100%
	Secondary Year 9-15	37	26.2%	91	64.5%	10	7.1%	3	2.1%	141	100%
	Comp./Restrict. Comp	7	33.3%	14	66.7%					21	100%
	Comp. Area School	4	36.4%	7	63.6%					11	100%
	Special School	5	62.5%	1	12.5%	2	25.0%			8	100%
	Correspondence - primary	6	54.5%	5	45.5%					11	100%
	Correspondence - secondary	4	50.0%	4	50.0%					8	100%
Total		211	28.9%	435	59.5%	68	9.3%	17	2.3%	731	100%

f) interviews/conferencing

		Q37f How do you assess student learning in science... interviews/conferencing?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	56	25.1%	102	45.7%	43	19.3%	22	9.9%	223	100%
	Full Prim. Year 1-8	53	26.0%	97	47.5%	43	21.1%	11	5.4%	204	100%
	Intermed. Year 7-8	4	15.4%	11	42.3%	7	26.9%	4	15.4%	26	100%
	Secondary Year 7-15	1	3.6%	5	17.9%	10	35.7%	12	42.9%	28	100%
	Secondary Year 9-15	2	1.9%	15	14.6%	40	38.8%	46	44.7%	103	100%
	Comp./Restrict. Comp	2	12.5%	3	18.8%	10	62.5%	1	6.3%	16	100%
	Comp. Area School	1	9.1%	6	54.5%	3	27.3%	1	9.1%	11	100%
	Special School	3	37.5%	4	50.0%	1	12.5%			8	100%
	Correspondence - primary	2	20.0%	7	70.0%	1	10.0%			10	100%
	Correspondence - secondary			4	80.0%			1	20.0%	5	100%
Total		124	19.6%	254	40.1%	158	24.9%	98	15.5%	634	100%

g) NEMP tasks

		Q37g How do you assess student learning in science... NEMP tasks?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	2	1.3%	26	17.1%	43	28.3%	81	53.3%	152	100%
	Full Prim. Year 1-8	2	1.5%	31	22.8%	42	30.9%	61	44.9%	136	100%
	Intermed. Year 7-8	2	10.5%	7	36.8%	4	21.1%	6	31.6%	19	100%
	Secondary Year 7-15			1	5.6%	2	11.1%	15	83.3%	18	100%
	Secondary Year 9-15			2	2.9%	11	16.2%	55	80.9%	68	100%
	Comp./Restrict. Comp			1	12.5%	2	25.0%	5	62.5%	8	100%
	Comp. Area School					2	33.3%	4	66.7%	6	100%
	Special School							2	100%	2	100%
	Correspondence - primary			3	42.9%	1	14.3%	3	42.9%	7	100%
	Correspondence - secondary					1	100%			1	100%
Total		6	1.4%	71	17.0%	108	25.9%	232	55.6%	417	100%

h) observation of students

		Q37h How do you assess student learning in science... observation of students?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	188	67.9%	85	30.7%	2	.7%	2	.7%	277	100%
	Full Prim. Year 1-8	172	67.7%	81	31.9%	1	.4%			254	100%
	Intermed. Year 7-8	22	59.5%	12	32.4%	3	8.1%			37	100%
	Secondary Year 7-15	15	46.9%	17	53.1%					32	100%
	Secondary Year 9-15	62	45.6%	60	44.1%	10	7.4%	4	2.9%	136	100%
	Comp./Restrict. Comp	15	60.0%	8	32.0%	2	8.0%			25	100%
	Comp. Area School	7	53.8%	6	46.2%					13	100%
	Special School	7	70.0%	3	30.0%					10	100%
	Correspondence - primary	1	16.7%	1	16.7%	3	50.0%	1	16.7%	6	100%
	Correspondence - secondary	1	16.7%	1	16.7%			4	66.7%	6	100%
Total		490	61.6%	274	34.4%	21	2.6%	11	1.4%	796	100%

i) peer assessment

		Q37i How do you assess student learning in science... peer assessment?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	36	15.7%	133	57.8%	43	18.7%	18	7.8%	230	100%
	Full Prim. Year 1-8	37	16.8%	129	58.6%	41	18.6%	13	5.9%	220	100%
	Intermed. Year 7-8	8	24.2%	17	51.5%	7	21.2%	1	3.0%	33	100%
	Secondary Year 7-15	4	13.8%	13	44.8%	8	27.6%	4	13.8%	29	100%
	Secondary Year 9-15	4	3.3%	71	58.7%	35	28.9%	11	9.1%	121	100%
	Comp./Restrict. Comp	2	11.1%	11	61.1%	5	27.8%			18	100%
	Comp. Area School			10	83.3%	1	8.3%	1	8.3%	12	100%
	Special School			1	25.0%	2	50.0%	1	25.0%	4	100%
	Correspondence - primary	1	16.7%	1	16.7%	3	50.0%	1	16.7%	6	100%
	Correspondence - secondary							3	100%	3	100%
Total		92	13.6%	386	57.1%	145	21.4%	53	7.8%	676	100%

j) pre-tests/post-tests

		Q37j How do you assess student learning in science... pre-tests/post-tests?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	77	31.6%	113	46.3%	41	16.8%	13	5.3%	244	100%
	Full Prim. Year 1-8	88	38.8%	100	44.1%	32	14.1%	7	3.1%	227	100%
	Intermed. Year 7-8	21	53.8%	13	33.3%	4	10.3%	1	2.6%	39	100%
	Secondary Year 7-15	18	50.0%	16	44.4%	1	2.8%	1	2.8%	36	100%
	Secondary Year 9-15	90	61.2%	48	32.7%	7	4.8%	2	1.4%	147	100%
	Comp./Restrict. Comp	13	59.1%	6	27.3%	3	13.6%			22	100%
	Comp. Area School	3	23.1%	7	53.8%	2	15.4%	1	7.7%	13	100%
	Special School	4	50.0%	2	25.0%	1	12.5%	1	12.5%	8	100%
	Correspondence - primary	2	28.6%	1	14.3%	2	28.6%	2	28.6%	7	100%
	Correspondence - secondary	8	88.9%	1	11.1%					9	100%
Total		324	43.1%	307	40.8%	93	12.4%	28	3.7%	752	100%

k) self-assessment

		Q37k How do you assess student learning in science... self-assessment?								Total	
		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	66	26.7%	148	59.9%	28	11.3%	5	2.0%	247	100%
	Full Prim. Year 1-8	79	33.3%	141	59.5%	13	5.5%	4	1.7%	237	100%
	Intermed. Year 7-8	17	47.2%	16	44.4%	3	8.3%			36	100%
	Secondary Year 7-15	8	27.6%	14	48.3%	4	13.8%	3	10.3%	29	100%
	Secondary Year 9-15	19	14.7%	70	54.3%	32	24.8%	8	6.2%	129	100%
	Comp./Restrict. Comp	3	14.3%	15	71.4%	3	14.3%			21	100%
	Comp. Area School	1	7.7%	11	84.6%	1	7.7%			13	100%
	Special School	5	55.6%	4	44.4%					9	100%
	Correspondence - primary	7	63.6%	4	36.4%					11	100%
	Correspondence - secondary	9	90.0%	1	10.0%					10	100%
Total		214	28.8%	424	57.1%	84	11.3%	20	2.7%	742	100%

'*Observation of students*' was the most popular way of assessing student learning in science (96% 'often' or 'sometimes'), followed by '*group investigations/research*' (90.3% 'often' or 'sometimes') and '*class discussion with students*' (89.7% 'often' or 'sometimes').

In summary the tables show that primary teachers favoured *observation* followed by *class discussion with students*. Intermediate teachers frequently used *individual and group investigations* and were also using *self-assessment* and *observation*. Secondary teachers used *pre-tests and post-tests* most often, followed by *observation of students* and *individual or group investigations*.

The least used forms of assessment across all school types were '*assessment bank*' and '*NEMP tasks*'. Other ways in which teachers (n=36) assessed student learning in science included formative assessment at the primary level and seminars, regular tests and homework at the secondary level.

Q38a In your school is student achievement in science being reported:

		... to the community?				... to parents?				... from teacher to teacher?			
		Yes		No		Yes		No		Yes		No	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
School Type - MOE code	Cont. Prim. Year 1-6	147	64.5%	81	35.5%	257	92.8%	20	7.2%	238	89.5%	28	10.5%
	Full Prim. Year 1-8	142	64.3%	79	35.7%	240	93.0%	18	7.0%	224	88.9%	28	11.1%
	Intermed. Year 7-8	27	75.0%	9	25.0%	40	100%			28	73.7%	10	26.3%
	Secondary Year 7-15	24	75.0%	8	25.0%	37	97.4%	1	2.6%	30	88.2%	4	11.8%
	Secondary Year 9-15	78	66.7%	39	33.3%	147	98.0%	3	2.0%	125	90.6%	13	9.4%
	Comp./Restrict. Comp	12	60.0%	8	40.0%	25	100%			20	83.3%	4	16.7%
	Comp. Area School	6	60.0%	4	40.0%	13	100%			11	91.7%	1	8.3%
	Special School			4	100%	8	80.0%	2	20.0%	5	71.4%	2	28.6%
	Correspondence - primary	1	16.7%	5	83.3%	11	91.7%	1	8.3%	7	77.8%	2	22.2%
	Correspondence - secondary	2	33.3%	4	66.7%	11	100%			9	90.0%	1	10.0%
Total		439	64.6%	241	35.4%	789	94.6%	45	5.4%	697	88.2%	93	11.8%

Science was being reported mainly to parents (94.6%). There was less communication about student achievement in science between teachers at intermediate schools than other schools.

