Review of Achievement Standards Level 1, Phase 2

Public Engagement Survey Report: Mathematics and Statistics

Feedback provided on draft, Phase 2 subject content 24 August 2021

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## Purpose

This report outlines the feedback received from a Public Engagement Survey by the Ministry of Education (the Ministry) on the Phase 2 development of Level 1 products for Mathematics and Statistics. This report will present the quantitative data collected from the survey as well as summarising the common themes and trends appearing in the qualitative data. This report will be used to inform any necessary changes to the products before they go forward for piloting as part of the Review of Achievement Standards (RAS).

## Background

1. As at 23 August 2021, the Ministry received 84 responses to the Ministry’s online survey about the subject content developed so far for Mathematics and Statistics. These included both multiple choice answer questions and long form, written response questions.
2. This report is organised into sections based on the questions in the survey. Each section was optional so not every respondent answered every section. The sections are:
   1. Summary of feedback as a whole
   2. General impressions of the subject content
   3. Course Outlines
   4. Individual Achievement Standards
      1. AS 1.1 and Assessment Activities
      2. AS 1.2 and Assessment Activities
      3. AS 1.3
      4. AS 1.4
   5. Impressions of the Achievement Standards as a suite
3. Please note that the content in this report does not reflect the opinions of the authors. The report aims to thoroughly and accurately reflect the views presented by those who fed back on the draft subject content.
4. Respondents had the option of submitting feedback as individuals or on behalf of groups, such as school departments. Except where pertinent, responses have not been identified as originating from an individual or a group.
5. **Summary of Mathematics and Statistics**

There were **84** responses to Mathematics and Statistics. Responses about the Course Outlines were mixed. Achievement Standard 1.1 received the most positive comments of all the Standards.

The main themes from feedback about Course Outlines, Standards and Assessment Activities were:

* More guidance and clarity needed for all materials
* More activities and examples needed to help teachers develop a course that will enable students to engage with the Significant Learning and achieve the Standards
* Concern about the balance between algebra and statistics across the Standards
* Concern that the scope of some Standards was too wide
* Concern about the balance of literacy and numeracy elements across the Standards.

Views and comments from individual responses are detailed below in each section.

1. **General impressions of the subject content**

***Do you think the draft materials for this subject are ready for testing with students in pilot schools/kura?***

***Chart B:*** *Are the draft Mathematics and Statistics materials ready for pilot?*

***Do you have any further feedback on the draft materials? If there was one thing you think would help make these materials easier to test in the pilot, what would it be?***

There were 42 responses to this question, with six main themes emerging from the comments:

* Requests for **more guidance and clarity** across the materials, particularly for external assessments.

Many respondents said that more examples and more detailed information would help them understand what teachers and students need to do. Some responses said that the activities are inconsistent with the Conditions of Assessment and need to be reworked.

*“Real need to be highlighted that these four standards make up our subject and don’t make up a course. ie. teachers are unaware that a course can be constructed with some or all of these standards, but that also, standards from across learning areas could be used to make up a course - clearly define the difference between a course and a subject.”*

*“Not enough information on the externals to see if Maori can succeed as Maori.”*

* Concern about the **Standards’ assessment format or timing**.

One response within this theme asked for clarity about timing for students who need to re-sit an assessment. Some other responses focused on the timing for external assessments, including the concern that the proposed timing of AS 1.3 and AS 1.4 was too prescriptive for a school to adapt them to suit their individual context.

*“ …the timing / format of the externals makes it hard to determine what is the best course of action in setting up a programme that is best suited for the students at your school.”*

*“Change the order of the External Assessments. To place a statistical-based External in Term 2 (up to 20 weeks) will mean schools are more focused on this strand than pure mathematics and possible connections. Leaving 10-15 weeks for the other connections. With no understanding of what is required for L2 there is a greater risk of underprepared students for continuing education.”*

* **Inequity or accessibility concerns**.

One comment said that the assessments shouldn’t be written with the assumption that all students have access to devices. Other comments said that the assessments would disadvantage students who can’t read very well, particularly the combined assessments.

