

Workshop 6

Wednesday 4th October, 1555

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W6A

Teaching Extension Mathematics to bright students of Years 6, 7, 8, 9, 10.

Bill Ellwood

Extension Mathematics includes extra useful material for all classes to complement their normal curriculum programmes. How I introduce topics Fibonacci Sequence, Golden Ratio, Pascal's Triangle, Number Partitions, the square root of 2, large Prime Numbers, Perfect Numbers, Lunes and Pythagoras Theorem. Also "codebreaker" starter to your lesson!

The emphasis is on teaching and introducing these topics to classes of different years. Making mathematics interesting and useful.

Bring your "BYOD" or at least a calculator!

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers

Life member NZAMT.

Life member CMA.

HOD Maths Burnside High School 1974 - 2006.

Maths teacher Westburn Primary School part-time 2006 to present.

Writer of NZAMT Mathsweek 2006 to present. (250,000+ student registrations this year!)

Jim Campbell Teaching Award, Woolf Fisher Fellowship 1990.

Author Maths Digest since 1987.

Co-author 7 Maths Text-books.

Invited speaker at NCTM conference in Boston 1991. Subject "Extension Math".

Former President NZAMT.

W6B

Teaching is not Telling

Paul Cliffe

Do you believe that discovery or inquiry-based learning would be the best way to help students understand Mathematics, but find this approach difficult to implement in the classroom? How often do students say they understand but in reality they have just learned a technique or algorithm for doing something that can be forgotten just as quickly as it was “learned”. This workshop will address the conditions needed to foster an environment of student investigation and discovery that will bring meaning and foundation back into student learning. This approach can be used from Year 9 to Year 13 so come along prepared to be challenged.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

My name is Paul Cliffe. I have an Engineering degree from Auckland University and 28 years of teaching experience. When I went through Teachers College the mantra there was "Teaching is not Telling" and for the last 2 decades this has been my goal as a Mathematics teacher. My belief when teaching Mathematics is that "Everything comes from somewhere. Everything makes sense and can be understood".

W6C.1 (Quickfire)

Teaching Mathematics to Enrich Lives beyond NCEA

Ray Spence

The New Zealand Curriculum Framework document is the envy of many countries allowing considerable freedom for schools to develop community-based programmes and its emphasis on the importance of the process of learning through the Key Competencies.

In practice there is, for many, a preoccupation with complying to a particular assessment mode, NCEA, perhaps to the detriment of learning as suggested by "The Finnish Schools Experience."

In this presentation it is proposed that rich, community based experiences are still possible, and even vital if we wish to develop life-long learners, within the constraints of NCEA. This argument is illustrated by the example of the relationship developed between a number of mathematics classes at Bayfield High School and a local residential care hospital.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

Ray is an experienced mathematics teacher of more than forty years and is currently employed part-time at Bayfield High School. He has taught mathematics in Australia and Scotland, Drama in Lithuania and has had the privilege of serving as mathematics advisor and HOD of mathematics. Ray has also taught a range of other subjects including, Economics, Drama and ESOL as well as being an author of children's books. He has a strong sense of the importance of having fun and finds ample expression of this being the proud "Grumpa" of two little girls.

W6C.2 (Quickfire)

Autograph software is worth paying for.

Tim Harrison

In the session, a number of examples will be presented where Autograph can show mathematical ideas and solutions in a dynamic and particularly clear way:

- Drawing diagrams that are clear, useful and a good basis for discussion and development.
- Forming illustrative renditions of 3D problems including volumes, vectors and planes.
- Data handling, plots and statistical investigation.

It is hoped that these examples will show the strengths of this software. While just criticising other software does not necessarily imply the worth of this package, some comparisons will be made with other standard packages (including free ones), two of which I regularly use and admire. The emphasis is on demonstration and discussion that lead to understanding and success, rather than the immediate solution of problems.

As time permits, reference will also be made to Autograph version 4

(Note: I have no commercial connexion to Autograph. I am happy to provide more detail and diagrams on request)

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

I have taught Mathematics at Canberra Grammar School for 35 years. In that time I have taught the NSW syllabus at all secondary levels and all courses, and in that time have become increasingly interested in the use of technology. In recent years I have also been involved with the IB program which emphasises technology.

W6C.3 (Quickfire)

BYOD in the maths classroom

John Mitchell

Many schools are introducing BYOD into their schools. It appears that there is a dearth of research on achievement and engagement in the affect of BYOD in maths classrooms. My research looked into the achievements and engagement of two year 9 classes in a couple of schools. It involved visiting several schools both in the Wellington area and the UK. I intend to share with you some of my findings and introduce some of the things I now incorporate in my lessons. This is not a resource session.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

I started teaching in 1998 after completing 22 years in the Royal Air Force. I taught in two schools in the UK and was Head of Maths at a boys grammar school in Kent. In 2009 I immigrated to New Zealand and have taught at two schools in Wellington. Current Assistant HOD at Hutt Valley High School. I was on study leave in 2016, working on a thesis for a Masters of Education.