Q38b Is the reporting being done in relation to:

		.. achievement objectives?				... levels?			
		Yes		No		Yes		No	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %
School Type - MOE code	Cont. Prim. Year 1-6	232	92.8%	18	7.2%	186	85.7%	31	14.3%
	Full Prim. Year 1-8	220	90.5%	23	9.5%	198	87.2%	29	12.8%
	Intermed. Year 7-8	36	92.3%	3	7.7%	28	80.0%	7	20.0%
	Secondary Year 7-15	25	83.3%	5	16.7%	28	87.5%	4	12.5%
	Secondary Year 9-15	99	76.7%	30	23.3%	98	73.7%	35	26.3%
	Comp./Restrict. Comp	18	90.0%	2	10.0%	15	83.3%	3	16.7%
	Comp. Area School	13	100%			11	100%		
	Special School	7	100%			4	100%		
	Correspondence - primary	11	100%			9	90.0%	1	10.0%
	Correspondence - secondary	11	100%			10	100%		
	Total	672	89.2%	81	10.8%	587	84.2%	110	15.8%

Reporting in science was being done mainly in relation to the achievement objectives (89.2%) and the achievement levels (84.2%).

Reporting science achievement was also done in relation to the success of topics or units of work in the case of almost 10% of secondary teachers. Some intermediate and special-school teachers used specific learning outcomes. Some secondary school teachers used scientific skills and attitudes. A few teachers used science fair results and benchmarks to report achievement in science.

Q39 What issues have arisen for you in assessing and reporting on student progress and achievement in science?

		Time factor/ too much paperwork for required assessment		The need to use different assessment e.g. formative		Establishing level accuracy		Parents/ BOT not understanding curriculum		Diverse abilities/ages/ levels in one class	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Cont. Prim. Year 1-6	41	14.2%	38	13.2%	13	4.5%	6	2.1%
Full Prim. Year 1-8	24		8.7%	24	8.7%	14	5.1%	12	4.3%	8	2.9%
Intermed. Year 7-8	8		19.0%	3	7.1%	1	2.4%			2	4.8%
Secondary Year 7-15	7		17.9%	3	7.7%	4	10.3%	3	7.7%	1	2.6%
Secondary Year 9-15	28		17.8%	20	12.7%	13	8.3%	13	8.3%	4	2.5%
Comp./Restrict. Comp	5		20.0%	2	8.0%	1	4.0%	1	4.0%	2	8.0%
Comp. Area School						1	7.7%	1	7.7%	1	7.7%
Special School	1		9.1%								
Correspondence - primary	1		7.7%					1	7.7%		
Correspondence - secondary	1		9.1%	1	9.1%			1	9.1%	1	9.1%
Total	116		13.3%	91	10.4%	47	5.4%	38	4.3%	36	4.1%

The most frequent issue (13.3%) in assessing and reporting, especially for secondary teachers, was that of the paper work required:

Assessment, recording and reporting has become a monster that threatens to disrupt learning. [secondary]

Insufficient time and support to handle the paper work. [composite/restricted composite]

Some teachers (10.4%) recognised that they needed to refine their assessment in science:

Mainly summative – needs to be more formative and process related, rather than knowledge related. [primary]

Group work is often necessary, but it is very difficult to ascertain individual input and progress in such situations. [secondary]

There were teachers who were concerned with establishing consistent understanding of the levels:

We need PD to have some benchmarks for each level, no opportunities for this to happen – contributing schools. Other curriculum areas provide these opportunities. [primary]
The low level of academic ability of some students makes any testing difficult and often irrelevant. [secondary]

Poor assessment systems in Science Dept. lead to variable results between teachers. [secondary]

The difficulty in deciding whether they are working at level 3 or 4 when between levels. [secondary]

Some teachers had concerns that parents may not understand what was reported:

Report to be in bilingual in order for the parents to understand. (Bilingual class) [primary]

Helping parents understand the differences between work in the Alternative Programme Dept and work in the mainstream. [secondary]

Producing grades that parents and caregivers can understand. The move to achievement standard based reporting is more meaningful I believe. [secondary]

We are told to report to parents on AO's but what does "5.1 MW" mean to a parent? [secondary]

Actual physical design and layout of report: what is included, keeping it appropriate to parents' understanding, how similar/standardized reports from different subjects should be. [secondary]

Teachers who had classes of students with a wide range of abilities reported difficulties in developing assessment tasks that were sensitive to the range of student understanding:

Difficult to apply a single 'level' grade when some students show ability in one science aspect but not others. [primary]

Handling science – open enough assessment to allow children understanding to be across levels. [primary])

Because of teaching programme restrictions, cannot really assess students from one class at different levels. [composite/restricted composite]

As well as NCEA issues, that concerned 13.4% of secondary Y9-15 teachers, there were several other less frequently mentioned issues including: lack of assessment experience; lack of Ministry guidance; identifying areas to improve and develop; poor student motivation; large classes; finding assessment

tools for younger children; relating tasks to the achievement objectives and specific learning outcomes and developing an idea of progression.

Q40 What has been the influence of school self-review on your teaching of science?

		Q40a What has been the influence of school self-review on your teaching of science ?										Total	
		Very positive		Positive		Not very positive		Not at all positive		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	23	8.8%	133	50.8%	14	5.3%	4	1.5%	88	33.6%	262	100%
	Full Prim. Year 1-8	16	6.5%	139	56.5%	15	6.1%	2	.8%	74	30.1%	246	100%
	Intermed. Year 7-8	3	8.1%	20	54.1%	2	5.4%			12	32.4%	37	100%
	Secondary Year 7-15	3	7.9%	23	60.5%	3	7.9%			9	23.7%	38	100%
	Secondary Year 9-15	10	7.1%	83	58.9%	15	10.6%			33	23.4%	141	100%
	Comp./Restrict. Comp	6	26.1%	11	47.8%	1	4.3%	1	4.3%	4	17.4%	23	100%
	Comp. Area School	1	7.7%	7	53.8%	1	7.7%			4	30.8%	13	100%
	Special School	1	11.1%	3	33.3%					5	55.6%	9	100%
	Correspondence - primary			2	20.0%					8	80.0%	10	100%
	Correspondence - secondary	1	9.1%	7	63.6%			1	9.1%	2	18.2%	11	100%
Total		64	8.1%	428	54.2%	51	6.5%	8	1.0%	239	30.3%	790	100%

Over half (54.2%) of the teachers had found self-review to be a positive influence upon their teaching and 8.1% found it very positive – they felt that school and/or departmental self-review gave useful insights into how and what they taught:

Acknowledgement of positive aspects of programme. Improvement where necessary. [secondary]

Of the 248 teachers who described positive influences of school self-review, 104 explained that review enabled areas for improvement to be identified, owned and relevant changes made, e.g., skills, professional development, resources, planning, objectives, mutual support and student needs. Some teachers did, however, acknowledge that school self-review was a time-consuming process that could produce a lot of work in making changes, or fail to result in needed changes.

Q41 What has been the influence of external review/evaluation (e.g., ERO) on the implementation of the science curriculum statement in your school?

		Q41a What has been the influence of external review/evaluation (eg ERO) on the implementation of the science curriculum statement in your school?										Total	
		Very positive		Positive		Not very positive		Not at all positive		Don't know		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Cont. Prim. Year 1-6	29	11.5%	94	37.3%	10	4.0%	5	2.0%	114	45.2%	252	100%
	Full Prim. Year 1-8	22	8.9%	111	44.8%	15	6.0%			100	40.3%	248	100%
	Intermed. Year 7-8	2	5.6%	10	27.8%	1	2.8%	2	5.6%	21	58.3%	36	100%
	Secondary Year 7-15	2	5.6%	18	50.0%	3	8.3%	1	2.8%	12	33.3%	36	100%
	Secondary Year 9-15	12	8.6%	64	46.0%	14	10.1%	4	2.9%	45	32.4%	139	100%
	Comp./Restrict. Comp	6	26.1%	6	26.1%	3	13.0%			8	34.8%	23	100%
	Comp. Area School	1	9.1%	7	63.6%					3	27.3%	11	100%
	Special School	1	11.1%	1	11.1%	1	11.1%			6	66.7%	9	100%
	Correspondence - primary			2	20.0%					8	80.0%	10	100%
	Correspondence - secondary	1	10.0%	2	20.0%	2	20.0%	1	10.0%	4	40.0%	10	100%
Total		76	9.8%	315	40.7%	49	6.3%	13	1.7%	321	41.5%	774	100%

Of the teachers responding to this question, 41.5% did not know what the influence of external review had been on the implementation of the science curriculum. However, more teachers (50.5%) considered external review had been of a very positive or positive nature than of a negative nature (8%):

A positive report means we are doing the right things, so we carry on without much change. [primary]

Aspects of external review that teachers appreciated included the way ERO enabled them to review their planning and teaching, i.e., gave useful feedback, and the identification of areas that needed revision, e.g., policy, scheme, assessment and reporting. Some teachers found the external review to be too judgemental and concerned with minor details, and out of touch with the realities of the classroom.

A difficult job – teaching: too little time... but ERO does not seem concerned. ‘Big brother’ attitude. Maybe the new ERO direction – assistance, may be better! [secondary]

Q42 Is there anything about the statement not already covered that you would like to add?

