MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

These national newsletters are produced by the Secondary Student Achievement national facilitation team, as part of supplementary PLD support for schools, from the University of Auckland and Mau ki te Ako project partners (University of Canterbury, University of Otago and Ngāi Tahu).

National Newsletter: Mathematics and Statistics

Information and resources for middle leaders in secondary schools | Term 4 2015

Whakatauki

Ma whero ma pango ka oti ai te mahi.
With red and black the work will be complete.
This refers to co-operation; if everyone does their part the work will be complete. The colours refer to the traditional kowhaiwhai patterns on the inside of the meeting houses.
URL: auckland-museum-education-kit-kowhaiwhai-tuturu-maori

Welcome to term 4

Term 4 is a time of reflection. As a middle leader, have you thought about the following:

- What went well this year across all levels and is worth repeating and what didn't work so well and needs adjusting or replacing?
- Have you spent time looking at examination techniques with your seniors? Research shows it works.
- Have you and your teachers shared activities within the department?
- What does your assessment data tell you about achievement levels in and between standards, teachers and curriculum levels?
- As a middle leader what PLD are you planning to provide for your department in 2016? Do you have designated PLD slots in department meetings?
- Have you thought about allowing students to present their work in a different way in 2016– e.g. PowerPoint, Google Docs, One Note, Blogs, Prezzie, oral presentation, storyboards
- Have you completed the Mathematics and Statistics Facilitator national survey? This is important for crafting our 2016 national workshops: MTX & STATS Facilitator National Survey
- Have you considered developing an assessment task which provides evidence for more than one standard? See page 2 for a very forward thinking example of this.

NIWA - NZ climate datasets

The National Climate Database holds climate datasets from around 6,500 climate stations around New Zealand including some offshore and Pacific islands. Over 600 stations are currently active and are still receiving valuable climate data. CliFlo is a web interface to the database managed by NIWA, allowing users to submit queries and retrieve ten-minute, hourly, daily or summary data. The use of CliFlo is free, given that the user has subscribed and accepted NIWA's terms and conditions.
Visit: http://cliflo.niwa.co.nz/ and http://cliflo.niwa.co.nz/doc/terms.html.

Vocational pathways

2016 is a transition year between the old and the new systems. In 2016, students will be able to gain a Vocational Pathways Award from EITHER the existing OR the refined pathways. Some standards currently identified

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as sector related may not be recognised as such in the refined pathways. The Award will include all standards identified for inclusion in both the existing and refined pathways.

From 2017, only the refined pathways will be available. The Ministry of Education will:

- Update and put online all guidance and pathways material
- Update the profile builder to include standards from both the existing and refined pathways, which also includes a new literacy and numeracy calculator
- Include four examples of Level 2 learning programmes in the online guidance material
- Include new information for learners and educators with regard to employability and work readiness
- Update the Frequently Asked Questions for Vocational Pathways

There is new and improved content now available on the Youth Guarantee website, such as the Profile Builder. There is a brand new literacy and numeracy calculator. Students can now calculate whether or not they have met the requirements for level 1 literacy and level 1 numeracy as these are needed for NCEA levels 2 and 3, and the reading/writing literacy requirements for University Entrance.

The Profile Builder now includes level 3, based on the *draft* level 3 achievement standards map that has been published on the Youth Guarantee website, and has a calculator for NCEA level 3 built in. To use the tool, go to http://www.youthguarantee.net.nz/vocational-pathways/profileuilder/

Pathway documentation and guidance material have been changed to an online format. There are four examples of learning programmes from Manufacturing and Technology, Primary Industries, Services Industries and Social and the Community Services pathways.

Project: Student-driven learning?

A level 3 student-driven project on the school farm investigating water quality (students chose to focus on Phosphorus/clarity) and macro-invertebrate population was done this year. The investigations were around the effect of rate and type of phosphorus fertiliser application on leaching through 3 main Northland soil types. Students developed a fertiliser strategy for the school farm based on their findings to reduce phosphorus runoff. Information gathered would be relevant to other farmers in Northland, as students tested 3 of the main soil classes.

