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The Insightful Classroom

Regular Insights, Tips and Pointers for Australian Maths Teachers

The School Issues... Issue

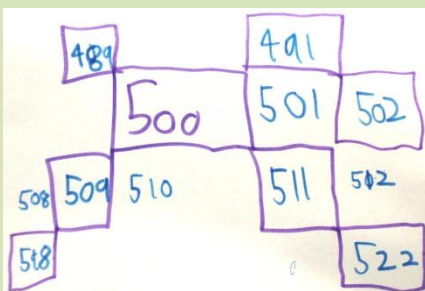
Behaviour management in Problem Based Lessons

Engaging the brain:

Two students from the same class who cause problems

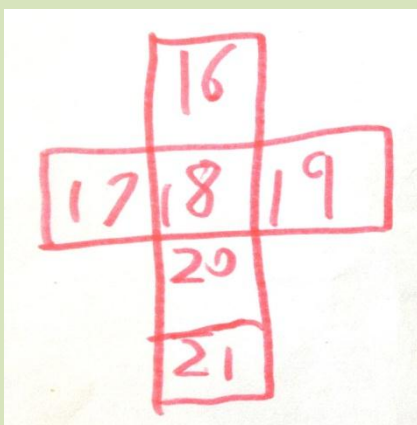
Samuel in year 2:

Creating problems in class because he is bored



James in year 2:

Creating problems because he feels stupid



Both need the same solution!

What asking the right questions can do for your class:

Many teachers shy away from problem-based teaching because of the perceived behaviour problems that it can allow, particularly during group work. I have found that the opposite result is usually true. Here are some simple keys to turning maths into your best behaviour management tools!

Principle 1: All kids want to feel smart. To feel smart there has to be a challenge that they overcome.

Answering questions that you already know how to solve is simply not hard enough. Likewise, being asked to answer questions that you have no way of working out is not an *appropriate* challenge.

I have found that most of the behaviour problems tend to come from students who fit into the following two categories:

1. Students for whom the problem is too difficult so they act out to avoid looking stupid
2. Students for whom the problem is too easy so they feel bored. When you have students acting out, look firstly to their learning to check that it is appropriate.

The first simple step in managing behaviour in mathematics lessons is this: *Provide a problem with an appropriate level of challenge: hard enough that it requires them to work out something that they don't yet know, yet not out of reach.*

Principle 2: No kids want to feel stupid, therefore eliminate the risk associated with being wrong.

Trying to solve a new problem requires a certain degree of risk-taking. If you want your students to be truly engaged then you need to lower the stakes for getting the answer wrong.

Unless students are willing to try out an idea and risk being wrong, there will be very little progress. I have found that the further through school students go the less willing they are to take a risk, and the more avoidance behaviours they have developed, which in turn creates havoc for behaviour management.

In problem-based lessons I implement a different set of rules in order to encourage risk-taking and lower the stakes for being wrong and the risk of feeling stupid:

1. I am not marking for right/wrong. I will keep asking harder and harder questions until you have something to be wrong about, so that you have something to work out.
2. Everyone has to guess. Accept that your guess will probably be wrong, because my problems are deliberately hard. Guess anyway.
3. You can change your mind as many times as you want to.
4. No rubbing out the wrong answers – how will I know what you were thinking and how you changed your mind? Just put a star next to your last answer and I'll know that's where you got to.
5. Copy as much as you want. Work together. I'm really not looking at the answers. If you want to try the same thing, go for it. If you have two different guesses, try two different things.

Continued on page 2

Using your classroom set-up to create learning opportunities:

How you arrange your furniture can significantly affect your ability to differentiate for individual students.

I am often asked whether I group by ability or mixed ability. To be honest, I often find that the question is moot in many classrooms.

I mostly end up “behaviour grouping” as in, **“these kids will not try to kill each other therefore they get to work together”**

While this works, it is incredibly important to create **flexible learning spaces** when trying to teach a diverse group of students. One simple tool that I have developed to help me cater for multi-levelled classes is a challenge table.

A **Challenge Table** is a spare table or set of desks somewhere in your class that is set aside as a work space. I use it to invite small groups of students to work with me for five minutes during our problem-solving time. I find that having this dedicated space allows me to maintain a great deal of flexibility within my classroom.

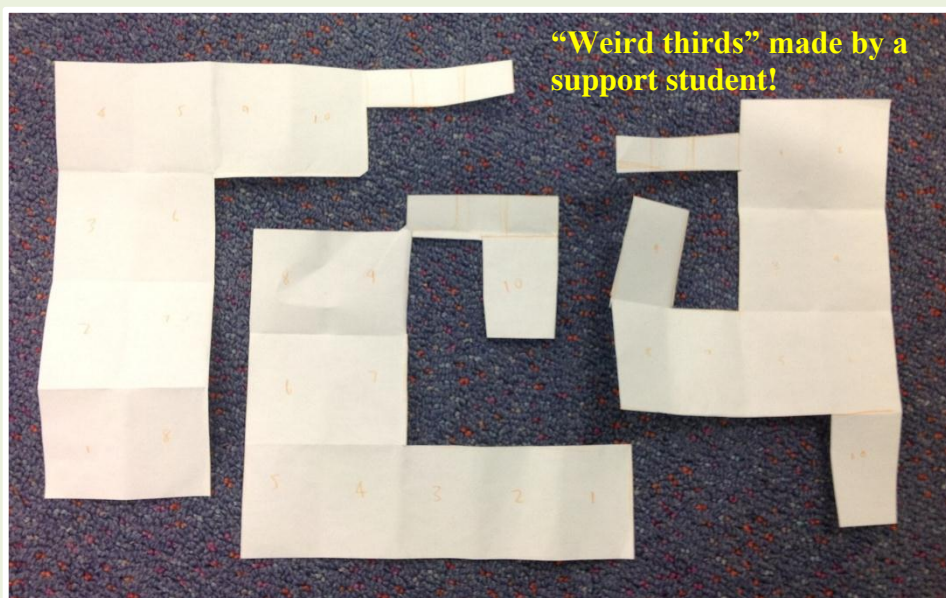
I invite different students to work with me based on what I need to happen within the whole class. Often I invite students with similar communication styles rather than students who are working at the same levels.

