Mathematics and Statistics newsletter

Information for leaders of mathematics and statistics in secondary schools | Term 2 | May 2012

Professional development this year

Professional Learning and Development (PLD) support for secondary student achievement this year will be in the form of face-to-face and online clusters, workshops, online support, facilitated meetings, and for selected schools, in-depth PLD.

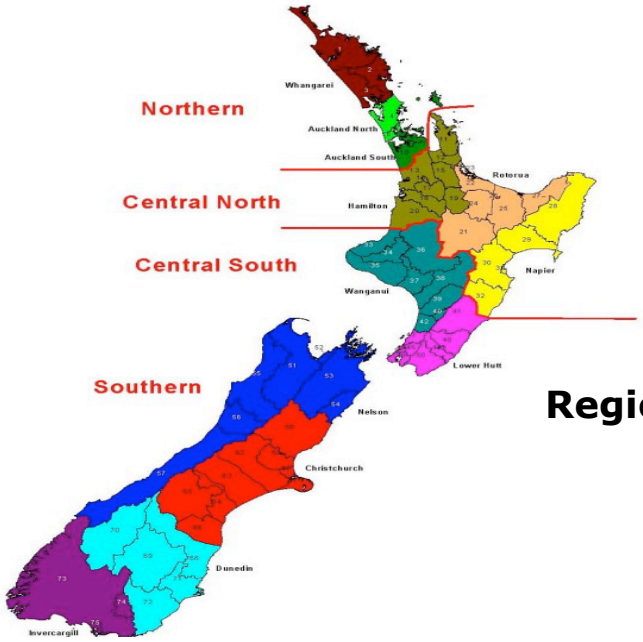
The PLD will be offered through two providers: The University of Auckland's Faculty of Education will offer PLD to secondary schools in the Ministry's northern and central north regions.

Te Tapuae o Rehua, a consortium of Canterbury University, Otago University and Ngai Tahu, will offer PLD to secondary schools in the Ministry's southern and central south regions (see map below).

Sandra Cathcart and Anne Lawrence have taken on a shared role as NCEA national coordinators in Mathematics and Statistics, and facilitators have been appointed around the regions.

National coordinators will work with facilitators to provide nationally consistent PLD to middle leaders and teachers of mathematics and statistics.

A series of four NCEA workshops is currently being planned with a focus on designing effective teaching and learning programmes in mathematics and statistics, using assessment practices that are consistent with The New Zealand Curriculum and embedding the new NCEA achievement standards within these programmes. See the attached flyer for details of workshops in your region.



Regions

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Online Forum

The online Professional Learning Communities for secondary mathematics teachers is the first place to go if you have questions around NCEA: http://www.nzmaths.co.nz/plc.

Numeracy Unit standards forum	Discussion around NCEA level one
NCEA Level three forum	Questions and answers about the realigned Level 3 Standards
NCEA level two forum	Discussion around NCEA level two
NCEA level one forum	Discussion around NCEA level one

These PLCs are a forum for teachers to ask and discuss questions relating to teaching Maths and/or Stats. They are moderated by the National Coordinators for Mathematics and Statistics. Members of the PLCs can register to receive email updates when new posts are made. Within each PLC there is a discussion thread for each standard. If you have a question, just add it as a comment to the appropriate thread.

For more information on joining and using PLCs go to:
http://nzmaths.co.nz/using-professional-learning-communities

NCEA Update

Level 2 standards, assessment resources and exemplars available

The conditions of assessment for internally assessed level 2 standards are now published, as are the "final published" assessment activities and schedules for internally assessed standards. These assessment resources have been quality assured by NZQA moderators and have the new quality trademark "NZQA approved". Exemplars of student work or "expected responses" are also finalised. These materials can be accessed on the subject pages of the NZQA website.

Teachers using assessment tasks from sources other than NZAMT and NZQA need to check that they are fit for purpose. Tasks to assess the mathematics standards need to provide an opportunity for students to select and use methods in solving a problem (questions focusing on skills seldom do this).

Teachers also need to be able to make holistic judgements about the quality of student thinking across a whole assessment. (Tasks comprising a set of separate sub-tasks typically do not do this.) The online forum is a good place for asking more about this.

New versions of draft level 3 standards on TKI

The level 3 standards have been revised in the light of responses to consultation last year and feedback received from the development of draft assessment resources for these standards. The revised versions of these draft standards are now on the TKI website.

There may be some improvements to these drafts as a result of feedback from the trialling of resources. The Ministry will publish a further set of level 3 drafts for school planning purposes by the end of May 2012, and final drafts by the end of September 2012.