Up to 34 credits came from Biology, Chemistry, Agriculture and Horticultural Science, Statistics and Education for Sustainability and were put to together in the teaching unit:

91602 Integrate biological knowledge to develop an informed response to a socio-scientific issue.
91601 Carry out a practical investigation in a biological context, with guidance.
91387 Carry out an investigation in chemistry involving quantitative analysis.
91583 Conduct an experiment to investigate a situation using experimental design principles.
91528 Carry out an investigation into an aspect of a New Zealand primary product or its production. (Optional)
90828 Evaluate a personal action that contributes towards a sustainable future.
90832 Develop a strategy for an organisation that will contribute to a sustainable future.
91735 Evaluate measures that may be taken to sustain and/or improve a biophysical environment.

Although this was a high risk unit because of the number of credits involved and was fairly intensive for the teacher who managed, it was a very valuable and successful activity.

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

The Pond

http://www.pond.co.nz/
http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/understanding-ncea/re/

Studyit Forums

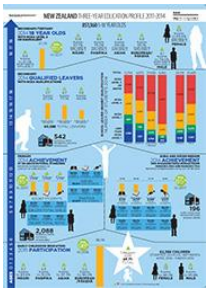
Studyit for NCEA students

Studyit forums are now open for student discussion and support in NCEA and Scholarship English, mathematics and science.
http://www.studyit.org.nz/

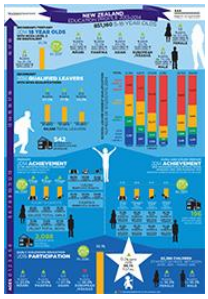
DigiStore

http://www.nzmaths.co.nz/digital-learning-objects

Education Counts



The **New Zealand Education Profile** provides key statistics from early childhood education through to 18 years of age. By looking at the Profile you can see the progress being made against important measures such as participation in early childhood education, National Standards and Ngā Whanaketanga Rumaki Māori progress and achievement, and the percentage of students gaining key NCEA qualifications by the time they leave school, at a national and regional level. It also shows where there are issues of inequity, and therefore what improvements are needed across the education system.
http://www.educationcounts.govt.nz/topics/national-education



Regional Education Profiles show analysis of regional and local data can allow communities to:

- Initiate education discussions
- Support the achievement of students within their boundaries
- Formulate partnerships with other regionally/locally based stakeholders to address barriers to achievement
- Develop local solutions to local problems
- Identify which investments and supports are effective in raising student achievement, and which are not.

http://www.educationcounts.govt.nz/topics/national-education/territorial-authority

Statistics:
http://www.educationcounts.govt.nz/statistics
Publications:
http://www.educationcounts.govt.nz/publications
Indicators:
http://www.educationcounts.govt.nz/indicators
Poster Links:
NZ-PAI-2014.pdf and NZ-PAI-2011-2014.pdf

iNZight and NZGrapher: tips and updates

iNZight: An interesting conversation with a DP… They use the SSA Export feature in KAMAR and then import into iNZight to view the school NCEA data for cohort tracking and sharing with students and whanau.
https://www.stat.auckland.ac.nz/~wild/iNZight/getinzight.php

NZGrapher: You can now track your (and your students') progress on MathsNZ Students, check it out at: students.mathsnz.com

Residuals Plots: A brief explanation of the residual graph, and why it is laid out the way it is. This is available here:
www.mathsnz.com/blog/residualsplots

Assessment matters

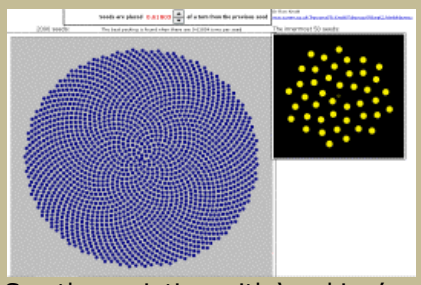
NZQA has only one Numeracy 'Making Assessor Judgements' Best Practice Workshop scheduled for the remainder of 2015. It is in Wellington on 25 November and is called Numeracy for Secondary Schools. The focus of the workshop is to clarify understanding of the requirements and grade boundaries of the Numeracy unit standards (26623, 26626 and 26627) and work with supplied samples of learner work to engage in professional discussion. Please enrol with NZQA early or the workshop will not run.

