MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

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National Newsletter: Mathematics and Statistics

Information and resources for middle leaders in secondary schools | Term 4 2014

Whakatauki

E koekoe te tūī, e ketekete te kākā, e kūkū te kererū.
The tūī chatters, the parrot gabbles, the wood pigeon coos. Its popular meaning 'It takes all kinds of people...

Welcome back to the last term of 2014. Term 4 is the time for reflection on 2014 and how you might make changes for 2015. These changes might include course content, looking at how to create a seamless progression from junior to senior programmes or increased expectations for students. Term 4 is also a time to think about budgets and PLD programmes for 2015 especially with NZAMT14 conference happening 7-10 July 2015.
We would like to thank all those people who have replied to the National Maths & Statistics middle leader survey. Responding to the survey helps us shape the National workshops to better meet your needs. If you haven't yet had your say here is the link https://www.surveymonkey.com/s/CHNSYDX.

AliM Pilot (Accelerated Learning in Mathematics)

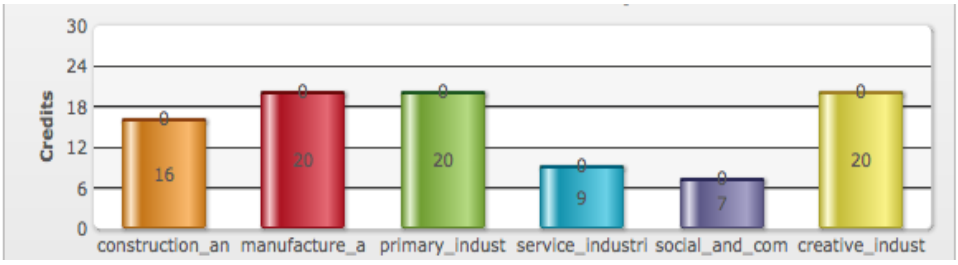
This MoE project is aimed at lifting achievement for year 9 & 10 students. The 10 weeks of Term 3 have seen intensive acceleration of small groups of students in 5 schools across New Zealand. Students who were performing just below their expected level in number and measurement were chosen for this pilot study. An acceleration programme was put in place to move these students quickly to a higher level of achievement.

A small inquiry group generally made up of the principal, the instructional leader and the classroom teacher, was set up to facilitate this. The inquiry group managed the resources provided, allocated time and provided support for the pilot. Students were tested using a revised adaptive adult numeracy tool before and after the intervention around number and measurement.
An evaluation of the pilot will be available later in the year.

Youth Guarantee and Vocational Pathways

Vocational Pathways are designed to improve the relevance of learning for students by indicating how their learning and achievement is valued by broad sectors of the workforce.
The Profile Builder is a useful tool for both teachers and students. Teachers can use this to see how planned courses fit into the pathways. Students can use the profile builder to see how they are progressing in terms of their chosen pathway.
It is expected that career pathways will feature in 2015 curriculum schemes.

Example profile for a Level 1 course that includes standards 91026, 91027, 91030, 91032, 91034 and 91035



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Use of Technology in Internals

The Conditions of Assessment state that:
"Care must be taken to allow students opportunities to present their best evidence against the standard that is free from unnecessary constraints."
Therefore it is acceptable for students to use apps such as Trianglesolver, Geogebra and Free Geo in solving problems for assessment purposes.

In assessing student work it is good practice to read the entire script and make a holistic judgement. If the student has clearly shown relational or extended abstract thinking in solving problems the use of the app or not is likely to be irrelevant.

The only time when the quality of the required evidence might be compromised by the use of the app is when the student has not shown relational or extended abstract thinking and the assessor is seeking evidence to award Achieved.

In solving problems for a standard using such apps, students could select and use methods that are relevant to solving the problem. If the student writes down an answer from the app and clearly interprets what it means in terms of solving the problem there could be sufficient evidence of selecting and using these methods.

Describing Statistical Displays

It is the intention of the statistics standards that students will describe the features of the displays for Achieved and provide supporting statements of these descriptions for Merit.
For example: AS 91035, Investigate a given multivariate data set using the statistical enquiry cycle.

A student could say that the dot plots suggest that the boys' heights are shifted further up the scale than the girls' heights. (Achieved) This is supported by the evidence from the box and whisker plot, because the box for the boys' heights goes from 140cm to 150cm whilst that of the girls goes from 125cm to 130cm. (Merit)

From the Facilitators Notebook

Throughout our work we have seen many examples of improved practice. These three give an indication of the types of good practice that show enhanced results.