One of the NCEA Workshops planned for this year will focus on pathways for level 3. Just a reminder that exisiting standards are available for 2013 and most unit standards do not expire until the end of 2013. Check details on NZQA website, (subject specific link).

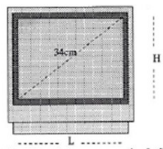
Scholarship and University Entrance

There are some changes to scholarship calculus for 2012. See the exemplar at NZQA website. The changes to the curriculum and the realignment of the standards have created real flexibility in designing mathematics and statistics in courses. These have important implications for University Entrance and Scholarship. We are still awaiting decisions about UE subject definitions. Note that consultation about scholarship subjects has now closed and the Ministry will publish the next draft of the New Zealand Scholarship performance standards and the associated draft assessment specifications by 31 May 2012.

Problem Solving

Here are some problems to ponder (taken from Heinemann Maths Starters which have been around for a while, but are still worth revisiting).

N4 SQUARE EYES



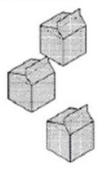
The size of a television screen is defined as the length of the diagonal. The ratio of the length to height of this television screen is 3:2. What is the length and height of a 34cm screen?

NO CALCULATORS.

Which is closer to $\sqrt{3}$

$\frac{7}{4}$ or $\frac{19}{11}$

A vat contains 2 000 litres of cream made up of 42% butterfat and 58% non-fat milk.
The dairy company requires that the cream be 40% butterfat before it is packaged. How many litres of non-fat milk need to be added to the vat to bring it down to 40% butterfat?



From the moderators

Teachers are being encouraged to submit student work to obtain written feedback from the moderators at any time, not just the time of the school's external moderation submission. The purpose of this feedback is to provide two-way dialogue between teachers and moderators on the interpretation of the standards and making assessment decisions. Specific questions can be asked about the samples to help clarify issues in the assessment of that work. The feedback provided from the moderators does not form part of the official moderation report and is designed to be more developmental in nature.

The National Moderators Report for 2011 has been published on the NZQA website. Go to http://www.nzqa.govt.nz/mathematics and click on National Moderators Report under Resources for internally assessed standards.

It is worth noting the information about "methods".

Also in assessment schedules, the evidence for Merit and Excellence needs to stand alone. It is not appropriate for Merit to be 'Achieved plus' and excellence to be 'Merit plus'.

There needs to be holistic judgements about the evidence that is presented with the assessor judgements for each grade level based on qualitative differences in achievement.

The Conditions of Assessment document contains additional information about the assessment of each new internal achievement standard.

Note that 91036 requires students to be involved in planning the investigation and collecting their own data. The plan needs to include information about what will be measured, how it will be measured and the decisions about ensuring consistency in the process of taking the measurements (managing variation).

For 91035 and 91036, students need to provide evidence of each component of the statistical enquiry cycle that is detailed in EN3 of the standard.

For 91038, there needs to be evidence of the experimental probability process (see EN3).

A page of formulae that can be used with the level 2 internal standards has been placed on the NZQA website at http://www.nzqa.govt.nz/mathematics under Resources for internally assessed standards.

Best Practice Workshops are focusing on the new level 2 internal achievement standards. Register through: http://www.nzqa.govt.nz/about-us/events/best-practice-workshops/

Useful Links and Resources
A useful site about networks http://plus.maths.org/content/rubber-data?nl=0

NZAMT Resources

The New Zealand Association of Mathematics Teachers held its annual writing camp in January and produced some excellent resources. Most schools belong to NZAMT and make good use of the range of resources on the site. However, fewer teachers are individual members which means they are missing out on the data projector resources and membership of the online forum.

It is worth considering supporting NZAMT by joining as an individual and getting access to these other resources. Application forms for a school license to the secure NZAMT resources as well as individual membership forms, are available from http://www.nzamt.org.nz. It is important to keep these resources confidential so that schools can use them as assessments knowing that students will not have had prior access to them.

Resources new on the site this year include:

- **Level 2 Internal Achievement Standards**
  - 16 assessments for the internal standards (at least one assessment for each internal).

- **Level 1 Achievement Standards**
  - 20 new assessments for the internal standards.
  - 2 parallel external assessments.

- **Maths for Numeracy – Level 1 Numeracy Standards**
  - 10 new topics. These are brief and appropriate for classes that are doing numeracy standards within an achievement standard course or for use in a thematically based alternative maths course. A teacher's guide is included for these topics with support for collating evidence to award and how moderate the standards.

The existing themed unit assessments were updated. The themed units are suitable for classes where the year's course is an alternative to an achievement standard course. These units contain teaching material from which the teachers can select appropriate material for their students.