W6D

Practical Applications of Mathematics in the Electrical Industry

Tina Coombes

A tutor from The Electrical Training Company (etco) will present the following:

- The key mathematical requirements you will need to be an Electrician
- The reason maths is so important within the industry
- The application of maths required with many examples
- What level of Maths is required to gain an electrical apprenticeship with The Electrical Training Company
- Why University is not the only option if you are good at maths
- Handout of practical maths that can be used in the classroom.

This workshop is presented by one of our GOLD Sponsors.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

Some of the very passionate tutors at ETCO and are excited to be given the opportunity to present to NZAMT2017 about practical application of Math outside the classroom.

W6E

Making sense of Algebra

Helen Adams

In traditional text books and teaching, the topics of Number and Algebra are treated as separate units. In reality algebra is just the generalisation of number. I have been working to help students (and teachers) see the link between the two. Students often struggle with algebra as it does not seem to relate to any other mathematics that they have done before. I have developed some techniques and strategies that I hope will make clear links between number and algebra, and make more sense of the algebra that we teach.

This is a hands-on workshop and is suitable for teachers of year 7 through to year 11.

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers

I am an experienced teacher of mathematics and am always looking for ways to improve my practice. I have been head of faculty in two schools but am now a regular classroom teacher which has given me more

time to reflect on the changing face of Education, and to further develop some of my pet ideas about student learning and understanding.

W6F

Oral assessment for Level 1 Measurement (AS91030)

Alan Carman, Holly Hueston, Margaret Priest

In 2016 the Wellington Girls' College Mathematics Department trialled a new form of assessment for the Level 1 Measurement Achievement Standard in response to the comparatively poor assessment performance of students.

The presentation charts the course three teachers took with support from Neil Marshall (National Assessment Moderator) to make the assessment of this Achievement Standard a meaningful and deep learning experience for the students.

Recommended Audience: Year 11 – 13 Teachers

Alan Carman, Holly Hueston and Margaret Priest, all Mathematics teachers at Wellington Girls' College, have a particular interest in ensuring that assessments measure what students know rather than what they don't know. All three have taught Mathematics in the Wellington region for a considerable period of time, with Holly also teaching in the United Kingdom for some years.

W6G

Preparing for the future by changing the way we teach now

Craig Grant

Students learning can be accelerated by connecting concrete concepts to key mathematical concepts at the start of each lesson. Students work on graded question sequences that finish with a low level and a high level extension questions. At the end of each sequence all questions are reviewed thoroughly. Then all students start the first question of the next sequence together. Slower students have repeated chances to succeed and the fast trackers have the high level extension keep them occupied. Each question sequence covers new ground and old ground. A planned series of question sequences can also be altered to improve outcomes using the feedback from the reviews.

No student is left behind or held back and the collective achievement of students is optimised.

If you think of a lesson as a stair case for students, the one I have outlined has a concrete concept as a foundation. You cannot build much of a staircase if you don't have solid foundations. The concrete concept anchors the key concept which is a pillar. This pillar supports an adjustable spiralling staircase that contains a number of reviewing landings.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

I taught in five secondary schools and one primary school, spending most of my time in boys schools. During this time I created the Parallel School Certificate Maths paper, writing most of them, and set up a tape based learning system at WBHS where my maths class scored 52.5% of the school's A grades in School Certificate during my final year there. Now I'm teaching teachers and writing maths material for teachers here and overseas.

W6H

Taking the textbook online with Education Perfect!

James Santure

Are you looking to take advantage of the latest in technological advancements, while ensuring that your students' learning needs are addressed and your pedagogy remains effective? Education Perfect is designed as a replacement for the traditional textbook and presents a flipped classroom, allowing your students to gain an understanding of topics through rich images and video. World-class reporting gives you meaningful insights into students' learning journeys and the latest in Direct Integration with LMS, live monitoring, and customisable content (aligned with the New Zealand curriculum) is incorporated into this intuitive platform.

Come along to this session to learn more about how you can implement Education Perfect in your classroom and make the most of this exciting and engaging program today!

This workshop is presented by one of our GOLD Sponsors.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

James was the Head of Mathematics at Samuel Marsden Collegiate, Wellington. When it was announced that Education Perfect was hosting New Zealand's first online Maths Exam for the New Zealand Qualifications Authority, James jumped at the opportunity to oversee the assessment from Education Perfect's end, as well as to work with our team to manage the Maths content strategy moving forward. James now heads up the full process of content development across Education Perfect as Head of Content.