Only 6.9% of teachers had additional comments at the end of the junior part of the questionnaire. Their comments may be broadly classified into those concerning resources and those concerning assessment.

The curriculum statement is fine – what is lacking is our overall approach to implementation, and enough resources for student use to support it. There seems to be a perpetual cycle of reinventing the wheel in every school across the country. [secondary]

As a teacher, new enough to the profession to remember my first year, I am still surprised at the lack of resources from the Ministry. It seems the trend has been to let schools and commercial interests develop these resources. However in the past the Ministry was sponsoring the development of resources like 7th form Biology books, by teachers. I believe that Internet technology could be used to get teachers to cooperate on preparing resources and making them available to all teachers. [secondary]

A primary teacher summed up with an enthusiastic comment:

I enjoy teaching Science and I am sure this rubs off on the children. Topics are so varied but its so hands-on which little children love.

THE SENIOR SCIENCE CURRICULUM STATEMENTS

From the total sample of 875 respondents to the questionnaire, there were 189 teachers who responded to questions 43 – 56 on senior science, years 11-13. These teachers taught from the senior science curriculum statements. In this section of the report the tables and commentary refer specifically to the sample of 189 senior science teachers. Where the questions were of a qualitative nature, the responses come from the randomly selected sample of 100 responses from the total sample of 875. Out of this sample of 100, there were 28 teachers who taught from the senior science curriculum statements and it is their responses that are referred to in this section.

The 189 senior science teachers came from the following school types:

School Type (eg Full Primary, Contributing etc according to MOE code)

	Frequency	Percent
Secondary Year 7-15	31	16.4
Secondary Year 9-15	131	69.3
Comp./Restrict. Comp	16	8.5
Comp. Area School	1	.5
Correspondence - secondary	10	5.3
Total	189	100.0

Most of the schools were State co-educational schools in urban areas:

State/private or independent/or State and integrated school

	Frequency	Percent
State	150	79.4
Private or independent school	17	9.0
Integrated and State	22	11.6
Total	189	100.0

Co-educational/boys/girls school

	Frequency	Percent
Co-educational	137	72.5
Boys	25	13.2
Girls	27	14.3
Total	189	100.0

Urban/rural school

	Frequency	Percent
Urban	171	90.5
Rural	8	4.2
99	10	5.3
Total	189	100.0

The teachers were mainly classroom/subject teachers:

Q1 What is your position in your school?

	Frequency	Percent
Principal	3	1.6
Deputy/Assistant /Associate Principal	7	3.7
Curriculum/Syndicate Leader	7	3.7
HOD/Head of Faculty	51	27.0
Classroom teacher/Subject teacher	121	64.0
Total	189	100.0

Nearly half (44.4%) of the teachers held a leadership position in science – either as HOD, curriculum leader or responsible for a science area. Just over one half (53.4%) of the teachers had been teaching for more than 15 years and almost one half (49.7%) had been teaching science for more than 15 years.

Teachers who responded to questions 43 - 56 not only taught from the senior curriculum statements; sometimes they also taught junior classes from the *Science in the New Zealand Curriculum* statement:

		Year 6		Year 7		Year 8		Year 9		Year 10		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
School Type - MOE	Secondary Year 7-15	1	3.2%	2	6.5%	8	25.8%	19	61.3%	17	54.8%	31	100%
	Secondary Year 9-15					1	.8%	96	73.3%	94	71.8%	131	100%
	Comp./Restrict. Comp	1	6.3%	3	18.8%	5	31.3%	11	68.8%	13	81.3%	16	100%
	Comp. Area School							1	100%	1	100%	1	100%
	Correspondence - secondary							5	50.0%	6	60.0%	10	100%
Total		2	1.1%	5	2.6%	14	7.4%	132	69.8%	131	69.3%	189	100%

Of those teaching the senior science classes, more taught year 11 than the other two year levels:

		Year 11		Year 12		Year 13		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %
School Type - MOE code	Secondary Year 7-15	21	67.7%	25	80.6%	21	67.7%	31	100%
	Secondary Year 9-15	121	92.4%	111	84.7%	76	58.0%	131	100%
	Comp./Restrict. Comp	13	81.3%	12	75.0%	10	62.5%	16	100%
	Comp. Area School	1	100%	1	100%			1	100%
	Correspondence - secondary	8	80.0%	8	80.0%	8	80.0%	10	100%
Total		164	86.8%	157	83.1%	115	60.8%	189	100%

Q6b If you teach science in years 11, 12 or 13, what science areas are you teaching?

The science subjects taught in the senior years included those for which curriculum statements have been written (biology, chemistry and physics) and others. Some teachers were teaching in more than one science area at senior level.

		Biology		Chemistry		Physics		Science		agriculture/ horticulture		alt sci course		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Secondary Year 7-15	13	41.9%	10	32.3%	10	32.3%	13	41.9%	4	12.9%		
	Secondary Year 9-15	69	52.7%	37	28.2%	29	22.1%	77	58.8%	4	3.1%	7	5.3%	131	100%
	Comp./ Restrict. Comp	4	25.0%	6	37.5%	6	37.5%	12	75.0%					16	100%
	Comp. Area School	1	100%					1	100%			1	100%	1	100%
	Correspondence - secondary	2	20.0%	3	30.0%	3	30.0%	4	40.0%	2	20.0%			10	100%
Total		89	47.1%	56	29.6%	48	25.4%	107	56.6%	10	5.3%	8	4.2%	189	100%

Q43 Which of the following senior science curriculum statements do you use and at what level(s)?

This question asked senior science teachers to say which of the senior curriculum statements they used with their classes. In looking at the findings it should be noted that teachers may not only have been teaching at more than one level but also may have been teaching more than one science area.

There were 89 teachers who taught senior biology. The biology curriculum statement was used by 41 (46.0%) teachers at year 11, 66 (74.1%) teachers at year 12 and 46 (51.7%) teachers at year 13.

Senior chemistry was taught by 56 teachers. The chemistry curriculum statement was used by 28 (50.0%) teachers at year 11, 55 (98.2%) teachers at year 12 and 42 (75.0%) teachers at year 13.

There were 48 teachers who taught senior physics. The physics curriculum statement was used by 32 (66.6%) teachers at year 11, 47 (97.9%) teachers at year 12 and 39 (81.2%) teachers at year 13.

The physics curriculum statement was the most frequently used curriculum statement, followed by the chemistry statement and then the biology statement. Overall, significantly more teachers at the Year 12 level used the senior science curriculum statements.

The next question probed into the ways in which the statements were being used:

Q44 How often do you refer to the senior science curriculum statements when planning the following for senior students:

schemes of work

		Q44a How often do you refer to the senior science curriculum documents when planning the following for senior students...schemes of work?										Total	
		Very often		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Secondary Year 7-15	7	23.3%	15	50.0%	6	20.0%	2	6.7%			30	100%
	Secondary Year 9-15	40	33.6%	40	33.6%	18	15.1%	15	12.6%	6	5.0%	119	100%
	Comp./Restrict. Comp	6	46.2%	1	7.7%	4	30.8%	2	15.4%			13	100%
	Comp. Area School	1	100%									1	100%
	Correspondence - secondary	3	50.0%	2	33.3%	1	16.7%					6	100%
Total		57	33.7%	58	34.3%	29	17.2%	19	11.2%	6	3.6%	169	100%

units of work

		Q44b How often do you refer to the senior science curriculum documents when planning the following for senior students...units of work?										Total	
		Very often		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Secondary Year 7-15	3	10.3%	11	37.9%	10	34.5%	5	17.2%			29	100%
	Secondary Year 9-15	28	23.3%	35	29.2%	29	24.2%	21	17.5%	7	5.8%	120	100%
	Comp./Restrict. Comp	2	16.7%	4	33.3%	4	33.3%	2	16.7%			12	100%
	Comp. Area School							1	100%			1	100%
	Correspondence - secondary	3	42.9%	2	28.6%	1	14.3%	1	14.3%			7	100%
Total		36	21.3%	52	30.8%	44	26.0%	30	17.8%	7	4.1%	169	100%

lessons

		Q44c How often do you refer to the senior science curriculum documents when planning the following for senior students...lessons?										Total	
		Very often		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Secondary Year 7-15	1	3.6%	7	25.0%	7	25.0%	12	42.9%	1	3.6%	28	100%
	Secondary Year 9-15	6	5.0%	16	13.4%	30	25.2%	43	36.1%	24	20.2%	119	100%
	Comp./Restrict. Comp	1	8.3%	1	8.3%	4	33.3%	6	50.0%			12	100%
	Comp. Area School									1	100%	1	100%
	Correspondence - secondary	4	57.1%			1	14.3%	1	14.3%	1	14.3%	7	100%
Total		12	7.2%	24	14.4%	42	25.1%	62	37.1%	27	16.2%	167	100%

Teachers were using the senior curriculum statements more often for planning schemes of work for their senior students than for planning specific units of work or for planning lessons.

Q45 How often do you use the following documentation to support your day-to-day lesson planning?