What do you do for your disengaged students?
Decile 5 Coeducational School.
While labouring through AS 2.13 a well-meaning but unenthusiastic student made comment about the options available at Subway and what a random 'sub' might look like. This led to the usual in-class discussions about choices available and their personal preferences. Seizing the moment the teacher suggested a 'field trip' to Subway as a subsequent lesson. There they learned about the variety of products and stock management to cater for customers preferences then took the information back to class for use in their future learning. The topic concluded with an NCEA assessment centred around their 'Subway' visit. I visited on the day of the assessment to see a class enthusiastically engaged in their assessment!
Since then they have been to the local 'Trucking Company' to support the learning for 'Networks'.
The challenge for us all is to 'seize the moment' and engage our students so they may enjoy their learning in a meaningful context, then hopefully improve their chances of reaching their potential!

2014 PLD links

- Newsletter Archive
- Middle Leader Information
- Vocational pathways
- NZAMT
- Census@School
- NZ Maths
- Tātaiako
- Pasifika Education Plan
- Raising Student Achievement

ERO National Reports

In 2013 ERO evaluated the quality of teacher appraisal systems. The report findings may be found here Effective-teacher-appraisal

Education Profiles

The New Zealand Education Profile provides key statistics from early childhood education through to 18 years of age. The info graphics show how we are progressing at a regional and national level.
http://www.educationcounts.govt.nz/topics/national-education

Mathematics Acceleration and Extension for High School Students

University of Auckland:
MAX (MATHS 153) is designed for students concurrently at high school who enjoy academic challenge and who have shown themselves to be very able mathematicians.
https://www.math.auckland.ac.nz/en/about/our-courses/pre-degree-and-preparatory-courses/max1.html

University of Canterbury offer a STAR programme for secondary students.
MATH 199 is a course in calculus, linear algebra and probability offered both as a distance learning paper or on campus for students who have done well in year 12.
www.canterbury.ac.nz/aqua/star/

The effect of high expectations and student tracking

Decile 1 Urban Coeducational School

In 2013 approximately 50% of students gained 10 or more credits from courses based around the numeracy standards. On reflection and with facilitator input, the main issue identified was teacher expectation. Consequently, in 2014, the decision was made for all students at Level 1 to complete a course based on Achievement Standards. This was made possible through PLD around a thorough understanding of the achievement standards and the pedagogy involved. Consistent tracking of student progress across the classes was an essential element of student achievement. Interventions, including conferencing, setting learning goals and parental input, were put in place to ensure students stayed on track. At the end of Term 3, 82% of Level 1 students are expected to gain 16 Mathematics credits.

Key messages to consider in planning your junior courses

Key message – Know, recognise and focus on multiplicative thinking

The implication, of the Year 11 focus of problem solving, for Year 9 and 10 is to use these important years to develop skills and knowledge. The target for all students is being "multiplicative" as soon as possible. This way of thinking should be developed across all strands. Multiplicative ideas appear in the measurement strand, as area, volume, rates and scale.

Key message – Plan to have fun and include variety in your lessons

Enjoy learning mathematics by offering variety in your teaching programme. This could include group work, co-operative learning, technology, hands on activities. Establish a pattern in your classroom and the expectation of learning but vary the routine! Take the time to teach them how to learn.

Key message – Understand the curriculum progressions

The learning progressions describe the development of understanding in the three curriculum strands. The term progression implies a continuous, sequential development towards a greater understanding rather than a series of separate tasks that need to be mastered to "move up."

It is important for you to know how the mathematics develops and why, so you can appropriately challenge and support a student's mathematical thinking. The progression concept is encouraging schools to rethink the content and structure of their junior curriculum to better prepare students for success in NCEA.

New from NZQA! Collecting Evidence Best Practice Workshops:

From November 2014 NZQA is launching a new type of Best Practice Workshop called 'Collecting Evidence' for all assessors. These new generic workshops will be offered in addition to the current workshops on making judgements and modifying assessment resources.

