MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

This newsletter and the Secondary Student Achievement Professional Learning and Development initiative is funded by the Ministry of Education. The providers are The University of Auckland and Te Tapuae o Rehua consortium.

National Newsletter: Mathematics and Statistics

Information and resources for middle leaders in secondary schools | Term 1 2015

Whakatauki

Kimihia, rangahaua! Kei hea rā te urupare ki te pātai nei!
Find out what you are truly passionate about!

Welcome to 2015

We hope that you have had relaxing and enjoyable break with family and friends and made the most of the fabulous weather that the country has had for the past month. It is now time to take stock of what we have learned in 2014 and move into 2015 with high expectations of achievement for our students. At this time of the year it is important to refocus and prepare for the year ahead.

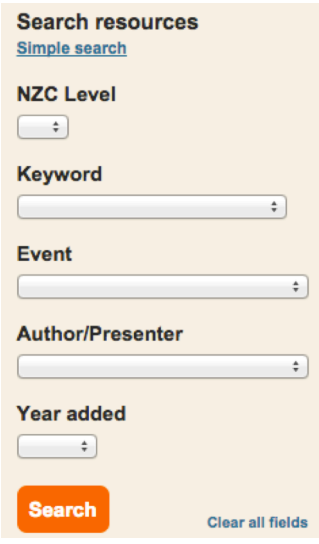
To that end have you:

- Analysed your 2014 NCEA data (across courses, teachers and levels) to ensure that your programmes meet identified needs?
- Organised your department's tracking and response systems, so that no student is left behind?
- Adjusted courses to reflect the needs of this year's students?
- Checked your senior course with the Vocational Pathways tool to ensure coverage is appropriate for your students?
- Allocated time within department meetings and out of school for professional development?
- Thought about trying something new – a resource, an experiment, rearranging the classroom?
- Planned to revive your junior programme to make the transition to NCEA Level 1 more seamless?
- Planned to visit teachers in your department on a regular basis?

Latest resources on Census at School

2015 brings a new set of census questions. To take part in the 2015 census register **here**.
The survey will be available for use with students from March 16th until May 29th. The nationwide database will be available for exploring and taking sample data from mid June 2015.

Census at school is the place to go for all things relating to the teaching of statistics. To help you find what you are looking for either go to the page relating to the standard or use the advanced search feature.



Contact details

Northland/Auckland
Sandra Cathcart
National Co-ordinator
Team Solutions, University of Auckland
Phone: 027 555 4660
E: s.cathcart@auckland.ac.nz

Auckland
Robyn Headifen
Team Solutions
University of Auckland
Phone: 027 250 3009
E: r.headifen@auckland.ac.nz

Waikato, BOP, Hawkes Bay, East Coast
Jim Hogan
Team Solutions
University of Auckland
Phone: 027 461 0702
E: j.hogan@auckland.ac.nz

Manawatu, Taranaki
Marc Paterson
Te Tapuae o Rehua
Phone: 021 627 287
E: marc.paterson@otago.ac.nz

Wellington, Wairarapa
Derek Smith
National Co-ordinator
Te Tapuae o Rehua
Phone: 021 913 150
E: derek.smith@otago.ac.nz

Christchurch, Nelson, West Coast
Derek Glover
Te Tapuae o Rehua
Phone: 027 405 6725
E: derek.glover@canterbury.ac.nz

Otago, Southland
Munro Doran
Te Tapuae o Rehua
Phone: 021 225 3150
E: munro.doran@otago.ac.nz

New from NZQA for 2015

- Updated exemplars for Level 1 are now available. Level 2 & 3 are being progressively updated. Unpacking the exemplars as part of a department meeting makes for great PLD.
- Revised clarifications for all levels have now been published on the NZQA website following moderation feedback from 2014.
- Level 1 Achievement Standards are now version 3.
- MCAT - Further clarifications for this achievement: Answers should be expressed in their simplest algebraic form. It is expected that answers will be left in fractional form and may contain π. Utilising procedures such as factorising, in simplifying a rational function, or writing an equation from a word problem will provide evidence of solving a problem. Candidates must know that given a word problem, they will be required to write equation(s) and demonstrate consistent use of these in solving a problem.

  Access to NZQA documents: click here

Secondary Student Achievement National Workshops: 'Mathematics and Statistics ∀'

In response to your feedback, the 2015 national workshops will include:

- Accelerating learning in Mathematics: how can we use the ideas from the pilot to help our 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.

