

Secondary Student Achievement PLD

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National Newsletter: Mathematics and Statistics

Information and resources for middle leaders in secondary schools | Term 3 2016

Whakatauki

Iti rearea teitei kahikatea ka taea.

The rearea (bellbird) is one of the smallest birds in the forest, yet it is capable of reaching the top of the kahikatea, the tallest tree in the forest.

Welcome to term 3

For many of you there will probably be only 8 or 9 weeks of teaching left before your seniors go on exam leave. This raises some key questions around the progress of your students to date.

- Where are your students at?
 - Who is on track to gain 14 or 16 credits?
 - Who is not on track to gain 14 or 16 credits?
- How do you know?
- What changes are you going to make as a teacher and as a department for those students who are not achieving?
- Where to next? Is the programme you have planned for your students still appropriate?

Maths Week, Monday 8 - Friday 12 August

Maths Week is the premier mathematics event in the New Zealand school calendar. Maths Week was created by the New Zealand Association of Mathematics Teachers (NZAMT) and is in its 16th year. It is targeted at Year 1 to Year 11. Last year 284,087 students registered.



This year's topics include:

- Maths Millionaire? Interactive game at three levels. Years 5 to 11.
- Survivor Series class tasks.
- Daily Dollar questions.
- The Dam Busters.
- The Sound of Music. Maths from the famous movie!
- The Motorway Planning Problem. Steiner Points.
- Travelling on Route 66. Maths on this famous road trip.
- Olympic Games. Mathematics from competitions involving kiwis.
- Skiing in France. A week at Meribel. Every young person's OE dream!

This year there is more interactive mathematics and more challenges!

Teacher registrations are now open - [click here](#)

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Assessment matters

- At Level 1, “a selection of...” means 3 or more methods that are relevant and contribute towards solving the problem.
- At Level 2 & 3, “a range of...” means 2 or more methods that are relevant and contribute towards solving the problem.
- For statistics standards all bullet points must be present in the report for achieved.

91032: Using Sin, Cos or Tan to find a side is a different method to using Sin, Cos or Tan to find an angle. Taking measurements at a precision appropriate to the task is a method. The students must choose what to measure and use their measurement in solving the problem. Using Pythagoras to find a hypotenuse is a method, and finding a short side using Pythagoras counts as a separate method.

91259: Using the Sine Rule to find a side or angle is one method and using Cosine Rule to find side or angle is another method. The use of a Triangle Solver app would be appropriate, however the students must clearly communicate their thinking to show the trigonometric relationship.

From the updated conditions of assessment

1. “Students are expected to have access to appropriate technology”.

For statistics standards this would include statistical software. For mathematics standards it might include the use of Geogebra or Desmos.

2. “Care needs to be taken to allow students opportunities to present their best evidence against the standard(s) that is free from unnecessary constraint”.

Feedback from teachers whose students are creating their own reference sheets report increased engagement. Are you giving your students the opportunity to create their own reference sheet for internal assessments? These sheets must be the students’ own work.

3. “Students are expected to have access to appropriate technology. For statistics standards this would include statistical software.”

All graphs for statistics standards could be generated by technology.

RISK: a strategy for improving exam results

By classifying their errors the students can see where they are making mistakes. RISK is a strategy that can help students learn.



Jscreationzs at FreeDigitalPhotos.net

R – I did not **READ** the question properly

I – I did not **INTERPRET** (understand) the question

S – I made a **SILLY** mistake

K – I didn’t **KNOW** how to do the question

Get students to RISK their work by:

1. Categorising all mistakes with R I S or K.
2. Fix their silly mistakes and reading errors.
3. Re-grade their paper as if they got those questions right. They are often surprised by the result.

Silly mistakes and reading errors they can fix themselves

Students will need help with I & K. One way they could work on interpretation is by drawing a picture of the problem. Knowledge and skills may need to be developed to generate an effective strategy.

Clarifications, Conditions of Assessment and Exam Specifications

These terms can be confusing so it’s worth noting who has produced them and for what purpose.

NZQA publish the [Clarifications](#). They are written by the external Moderators and give advice to teachers about each internal achievement standard related to their subject. They are the result of areas of weakness or confusion that the Moderator has noticed while moderating work from schools. Before writing any assessment, this should be the first thing you read! The National Moderators also produce a [newsletter](#) four times a year which again draws people’s attention to anything relevant to do with the assessment of the internal standards – changes in wording, upcoming workshops.

The **Ministry of Education** publishes the [Conditions of Assessment](#). These also support the internal achievement standards and should be read before writing any assessment. The introduction to the standards is similar now for all subjects but there is information specific to each internal as well. They focus on ways of gathering evidence of achievement and comment on authenticity.

These documents have been **collated** with the standard onto one A3 page and can be found [here](#)

For the externals, the important document is the [Assessment Specifications](#). These are published by NZQA at the beginning of each year and provide information about the examination of each standard at the end of the year. They cover such areas as the format, specific content that may be examined and what students should bring to the exam. Link is on your NZQA subject page.

Maths teachers must be aware of the [changes to 91028](#) (1.3)

Youth Guarantee update

The Ministry has an annual maintenance process to ensure the Vocational Pathways remain up to date and relevant. This is done in consultation with relevant agencies and groups. The Vocational Pathways and tools (profile builder, spreadsheets and Qualifications and Employment Pathways mapping tool) will be updated by 30 June of each year. This enables secondary schools to integrate new standards and qualifications into course booklets for the following year.

