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 3 2014

Whakatauki

Nāu te rourou , Nāku te rourou, Ka ora ai te iwi
With your food basket, and my food basket, the collective will survive and grow.

Welcome

Welcome back to term three – the term where the teachers and students focus shifts from the internals to the MCAT and externals. Term three is also a time to check students' progress.
In our work in schools, we are seeing tracking of student data becoming more common practice. Tracking students enables you and your department to respond to patterns you may see in the student data. Any issues identified could result in a change of course content and design, student engagement and pedagogy.
We are beginning to observe discussions around data which are resulting in increased student achievement.

Practice Assessment Tasks

Kohia Education Centre is now selling the four practice assessment tasks for all external mathematics achievement standards, together with their associated assessment schedules.

- Level 1 Mathematics and Statistics
- Level 2 Mathematics and Statistics
- Level 3 Statistics
- Level 3 Mathematics

Refer to the flyer emailed to you from the facilitators in term 2.

Dyslexia, Dyscalculia, Dysgraphia

Turns handwriting into calculations – google 'my script calculator' for this free app for iPad/iphone & android devices –recognises most mathematical symbols – exponents, roots, sin, cos, tan etc, and handwriting.

Bowlandmaths

A resource that was previously only available for educators in the UK but is now available for educators worldwide exhibiting interactive PD sessions http://www.bowlandmaths.org.uk/pd/ that can be completed individually but best as a department - they can be done from the web or downloaded for use offline. Videos and materials are available for use, for example - tackling unstructured problems http://www.bowlandmaths.org.uk/pd/pd_01.html.
There are extended projects covering many curriculum outcomes http://www.bowlandmaths.org.uk/projects/index.html. While they are designed for the UK curriculum they could be a great source of ideas and activities which could be adapted for the NZ situation.

Free Online courses in content

Online learning is starting to blossom with a number of free courses available. Visit: https://www.futurelearn.com for more information.

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
Jim Hogan
Team Solutions, University of Auckland
Phone: 027 461 0702
E: j.hogan@auckland.ac.nz

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

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

Nelson, Christchurch, 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

TKI, NZQA, nzmaths, C@S, Statistics NZ, NZAMT

Register for these updates via RSS feeds or add to your favourites:

TKI www.tki.org.nz	NZQA www.nzqa.govt.nz
NZAMT www.nzamt.org.nz	nzmaths www.nzmaths.co.nz
C@S censusatschool.org.nz	Statistics NZ Census 2013

NZQA updates: The Level 1 clarifications are being updated.
nzmaths updates: Several more e-ako activities have been added to the geometry and measurement pathway on e-ako maths. There are now 17 measurement and 9 geometry pathways. A collection of rich learning activities. You can see all of the content at https://e-ako.nzmaths.co.nz .
A collection of rich learning activities has been added in the Secondary section of the site, http://www.nzmaths.co.nz/rich-learning-activities. The activities are designed to provide engaging contexts in which to explore the achievement objectives from Level 5 of NZC.
A series of modules has also been developed to help teachers work with the National Standards with illustrations in mathematics. Visit: http://www.nzmaths.co.nz/ns-modules/

Newsflash!

The 'Figure It Out' series is being digitalized and being placed on the nzmaths website, giving you the flexibility to download and print the activities you want directly. ☺ The direct link is: Figure-it-out-carousel-interface .

Youth Guarantee and Vocational Pathways

http://youthguarantee.net.nz/start-your-journey/
http://youthguarantee.net.nz/achievement-retention-transitions/
These website contain many videos and resources which are useful as schools/departments plan and reshape their teaching and learning programmes to meet the needs of their diverse learners and support authentic pathways of learning.
Tools to help you plan your courses using the Vocational Pathways

Profile Builder	Curriculum guidance documents
Internal assessment resources for NCEA Levels 1 and 2	Youth Guarantee newsletter

Click here to order Vocational Pathways leaflets for your students and communities,.

ERO

There are a number of documents that we need to be familiar with from ERO. Margaret recently received an ERO document as chairperson of a BOT that highlights current secondary school practices that are making a difference for priority learners.
http://ero.govt.nz/National-Reports
School Leaders – Latest newsletter
ERO newsletters

ALiM Pilot (Accelerated Learning in Mathematics)

This MoE pilot will provide supplementary support for learners at years 9 and 10. An intervention contextualised for secondary students that focuses on lifting the achievement of a small group of learners who have been identified as not having the mathematics knowledge, skills and strategies to access the NZ Curriculum at their relevant year level.
ALiM is a school-led and school-driven initiative, using the mathematics expertise in the school to review current mathematics achievement and to identify small groups of students who need accelerated learning.
Schools design, teach, reflect on and closely monitor the 10-week intervention with the support of a wider inquiry team.
Schools will be supported by a mentor from the Secondary Student Achievement Professional Learning and Development suppliers – University of Auckland for schools in the Northern or Central North Regions and Te Tapuae o Rehua for schools in the Central South and Southern Regions.
The pilot has been developed from the primary model for use in a secondary context. There is a similar pilot in Literacy. The pilot also provides an opportunity to trial a Literacy and Numeracy for Adults Assessment Tool adapted for youth.