- **Maths for Living – Level 2 Alternative Maths Course**
  - 9 units were written. We are in the process of applying for registration of a Level 2 certificate course that will address the mathematics learning needs of students in their daily lives. These units are intended to be optional topics within such a course. Further topics are yet to be developed and NZAMT is hoping to have the material ready for the 2013 school year.

Statistics Resources

The following files from the 2011 Statistics Teachers' Day organised by the Auckland Mathematical Association and The University of Auckland's Department of Statistics have now been put up on Census At School's website:

http://www.censusatschool.org.nz/2011/statistics-teachers-day-years-12-and-13/

· **Death of the Normal Distribution:**
Resampling (Bootstrapping), Randomisation

· **Star Trek Inference Tour:**
Taking samples, bootstrap, inference at light speed

· **Questionnaire Design:**
(Achievement Standard 2.8: Design a questionnaire)

· **Teaching activities** towards **Achievement Standard 2.9**:
Use statistical methods to make an inference: Handouts and Data Files

· A brief introduction to **experimental design** (Relates to AS 2.10)
James Curran, University of Auckland

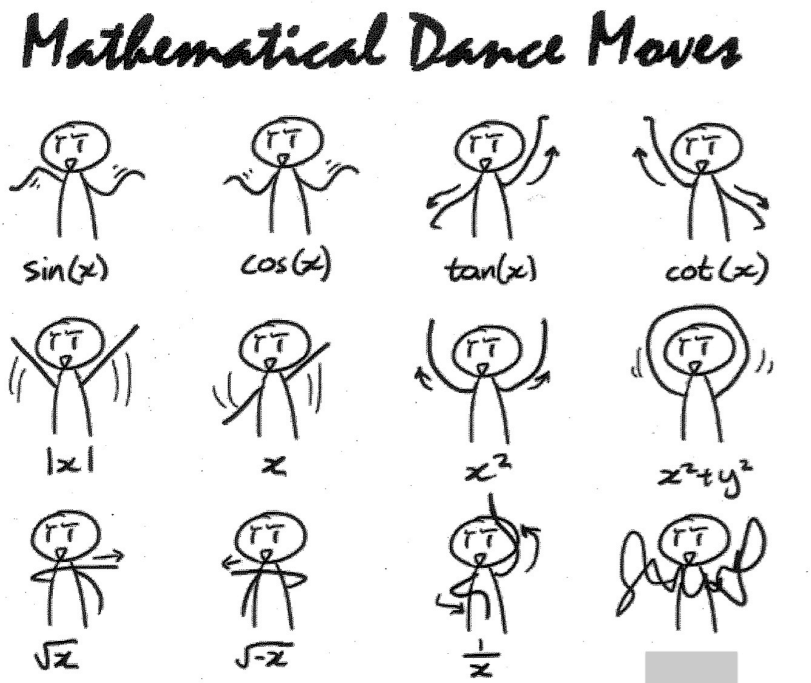
· **Talk Back to Statistics**: Statistical literacy skills in Achievement Standard 2.11 (Evaluate a statistically based report)

· **Risk** (Relates to part of AS 2.12)

· **A new world of simulations**:
Games Suitable for Simulations and Other Handouts

· **Probability**:
Risk-free

· **Genstat** for Year 11 and 13 Statistical Analysis



RESOURCES

My three act math problem
http://www.thelandscapeoflearning.com/2011/12/my-three-act-math-problem.html
Excerpt from the website
"Teaching mathematics should be like having your students watch a movie. In a typical movie, there are three acts.

Act One engages the audience.
Act Two is when the conflict surfaces and the plot develops.
Act Three is when the conflict is resolved and a sequel is expected.

Today I was at the gas station, filling up my tank to go home for the holidays, when I noticed that it was taking an unusual length of time. At one point I thought to myself, 'I wonder how long this is going to take?' Then a lightbulb went off! I thought, this is the perfect example of a math problem to share with my students. So, I took out my smartphone and recorded the data at the gas pump."

· **Building Numeracy: Moving from Diagnosis to Intervention** by George Booker. Well-respected author George Booker meticulously details the number ideas underpinning numeracy: numeration, computation, fraction ideas and making connections. Key examples of mathematical misconceptions and inappropriate ways of thinking are shown and discussed. Explanations of the analysis of evidence gathered from screening tests are given, leading teachers towards the diagnosis of difficulties and then effective intervention.

· **Focus in High School Mathematics: Statistics and Probability** by J. Michael Shaughnessy, Beth Chance, and Henry Kranendonk.

Through quite detailed descriptions of six investigations - including examples of students' reasoning and notes to the teacher -- the book shows teachers how students' sense making and reasoning can be developed.