

# The Insightful Classroom

Regular Insights, Tips and Pointers for Australian Maths Teachers

## The Draft ACARA Guidelines

What will they really mean in your classroom?

### Problem-Solving at the Heart of the Curriculum

#### The Real Classroom Experience

*We have all heard about the problem-based nature of the new National Curriculum, but have you had a look for yourself? We recently had the opportunity to take a group of teachers through a two-day course to explore the depths of the ACARA proficiency strands, and the results were startling.*

**Problem-solving, Reasoning and Understanding:** Three terms that are striking fear into the hearts of teachers around the State with the arrival of the ACARA draft curriculum. Yet they need not elicit such depth of response. Here is an example of how it can work. We recently had the pleasure of working with teachers, HOCs, deputies and even numeracy coaches from across Brisbane in a Facilitator Training course. During the course we ran an example lesson with a grade six class on decimal numbers and fractions.

In the course of that single lesson we saw more problem-solving, reasoning and understanding than is common in many classrooms during a whole term. This class, like many, had numerous misconceptions regarding decimal numbers.

#### Benefits of problem-solving:

- Students stay engaged
- Improved understanding
- Increased retention

They were asked firstly to build the number '23' out of MAB.

They did so with amusement, but this was short-lived...The next question that we asked was for them to build '23.7' from MAB. This was much harder, and most of the students initially used seven

**We covered every proficiency, and the kids absolutely loved it!**

'ones' blocks to form the 7 tenths.

After a time of leading questions, the students tried

out many different ideas before finally realizing for themselves that they would need to cut the MAB into 10 pieces and use 7 of them.

When we later analysed our results, every one of the proficiency strands had been met in a single hour, and the kids loved it!

### How Many Times Does "A" Go Into "D"?

#### The Grading Changes That Could Ruin Your Report Cards

*Many teachers accustomed to content-based grading structures are finding themselves caught out by the latest curriculum changes.*

The QCAR guidelines stipulate that students must demonstrate insightful application in order to receive an "A" grade for Thinking and Reasoning. What this means in practice is an area of confusion for many teachers who feel they have missed out on the necessary professional development to understand these new requirements.

Possibly the greatest change in teaching approach stems from the idea that students can no longer be graded simply on rehearsed questions.

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Need more information about how the new curriculum will affect your teaching and your students outcomes?

For information sheets, online resources training seminars and professional development, go to:

[www.kennedypress.com.au](http://www.kennedypress.com.au)

## Pick the student with the wrong answer!

*When using oral questioning, why not deliberately try choosing a student who is likely to have a wrong answer?*

*Test the student's answer as a whole class by putting it back into the question. When you see the student realise that their answer is wrong, ask if they want to change their thinking, then retest their new answer.*

*It's a great way to turn a simple question into a learning opportunity and builds confidence in all students.*

## How to... Make pie graphs without needing equations

### Lower primary:

1. Have students line up according to their hair colour.
2. Join these lines up into a circle by holding hands.
3. Draw lines from the end of each section to the middle of the circle to form your pie chart.

### Upper primary:

1. Make a strip of paper that uses 1cm length for every student in your class (e.g. 24 kids = 24cm long).
2. Divide your strip into sections according to the hair colour of the kids (e.g. 7cm for 7 kids who are brunette).
3. Join the two ends of the strip to form a circle.
4. Put a dot in the middle, and join the ends of each section to the centre.

## Grading Changes

*(continued from front page)*

The key question to use when deciding on a student's grade for Thinking and Reasoning (aka Problem Solving in ACARA) is

### *Whose thinking is this?*

In order to demonstrate "insightful" thinking and reasoning, students need to be working something out for themselves. It is simply not meeting the criteria to only ask them questions that they have practiced time and again. There is no *insight* needed to answer those questions.

A very useful document to refer to is the P-12 curriculum framework available on the EQ website. The table found in "Designing quality assessment tasks" found at

<http://education.qld.gov.au/curriculum/framework/p-12/assessment-guidelines.html>

is very helpful as it gives clear examples of questions that are rated at various standards.

For more information, download the information pack on the Kennedy Press website.