Resources and web links

2014 PLD links

- Secondary-middle-leaders/Professional-learning-and-development
- Secondary-middle-leaders/News
- System-of-support-incl.-PLD
- E-newsletters
- Tataiako
- esolonline.tki.org.nz (news updates)
- Secondary Literacy online link (and link to subject specific resources from this link)l
- Literacy-Online
- Success for All – links to:
  1. Including-Students-with-High-Needs
  2. National-Evaluation-Topics
  3. SuccessForAll

Monty Hall problem and data

A recent Mythbusters episode on Prime looked at the Monty Hall/Pick-a-Door problem, using experimental data as well as theory. For those of you who haven't been exposed to it, the idea is as follows: There are three doors. Behind one is a prize. The contestant picks a door.
monty hall problem

ERO National Reports
Effective-teacher-appraisal

Matariki

Numerous resources and celebrations for Matariki:
http://www.matarikiwellington.org/
http://www.teara.govt.nz/en/matariki-maori-new-year
http://www.mch.govt.nz/nz-identity-heritage/matariki

Maths Week - 11th to 15th August

Mathsweek offers something for everyone from year 1 to year 13 and is supported by the MOE. Last year over 91 000 students registered throughout New Zealand.
The Challenge Section will have the popular Daily Dollar Questions and the Survivor Series Challenges for all levels, both which will offer great in class entertainment.
The interactive "Who wants to be a Maths Millionaire?" returns with themes including Lewis Carroll puzzles, Facebook, sports and mystery numbers.
This has been very popular and it is fully interactive. There will be two Maths Millionaire challenges each day, one for senior and one for junior students.
The very popular Games Section has been updated and will be interactive and include by tablets or iPods access.
The Challenges are written in Word and a PDF form for easy access. Answers will be provided for teachers along with suggestions as to how the challenges can be worked, provided you register early on www.mathsweek.org.nz.

NZQA's Best Practice workshops

The link below provides information on these workshops:
best-practice-workshops
Venues:

Subject / Location	AUCK	MANUKAU	P NORTH	CH-CH	WGTN
Mathematics	18-Sep	28-Aug	7-Aug	18-Sep	14-Aug
Statistics	19-Sep	29-Aug	8-Aug	19-Sep	15-Aug

Please enroll ASAP no later than a month out from the date. Workshops require 18 participants to run.
Content: Statistics concentrates on the three inference and two bivariate standards and mathematics covers Level 1 measurement, Level 2 graphs, Level 3 simultaneous equations and Level 1, 2 and 3 trigonometry.

Can your students win $6000?

This annual competition is a problem solving team event for secondary students, organised by the Department of Engineering Science at The University of Auckland.
This fun and challenging competition is for teams of three or four Year 12 or 13 students, who have interests in mathematics and science. 2014 will be the sixth year in which the competition has been run.
The 2014 competition will run near the start of term 3, on Saturday the **2nd of August.** The problem is revealed at 9.00am in the morning and students work in their teams to provide a solution by 6.00pm of that day. First prize is $6,000 plus there are two runner-up prizes of $2,000.
For more information and to register your team(s) see the Department of Engineering Science website: www.des.auckland.ac.nz/competition
Note that registrations close on Friday 25th July.

Mathematics Education course from Stanford

Explore the new research ideas on mathematics learning and student mindsets that can transform students' experiences with math. The sessions are all interactive and include various thinking tasks to promote active engagement - such as reflecting on videos, designing lessons, and discussing ideas with peers. Taught by Jo Boaler, professor of mathematics education, Stanford University, you will learn useful ideas and practices that you can apply immediately, for example:

- New pedagogical strategies
- An understanding of high quality math tasks
- Questions to promote understanding
- Messages to give students
- Inspirational messages from educational thought-leaders.

Comprised of 8 sessions, each with a viewing/listening time of 10-20 minutes plus activities totalling 1 to 2 hours, the course focuses on: **How to Learn Math:** For Teachers and Parents.