		Q45a How often do you use the following documentation to support your day to day lesson planning...school schemes?										Total	
		Very often		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Secondary Year 7-15	6	20.7%	16	55.2%	4	13.8%	3	10.3%	1	8%	29	100%
	Secondary Year 9-15	53	44.2%	42	35.0%	17	14.2%	7	5.8%			120	100%
	Comp./Restrict. Comp	6	40.0%	3	20.0%	2	13.3%	2	13.3%	2	13.3%	15	100%
	Comp. Area School					1	100%					1	100%
	Correspondence - secondary	2	50.0%							2	50.0%	4	100%
Total		67	39.6%	61	36.1%	24	14.2%	12	7.1%	5	3.0%	169	100%

		Q45b How often do you use the following documentation to support your day to day lesson planning...prescription?										Total	
		Very often		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Secondary Year 7-15	4	14.8%	10	37.0%	10	37.0%	2	7.4%	1	3.7%	27	100%
	Secondary Year 9-15	25	21.0%	36	30.3%	37	31.1%	17	14.3%	4	3.4%	119	100%
	Comp./Restrict. Comp	1	7.1%	7	50.0%	4	28.6%			2	14.3%	14	100%
	Comp. Area School					1	100%					1	100%
	Correspondence - secondary	3	60.0%							2	40.0%	5	100%
Total		33	19.9%	53	31.9%	52	31.3%	19	11.4%	9	5.4%	166	100%

		Q45c How often do you use the following documentation to support your day to day lesson planning...other resource materials?										Total	
		Very often		Often		Sometimes		Rarely		Never		Count	Row %
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %		
School Type - MOE code	Secondary Year 7-15	6	24.0%	14	56.0%	4	16.0%	1	4.0%			25	100%
	Secondary Year 9-15	46	41.1%	39	34.8%	18	16.1%	7	6.3%	2	1.8%	112	100%
	Comp./Restrict. Comp	1	8.3%	7	58.3%	2	16.7%			2	16.7%	12	100%
	Comp. Area School	1	100%									1	100%
	Correspondence - secondary	3	60.0%							2	40.0%	5	100%
Total		57	36.8%	60	38.7%	24	15.5%	8	5.2%	6	3.9%	155	100%

Teachers most frequently used school schemes and other resource materials to support their day-to-day lesson planning.

Q46 How are you teaching the senior science curriculum knowledge?

This question asked teachers to tick the appropriate boxes in their subject area: *in traditional topic or content areas*, *in context across content/topic areas*, and *in contexts within traditional content/topic areas*. Teachers were able to tick more than one box.

Biology

Of the 89 teachers who taught from the senior biology curriculum statement, 64 (71.9%) reported teaching biology *in traditional topic or content areas*, 11 (12.4%) taught biology *in context across content/topic areas* and ten (11.2%) taught biology *in contexts within traditional content/topic areas*.

Chemistry

Of the 56 teachers who taught from the senior chemistry curriculum statement, 43 (76.8%) reported teaching chemistry *in traditional topic or content areas*, 16 (28.6%) taught chemistry *in contexts within traditional content/topic areas*, and five (8.9%) taught chemistry *in context across content/topic areas*.

Physics

Of the 48 teachers who taught from the senior physics curriculum statement, 33 (68.8%) reported teaching physics *in traditional topic or content areas*, 12 (25.0%) taught physics *in contexts within traditional content/topic areas*, and eight (16.7%) taught physics *in context across content/topic areas*.

Teachers were most likely to be teaching the senior science subjects *in traditional topic or content areas*. About one quarter of chemistry and physics teachers taught *in contexts within traditional content or topic areas*. Few teachers taught *in context across content or topic areas*.

Q47 In your teaching of senior science, when do the students carry out an independent long-term investigation?

Of the 89 teachers who taught from the senior biology curriculum statement, 54 (60.7%) reported that an independent long-term investigation was carried out in year 13, there were 29 teachers (32.6%) who reported that an independent long-term investigation was carried out in year 12, and eight teachers (9.0%) reported that an independent long-term investigation was carried out in year 11.

Of the 56 teachers who taught from the senior chemistry curriculum statement, 37 (66.1%) reported that an independent long-term investigation was carried out in year 12, there were 12 teachers (21.4%) who reported that an independent long-term investigation was carried out in year 13, and four teachers (7.1%) reported that an independent long-term investigation was carried out in year 11.

Of the 48 teachers who taught from the senior physics curriculum statement, 26 (54.2%) reported that an independent long-term investigation was carried out in year 12, there were 20 teachers (41.7%) who reported that an independent long-term investigation was carried out in year 13, and six teachers (12.5%) reported that an independent long-term investigation was carried out in year 11.

Long-term investigations in biology were more likely to be undertaken in year 13, whereas long-term investigations in chemistry and physics were more likely to be undertaken in year 12.

Q48 If you do a long-term investigation, please describe the structure of the main investigation you use:

Approximately 60% of senior science teachers (n=189) described a typical long-term investigation. From the sub-sample of 28, there were twenty-two teachers who described a long-term investigation in response to this question. Four of the five physics teachers stated that students undertook a long-term investigation in year 13. Topics for this included medical physics and astrophysics. Two teachers described year 12 investigations. The most comprehensive response was:

Y12 -three weeks to complete it. Some physics-related principle/application of students choosing. Must only involve investigating the effect of one variable on another (not an already well-understood system, e.g., simple pendulum). [secondary physics teacher]

Of the nine responses about chemistry investigations, seven described year 12 investigations. Some teachers indicated that their students designed their own investigations, others that the students were able to choose experiments from a set provided by the teacher. Three teachers used investigations based around titrations. Eight of the nine teachers indicated that investigative work had a practical component and could involve investigating a real-life question.

Students choose a topic where they can involve a quantitative analysis and research chemical and society implications, e.g., what % vitamin C in kiwifruit- what chemistry, health issues etc. [secondary chemistry teacher]

Y12: I leave it quite broad, but give students suggested topics (usually titration work), e.g., which brand of aspirin is best? SO₂ content of wine. [secondary chemistry teacher]

Y12: An investigation of an industrial process from within New Zealand detailing the local method of production. Presentation to be done in written, oral and PowerPoint. No practical investigation this year, because I'm following the school's old approved scheme. [secondary chemistry teacher]

Eight teachers provided descriptions of biology investigations. Of these seven were at year 13, part of the University Bursary course, and included a plant and an animal study. There was considerable variation in the studies:

Biology Y13, two investigations: Animal (six weeks,) Plant (four weeks). Students design and carry out an investigation into aspects of the ecological niche of a plant/animal during this time; mini-deadlines are given throughout the period. [secondary biology teacher]

Y12 and13 Biology – One-week plant study followed by one-week preparation for animal study. Three days/nights on location at tidal area, pupils carry out self-planned investigations. [secondary biology teacher]

Q49 In each statement there is an objective relating to interaction with people, their environment and/or society. How do you deal with this objective?

Q49d How do you deal with the objective relating to interaction with people, their environment and/or society?

		Incorporate into a few topics/content areas		Incorporate into most topics/content areas		Student synthesis of info from teacher		Independent student research on defined topic(s)		Independent student research on self-selected topic(s)		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
		School Type - MOE code	Secondary Year 7-15	11	35.5%	8	25.8%	4	12.9%	9	29.0%	9	29.0%
	Secondary Year 9-15	63	48.1%	31	23.7%	11	8.4%	33	25.2%	17	13.0%	131	100%
	Comp./Restrict. Comp	5	31.3%	3	18.8%			3	18.8%	4	25.0%	16	100%
	Comp. Area School	1	100%									1	100%
	Correspondence - secondary	5	50.0%	1	10.0%			2	20.0%	1	10.0%	10	100%
Total		85	45.0%	43	22.8%	15	7.9%	47	24.9%	31	16.4%	189	100%

Almost half (45%) of the teachers incorporated this objective into a few topics or content areas. A quarter of teachers (24.9%) encouraged independent student research on defined topics to incorporate this objective.

Q50 How do you assess this objective?

Approximately 20% of senior science teachers (n=189) responded to this question. From the sub-sample of 28, there were 20 teachers who reported that they assessed the objective relating to interaction with people, their environment and/or society through essays, research projects, seminars, essays and practical work and tests. Four commented that the assessment was integrated into projects or other assessment tasks, for example:

Keep a conservation scrapbook, research a conservation topic and write an essay on history, why is this an issue, what's being done about it, etc. [secondary biology teacher]

Research topic where students are asked to defend a position about the sustainability of crayfish/development of new birth technologies. [secondary biology teacher]

Through individual research assignments, e.g., A Famous Chemist, Careers in Chemistry, Organic Chemistry and Industry. [secondary chemistry teacher]

Q51 What are the major challenges you have faced in implementing the senior science statement?

Half (50.8%) of senior science teachers (n=189) responded to this question. From the sub-sample of 28, there were 18 teachers who described the challenges they faced in implementing the senior science curriculum statements. There was no consensus amongst the six physics teacher respondents. The issues they raised included lack of equipment, NCEA workload, students with poor motivation, mathematical skills and general understanding, coverage and difficulties in finding appropriate assessment tasks.

Difficulties with ensuring coverage of the year 13 course were mentioned by two of the six chemistry teacher respondents. Their other concerns included lack of preparation time, the challenge of making the content and contexts relevant and increased extra-curriculum demands on students. A new teacher commented that he/she found prescriptions useful because they were more specific. Of the six biology teacher respondents, three mentioned the need to update their own knowledge (particularly in relation to genetics). Other challenges included difficulties in covering the course and a lack of resources (space, access to field trips and equipment).

Q52 Have you had any professional development related to a senior science statement?

Of the 89 teachers who taught from the senior biology curriculum statement, 38 (42.7%) reported that that they had received professional development related to senior biology.