## Problem, solved >>>

# It's Not What You Know, It's How You Knew It That Counts

*It's an unfair stereotype that maths teachers are all about the answers in the back of the book. In reality, we all understand that what we are trying to teach is the strategies that students should use to reach the right answers every time. So why is it so hard for us to make the extra step and realise that we need to teach not only the process of finding the answer, but also the **process of finding the right process**? (Yes, that sentence nearly did make our editor's head explode!)*

There are two broad strategies that can be employed - Teach, demonstrate and practice the use of an equation or approach to solving a problem OR Ask the right questions and give the right prompts to help students to work out for themselves how to solve the problem.

Well-constructed studies have conclusively shown that students not only achieve better understanding with the second approach, but actually retain far more of that understanding months and years later.

We've all experienced the frustration of knowing that a class was taught all of the required content the year before and yet seemingly having to teach the same material over again.

Imagine how much more efficient, pleasurable and effective it is to work with a class who have retained what they learned and are ready to build on that in the new year?

That's the experience of teachers using good problem-solving teaching in their classrooms. But, then, many of us have also seen problem-solving used badly. How then do we ensure we are using this powerful approach correctly?



# Insightful Learner, Inspired Teacher

*There is more to constructing a problem-based lesson plan than just photocopying an exercise and setting the students at it, noses down and pencils scribbling.*

*It can feel like an uncertain step, so why do it at all?*

If you are anything like me, you started teaching because you wanted to be part of helping children learn and develop. Most of us were excited the first time we saw the light in a student's eyes as they suddenly understood something new and exciting - something that had not been part of their world until that moment.

So, why is it that so many of us have lost some of this joy in our teaching? I refuse to believe that it's because we've stopped caring.

Enter "insightful learning", a process of teaching students which may feel both new and familiar. New, because it is a twist, a reversal of the way most lessons are taught, and familiar because you have probably unconsciously used some of these principles before.

Many teachers have tried to use investigations in their classroom, but have been put off by poor outcomes and unruly student behaviour. Most have struggled until they have discovered the key - which is to provide a challenging task without too many instructions. It is essential to grab the students' interest and then lead them through the problem-solving process by asking questions rather than giving answers. When a student poses an answer, help them to decide which questions to ask in order



**"I didn't backup my brain over the holidays,  
so I am going to have to start all over again  
in maths this year!"**

to check their answer. We all like to be asked our opinion - and your students are no different. By keeping the questions coming, you keep them engaged and thinking. And when they find the answer for themselves, the rewards for both student and teacher are truly great.

How do you learn and develop this approach if you are not currently familiar with it? Useful resources can be found by contacting your numeracy coordinator, and by requesting further information from Kennedy Press.

## ask the experts >>>

**Q:** *How do support students cope in a problem-solving environment?*

**A:** *So well, you would think it was designed just for them.*

Problem-based teaching encourages students to form deep understandings about the patterns and principles that make maths work. We have found consistently, that when teachers use problem-solving to introduce content to support students they grow in understanding far more rapidly than in a traditional classroom. Many even stop needing support after 12 months!

Problem-based lessons are designed to encourage students to use a variety of methods to solve the problems. These usually include the use of visual and kinesthetic materials in addition to traditional number sentences and stories. Many support students **positively soar** in these conditions, and for the first time receive an A or B for mathematics!

## Raise Your Hand!

*Something on your mind? Do you have a clever trick, an idea or even a funny anecdote to share with your colleagues? We'd love to hear from you! We also welcome suggestions of topics you would like to see covered and issues you are concerned about.*

Please email:

[tierney@kennedypress.com.au](mailto:tierney@kennedypress.com.au)

## NAPLAN - Evil, dirty, nasty - and surprisingly useful

NAPLAN results are almost due out, and this year I think that we should approach them differently. Instead of just examining the content in the questions, why not use this year's results to look at your students' problem-solving skills and misconceptions? Download the 'cohort item level summary' from OneSchool and look at how close your students were to the average for each of the items. Then consider what it was about that item that made it difficult.

