

Mathematicians in schools Uncovering maths' beautiful secrets



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Bronwyn Welch shares vignettes of primary classes working with mathematicians as part of the Mathematicians in Schools' program.

Life is only good for two things,
discovering mathematics and
teaching mathematics.
(Poisson)

Those participating in CSIRO's Mathematicians in Schools program, possibly know this better than most.

Mathematics professionals are working with teachers revealing the reality and beauty that happens in the world of maths and to show that this is essentially a 'human endeavour', embedded in much of what we do and the ways in which we think.

Here are a few stories we would like to share.

Big stories, big numbers

Dr Jarad Martin is a Radiation Oncologist by trade, but in his partnership with Kerrie Armstrong, Year 5/6 teacher at Tighes Hill Public School, he indulges in his love of maths and maths history.

It sounds like something that would send most students to sleep, but stories about famous mathematicians and mathematical theories is what Jarad uses to engage Kerrie's Years 5 and 6 students. *Fermat's Last Theorem*, *The Poincare Conjecture*, Isaac Newton and Einstein are just some of the fascinating stories and personalities the students have been able to explore with Jarad.

Problem solving skills are then put to the test. In one session, students were introduced to Fermi problems and asked to estimate the number of hairs on a human head. Answers ranged from three thousand to three trillion. After breaking

the problem down, the students calculated a figure of 70 000, very close to the widely accepted number of 100 000. With students working in small groups they are able to share their solutions, displaying a range of approaches and prompting many discussions.

The focus during Jarad's once-a-term visits is taken beyond specific curriculum content and entails the proficiencies of Problem Solving and Reasoning. Being an opportunity class, the students are often working beyond their year level, but the benefits of the partnership to the students are the same as any other MiS partnership: making maths relevant and fun, and having access to a passionate professional who encourages their love of maths, science and engineering.

The real challenge in this partnership is containing the students' excitement. Who can complain about their talkative state when they have this to say about Jarad's visits: "I enjoyed having to do estimations about working out how many blades of grass were on an average lawn and using maths theories to solve it." and, "I enjoyed everything about the visits—it was fun."

Inheriting Ratios

Many of the teachers who register for a mathematics partnership with Scientists and Mathematicians in Schools want to demonstrate the relevance of maths in the real world. What better way to do that than by exploring the places where mathematics meets science? Dr David Humphrey is a Research Scientist from CSIRO and he has formed a partnership with a Year 6 teacher, Clare.

After discussions with Clare, David introduced the Year 6 students to statistics through a well-known scientific paper on the genetic model of inheritance. They discussed how the occurrence rate of any given trait would be the same between generations, before using tree diagrams to replicate the results of the paper.

Although Clare was concerned the task would be beyond the students' capabilities, the students were completely engaged. "They were enthusiastic to solve the complicated mapping that David had set up and because it was a real-life maths situation, it had real purpose behind it. Brilliant!"

The students loved the challenge. "It was so interesting...it was really hard but we were desperate to work out the ratios to solve the problem". Another student stated "I liked that it was statistics that really exists and it helped me understand the problem."

So if you are struggling to make mathematics relevant, you could look to science for the context. After all, maths is the language of science, and it is everywhere. Understanding it is the key; "Sometimes newspapers and TV say things and you go OK, but when you look at the statistics like Dr Humphrey showed us, you see the whole thing differently."

Suspense and Mystery

Finnur Larusson, Professor at the School of Mathematical Sciences, University of Adelaide,

is partnered with Emma Murphy of Belair Primary School. Finnur visits Emma's class twice a term and engages students in some well-known maths investigations. The investigations include the Seven Bridges of Konigsberg, the Four Colour problem, prime numbers and their mysterious patterns, to name a few. The beauty of these investigations, which are pitched perfectly for the Year 4/5 class, is that the concepts lead to serious mathematical content.

Finnur considers the most fun topic to be investigating pi. He guides the students through finding areas of rectangles to estimate the area of a circle and hence discovering this famous number and "there is great suspense as we collect the students' approximations...wait to see who came closest to the true value of this mysterious number. The answer is only revealed at the end".

Unique to Australia, Scientists and Mathematicians in Schools connects teachers with volunteer mathematicians, scientists and other STEM professionals who use maths as a major component of their work. If you think this would be a good opportunity for you and your students, register online: <http://www.mathematiciansinschools.edu.au/teachers/registration.htm>

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