W6I

Learning with Sphero Robots 1
Subash Chandar K

Inspired by Jared Hockly in 2016, our department invested in 4 of the Sphero robots. In this workshop I would like to share our department's journey in using these robots in an exciting context for learning. These robots were used for assessing AS 1.4 Linear Algebra in term 1 and AS 1.7 Right Angled Triangles in term 2. You will drive the robots in this session using a smartphone and complete a couple of tasks relating to Level 1 and 2 Trigonometry. Please have the app (Sphero EDU or SPRK Lightning Lab - available in iOS & Google Play) installed in your smart device for this session. See the robots in action @ https://youtu.be/e_3XY1abRtQ

An advanced workshop on using Sphero Robots in the math classroom with run later in the conference

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

Subash Chandar K is the curriculum leader of Mathematics and Statistics at Ormiston Senior College. He is the owner of the YouTube channel infinityplusone for which he was recognized with an Ernest Duncan Award in 2016. He is a regular contributor to the Auckland Mathematics Association events since 2014. He is in constant pursuit of engaging and challenging students at their levels with the use of innovative techniques.

W6J

How do we get the skill, will and thrill into learning Mathematics? Applying 'Visible Learning Plus' to Mathematics teaching
Mitchell Howard

The Visible Learning Plus model for learning is an attempt to weave together the findings of John Hattie's meta-analysis of what works best in learning and provide a framework of how this can be implemented. A pleasing implication is that it is not a completely new way to approach teaching as it pulls together many of the various threads we have been exposed to over the last decade or so. How do Learning Intentions, Success Criteria, SOLO taxonomy, feedback, open ended tasks, fluency and growth mindset fit together? In this presentation, Mitchell will present a summary of the Visible Learning Plus model through the lens of a Mathematics and Statistics teacher. He will draw from his participation in a Visible Learning Plus workshop with John Hattie earlier this year and his experience in the classroom.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

Mitchell has taught Mathematics in NSW, UK, ACT, Victoria and NZ over the past 20 years. He is currently the Head of Mathematics and Statistics St Andrew's College and previously the HOLA at Lincoln High School and Vice President of the Canterbury Mathematics Association (CMA). He has been a regular presenter of workshops at NZAMT conferences (since 2008) and for the CMA. Mitchell was awarded a Jim Campbell award in 2015, has published a Book on SOLO Taxonomy in Mathematics with Pam Hook and contributed a chapter to Robin Averill's Mathematic and Statistics in the Middle Years: Evidence and Practice.

W6K

A dialogue about the future of statistics education in NZ
Anne Lawrence, Pip Arnold, Anna-Marie Fergusson, Mark Hooper, Alasdair Noble, Michelle Dalrymple

The Education Committee of the NZ Statistical Association has a strong interest in the future of statistics education in NZ schools. Feedback from teachers and the wider community led us to the realisation that we needed to be more selective in the way we worked in order to better support teachers and influence statistics education. For 2017, the committee interrogated the issue, and agreed to focus on

four priority areas:• statistics education in the primary sector• establishing an online statistics teaching journal for NZ • datasets that can be used for learning and assessment and engage students• the future of our school statistics curriculum.

We begin with a brief introduction to the Education Committee's aims. A panel of priority-area leaders chaired by Anne Lawrence will then describe each of our four priority areas and our current plans for them, and seek dialogue with you about them.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers, Year 9 – 10 Teachers, Year 11 – 13 Teachers, Other

All presenters are members of the NZ Statistical Association's Education committee. Anne taught mathematics and statistics at secondary schools before becoming an adviser and is now a tutor with the Statistics Group at Massey University. Pip has been a member of the NZSA for a number of years; her interests include posing and answering investigative questions. Anna teaches introductory-level statistics at the University of Auckland. She taught secondary school level and was involved in developing national assessment standards, tasks and teaching resources for statistics. Michelle is a passionate teacher who loves working creatively with her students to achieve the best possible outcomes. Mark was UK born, trained and first part of career, but has been teaching at secondary school in NZ since he saw the light of the southern hemisphere 12 years ago. Alasdair used to be a mathematics teacher and is now a senior statistician at AgResearch.

W6L

The Baby and the Bathwater Dianne Scouller

Following the dramatically entitled article in the NZ Herald on March 18th, claiming that our education system is 'dumbing down' our young people, this presentation suggests that reforms in the teaching and learning of mathematics in NZ have rejected much of great value in traditional approaches. Potential risks to deep learning predicted by Emeritus Professor Elley and others earlier this century are now apparently being evidenced by PISA results. Ways in which successful approaches from the past can be incorporated with modern methods to provide rich learning experiences will be discussed. Is it possible to have 'the best of both worlds'?

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Dr Scouller has been a dedicated teacher of mathematics for over 40 years in both secondary and tertiary sectors. She is currently involved in pre-service teacher education at Laidlaw College, in the Bachelor of Teaching programme. Her interests include finding ways to incorporate the best of traditional approaches with the best of modern learning environments and technologies.