Of the 56 teachers who taught from the senior chemistry curriculum statement, 31 (55.4%) reported that that they had received professional development related to senior chemistry.

Of the 48 teachers who taught from the senior physics curriculum statement, 20 (41.6%) reported that that they had received professional development related to senior physics.

More chemistry teachers had received professional development related to their curriculum statement than teachers of other senior science areas. Less than 50% of teachers who taught from the senior biology and physics curriculum statements had received professional development related to the documents they teach from.

Q53 If you have received any professional development in a senior science statement, in what ways has it helped/not helped you in your teaching?

Q53 In what ways has professional development in a senior science statement helped/not helped you in your teaching:

		helped		did not help		Total	
		comment		comment		Count	Row %
		Count	Row %	Count	Row %		
School Type - MOE code	Secondary Year 7-15	6	19.4%	1	3.2%	31	100%
	Secondary Year 9-15	16	12.2%	5	3.8%	131	100%
	Comp./Restrict. Comp	4	25.0%	1	6.3%	16	100%
	Comp. Area School	1	100%	1	100%	1	100%
	Correspondence - secondary	4	40.0%			10	100%
Total		31	16.4%	8	4.2%	189	100%

From the sub-sample of 28, there were 17 teachers who described ways in which professional development related to the senior science statements had helped them in their teaching. The key benefits

of professional development indemnified by the 17 teacher respondents were the opportunity to share teaching ideas and to up-date their own knowledge by working with colleagues. Subject conferences were mentioned as beneficial in this regard by three of the teachers:

Provided interesting examples to use in class, e.g., Bio-live Conference spoke about the use of genetics in criminal investigations. [secondary biology teacher]

My knowledge in the area of GM was very scratchy, and an in-depth knowledge is essential to be able to teach it effectively. [secondary biology teacher]

It allows one to network and establish contacts, and to pick up a pool of fresh teaching ideas. [secondary chemistry teacher]

Four teachers reported the professional development they had experienced had not helped in their teaching, the main reason being that ideas they gained were difficult to implement because of lack of resources:

Took an unrealistic application which time-wise is hard to implement. [secondary chemistry teacher]

A number of procedures require very expensive (i.e., \$100's and \$1000's) specialist equipment which can only be described to students. [secondary biology teacher]

Promised resources not yet seen. [secondary biology teacher]

One teacher expressed frustration that the professional development had taken so long to be made available:

Increased my personal knowledge and understanding e.g., Biotech procedures – NOT within my degree, now 20yrs old, yet I have been expected to teach it effectively for the last 5 years – 1st available course, and able to attend –2000. [secondary biology teacher]

Q54 Describe an example from your senior classroom work that has been effective in improving your students' learning in this senior science curriculum subject.

Just over half (51.9%) of senior science teachers (n=189) responded to this question. From the sub-sample of 28, there were 22 teachers who described examples of effective senior classroom work. In general teachers had found that the use of ICT was helpful, that long-term investigations helped students to develop techniques and confidence, and an emphasis on practical work linked to problem solving and challenges was very effective in improving students' learning.

In biology, teachers referred to an interactive way of teaching as being a very effective way to improve student learning:

Jigsaws in evolution (Y12) – encourages student talk rather than teacher talk. [secondary biology teacher]

Interactive activities, experiential activities. In groups, each given a biological concept, have to design an activity using themselves, involving the rest, shows how their system/concept works. [secondary biology teacher]

Using more group/interactive ways of teaching, using discussions and practical experiments when teaching gene tech to Y13 (from "Bio decisions" and "Gene Technology" books). [secondary biology teacher]

They also used individual investigations and student presentations to improve student learning:

Students presenting a concept to class – individually or in groups (with visual aids, e.g., OHTs, posters, models etc) ensures students understand the concept and have to 'use' specialised vocabulary. [secondary biology teacher]

Field trips were described by three of the five chemistry teachers in the sample:

Taking the class on a field trip to Nuplex Industries, talking with lab technicians and seeing chemistry in the real world with economic consequences on a global scale. [composite/restricted composite chemistry teacher]

Field trip to a local tertiary institute and/or labs to see science at work, and do experiments that can't be done at school. Use of the computer aided temp/PH/resistance/... probes to do experiments that took ages before. [secondary chemistry teacher]

One chemistry teacher held after-school tutorials:

Y13 The use of a weekly after-school tutorial to allow students to reinforce what has been covered, to revisit Y12 work from equivalent topics, to just 'talk chemistry'. [secondary chemistry teacher]

In physics, one teacher described how the use of electronic software had helped the students, and one teacher had found that by designing and building items from yo-yos to capacitors assisted the students to put the theory into practice:

They had to build a 2 μ F capacitor using paper and tinfoil. They used theory previously covered to calculate what was needed – very effective. [secondary physics teacher]

Q55 Is there anything not already covered that you would like to add?

A small number (12.7%) of senior science teachers (n=189) responded to this question. From the sub-sample of 28, there were ten teachers who made further comments. Of these, five identified workload and lack of resources as an impediment to their implementing the curriculum. This concern is a universal one as the two quotes that follow show - the first is from a teacher in a high decile secondary school; the second is from a teacher in a low decile secondary school:

We need more time for preparation etc., more technical help so we can provide more practical experiences, more space so students can leave extended experiments. No point spending all this time answering questions unless something gets done! Could be money better spent. [secondary biology teacher]

Technician support is vital to science teachers to enable them to offer a wide range of practical experiences, without sufficient technician support the delivery of many aspects of the course is almost impossible. Is vital to science teachers to enable them to offer a wide range of practical experiences, without sufficient technician support the delivery of many aspects of the course is almost impossible. [secondary physics teacher]

CHAPTER FIVE: CONCLUSIONS

SCIENCE QUESTIONNAIRE FINDINGS

- Leadership positions in science were held by 29.2% of teachers.
- The largest category of teachers had been teaching for more than 15 years (43.7%).
- Primary, intermediate, composite area school and primary correspondence teachers were most likely to have taken 6th Form Certificate science as their highest qualification in science.
- Over 85% of secondary school teachers held a science degree.
- The most common challenges facing primary teachers in implementing the science curriculum were difficulties with resourcing and equipment, finding time in a crowded curriculum and concerns with their own level of content knowledge.
- The most common challenges facing secondary teachers in implementing the science curriculum were difficulties with resourcing and equipment, finding time in a crowded curriculum, modifying the curriculum to the students' level of understanding and the organisation required for practical work.
- Primary and intermediate teachers tended to have a medium degree of confidence, whereas secondary teachers reported a high degree of confidence.
- The most important factor contributing to the degree of confidence felt by teachers was teaching experience (79.5%). Most teachers also felt that their own knowledge of science was an important factor (74.4%).

Impact of curriculum structure and assessment and compliance practices on teaching and learning

- Overall, one half of teachers found the science curriculum statement to be 'user-friendly' and one third found it to be 'user-friendly in some ways'.
- The science curriculum statement has been of most help in planning the school or department programme and in planning the classroom programme.
- The statement has been of least help in communicating student achievement to teachers at other schools and in meeting the needs of Māori students in the classroom.

Contextual strands

- Primary and intermediate teachers tended to cover each strand over a two-year period with some combination, whereas secondary teachers favoured covering each strand each year separately.
- Primary teachers found that providing learning experiences in the Living World was the easiest, followed by Planet Earth and Beyond, the Material World and then the Physical World
- Secondary teachers found that providing learning experiences in the Living World was the easiest, followed by the Material World, the Physical World and then Planet Earth and Beyond.
- Facilities and resources were the most important factors influencing the ease with which teachers were able to provide learning experiences in the Material and Physical Worlds. The confidence teachers had in their ability to teach science skills in these strands was also an important factor.
- The ‘interests of students’ was the most important factor influencing the ease with which teachers were able to provide learning experiences in Planet Earth and Beyond.
- The ‘teachers’ own interests’ was the most important factor influencing the ease with which teachers were able to provide learning experiences in the Living World.

Integrating strands

- Many teachers incorporated the integrating strand ‘Making Sense of the Nature of Science and its Relationship to Technology’ by incorporating aspects of the strand into the science topic or unit being taught.
- To ensure coverage of the integrating strand ‘Developing Scientific Skills and Attitudes’, secondary and intermediate teachers tended to teach skills and attitudes as needed; whereas primary teachers were equally divided between doing this and planning for investigative work in each unit of work.
- Over two thirds of teachers found there was sufficient information in the science statement and supporting documents to enable them to teach the integrating strands.
- Teachers who had difficulty in teaching the integrating strands said they would appreciate clear guidelines and detailed exemplars at each level.

General issues

- There was a general degree of satisfaction with the curriculum statement in that less than 23% of teachers wanted to make changes. The largest group who wanted to make changes to the structure organisation were secondary year 7-15 teachers (34.2%). The largest group who wanted to make changes to the content were secondary year 9-15 teachers (36.7%).
- The main suggestion for change to the structure or organisation of the statement from the sub-sample was that more detail be provided, particularly on the ‘big ideas’ as a support for teacher planning and to ensure children changing schools were not disadvantaged.
- The main suggestion for change to the content of the statement from the sub-sample was that of clarifying and differentiating what is required at each level and reducing the overall content to allow time for “higher order thinking and problem solving”.

Achievement objectives

- Nearly half the teachers found the achievement objectives to be ‘about right’ (44.9%), however there was some dissatisfaction with the breadth of the achievement objectives and this was focused in the secondary schools.