These national workshops are free but registration is essential. Morning tea provided. BYO lunch. All workshops will run 9.00am – 3.00pm.

Mon 23 Mar	Auckland (North)	Tues 11 May	Masterton
Tue 24 Mar	Auckland(South)	Wed 12 May	Paremata
Wed 25 March	Auckland(central)	Fri 14 May	Wellington Central
Wed 1 April	Whangarei	Thurs 7 May	Nelson
Thur 2 April	Kaitaia	Thurs 30 Apr	Greymouth and Westport combined
Tue 5 May	Hamilton	Tue 12 May	Rangiora
Wed 6 May	Rotorua	Wed 13 May	Christchurch
Thur 7 May	Tauranga	Thurs 30 Apr	Otago N and Timaru
Tue 12 May	Hastings/Napier	Tues 5 May	Dunedin
Tue 19 May	Gisborne	Tues 12 May	Cromwell
Tues 28 Apr	New Plymouth	Thurs 7 May	Invercargill
Thur 30 Apr	Palmerston North		

Registration for these workshops
Online registration details and specific venue information will be emailed to you soon. If you have any enquiries in the meantime please contact:
Sandra Cathcart s.cathcart@auckland.ac.nz
or
Derek Smith derek.smith@otago.ac.nz

PLD links

Latest news for middle leaders

TKI PLD resources

Other curriculum area national newsletters

TKI Literacy Online: Literacy in Mathematics

ERO Report: Supporting school improvement through effective teacher appraisal

Ted Talks

The Fractals at the heart of African designs

The beautiful math of coral

The math & magic of origami

More math talks from Ted

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

Mathsreach from NZ Institute of Mathematics

Youcubed from Stanford University

NZ Transport Agency Resources

http://www.nzima.org/ has resources that link mathematics and statistics to real life applications.

Just for fun - Numberphile

Educating Tama

educating-tama

This documentary tracks students and staff of Hastings Boys High School over the course of one year to provide a glimpse of Māori education success stories.

Making Mathematics & Statistics more connected, exciting and enjoyable

- Do students enjoy your mathematics classes?
- Do other learning areas understand the importance of mathematics?
- Can you get context from other learning areas to support and enrich the learning in your classes?

What are the answers to these questions? How do you know?

Get to know your students. Begin the year with a student data questionnaire for your classes. This will help you remember their names and show that you care, and more quickly build a robust relationship so that real learning can happen.

Ask questions about family, hobbies, favourites, sports and interest, about subjects taken, future plans and hopes and data about family. You could use the C@S survey to build your knowledge of your students.

Other departments do data measuring as well. Check out when and what. The HPE department measures many things, counts many things, and over time as well. The Science department is always experimenting and collecting bivariate and multivariate data sets. This data is useful to build meaningful context in senior stats. Students have the contextual information they need to make much better statements about inference and relationships between variables.

Do other departments use graphs, numbers, rulers and maps? Do you all speak the same language and use the same words. What accuracy is expected and how is data recorded. Do all use the same statistical names for variables?

Enjoying learning Mathematics and Statistics is probably the most important. Have some fun. Let problems swirl around with potential answers and conjecture. Make a big deal out of thinking mathematically. A favourite for Year 9 Day 1 is Pentominoes. It is non-numeric, solvable by all, a big challenge, colourful, and cooperative.

Lastly, journaling, every day, every period, every student. Stop a few minutes early and have students write a brief reflection on learning of today. Begin with sentence starters like, "Today I learned…" and after a few weeks of different starters leave it to them. You will get good information - read it to show interest and write a comment. This is really appreciated by the students.

Success statements from teachers working a teaching as inquiry process

"The realisation that focusing on just a few students within the class can have a pronounced effect on the achievement of the other students in the class."

A student commented that, "the extra attention from my teacher really helped my grades. In other classes my teachers often helped the smarter students and I would get left behind. The extra attention and push has helped keep me motivated to try my hardest."

A teacher observed that, "The biggest learning from this inquiry has been for me. I have learnt about the importance of self-belief and the impact that my interactions can have on students belief in their ability to learn Maths. Though not all my focus students achieved what I would have liked them to achieve - they did all make significant progress."