Updated maps will be on the Youth Guarantee website and NZQA's systems will be updated to incorporate additions to the Vocational Pathways framework.

The Qualifications and Employment Pathways updated mapping tool helps young people make informed choices about their study and employment pathways. It shows young people what they can do if they are interested in further study or careers in particular pathways.

The tool will be available on the Youth Guarantee website.

NCEA Pal, an App for students to track their NCEA progress, has been re-launched with new features and a new name, **Blueprint**.

Blueprint enables students to explore specific courses aligned to Vocational Pathways from over 50 tertiary providers. Students can follow chosen tertiary organisations to get more information. At present this function of the app includes information from New Zealand polytechnics, universities, one industry training organisation and some private training establishments.

In May 2016 the Education Review Office released the report *Vocational Pathways: Authentic and Relevant Learning* which is available online. <http://www.ero.govt.nz/publications/vocational-pathways-authentic-and-relevant-learning/>

ERO's report reinforces existing Ministry key messages about the potential value of the Vocational Pathways in supporting more relevant and integrated curriculum for all learners.

The Vocational Pathways provide new ways to achieve NCEA, the foundation for success in further education and work. They show students how their learning and achievement is valued in the workplace.

Back to the future

Interestingly, the 1982 [Cockcroft Report](#) highlighted findings in mathematics education that are still valid today. Chapters 5 to 11 outline how mathematics teaching at all levels should include opportunities for:

- Exposition by the teacher
- Discussion between teacher and pupils and between pupils themselves
- Appropriate practical work
- Consolidation and practice of fundamental skills and routines
- Problem solving, including the application of mathematics to everyday situations
- Investigational work

How do your programmes of learning and practices in class match up to these clear directions?

Does the learning and teaching in your school reflect these ideas?

Useful resources for external exams

[NZQA exemplars & old exam papers](#)

[Study It for NCEA](#)

[Learn Coach](#)

[Assessment Specifications](#)

Useful resources for internal assessment

[NZQA Mythbuster sheets](#)

[A3 Summaries for all Internal assessments](#)

[NZAMT](#)

School membership is needed for access.



Other useful resources

[Vocational Pathways Profile Builder](#)

[NCEA Pal](#)

Learning to Learn

The recent publication from [NCER by Rosemary Hipkins](#) explores teachers' practice and thinking about one of the eight principles in the New Zealand Curriculum, learning to learn.

The report includes ideas for strengthening learning to learn approaches in schools.

Kohia and NZAMT practice examinations

These resources are now available. Papers are fully editable so you can customise to suit your needs.

NZAMT papers are available at no charge to member schools.

Kohia papers are available to order via this link:

<https://onlineforms.education.auckland.ac.nz/index.php/964613/lang-en>

Please keep these papers secure until the end of the year so that schools that wish to use them for their practice exams can be confident that their students have not seen them. They should not be used for tutoring students.

NZCER



LEMMA is a series of mathematics tasks for Years 9-13, designed to promote higher order thinking. It was developed by a team led by Dr. Caroline Yoon of the University of Auckland's mathematics department, with Professor Bill Barton.

<http://www.nzcer.org.nz/news/lemma-maths-resources-launched>

Pathways Awarua – secondary space

[Pathways Awarua](#) is developed by New Zealand's Tertiary Education Commission to support adult learners to strengthen their numeracy and literacy competencies. From 2016, the Ministry of Education has supported its use in state and integrated schools with year 9-13 students.

The 390+ modules in Pathways Awarua have been developed to support learners to strengthen their numeracy, reading, writing and listening competencies. Users are able to select between general, trade or service versions of the numeracy and reading pathways.

In the Secondary Space the modules on the numeracy pathway have been linked to levels of the New Zealand Curriculum. The modules on the reading and writing pathways are linked to three collections, with the lowest collection providing support to learners with the most significant literacy needs



Diary dates

8-12 August	Mathsweek
27 August	Northland Maths Association Primary Symposium
3 September	Maths Craft Festival, Auckland
18 November	Bay Of Plenty Maths Association, Conference
24 November	Auckland Maths Association, Mathematics Day
25 November	Auckland Maths Association, Statistics Day

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](#)

Useful web links

[NZ Maths for Level 1-5 information](#)

[NZAMT for teaching & assessment resources](#)

Mathematics & Statistics
[Achievement Objectives](#)

[Census at School NZ for statistics resources](#)

Australia, UK & USA also have Census at School sites.

[Maths & Stats on NZQA](#)

DUDAMATH is an integrated environment for interactive exploration of mathematical concepts and problem solving.
<http://www.dudamath.com/>

A rich source of mathematical resources and problems (UK).
[NRich](#)

A network for teachers to share resources.
[TES Resources](#)

[Web Apps to support the teaching of statistics](#): Agresti, Franklin, Klingenberg

Facebook

[NZQA Mathematics & Statistics](#)
[NZA online](#)

There are 3 closed Facebook groups for NZ registered teachers to support each other, share ideas and ask questions.

[Maths](#)
[Statistics](#)
[Calculus](#)

For those not on Facebook, access to web based resources shared have been collected on a [Pinterest](#) page.