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 2 2015

Whakatauki

Ehara taku koe it e toa takitaki.
Success is available to us all, especially if we work positively with others to achieve it.

Welcome to term 2

At the beginning of each term there is a need to focus again on those things that are important for the achievement of our students and that contribute to the pleasure of teaching. Some ideas for you as a HOD to think about, do you:

- encourage the belief that all students can learn
- set challenging rather than "do your best" goals for yourself and your department
- invite students to engage in challenging goals and commit to achieving them
- demonstrate respect, care and commitment for students in a way that is transparent to students
- constantly search for more effective ways to teach using the "teaching as inquiry cycle"
- build an atmosphere of trust between teacher and student and student and student and between you and your department
- monitor student success and understanding and adjust your teaching programme
- capture student voice about what is happening in your classroom.

The list above could well provide the basis of a discussion in a faculty meeting along the lines of "how do we know this is happening?" Share your successes. Have a good term!

Inclusive Practice

Schools continue to work on developing inclusive practices for all students. A recent addition to resources that can support teachers to feel more confident and capable in this work is TKI's Guides for Inclusive Educators. This site presents a range of resources for Years 0 -13 teachers. It includes a range of video clips demonstrating inclusive practice within a variety of school settings. For more information click on this link developing an inclusive classroom culture

FutureIntech

This year Futureintech's focus will be offering more Ambassador visits that are integrated with learning programmes; reaching as many Year 7-10 students as possible; and promoting innovation and entrepreneurship, hands-on and curriculum-linked focus for 2015.

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- Curriculum-linked presentations, hands-on activities
- The key years to target are intermediate schools (Year 7-8), and the first two years at secondary school (Years 9-10) before students are able to choose which subjects to continue in senior secondary school.

The Futureintech website highlights some profile stories. Theses profiles of more than a thousand scientists, IT professionals, surveyors, food technologist and engineers are the heart of the Futureintech website, and are a fantastic resource to inspire your students. Read more by clicking **here** and **here**.

National workshops term 2, 2015

theme: 'Mathematics and Statistics ∀'

In response to your feedback this year's National Workshops will include:

- Accelerating learning in Mathematics: how can we use the ideas from the pilot to help students? An introduction to the new PacT tool
- BYOD: sharing ideas of current practices
- Year 9/10 progressions (junior programme) with links to NCEA Level 1 Geometry, Measurement & Statistics
- Tracking to enhance achievement: what does this really mean?
- Senior statistics: moderator feedback
- Running a department: assessment, department goals link to school goals, PLD in the Mathematics Department.

All workshops will run 9am – 3pm. National Workshops are free, registration is essential. Tea & Coffee is provided.

Tue 5 May	Hamilton	Thurs 14 May	Wellington
Wed 6 May	Rotorua	Thurs 7 May	Nelson
Thurs 7 May	Tauranga	Thurs 30 Apr	Greymouth
Tues 12 May	Hastings/Napier	Tue 12 May	Rangiora
Tues 19 May	Gisborne	Wed 13 May	Christchurch
Tues 28 Apr	New Plymouth	Thurs 30 Apr	Timaru
Thurs 30 Apr	Palmerston North	Tues 5 May	Dunedin
Mon 11 May	Masterton	Tues 12 May	Cromwell
Tues 12 May	Paremata	Thurs 7 May	Invercargill

Graphics calculators - are they costing students higher grades in external achievement standards?

Level 2 Assessment Specifications say: *"Candidates will require an approved calculator (preferably a graphing calculator). Candidates who do not have access to graphing calculators will be disadvantaged."*
Graphics calculators are a very effective and necessary tool if students are to perform well in external achievement standards BUT they can also deny students gaining a higher grade if too much reliance is placed on their use. As part of teaching and learning (ako) we suggest making a priority for students to understand how to effectively use their graphic calculator so as not to be denied gaining a Merit or Excellence.

The 'NZQA Assessment Specifications" are a good starting point: *'Candidates will be expected to demonstrate an understanding of the mathematical concepts rather than directly transferring results from a graphics calculator'. 'Correct answers only may not be sufficient for showing evidence of the level of thinking required by the standard'.*
Also, don't forget to go over the cover page for each assessment; e.g. Level 2 Algebra – *"You are required to show algebraic working in this paper. Guess and check methods and correct answer only will generally limit grades to Achievement."*

However, that is not to say students should be discouraged using calculators in those more complex questions involving "Relational Thinking" or "Extended Abstract thinking". They can be particularly useful for checking the number or validity of the solutions obtained, or the correctness of an answer which could highlight the need to go back and check earlier working or a rethink of their approach in solving the problem.