*“It is not a good idea to put two or more topics in one assessment as most of the students will fail. I still like more skilled based assessments in Level 1 and more able students to do Level 2 and Leve 3 [sic] with more questions in context.”*

One response said that the new system of four assessments will result in poor wellbeing and equity outcomes for students.

*“With only four standards, the assessments are high stakes. This completely contradicts the proposed system shifts of both Wellbeing (high stakes = high stress) and Inclusion and Equity (attendance levels, accessibility, unfamiliar context in Externals). Reducing the number of standards has allowed for the interweaving of the strands, however it seems the new standards and proposed changes …the goals of Wellbeing and Inclusion and Equity of the Review, are better met under the current system.”*

* The **need for professional development**.

Comments on this theme were concerned about general support needed for teachers about the new assessment approach and providing cultural resources for staff. Some responses said that more information was needed for teachers to incorporate mātauranga Māori in their courses and teaching.

*“Unsure how to deliver, no hint of pedagogical pathway, lots of interpretation needed, especially for new, or new to maths teachers.”*

* **Imbalance between literacy and numeracy requirement**.

Some responses expressed concern that the literacy requirements would be too challenging for some students, which would likely impact their success.

*“We feel that objective 3 in the numeracy standard asks for explanations and reasoning that requires a high level of literacy and unfairly penalises students with low literacy.”*

Other comments related to the implications of teacher emphasis on skills-based numeracy assessment, including the possibility of “*moving away from problem solving, critical thinking and contextualized learning.”*

* Many responses provided **positive feedback** about the Mathematics and Statistics materials, as illustrated in the quotes below:

*“Like the fact that the strands are interwoven”*

*“Good matrix on one page, compact, can see holistic picture”*

*“Big idea process and knowledge headings good to have”*

Some responses expressed concerns that teachers will have **authenticity issues with** group activities., while others said that the **balance between algebra and statistics** isn’t right (too much statistics).

One response said that the materials **aren’t adequately grounded in mātauranga Māori**.

*“…Unlike other subjects' changes, the summaries provided have used te reo Māori (and talanoa) to rename ideas. This is not an incorporation of mātauranga Māori, though. There are suggestions that kaupapa Māori may be included, but mātauranga Māori is not addressed. AS 1.2, again, suggests we live in a bicultural country, but the wording of the AS implies using Māori or Pacific problems as flavour text to the problems we present.”*

1. **Course Outlines**

***Do the sample Course Outline(s) exemplify how the Significant Learning can form a coherent years’ programme with opportunities to assess the 4 Standards?***

***Chart C.1:*** *Do the Course Outlines form a coherent year’s programme?*

***Do the Course Outline(s) demonstrate how teaching and learning could be grounded in mātauranga Māori?***

***Chart C.2:*** *Do the Course Outlines demonstrate how teaching and learning could*

*be grounded in mātauranga Māori?*

***Do you have any further feedback on the Course Outline(s)?***

There were 18 responses to this question,

The main theme emerging from the comments was that **more guidance and clarity** was needed across all the Course Outlines. These responses included general comments saying that the Course Outlines were too broad, and requests for more information in the Outlines about teaching that relates to external assessments.

Two minor themes emerged from the comments:

* Inadequatedemonstration in the Course Outlines of how teaching and learning could be grounded in **mātauranga Māori**. One response said that there were very few authentic mātauranga Māori learning activities in the Course Outlines. Another response listed specific areas in the Course Outlines lacking in content that would enable better grounding of mātauranga Māori.

*“• Although there is an effort in some of the assessment materials to include cultural contexts, this is not shown in the course outlines*

*• Very little te reo is used throughout the course outlines”*

* The **level of learning** presented in the Course Outlines was not right for Curriculum Level 6.

*“The statistics content is not pitched at the correct level (seems more like primary school level).”*

*“Across all course outlines, there are places where the teaching activities are not at curriculum level 6 (eg CO2 discussions volume of cuboids, bearings, parallel lines, standard form + more which are all CL5 or below skills) - these should NOT appear in the course outlines”*

* Other views (from one or two responses) were:
  + There was **too much content** in the Course Outline given the timeframe (they did not specify which Outline).
  + **Specific content changes** were needed for some Course Outlines’ information Blocks.
  + They liked that **Course Outline 3 had links to the curriculum elaborations**, and this should be modelled across future Course Outlines.
  + The **order of teaching** presented in the Course Outlines doesn’t match the subject’s suggested timing of assessments.