The National Assessment Moderators for Mathematics and Statistics can be contracted to run short "Making Assessor Judgements" workshops for either subject (or local) associations or cluster groups. These can be run as face to face workshops or in an on-line environment and typically last for 120 minutes. Arrangements for these short workshops, including the costs and venue, need to be made through either Michael Henson or Lynn Gill
Michael.Henson@nzqa.govt.nz Lynne.Gill@nzqa.govt.nz

Fibonacci numbers

The mathematics of nature…
If you were asked what is the best way to pack objects … then the sunflower is a perfection of this…

http://www.maths.surrey.ac.uk/hosted-sites/R.Knott/Fibonacci/fibnat2.html



See the variation with 'packing' using the interactive sliders from Wolfram.
http://demonstrations.wolfram.com/PhyllotaxisSpirals/
Download the cdf player application from:
http://demonstrations.wolfram.com/download-cdf-player.html

Learning Te Reo?

Content:

- Introduction - He Kōrero Timatanga
- Government's Māori Language Strategy
- Greetings - He Mihimihi
- Opening - He Mihi Maioha
- Closing - Te Kupu Whakamutu
- Making a speech - He Kōrero
- Farewell - Poroporoaki
- Karakia
- Songs of Support - Ngā Waiata
- Local Māori - Tangata Whenua
- Māori Dictionary

Visit:
http://www.dol.govt.nz/services/LMI/maori/korero/index.asp

Archived SSA national newsletters

These can be found at: http://nzcurriculum.tki.org.nz/Secondary-middle-leaders/Professional-learning-and-development/E-newsletters

Click on the years to view current and archived newsletters:
2015 2014 2013 2012

Have you a fixed or growth mindset?

Mindset is a simple idea discovered by world renowned Stanford University psychologist Carol Dweck in decades of research on achievement and success – a simple idea that makes all the difference. Carol Dweck visited NZ earlier this year and conducted seminars (some of you may have been lucky enough to attend) in which she discussed how to change students with fixed mindsets to develop growth mindsets. So what is the difference?

Fixed Mindset	Growth Mindset
Intelligence is static.	**Intelligence can be developed.**
Leads to a desire to *look smart* and therefore a tendency to	Leads to a desire to *learn* and therefore a tendency to
• **avoid challenges**	• **embrace challenges**
• **give up easily due to obstacles**	• **persist despite obstacles**
• **see effort as fruitless**	• **see effort as path to mastery**
• **ignore useful feedback**	• **learn from criticism**
• **be threatened by others' success**	• **be inspired by others' success**

It is important to know that everyone employs a mixture of both. Many students have fixed mindsets about mathematics. A student with a fixed mindset will say "I've never been any good at Maths." Dweck suggests that this student will develop a growth mindset when the teacher praises the student for continued efforts with maths, for choosing to do challenging tasks, for any improvement and for using clever strategies.

Free online course provides content knowledge for NCEA statistics

A re-run of "Data to Insight: An Introduction to Data Analysis" begins on 19 October, 2015. This free, 8-week, online course is led by Chris Wild and was very well received by NZ teachers last year. It provides most of the content knowledge required for teaching NCEA statistics and teaches you how to use iNZight. It starts from the basics and goes beyond Year 13 content. It will also provide you with lots of ways of giving your students statistical insights. As you know from your own teaching, engagement with working through activities enhances learning, than what you simply see or read. The order in which statistical ideas are built up over the progression of the course is also important to enhance the learning:

(1) Introduction
(2) Data on a single variable and comparing groups
(3 & 4) Relationships between variables (bivariate and beyond)
(5) Bias, lurking variables and random error
(6) Confidence Intervals and bootstrapping
(7) Experiments and the randomisation test
(8) Time Series
Visit: https://www.futurelearn.com/courses/data-to-insight to enrol.

Educational Review Office national reports

(2 page summary reports)
http://www.ero.govt.nz/National-Reports

Secondary-Tertiary Programmes (Trades Academies): What works and next steps (June 2015)
ERO - Secondary – Tertiary Programmes

Careers education and good practice (May 2015)
ERO - Careers education

Inclusive practices for students with special education needs in schools (March 2015)
ERO - Inclusive practices