Curriculum resourcing and support

- More than 80% of primary and intermediate teachers had made use of the Making Better Sense series.
- The School Journal had been used by over 60% of primary teachers.
- The TKI website had been accessed by 49.3% of teachers.
- Teachers appreciated the clarity of the Ministry of Education resources and liked the way they had been set out. They felt that they could adapt the resources to suit their own needs.
- Over half the teachers (57%) across all school types chose ‘resources, teachers’ guides and assessment examples that have been trialled and nationally distributed’ as the most important resource to support effective implementation of the curriculum.
- ‘Household resources’ were the most frequently used resource across most school types.
- Teachers in composite and composite-restricted schools made the most use of computer software/websites.
- Secondary teachers made the most use of write-on resources.
- Primary and composite/composite-restricted composite schools were able to make class visits with their classes the most often.
- Over 90% of secondary teachers used specialised laboratory equipment and resources ‘often’ or ‘sometimes’ compared to less than 45% of primary teachers and 55% of intermediate teachers.
- Approximately 90% of secondary teachers used textbooks ‘often’ or ‘sometimes’ compared to less than 50% of primary and intermediate teachers.

Professional development

- The most useful source of professional development to over 65% of teachers was ‘other teachers in the school’. Books and journals (62.1%) and School Support Services (35.1%) were also considered useful.
- Teachers reported that professional development had helped by providing an opportunity to share ideas for planning and implementing science lessons.
- Only 16.3% of teachers considered that professional development in science had provided adequate support for them to improve the achievement of Māori students – the most frequent comment was that there had been no specific reference to Māori students. A few teachers who had received professional development in science that had been taken by Māori providers had found the experience helpful.
- Teachers were most interested in receiving professional development in a specific science area or strand. Teachers across all year levels asked for “increased access to resources”.

Curriculum implementation*Primary implementation:*

- Nearly three quarters of primary and intermediate teachers were integrating science with other learning areas. Primary teachers also favoured block or module teaching of science.
- Primary teachers tended to integrate science with technology and English.
- Primary teachers were well supported by team and syndicate planning, and half of primary and intermediate teachers taught in schools where there was a well-developed school scheme for science.

Secondary implementation:

- Secondary school teachers were mostly teaching science as a subject with its own timetable slots. They reported little integration of science.
- Secondary teachers tended to be supported by a well-developed school scheme for science and to have good access to professional development. They had good lab technician support and were more likely to have access to lesson units written by specialist science teachers.

Teaching approaches:

- Across all school types the most emphasis was placed on problem solving skills and information skills; the least emphasis on physical skills.
- Most teachers said that they ‘used’ or ‘sometimes used’ an investigative approach in their science programme. The activities they described required active student participation. ‘Hands on’ activities were considered to be effective in improving students’ learning in science.
- Less than half of the teachers said they were able to include Māori knowledge about the natural and physical world in their science programme, mainly due to limited teacher knowledge.

Inclusiveness:

- Gender issues for teachers consisted of the need to encourage girls to participate, accept leadership and assert their ideas, and to make science as ‘hands-on’ as possible for boys to maintain interest.
- Ethnicity issues in science for teachers included motivation, learning styles and literacy.
- Limited time in class, class size, resources and space for experiments was seen as issues relating to the extension of gifted and talented students.
- Primary teachers dealt with issues regarding NESB students more easily than secondary teachers by using ESOL teachers, teacher aides, peer helpers, glossaries and visual presentations. Secondary teachers found that a lack of English fluency affected students’ understanding of science concepts and safety issues.
- Some of the ideas suggested to help students with disabilities were: small lower ability classes; adequate supervision during practical activities; suitable seating in laboratory; use of laptop computers; adapted worksheets; and making the classroom more accessible.

Assessment:

- Observation of students was the most popular way of assessing student learning in science, followed by group investigations or research and class discussion with students.
- Science was being reported mainly to parents and mainly in relation to the achievement objectives and achievement levels.
- The most frequent issue in assessing and reporting, especially for secondary teachers, was that of the paper work required.
- Over half of the teachers had found school self-review to be helpful in that it gave useful insights into how and what they taught and enabled areas for improvement to be identified.
- Half of the teachers considered external review to be helpful in that it gave useful feedback for their teaching; over 40% of teachers were unaware of the influence external review had had on the implementation of the science curriculum in their school.

Senior science questionnaire findings

- Of those teaching senior science classes (n=189), more (86.8%) taught year 11 than year 12 (83.1%) or year 13 (60.8%).
- Of those teaching senior science classes, more taught biology (47.1%) than chemistry (29.6%) or physics (25.4%).
- The physics curriculum statement was the most frequently used (81.9% of physics teachers reported using the curriculum statement) (chemistry statement = 79.3%: biology statement = 57.2%).
- The senior curriculum statements were being mostly used at year 12. The biology teachers made significantly less use of their curriculum statements.
- The senior science curriculum statements were used mostly for planning schemes of work .
- Senior teachers most frequently used school schemes and ‘other resource materials’ to support their day-to-day lesson planning.
- Senior teachers were most likely to be teaching the senior science subjects in traditional topic or content areas.
- Long-term investigations in biology were more likely to be undertaken in year 13.
- Long-term investigations in chemistry and physics were more likely to be undertaken in year 12.
- The challenges faced by senior physics teachers included lack of equipment, NCEA workload, students with poor motivation, mathematical skill and general understanding.
- The challenges faced by senior chemistry teachers included ensuring coverage of the year 13 course, lack of preparation time, making the content and contexts relevant and increased extra curriculum demands on students.
- The challenges faced by senior biology teachers included the need to update their own knowledge, particularly in relation to genetics, covering the course and a lack of resources.
- More chemistry teachers (55.4%) had received professional development related to the senior science curriculum statement that they taught from than teachers of other science areas; less than 50% of senior biology and senior physics teachers had received professional development related to their curriculum statements.
- For those teachers who had received professional development the key benefits were the opportunity to share teaching ideas and to up date their own knowledge by working with colleagues.
- In some cases professional development had not helped due to the lack of resources to support the implementation of new ideas.
- Examples of senior classroom work that had been effective in improving students’ learning included the use of ICT, long-term investigations and an emphasis on practical work linked to problem solving and challenges. Interactive activities, student presentations, field trips and after-school tutorials were also found to be effective.
- A universal concern for teachers of senior science courses was that of workload and lack of resources.

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APPENDIX A: SCIENCE QUESTIONNAIRE

Curriculum Stocktake:

National School Sampling Study

SCIENCE QUESTIONNAIRE



This questionnaire is an opportunity for you to provide information about your experiences in implementing the *Science in the New Zealand Curriculum* statement. The Ministry of Education is now seeking the views of a large sample of teachers, the results of which will influence future policy on curriculum and lead to sharing of practices between teachers and schools.

The information you provide will be seen only by the research team; individual schools and teachers will not be identifiable in reports of the results to the Ministry of Education. However, you may choose to provide your name for possible future internet or face-to-face discussions with other teachers about teaching experiences.

In the questions we have used wording taken from the national curriculum:

The NZ Curriculum Framework is the document published in 1993, which set out the overall policy direction for curriculum and assessment.

- *By science curriculum statement we mean the statement released by the Ministry of Education called Science in the New Zealand Curriculum.*
- *By physics, chemistry, biology curriculum statements we mean the statements released by the Ministry of Education called Physics in the New Zealand Curriculum, Chemistry in the New Zealand Curriculum, and Biology in the New Zealand Curriculum.*

The terms strands, achievement objectives, and levels refer to their meaning in the NZ Curriculum Framework (1993) and the seven national curriculum statements.

The focus of the questions is on teaching experiences with the science curriculum statement (especially in years 1-10 where it is compulsory) and so is not concerned with qualifications changes such as the introduction of NCEA. There will be alternative questionnaires about Māori statements in some schools.

If you teach a senior science subject with an individual curriculum statement e.g. Biology, Chemistry, Physics, please complete both the main questions 1-42 and the senior science questions 43-55.

Professor Clive McGee Director, Research Team
University of Waikato

INTRODUCTION

1. What is your position in your school? *(please tick appropriate boxes)*

Principal

Deputy/Assistant/Associate Principal

Curriculum/Syndicate Leader

Head of Department/Head of Faculty

Classroom Teacher/Subject Teacher

Other *(please specify)*: _____

2. Do you have a leadership position in science?

Yes

No

If yes, what? _____

3. How many years have you been teaching? *(include both part-time and full-time)*

Less than 2 years 2 - 5 years 6 - 10 years 11 - 15 years More than 15 years

4. How many years since 1993 have you been teaching? *(include both part-time and full-time)*

Less than 2 years 2 - 3 years 4 - 5 years 6 - 7 years 8 - 9 years

5. How many years have you been teaching science? *(include both part-time and full-time)*

Less than 2 years 2 - 5 years 6 - 10 years 11 - 15 years More than 15 years

6a. What class year level(s) do you currently teach science? *(please tick appropriate boxes).*

Year 1 Year 2 Year 3 Year 4 Year 5

Year 6 Year 7 Year 8 Year 9 Year 10

Year 11 Year 12 Year 13 Not applicable

6b. If you teach science in Years 11, 12 or 13, what science subjects are you teaching?