Computus, the calculation of the date of Easter

The date of Easter is figured as "The first Sunday, after the first full moon, after the Vernal Equinox (first day of Spring)". It was done that way to coincide with Passover that changes every year.
To each day in a calendar year, the Easter cycle implicitly assigns a lunar age, which is a whole number from 1 to 30. The moon's age starts at 1 and increases to 29 or 30, then starts over again at 1. Each period of 29 (or 30) days of the moon's age makes up a lunar month. With occasional exceptions, 30-day lunar months alternate with 29-day months. So a lunar year of 12 lunar months is reckoned to have 354 days. The solar year is 11 days longer than the lunar year.
This algorithm for calculating the date of Easter Sunday was first presented by the mathematician Carl Friedrich Gauss.
The number of the year is denoted by Y; mod denotes the remainder of integer division (e.g. 13 mod 5 = 3. Calculate:
a, b and c:
$a = Y \bmod 19$
$b = Y \bmod 4$
$c = Y \bmod 7$
Then calculate
$d = (19a + M) \bmod 30$
$e = (2b + 4c + 6d + N) \bmod 7$
For the Julian calendar (used in eastern churches) $M = 15$ and $N = 6$, and for the Gregorian calendar (used in western churches) M and N are from the following table:

Years	M	N
1583-1699	22	2
1700-1799	23	3
1800-1899	23	4
1900-2099	24	5
2100-2199	24	6
2200-2299	25	0

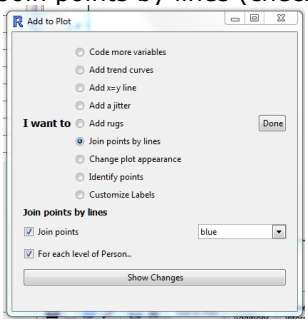
If $d + e < 10$ then Easter is on the $(d + e + 22)$th of March, and is otherwise on the $(d + e - 9)^{th}$ of April.
If $d + e < 10$ then Easter is on the $(d + e + 22)^{th}$ of March, and is otherwise on the $(d + e - 9)^{th}$ of April.

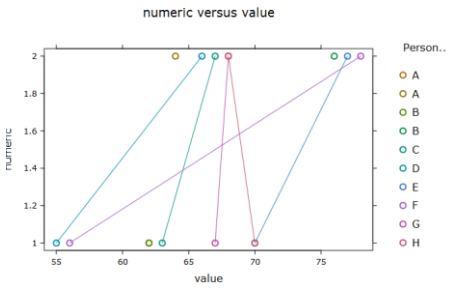
Statistical Graph for AS2.10 Experiments

Drawing a paired dot plot in iNZight. Example:

Person	Value	When	Numeric
A	62	Before	1
A	64	After	2
B	62	Before	1
B	76	After	2
...	...	...	...

Select a Scatterplot of 'Numeric' versus 'Value'.
Then 'Colour' by 'When'.
Join points by lines (check box that does this separately for each colour group).





Experiments and Inference at Level 2 and 3.

For 91583 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.
For 91265 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.
For 91582 the bootstrapping confidence interval needs to be used for the formal statistical inference. It is not appropriate to use the re-randomisation process in this standard.

NZGrapher

Available @: http://www.jake4maths.com/grapher/, runs on the web on PC, Mac, iPad, Microsoft Surface, Android, Linux, ChromeBooks,... if it can be accessed via the internet it should work. NZGrapher supports custom folders for assessments or your own datasets, allowing students with iPads to access assessment material, as the iPad do not support uploading of files.

NZAMT Writing Camp

NZAMT will be running their annual January Writing Camp from Monday 12th to Thursday 15th of January 2014 in Auckland. These four days are a superb opportunity for Professional Development in that you follow the process of writing a task, modifying it to fit the standards, have it peer reviewed and fit it to the NZAMT template for the secure area of the NZAMT website. Early in term 3 an email will be sent out asking for expressions of interest to take part in the writing camp.

NZAMT Conference

7-10th July 2015 AUT, Wellesley Street East, 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: http://www.aucklandmaths.org.nz/

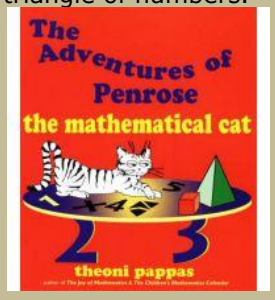
Professional Learning and Development survey

A live survey on the TKI website. This provides an opportunity for schools to feed back to the Ministry of Education on their recent PLD experiences in an informal way. Link: System of support PLD

The following constraints must be taken into account:
If the date given by the formula is the 26th of April, Easter is on the 19th of April.
If the date given by the formula is the 25th of April, with $d = 28$, $e = 6$, and $a > 10$, Easter is on the 18th of April.
Source:
http://calendars.wikia.com/wiki/Computus

Book Reviews

The Adventures of Penrose the Mathematical Cat
by Theoni Pappis
An exploration of mathematical ideas, Penrose takes a journey to meet the Zeros and the Ones, discovers mathematical stars and learns the truth about infinity. He meets Mr Abacus and discovers the mystery of the triangle of numbers.



Sona Geometry from Angola: Mathematics of an African Tradition (colour edition)
By Paulus Gerdes
The 'sona' tradition belongs to the culture of the Cokwe and related peoples in Eastern Angola and neighboring areas of Northwest Zambia and the Congo. Observers have described 'sona' as sand graphs, sand drawings, drawings in the sand, writing in the sand, pictographs and ideograms, and as a system of communication. This book shows the mathematical considerations involved and developed as the Cokwe invented 'sona' and built up their symbolic-graphic expressions.