**Individual Achievement Standards**

* 1. **AS 1.1 and Assessment Activities**

***Is this Achievement Standard ready for piloting?***

***Chart D1.1:*** *Is AS1.1 ready for piloting?*

***Are the Achieved, Merit and Excellence criteria clear enough to support consistent assessment judgments?***

***Chart D1.2:*** *Are the AS1.1 criteria clear?*

***Does the unpacking of the Standard and the Conditions of Assessment provide sufficient and clear guidance on the use of the Standard?***

***Chart D1.3:*** *Do the Conditions of Assessment and the unpacking of AS 1.1 provide sufficient and clear guidance?*

***Internal Assessment Activities***

***Could the activities for AS1.1 be used or adapted in your local context?***

***Chart D1.4:*** *Could the activities for AS1.1 be adapted to your local context?*

***Do the Internal Assessment Activities exemplify how mātauranga Māori can be recognised and valued in assessment?***

***Chart D1.5****: Do the activities for AS1.1 exemplify how mātauranga Māori can be recognised and valued in assessment?*

***Do the activities for AS1.1 support the engagement, access, understanding and participation of all learners?***

***Chart D1.6:*** *Do the activities for AS1.1 support all learners?*

***Do you have any further feedback on this Standard and its activities?***

There were 11 responses to this question.

Many responses had positive comments about this Standard, such as *“I like the way it is broken up into parts so that students know exactly what to answer.”*

There were two main themes emerging from the comments:

* **Guidance and clarity needed**.

Each response focused on a different aspect of the Standard, including:

* + How much teacher guidance can be given?
  + Why are students required to collect their own data?
  + Is this Standard open or closed book?
  + Can students work out of class, or do little bits at a time (eg mini-assessments)?
  + How does the grading work with group and individual work?
  + Further clarity is needed about whether the assessment format would be a portfolio or just one piece of work.
* Several responses expressed concern about **inequity or accessibility challenges** for some students, in relation to this Standard. These comments ranged from concern that some students would be disadvantaged if technology was required to achieve the Standard, to concern that the activity about looking at lunchbox content could be unsafe or dangerous for students with eating disorders.
* Other views (from one or two responses) were:
  + There was **potential crossover** between Standard 1.1 and Standard 1.3.
  + The **activities do not adequately demonstrate mātauranga Māori**, and more support and examples are needed on how to do this in a Māori context and how to exemplify it well.
  + More ideas might be needed to **incorporate the experimental probability** in tasks.
  + There is **no Exploratory Data Analysis**, though this is in the title.
  + Creating a questionnaire should not be considered **collecting data.**
  1. **AS 1.2 and Assessment Activities**

***Is this Achievement Standard ready for piloting?***

***Chart D2.1:*** *Is AS1.2 ready for piloting?*

***Are the Achieved, Merit and Excellence criteria clear enough to support consistent assessment judgments?***

***Chart D2.2:*** *Are the AS1.2 criteria clear?*

***Does the unpacking of the Standard and the Conditions of Assessment provide sufficient and clear guidance on the use of the Standard?***

***Chart D2.3:*** *Do the Conditions of Assessment and the unpacking of AS 1.2*

*provide sufficient and clear guidance?*

***Internal Assessment Activities***

***Could the activities for AS1.2 be used or adapted in your local context?***

***Chart D2.4:*** *Could the activities for AS1.2 be adapted to your local context?*

***Do the Internal Assessment Activities exemplify how mātauranga Māori can be recognised and valued in assessment?***

***Chart D2.5:*** *Do the activities for AS1.2 exemplify how mātauranga Māori can be recognised and valued in assessment?*

***Do the activities for AS1.2 support the engagement, access, understanding and participation of all learners?***

***Chart D2.6:****Do the activities for AS1.2 support all learners?*

***Do you have any further feedback on this Standard and its activities?***

There were 15 responses to this question.