PLD links

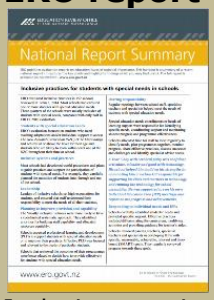
Latest news for middle leaders

TKI PLD resources

TKI Literacy Online: Literacy in Mathematics

ERO Report: Supporting school improvement through effective teacher appraisal

Inclusive practice ERO report



Inclusive practices for students with special needs in schools – March 2015. This report examines how well students with special education needs are included in New Zealand schools. Click on the hyperlinked image above for more information.

Useful web links

NZ Maths for Level 1-5 information

NZAMT for teaching & assessment resources

TKI for Level 6+ information

Census at School NZ for statistics resources

NZQA documents

Young People's Success at Secondary School - ERO Report

This report presents the findings of ERO's evaluation of how well 68 secondary schools in Term 1, 2014 promoted and responded to student wellbeing. Click on the hyperlinked image above for more information.

Wellbeing for Young People's Success at Secondary School ERO Report

The conclusions made from the review and reporting from 68 secondary schools, where these leaders understood that students needed opportunities to:

- develop relationships with peers and adults that were based on mutual respect
- learn and take risks in a safe environment
- develop goals and experience success
- develop leadership skills and a sense of their own ability
- be "confident, connected, actively involved, and lifelong learners".

NZAMT Conference July 7 – 10, AUT City Campus BACK TO BASICS

It is time to register for the Back to Basics Conference. This is a fantastic opportunity to collaborate with colleagues, expand your professional network and hear the latest from experts in maths education.
Visit the site here to register and for more information as it becomes available.

NZQA Best Practice Workshops

These are a great forum for staying up to date with the latest thinking from NZQA, allow you to share successes and issues with colleagues from other schools and build your networks. The experiments and linear programming standards will be included in this year's workshops. Please register at least 4 weeks prior to the date of the workshop.

The Achievement Standards covered this year are:
Mathematics: 91030, 91257, 91260, 91573 and 91574
Statistics: 91038, 91035, 91264, 91582, 91265 and 91583

Venue	Mathematics	Statistics
Whangarei	May 26th	May 27th
Auckland	June 8th ; August 24th	June 9th; August 25th
Hamilton	June 16th	June 17th
Wellington	June 24th	June 25th
Christchurch	June 21st	June 22nd
Dunedin	July 28th	July 29th

NZQA moderators may be available to run workshops on request.
For further information and details of dates, venues, costs, and the process for registration see the NZQA website:
http://www.nzqa.govt.nz/about-us/events/best-practice-workshops/
Achievement Standard Summaries have been created pulling together key information for all internal standards fitting on to an A3 page. These can be accessed from: http://bit.ly/1wJLCcf

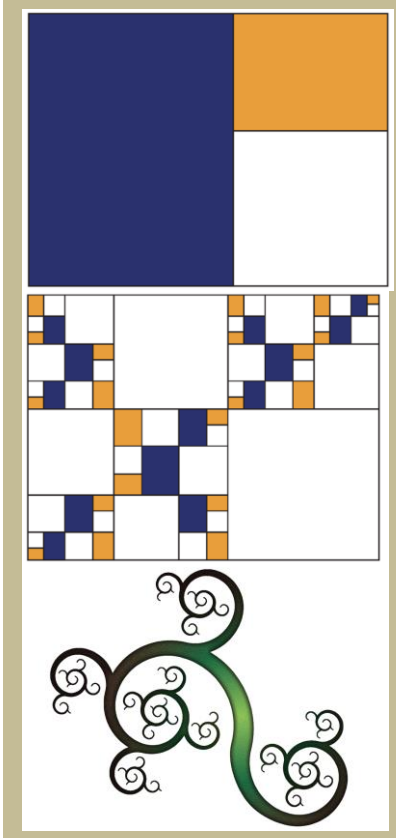
Mathematics and statistics in the middle years: evidence and practice

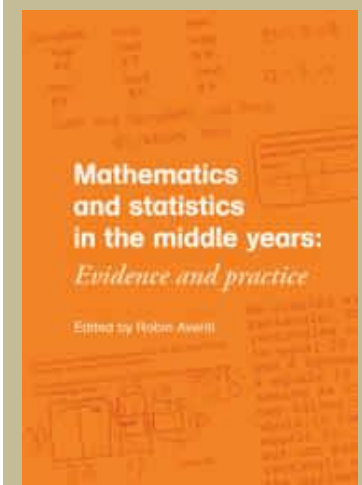
Published by NZCER and edited by Robin Averill, Victoria University of Wellington. The book focusses on putting educational policy and theory into practice and teaching mathematics in culturally responsive and equitable ways. The book has 18 chapters written by academics and teachers. It shows ways that teachers can have and convey high expectations of all students. Substantial review and consultation processes and a digital technology emphasis throughout ensure the book's relevance and usefulness to teachers, student teachers, professional development advisers, and academics. Its focus is on teaching students in years 7 to 10 but it is also relevant outside of that range. ISBN 978-1-927231-48-7

The Harriss Curve

The golden ratio has spawned a beautiful new curve: the Harriss spiral. "Instead of cutting a square, I cut a rectangle," he said. What he did was this: he found the rectangle that would divide into two similar rectangles and a square, as illustrated below.