7. What formal qualifications in science do you hold? *(please tick highest).*
- | | |
|--|---|
| <input type="checkbox"/> MSc or higher | <input type="checkbox"/> BSc |
| <input type="checkbox"/> 3 rd year university science paper(s) | <input type="checkbox"/> 2 nd year university science paper(s) |
| <input type="checkbox"/> 1 st year university science paper(s) | <input type="checkbox"/> University Bursary science subject(s) |
| <input type="checkbox"/> 6 th Form Certificate science subject(s) | <input type="checkbox"/> School Certificate science subject(s) |
| <input type="checkbox"/> Other <i>(please specify)</i> : _____ | |
| <input type="checkbox"/> I have no formal qualifications in science | |
8. What are the major challenges you have faced in implementing the science curriculum? *(please give some examples, including ways these have been addressed)*
- _____
- _____
- _____
- _____
- _____
9. Please indicate your degree of confidence in teaching science:
- High Medium Low Don't know
10. Having indicated your degree of confidence, what factors have contributed to this? *(please tick appropriate boxes)*
- My knowledge of science
- My teaching experience
- My qualifications/specialist background in science
- My professional development in science
- My school/department has translated the achievement objectives into specific learning outcomes
- My school/department has translated the achievement objectives into a school scheme
- My school/department working directly from the achievement objectives
- Units of work developed to complement the achievement objectives, using the curriculum statement and supporting resources.
- Other *(please specify)*: _____

IMPACT OF CURRICULUM STRUCTURE AND ASSESSMENT AND COMPLIANCE PRACTICES ON TEACHING AND LEARNING (the curriculum in practice)

We are interested in how you have responded to the way science as an area of learning is structured by the New Zealand Curriculum Framework and the science national curriculum statement, Science in the New Zealand Curriculum.

11. How user-friendly have you found the science curriculum statement?

Very user-friendly User-friendly User-friendly in some ways Not user-friendly

12. In your teaching of science, to what extent has the science curriculum statement with its strands, levels, achievement objectives, learning experiences, etc assisted you in:

a) planning your school/department programme?

Always Sometimes Not very often Rarely Don't know

b) planning your classroom programme?

Always Sometimes Not very often Rarely Don't know

c) gaining an overview of a progression of key scientific ideas?

Always Sometimes Not very often Rarely Don't know

d) developing (specific) learning outcomes?

Always Sometimes Not very often Rarely Don't know

e) achieving consistent understanding of the curriculum levels within your classroom/school?

Always Sometimes Not very often Rarely Don't know

f) assessing student achievement?

Always Sometimes Not very often Rarely Don't know

g) meeting the needs of Māori students in your classroom/school?

Always Sometimes Not very often Rarely Don't know

h) communicating student achievement to other teachers within your school?

Always Sometimes Not very often Rarely Don't know

i) reporting student achievement to parents and caregivers?

Always Sometimes Not very often Rarely Don't know

j) communicating student achievement to teachers at other schools?

Always Sometimes Not very often Rarely Don't know

CONTEXTUAL STRANDS **Making Sense of the Living World,
Making Sense of the Material World,
Making Sense of the Physical World,
Making Sense of Planet Earth and
Beyond.**

13. How do you ensure coverage of the contextual strands in the science curriculum statement?

- cover each strand each year, with some combination of strands
- cover each strand each year, usually separately
- cover each strand over a two-year period, with some combination of strands
- cover each strand over a two-year period, usually separately
- teach in context across strands
- teach each strand separately
- Other (*please specify*): _____
- I have difficulty ensuring coverage (*please explain*): _____

14. How easy is it for you to provide students with learning experiences in the contextual strands? (*please tick appropriate boxes*)

	Easy	Manageable	Difficult	Not applicable - I do not teach in this area
Making Sense of the Living World	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making Sense of the Material World	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making Sense of the Physical World	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making Sense of Planet Earth and Beyond	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comment: _____

15. What has influenced the ease with which you are able to provide learning experiences in the contextual strands? (*please tick the appropriate box for each strand*)

	Living World	Material World	Physical World	Planet Earth and Beyond
My depth of scientific knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My confidence in teaching science skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My interests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interests of students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilities/resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timetabling/scheduling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other (*please specify*): _____

INTEGRATING STRANDS Making Sense of the Nature of Science and its Relationship to Technology, Developing Scientific Skills and Attitudes.

16. Making Sense of the Nature of Science and its Relationship to Technology' How do you incorporate this strand into your teaching of science?

If you have difficulty incorporating this strand please explain: _____

17. How do you ensure coverage of the integrating strand 'Developing Scientific Skills and Attitudes' in the science curriculum statement?

- I teach the skills and attitudes as needed
- I have a separate unit on skills and attitudes
- I incorporate investigative work in each unit
- Each unit focuses on a different skill/attitude
- I have difficulty ensuring coverage (*please explain*): _____

18. Is there sufficient information in the science curriculum statement and supporting documents to enable you teach the integrating strands?

Yes No

If you answered 'yes', what helped? _____

If you answered 'no', what additional support would you find helpful? _____

GENERAL ISSUES

- 19a. Would you make any changes to the **structure, organisation** of the science curriculum statement?

Yes No Don't know

If yes, what? _____

19b. Would you make any changes to the **content** of the science curriculum statement?

Yes

No

Don't know

If yes, what? _____

ACHIEVEMENT OBJECTIVES

20. Generally speaking, the science achievement objectives are:

Too broad

Sometimes too broad

About right

Sometimes too specific

Too specific

CURRICULUM RESOURCING AND SUPPORT

21. Which of the following Ministry of Education resources have you used to support your teaching of science? (please tick appropriate boxes)

Making Better Sense series

Building Science Concepts

Programme Planning in Science

Assessment in Science

'Connected' series

'Applications' series

www.minedu.govt.nz/ e.g. The Science Toolbox

School Journal

http://www.science.school.nz - NZASE website

TKI website

Other Ministry of Education publications (please specify): _____

In what ways have you found these resources helpful? _____

22. Are there any examples of other support materials you have found to be particularly helpful?

a) _____

b) _____

c) _____

d) _____

23. What do you believe is the **most important resource** to support effective implementation of the science curriculum? (please tick one box only):

a nationally co-ordinated effort to develop units of work

professional texts

resources, teachers' guides and assessment examples that have been trialled and nationally distributed

time for teachers to plan, trial, implement, assess and evaluate

Other (please specify): _____

24. There is a comment in *Science in the New Zealand Curriculum* about the use of resources including apparatus, textbooks, technology and the community. Please indicate how often you use the following resources.

	Used often	Used sometimes	Used rarely	Not used at all
Community mentors e.g. scientists, Kaumatua	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer software/websites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Household resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specialised laboratory equipment/resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Textbooks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visits to science centre, museums etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Write-on resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PROFESSIONAL DEVELOPMENT

25. What sources of professional development have been very useful for your teaching of science? (please tick appropriate boxes)

- | | |
|---|--|
| <input type="checkbox"/> Books and journals | <input type="checkbox"/> Community/Industry contacts |
| <input type="checkbox"/> Conferences | <input type="checkbox"/> Local/national science teachers' associations |
| <input type="checkbox"/> Ministry of Education contracts | <input type="checkbox"/> Other teachers in the school |
| <input type="checkbox"/> Parents/Trustees | <input type="checkbox"/> Principal |
| <input type="checkbox"/> Private providers of professional development | <input type="checkbox"/> RSNZ teacher fellowship |
| <input type="checkbox"/> School Support Services, Advisers, Resource Teachers | <input type="checkbox"/> Teachers in other schools |
| <input type="checkbox"/> TRCC (Teacher Refresher Course Committee) | <input type="checkbox"/> University or College of Education lecturers |

Other (please specify): _____

I have had no professional development in science (If you ticked this box, please skip to Q28)

If none of these sources of professional development have been very useful, please give reasons: _____

26. If you have had any professional development in science, in what ways has it helped/not helped **you** in your teaching of science?

It helped because _____

It did not help because _____

27. If you have had any professional development in science, do you consider that it provided adequate support for you to improve the achievement of Māori students in your classroom/school?

Yes No Don't know Not applicable (I don't teach any Māori students)

Comment _____

28. In what aspects of science would you most like to receive professional development to support your teaching of science?

CURRICULUM IMPLEMENTATION

29. How do you implement the science curriculum? *(please tick appropriate box/es)*

- As a subject with its own timetable slots
- In blocks/modules
- As a stand-alone subject, but with teachers with various backgrounds planning and delivering different parts, e.g., the chemistry teacher teaches 'The Material World'
- Integrated into other learning areas: *(please tick appropriate box/es below)*
- The Arts Pacific Languages and International Languages
- English Social Studies
- Health and Physical Well-being Technology
- Mathematics Te Reo Māori
- Other *(please specify)*: _____

30. What systems has your school established to support your teaching of science? *(please tick appropriate box/es below)*

- Access to professional development
- Lab technician support
- Lesson units written by specialist science teacher
- Team/syndicate planning
- Well-developed school scheme for science
- Other *(please specify)*: _____

ESSENTIAL SKILLS

31. Please tick which of the essential skills (from the *New Zealand Curriculum Framework*) you emphasise in your teaching of science. Put **two ticks** beside those which you emphasise the most:

- Communication Skills
- Information Skills
- Numeracy
- Physical Skills
- Problem Solving Skills
- Self-management and Competitive Skills
- Social and Co-operative Skills
- Work and Study skills

32. An investigative approach to teaching and learning science is recommended in the *Science in New Zealand Curriculum* statement. Do you use an investigative approach to teaching and learning in your science programme(s)?