* Several responses said that **more guidance and clarity** was needed about the Standard’s criteria, and more detail is needed to ‘unpack’ the Standard. Some responses suggested that **more examples** would help clarify the Standard’s intention and its criteria, including a wider range of examples with ‘real life contexts’. Other responses said that the draft activities didn’t make sense, or would be hard to develop in practice.
* Some responses expressed confusion about or disapproval of the **assessment format or timing.** Theseresponsessuggestedthat AS1.2 should be an ongoing assessment over a longer period of time, or a project-based assessment, instead of a common assessment activity.
* Some responses said that **mātauranga Māori** was not demonstrated in the Standard in an authentic way, and this was a missed opportunity. Comments mainly focused on the Maui fish hook activity. One view was that this activity’s link between Maui’s fish hook and maths is “tenuous”, while different responses said that this activity is “unsettling” and “not realistic”.
* Other views (from one or two responses) were:
  + The **balance between algebra and statistics** isn’t right.

*It is very concerning that there are limited opportunities for students to use Algebra skills here. Currently academic/capable mathematicians in our school will spend around 20 of their 32 weeks at school on Algebra standards - 1.2, 1.3, 1.4. There is not the provision for this in these standards. How will they be prepared to attempt L2 and L3 without all those weeks practice.”*

* + There will be **teacher workload issues**, with the time it will take for teachers to mark these assessments.
  + The **standard is too complex** and “massive” for Year 11 students, and some of the activities don’t seem to be at the right level for Curriculum Level 6.
  + **Inconsistent level of learning between the activities**. “*For example, AS 1.2 task A seemed to be a more complex task that requires higher level conceptual thinking than the more measurement-based activity in task B.”*
  + Endorsement, in terms of the **accessibility of the activities**. This response said *“We could see the playground task being well received at our school”.*
  1. **AS 1.3**

***Is this Achievement Standard ready for piloting?***

***Chart D3.1:****Is AS1.3 ready for piloting?*

***Are the Achieved, Merit and Excellence criteria clear enough to support consistent assessment judgments?***

***Chart D3.2:*** *A**re the AS1.3 criteria clear?*

***Does the unpacking of the Standard and the Proposed Assessment Approach provide sufficient and clear guidance on the use of the Standard?***

***Chart D3.3:****Do the Conditions of Assessment and the unpacking of AS 1.3 provide sufficient and clear guidance?*

***Do you have any further feedback on this Standard?***

There were 10 responses to this question.

* Several responses said that **more guidance and clarity** is needed. Many of these responses said that more examples would help schools plan their courses and pathways to Levels 2 and 3. Some responses said it is not clear which strands of the curriculum are involved, and whether the assessment will it be one task or a series of questions about different stimuli. One response expressed that financial literacy was included in the ‘unpacking’ section.
* Several responses related to this **assessment’s format and timing**. This includes queries about how much time will be given for the standard, and whether it is open or closed book. One response expressed concern that assessing this Standard in Term 2 would *“force schools into teaching the statistics and probability in the first half of the year”.*  One response said that this CAA will have similar problems to other internal assessments in terms of the variability and inconsistency of assessment conditions. One response suggested alternative assessment timing:

*“There should be an opportunity for a second assessment slot in the traditional term 4 exams - most schools will be adapting their courses and offering three out of four standards. Realistically, students who are not looking at doing Calculus may not attempt 1.4 so need something to work towards in term 4. These are also the students that are unlikely to cover all the content needed for 1.3 in half a year. Having a second assessment slot would be really beneficial for these students.”*

* One response said that there could be a **teacher workload issue** from this assessment, if there are many assessments (across multiple subjects at a school) occurring at the same time, which could overload students and the teachers.
* One response said that the **literacy element of this assessment looks too significant** for students, and it is unclear whether literacy, maths or stats is being assessed.
  1. **AS 1.4**

***Is this Achievement Standard ready for piloting?***

***Chart D4.1:****Is AS1.4 ready for piloting?*

***Are the Achieved, Merit and Excellence criteria clear enough to support consistent assessment judgments?***

***Chart D4.2:****Are the AS1.4 criteria clear?*

***Does the unpacking of the Standard and the Proposed Assessment Approach provide sufficient and clear guidance on the use of the Standard?***

***D4.3:****Do the Conditions of Assessment and the unpacking of AS 1.4 provide sufficient   
and clear guidance?*

***Do you have any further feedback on this Standard?***

There were 11 responses to this question.