The blue rectangle and the orange rectangle have the same proportions as the overall rectangle, which is a ratio between the sides of 1.325. Visit: http://gu.com/p/43pnb





Click on the hyperlinked image above for more information on this new resource.

NCEA achievement standards update

Level 1: The only change to Level 1, which are now version 3, is that the review date has been pushed out to December 2018.
Level 2: Now version 2, have also had their review dates pushed out to December 2018 and have had a reference to Te Marautanga o Aotearoa added.
Level 3: Are still version 1.
For AS91583 the experiment must involve a treatment and a control group. The experimental units need to be randomly assigned to the two groups and the experiment is strengthened by the random allocation of treatment and control to the two groups.
AS91265 the experiment could involve a treatment and control group and, if so, the same comments apply about random allocation of participants to the two groups and treatment & control to the two groups. Alternatively the experiment could be a before and after experiment with the same participants being involved in both situations.
AS90136 and AS91581 (Bivariate data) students to not need to consider sampling variability or to make an inference about the population.

A very short leap year!

Scientists need to make a tiny adjustment later this year!
The earth's movement in not a perfect circle and it spins on an angle. These two irregularities mean that solar days change in length – solar days are longer than 24 hours in summer than winter.
Our clocks however, are regular. Seconds do not get longer or shorter throughout the year. According to a clock there are 24 hours in a day, or 1,440 minutes, or 86,400 seconds.
Luckily, these two measurements line up perfectly over a year.
According to a clock, one year of 365 days has 31,536,000 seconds. The seconds match, but the times are not exactly the same. Earthquakes, glacier movement and tidal forces can speed up or slow down the earth's rotation. Over the past three years, these small changes have added up to almost one second.
To line things up, a leap second has been announced by the International Earth Rotation and Reference Systems Service. The final minute of 30th June 2015 will have 61 seconds so that the solar time can catch up with clock time. So, this year is going to be slightly longer that last!

A reminder about UE requirements

University Entrance (UE) is the minimum requirement to go to a New Zealand university. To qualify for University Entrance students need:

- NCEA Level 3
- Three approved subjects at Level 3, made up of 14 credits each
- Literacy - 10 credits at Level 2 or above, made up of 5 credits in reading and 5 credits in writing
- Numeracy - 10 credits at Level 1 or above.

Once a student has met the requirements for University Entrance it will appear on their Record of Achievement.

PaCT and the underpinning framework (Y1-8)

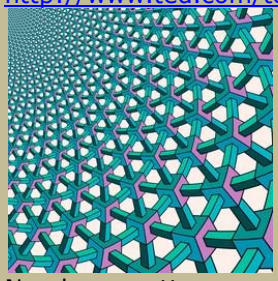
Secondary schools need to be aware of PaCT and the underpinning framework (Y1-8), The PaCT framework breaks mathematics and statistics into aspects with each aspect representing a clearly observable and distinct learning step. More information can be found information can be found at:
http://assessment.tki.org.nz/Progress-and-Consistency-Tool

National newsletters archived links

Archived-newsletters-2012
Archived-newsletters-2013
Archived-newsletters-2014
Archived-newsletters-2015

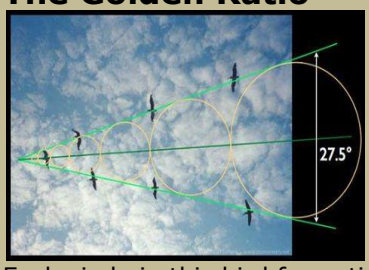
TED Talks

A collection of video playlists from TED Talks on mathematics and statistics related topics.
http://www.ted.com/topics/math



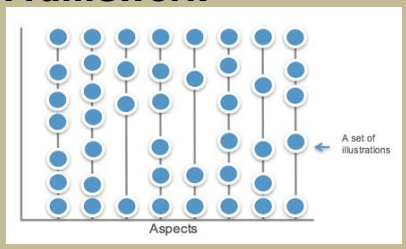
Numbers, patterns and equations are at the core of these talks, which will teach you how to fold better origami to how to quantify history...
The Fractals at the heart of African designs
The beautiful math of coral
The math & magic of origami
More math talks from Ted

The Golden Ratio



Each circle in this bird formation is Phi larger than the last, giving a Phi growth rate at the Phi scaling angle of 27.5 degrees.

The Pact Aspect Framework



An introductory video can be watched **here**.

Being creative in your classroom

https://www.zaption.com/
Turn online videos into interactive learning experiences.