Yes No Sometimes Don't know

If yes, or sometimes, please describe an example of how you have used an investigative approach to teaching and learning in science in your classroom programme:

If no, please comment on why this is the case:

33. The curriculum statement refers to ensuring that students carry out 'extended investigations'. What opportunities do you give your students to meet this requirement? (please tick appropriate boxes)

- Participation in Science Fairs for all students
- Participation in Science Fairs for selected students
- Participation in the CREST Award scheme
- An investigation integrated into each contextual strand
- One, or more, major investigation per year
- Provision for developing different investigative skills in different units

Other (please specify): _____

I have difficulty providing opportunities for students to carry out extended investigations because:

34. Describe an example from your classroom work that has been effective for you in improving your students' learning in science:

35. How often have you been able to include Māori knowledge about the natural and physical worlds in your science programme?

- Often included
 Included sometimes
 Rarely included
 Never included

Please give reasons: _____

INCLUSIVENESS

36. There is a comment in Science in the New Zealand Curriculum about catering for individual needs. What, if any, issues have arisen for you in providing adequate and appropriate Science education experiences for different groups of students, and how have you dealt with these?

Girls _____

Boys _____

Māori _____

Pacific _____

NESB (Non-English Speaking Background Students) _____

Gifted and talented _____

Students with disabilities _____

Other individual needs (please specify) _____

ASSESSMENT

37. How do you assess student learning in science? (please tick one box for each category)

	Often	Sometimes	Rarely	Never
Assessment Resource Banks (ARB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Class discussion with students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concept mapping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group investigations/research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Individual investigations/research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interviews/conferencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEMP tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Observation of students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Peer assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pre-tests/post-tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self-assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other (please specify): _____

38. a) In your school is student achievement in science being reported:

i) to the community? Yes No

ii) to parents? Yes No

iii) from teacher to teacher? Yes No

b) Is the reporting being done in relation to:

i) achievement objectives? Yes No

ii) levels? Yes No

iii) other? (e.g., specific units; please specify): _____

39. What issues have arisen for **you** in assessing and reporting on student progress and achievement in science?

40. What has been the influence of school self-review on your teaching of science?

Very positive Positive Not very positive Not at all positive Don't know

Please explain _____

41. What has been the influence of external review/evaluation (e.g. ERO) on the implementation of the science curriculum statement in your school?

Very positive Positive Not very positive Not at all positive Don't know

Please explain _____

42. Is there anything about the statement not already covered that you would like to add?

If you would be prepared to share these experiences in more detail and would be happy to be contacted by the research team, please add your name and email address:

Name: _____ Email: _____
 (please print clearly)

Thank you very much for your co-operation. Please place this survey in the envelope provided and return to the person who distributed it to you.

**IF YOU TEACH SENIOR SCIENCE AT YEAR 11, 12 OR 13,
 PLEASE COMPLETE THE REMAINDER OF THIS QUESTIONNAIRE**

43. Which of the following **senior science curriculum** statements do you use and at what level(s)? *(please tick in one or more of the appropriate boxes)*
- | | Year 11 | Year 12 | Year 13 |
|-----------|--------------------------|--------------------------|--------------------------|
| Biology | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Chemistry | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physics | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
44. How often do you refer to the **senior science curriculum** statements when planning the following for senior students? *(please tick one box for each category)*
- | | Very often | Often | Sometimes | Rarely | Never |
|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Schemes of work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Units of work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Lessons | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
45. How often do you use the following documentation to support your day to day lesson planning? *(please tick one box for each category)*
- | | Very often | Often | Sometimes | Rarely | Never |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| School schemes | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Prescription | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other resource materials | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
46. How are you teaching the senior science curriculum knowledge? *(please tick the appropriate boxes in your subject area)*
- a) Biology:
- In traditional topic or content areas
- In context across content/topic areas
- In contexts within traditional content/topic areas
- Other *(please specify)*: _____
- b) Chemistry
- In traditional topic or content areas
- In context across content/topic areas
- In contexts within traditional content/topic areas
- Other *(please specify)*: _____
- c) Physics:
- In traditional topic or content areas
- In context across content/topic areas
- In contexts within traditional content/topic areas
- Other *(please specify)*: _____

47. In your teaching of **senior science**, when do the students carry out an independent long-term investigation?

	In Year 11	in Year 12	in Year 13
Biology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemistry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

48. If you do a long-term investigation, please describe the structure of the main investigation you use:

Subject: _____ **Year:** _____

49. In each statement there is an objective relating to interaction with people, their environment and/or society. How do you deal with this objective?

- This objective is dealt with through incorporation into most topics/content areas
- This objective is dealt with through incorporation into a few topics/content areas
- Student synthesis of information provided by the teacher
- Independent student research on defined topic(s)
- Independent student research on self-selected topic(s)
- Other (*please specify*): _____

50. How do you assess this objective? _____

51. What are the major challenges you have faced in implementing **the senior science statement**?

Subject: _____ **Year:** _____

52. Have you had any professional development related to a senior science statement? (please tick in one or more of the appropriate boxes)

	Yes	No
Biology	<input type="checkbox"/>	<input type="checkbox"/>
Chemistry	<input type="checkbox"/>	<input type="checkbox"/>
Physics	<input type="checkbox"/>	<input type="checkbox"/>

53. If you have had any professional development in a senior science statement, in what ways has it helped/not helped you in your teaching?

It helped because _____

It did not help because _____

54. Describe an example from your senior classroom work that has been effective in improving your students' learning in this senior science curriculum subject:

55. Is there anything not already covered that you would like to add?


If you would be prepared to share these experiences in more detail and would be happy to be contacted by the research team, please add your name and email address:

Name: _____ Email: _____

(please print clearly)

Thank you very much for your co-operation. Please place this survey in the envelope provided and return to the person who distributed it to you.

APPENDIX B: LETTER TO SCHOOL CONTACT

<p>Date</p> <p><<CONTACT_FIRST>> <<CONTACT_LAST>> <<INST_NAME>> <<ADDRESS_2>> <<ADDRESS_3>> <<ADDRESS-4>></p>	<p>Curriculum Stocktake: National Sampling Study The School of Education The University of Waikato Private Bag 3105 Hamilton, New Zealand</p> <p>Professor Clive McGee Project Director Telephone 07-838 4466 extn. 7815 Facsimile 07-838 4555 Email mcgee@waikato.ac.nz</p>	 <p>The University of Waikato Te Whare Wānanga o Waikato</p>
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Dear «CONTACT_FIRST»

Re: Curriculum Stocktake: National School Sampling Study - Instructions

Following the agreement of your school to take part in this study, it is now time to complete the second round of questionnaires. Thank you for agreeing to distribute, collect and return them.

It is very important to encourage **all teachers** who teach from any of these curriculum documents to complete one of the questionnaires. If anyone wants to do more, they are welcome to.

Briefing the teachers:


1. Perhaps the best way to inform the staff is at a staff meeting. A school might choose to set aside a staff meeting to do the questionnaires.
2. Explain that each teacher who teaches any of these subjects is being asked to complete **one** questionnaire.
3. The questionnaire is part of a research project that is part of the Curriculum Stocktake by the Ministry of Education. Major teacher groups are represented on a stocktake Reference Group, and there is strong support for this research because it **gives teachers the chance to** report on their experiences of implementing national curriculum (refer teachers to the cover notes on the questionnaire). Their views should influence future curriculum policy. A letter of support from Amanda Coulston, National President of NZEI, is on the reverse side and if it is relevant in your school please quote it to reinforce NZEI support.
4. When released, the report of the first round results is available on the Ministry of Education's website: <http://www.minedu.govt.nz> in the Schools - Curriculum Teaching and NCEA area.
5. Give each teacher who teaches any of these subjects a questionnaires.
 - a) **English** (dark blue cover) to 1/3 of teachers including those with leadership or specialisation in English.
 - b) **Science** (green cover) to 1/3 of teachers including those with leadership or specialisation in science.
 - c) **Social Studies** (purple cover) to 1/3 of teachers including those with leadership or specialisation in social studies.
6. Set a date to return the completed questionnaire to you; an envelope is provided for confidentiality. I suggest no more than 7-8 school days, but this depends upon school events. In my experience, a tighter deadline produces a higher return rate.
7. When all are returned (reminders by you will probably be needed!) please place in the supplied return package and mail to us.

Thank you again for your school's willingness to participate in this project. If you need more questionnaires or clarification, please email or telephone:

<i>Project director:</i>	<i>Project administrator:</i>
Professor Clive McGee	Karen MacKenzie
Telephone 07 838 4466 extn 7711	Telephone 07 838 4466 extn 7815
Email mcgee@waikato.ac.nz	Email karenmac@waikato.ac.nz

Yours sincerely

Professor Clive McGee
Project Director

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 - d) **Languages** (light blue cover) to any teacher who teaches **Japanese, Spanish, Korean, Samoan or Chinese**.
*In a one or two teacher school, choose which ones you wish to do.
Next year other subjects will be covered.*
6. Set a date to return the completed questionnaire to you; an envelope is provided for confidentiality. I suggest no more than 7-8 school days, but this depends upon school events. In my experience, a tighter deadline produces a higher return rate.
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 - d) **Languages** (light blue cover) to any teacher who teaches **Japanese, Spanish, Korean, Samoan or Chinese**.
But those secondary teachers who teach more than one of these subject should choose the one they do more teaching in.
Next year other subjects will be covered.
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