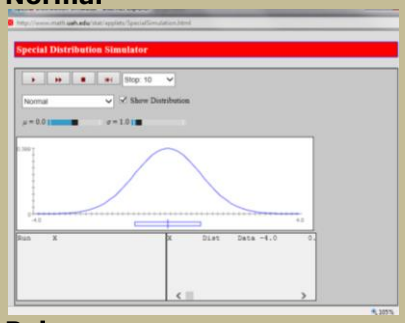
The purpose of the 'Collecting Evidence' workshop is to explore diverse and valid methods of collecting assessment evidence to meet the varied needs of learners. The activities in the workshop have been informed by the collection of student voice. Students tell participants what they value about assessment practice; what engages them; and how this helps them reach higher levels of achievement. The workshop showcases innovative assessment practice and also offers ideas around different assessment modes. Participants will have an opportunity to consider these ideas by working on a unit plan in a subject of their choice, making the workshop more relevant and meaningful to them.

Statistical Distribution Simulator

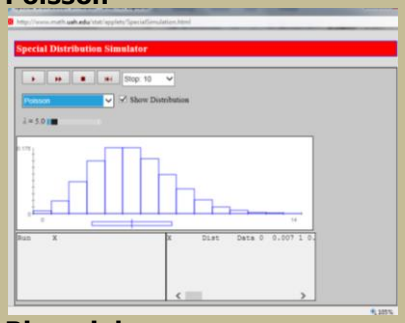
Open the distribution simulator and select the triangle distribution. Vary p (but keep the default values for the other parameters) and note the shape of the probability density function. For selected values of p, run the simulation 10 000 times and note the agreement between the empirical density function and the probability density function.

http://www.math.uah.edu/stat/applets/SpecialSimulation.html

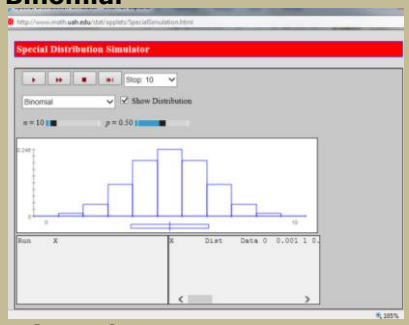
Normal



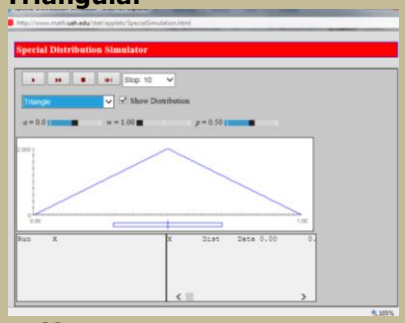
Poisson



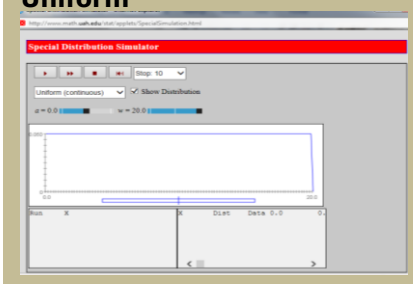
Binomial



Triangular



Uniform



Term 4 Calendar

Manawatu Teachers Day	Massey University, Palmerston North, afternoon and evening: **23rd October**
Wellington HOD Day	Gear Homestead, Porirua: **14th November**, all day
NZQA: Collecting Evidence BPW	Whangarei: **19th November** Palmerston North: **20th November** Auckland: **21st November** Wellington: **27th November** Dunedin: **27th November**
MTX and STATS PRT1 and 2 Day	Wellington, Dowse Art Gallery, Lower Hutt: **20th November**, all day
Bay of Plenty Maths Association www.bopma.org.nz	**21st November**: 9am – 3pm "At the Edge" focus on year 9 & 10
NZQA: Making Judgements BPW	Auckland Statistics: **21st November** Auckland Mathematics: **20th November**
NZSA conference	Wellington: **24th – 26th November** – 26th Nov is the secondary teacher day section.
Auckland Maths Association www.aucklandmaths.org.nz	Statistics Day: **27th November** Maths & Calculus Day: **28th November**
CMA HOD Day	Christchurch: **28th November**

Dates to be confirmed:

Marlborough/Nelson MA HOD Day	Nelson: **Week 7**, to be confirmed
Otago/Southland HOD Day	Dunedin: **Week 8**, to be confirmed

To register for BPW's click here
www.nzqa.govt.nz/about-us/events/best-practice-workshops/