* Similar to comments relating to AS 1.3, several responses said that **more guidance and clarity** is needed about AS 1.4. Many of these responses said that more examples would help schools understand the requirements for this Standard, and implement the teaching associated with it. One response said that the structure behind the Standard isn’t ready (eg teaching sequences aren’t clear in the Course Outlines).
* Some comments expressed concern that the **scope of this Standard is too wide**.

*“We would prefer that Probability stayed in 1.3 where it sits better from a statistical interpretation point of view. To also include it in 1.4 (I presume a more theoretical approach) would be too much. There will be plenty of scope in 1.4 without Probability too!”*

“*Workload is huge as the program will need to be specific for the school. 1.4 is intertwined with every other standard so couldn’t be dropped very easily”.*

* One response expresses concern about the **level of learning** required for this assessment: “*I am very concerned that 1.4 seems to contain most of the topics that would be most useful for level 2 maths.”*

1. **Impressions of the Achievement Standards as a suite**

***Do the four Achievement Standards as a group credential the most important knowledge and/or skills for this subject as illustrated by the Learning Matrix?***

***Chart E.1:****Do the four Standards credential the most important knowledge and*

*skills as illustrated by the Learning Matrix?*

***Do the Achievement Standards support ākonga Māori to succeed as Māori? (select all that apply)***

***Chart E.2:****Do the four Standards support ākonga Māori to succeed as Māori?*

***Are the Achievement Standards appropriate to Level 6 of the curriculum? (Approximately Year 11)***

***Chart E.2:****Are the four Standards appropriate to Level 6 of the Curriculum?*

***Do you have any further feedback on the Achievement Standards?***

There were 35 responses to this question, with four main themes emerging from the comments.

* **More guidance and clarity** needed.

Several comments said that more examples could be needed to understand the Standards, and to support Māori and Pasifika learners. Some comments said the explanatory notes need to be more detailed. One response queried what is meant by “critical” knowledge. One response asked for clarity on whether students need to achieve in all the areas of number, algebra, geometry, measurement., or just some of them. One respondent said that they’d need clear marking schedules for AS 1.3 and AS 1.4 to know if those assessments are too difficult or not.

* **Assessment format or timing issues**

Several responses related to timing of the external assessments. The was some confusion about how flexible the timing could be for the external assessments, and the request that the CAA could be offered twice yearly. One response suggested that AS 1.3 should be later in the year to enable students to build sufficient evidence. One response expressed concern about AS 1.2 being a two-hour assessment, saying that this Standard should be changed to suit “less capable students” that learn in “chunks”.

* **Approval** of the new Mathematics and Statistics materials.

*“I am pleased to see that we are now proposing to assess ideas that link between subjects...I also like the idea of assessing some things internally and that these should include a real life context and use of several areas of Mathematics.”*

*“Good general coverage of topics, taking the emphasis away from assessment for each strand in detail.”*

*“mātauranga Māori - There is enough freedom to allow for this*.”

* Concern that the **proposed level of learning is not right for** Curriculum Level 6. Responses ranged from saying that the bar to pass is too low, to saying that the internal assessments will be easier compared to the external assessments, to commenting that these draft assessments mixed in Level 5 and Level 7 skills.
* Some responses said that the **balance between algebra and statistics is not right**. The dominant view was that there was too much statistics content across the Standards.

*“The algebra strand feels too lost and there is too much Statistical literacy. Why are 2 standards based on the statistics strand? it is 1/5 strands yet gets 50% of the weighting.”*

* Other views (from one or two responses) were:
  + The **distribution of credits** across the Standards is not right, in terms of the curriculum and time to teach them.

“*1.1 and 1.3 Statistics and Probability 12 weeks teaching time = 10 credits*

*1.2 and 1.4 Algebra, Number, Measurement, Geometry 20 weeks teaching time = 10 credits.”*

* + There is **too much content** to be covered in the time available to teach it, which will impede the delivery of the key skills needed for students to achieve all four standards.
  + **Information about Levels 2 and 3** is needed, to see how the draft Level 1 materials will connect with higher Levels and show clear pathways for learning.