Across QLD the trend has been that our results are higher than the Australian average for the first 5-10 questions, and then get further from the average when the questions involve more than memorised procedures. Questions that involve multiple steps, working backwards and non-standard representations often stand out as ones we perform poorly in. So perhaps in 2011 we could best combat this by implementing problem solving regularly, so that the first time that our students encounter deep thinking is not on NAPLAN. When it comes down to it, *that* is how to prepare your students for NAPLAN!

*"One of my students who received a **one** on NAPLAN last year has improved dramatically. She is now on the border of receiving a B or C grade for maths! I have never seen students improve like this before."*

Sunshine Coast 2010

# A word to HOCs

*There is much to consider when deciding how to train and resource your staff, especially when change is needed. From overcoming inertia in staff to looking after your budget, you need to make the best decision. I'd like to take a moment to address some of the matters that might be on your mind.*



Tierney Kennedy -  
Education Consultant,  
Author and Editor

Every year I work with hundreds of schools across QLD, and while every school is unique, most HOCs share similar concerns.

The most common concerns they express are:

- Whether or not to implement the National Curriculum now or wait another year,
- How to train staff to do more than just traditional teaching and assessment before ACARA comes,
- And the worry that students just won't be ready for the higher-order thinking components!

This year, to allay these fears and to help prepare schools to face the challenges of ACARA we are running Back-to-Front Maths Facilitator Training, and offering low-cost PD to schools who take on the program. So far the feedback from teachers, HOCs, deputies and Numeracy Coaches has been outstanding. The next series of courses run in October, so keep your eye out!

We have also designed Back-to-Front Maths as a professional development tool especially to help teachers in implementing problem-based teaching. It provides a supportive program, while still maintaining flexibility and teacher autonomy because it is delivered in only 3 lessons per week. At the same time, you can be assured that the entirety of QCAR and ACARA will be covered.

Many teachers are initially resistant to change because they honestly want to do the best by their students, and they are concerned about the chaos that might ensue if students are in control. However, when provided with appropriate lesson structures and some basic training, almost all

teachers rapidly realise that problem-based teaching techniques are so effective in keeping the students engaged, that classroom discipline automatically improves. It is great to see more smiling faces on my return visits to schools using our program, not least of all on the faces of the teachers. When you can use maths as your behaviour management strategy, the war is won!

It is also understandable of course, that you may be hesitant to change from your established program and resources. It is worth noting that 100% - yes, *every single school* - that used Back-to-Front Maths with professional development has reported improvements in student performance inside 6 months, regardless of which program or resource they used previously.

With that in mind, we are so confident in the value of this program that we are offering the following guarantee:

**Schools that commit to using Back-to-Front Maths across all grades, in print format, and with professional development will be eligible for a full refund of the purchase price of the books if they do not experience an improvement in student performance in problem-solving, reasoning and understanding by the end of the first year.**

Full terms of this offer are available at: [www.kennedypress.com.au/guarantee](http://www.kennedypress.com.au/guarantee)

I find it very disappointing when companies sell you a resource, but leave you to sort the rest out yourself. It's just not good enough! Our education consultants work to establish an ongoing partnership with your school so that you and your staff can seek support and clarification whenever you need it.



coming soon >>>

## In The Next Issue

- *Teaching Tips: Decimal numbers*
- *Differentiating lessons for all learners*
- *Communicating and Reflecting: how to reduce the Literacy load.*

Best of luck to you all, and I look forward to visiting many of you in the coming weeks. Support from Kennedy Press comes in many forms depending on what best suits you. Our popular methods include email or telephone advice, in-school professional development, and taking advantage of our Facilitator Training, which provides yourself or a senior staff member with the knowledge, skills and certification to conduct training for the rest of your staff.

Why not give me a call to discuss how we can help your staff deliver a better way of teaching?

*Tierney*

Contact Tierney directly on **0439 711 743** [www.kennedypress.com.au](http://www.kennedypress.com.au)

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*Feedback and questions are always welcome: Contact Education Consultant Tierney Kennedy at [tierney@kennedypress.com.au](mailto:tierney@kennedypress.com.au) or call 0439 711 743*



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**COMING SOON!** A collaboration service to allow teachers and senior staff to share ideas, program development and resources - see the website for details or watch this space.

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