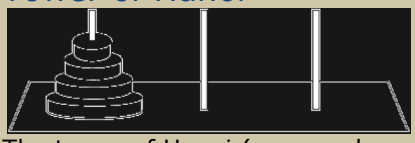
Youcubed

Find Jo Boaler's 7 favourite messages for maths students here. Jo Boaler is the author of the online course, How to learn maths for students and the driving force behind the youcubed website.

DreamCatcher

Tools, ideas, contacts and structure for their thoughts to make informed decisions of their future.
http://www.dreamcatcher.school.nz

Tower of Hanoi



The tower of Hanoi (commonly also known as the "*towers* of Hanoi"), is a puzzle invented by E. Lucas in 1883. It is also known as the Tower of Brahma puzzle and appeared as an intelligence test for apes in the film *Rise of the Planet of the Apes* (2011) under the name "Lucas Tower."
http://mathworld.wolfram.com/TowerofHanoi.html

Interactive tower URL:
http://www.dynamicdrive.com/dynamicindex12/towerhanoi.htm
for n = 3 ~ 8 disks.

Frogs and toads

A frog or toad can jump over one other onto an empty lily pad or it can slide onto an empty lily pad which is immediately next to it. Only one animal can move at a time, and is allowed on each lily pad.

The idea is for the frogs and toads to change places. So, the frogs will end up on the side where the toads started and the toads will end up where the frogs began. The challenge is to do this in as few slides and jumps as possible.

You can watch a demonstration video here:
http://nrich.maths.org/1246&part

You can use the interactive URL here:
http://nrich.maths.org/6282

Points to consider around NCEA assessment

- Always check tasks against the standard.
- Teachers must work through assessment tasks before the students.
- All third party assessment schedules are only an indication of how each level of achievement may be demonstrated. They are not the only way.
- Where teachers are writing tasks make sure there is a prompt to enable the students to get to excellence, e.g. The "Mike and Huia" task the fluctuation of the exchange rate as well as the plus/minus $50.
- AS 91265 – this standard is best done with "before and after" data and for teachers to encourage the drawing of arrow graphs. This has the potential to provide more evidence for excellence.
- AS 91032 – finding the hypotenuse using Pythagoras and finding the short side using Pythagoras can be considered to be two methods as long as they contribute to the overall solution to the problem.
- AS 91036 – the intention of this standard is for students to gather their own data. If students are collecting and gathering data from websites, care should be taken to ensure that there is an opportunity for students to manage variation.
- "Outliers" – students need to comment on what they see, not what they don't see. All data points should be considered valid unless evidence suggests otherwise.
- The conditions of assessment state that the context needs to be familiar i.e. context can be wrapped up in the teaching and learning for the standard.
- When making "holistic" judgements, it is important to remember that evidence of all the bullet points in the Explanatory Notes of the achievement atandard must be evident for any level of achievement.

NZQA's Best Practice Workshops

These workshops from NZQA will be offered again in 2015. They 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.

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/

Quality teaching supports priority learners

An essential focus for term 1 is to identify the priority learners in your classes; those who are at risk of not achieving, those with special learning needs or who are below the expected curriculum level, Māori or Pasifika students; therefore requiring additional support to enhance their learning experience. Identify areas they are struggling with and begin to put in place the targeted support they need.

- Is it support in how to read a text?
- Do they need help with their basic facts?
- Is it in building their capability to write clear concise statements about statistical graphs?
- Is it in reading a question to decide what knowledge is needed in their response and building their capability to communicate their response?

NZAMT Writing Camp

A huge thank-you to the teachers who gave up 3 days of their summer holidays to take part in the NZAMT Writing Camp this year. As a result of their efforts we will have new & revised tasks available to us through the NZAMT website.

Have you renewed your NZAMT subscription for 2015?
nzamt.org.nz

NZAMT14 Conference

7-10th July 2015
AUT, Wellesley Street, Auckland

The Auckland Mathematical Association invites you to Auckland for an invigorating and exciting time at the NZAMT14 Conference. Now is the time to be thinking about PLD for 2015 and plan to get as many of your department to the Conference as possible.

For further information will be available on the Auckland Mathematics Association Website.
Click here

Census at School

3 things to do now

1. Register yourself for 2015
2. Preview the question
3. Download the teachers information pack.

Census link here

Are you ready for IES?

On 8 December Education Minister Hekia Parata announced the first 11 Communities of Schools. These Communities set shared goals based on information about their students' educational needs and work together to achieve them
Read more here