Inviting all of the students who are dominant allows them to “fight it out”, while freeing up your other groups to think for themselves. Inviting all of the students who are very quiet and just go along with the group under normal circumstances means that one of them eventually has to crack!

You can use the Challenge Table in whatever manner best suits your class. Consider some of the following ideas:

- Use it for your support students when you first set a problem so that you can help explain the problem in more depth, or offer a problem with a lower content level
- Use it for your fast-finishers so that they can explain their solutions to each other and decide who is right
- Use it for students who all seem to be experiencing the same difficulty or misconception so that you can work with them in more depth
- Use it for assessing individuals

Who you choose to invite is up to you, but make sure that everyone gets a turn. Working one-on-one with the teacher is a privilege that most students look forward to!



Behaviour management continued from page 1

Principle 3: Turn maths into a reward by changing your class culture

Get excited when kids don't immediately know the answer! Now they have a chance to work something out. Use positive peer-pressure to turn things around - “If you are not working with me then you will have to miss out on this maths today and I'll find you something else to do instead.”

Exclude students who are misbehaving from your lesson, and give them routine questions on worksheets to do instead. These need to be completed silently, in isolation. Also, you need to have a formidable stack of these worksheets so that students understand that they will never run out and therefore have the excuse of having nothing to do. I usually find that within half an hour students are begging to be included in problem-based maths again.

I still remember continually finding a particular boy sneaking into my grade 8 maths class after being tossed out by his regular teacher... for misbehaving.

Why do gifted kids end up in support maths?

This question has been plaguing me a lot lately.

In the last month a particular student has been playing on my mind. I taught a year eight girl who thought she was really bad at maths. After telling me this she proceeded to make some of the most creative thirds that I have ever seen. Check out the picture to the left. They are actually remarkably accurate!

She really lacked confidence in her own ability, but looking at what she produced I really have to wonder why. Is it that that her way of thinking is so different to school maths that it just doesn't fit? Just what happened to convince her that she was so poor at maths?

Her intuitive grasp of fractions was quite phenomenal – far beyond that of her “more advanced” peers. Yet when I pointed this out to her teacher he was shocked. Her giftedness had been overlooked in their previous testing. She had been considered a “support” student.

So what do we do about this? I don't have all the answers, but the first step is to begin assessing for student Understanding rather than Fluency. Check out our latest article on the website for simple diagnostic tools to use for this:

[Assessing for Understanding not Fluency](#)

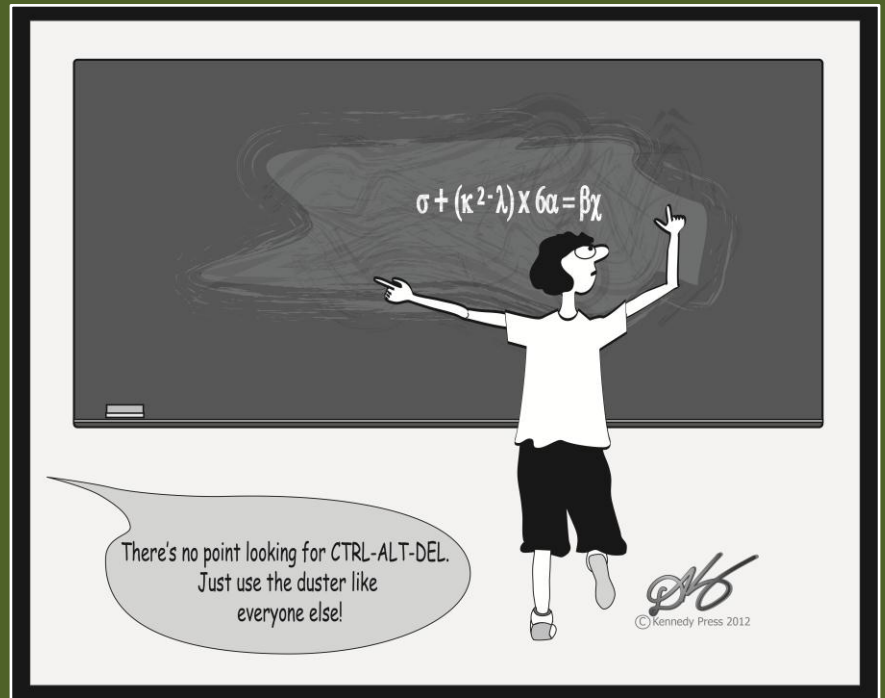
Number facts are a necessary, but often over-emphasised part of primary school maths. Here are a few simple ideas for improving them:

Multiplication grids

- Mix up the numbers on the sides so that they are not in order
- Add in some decimal points and powers of ten
- Leave off the numbers on the outside and instead fill in a few of the answers. Students work backwards.

Dice games:

- Roll two dice. Using on these numbers, but any operations, make all the numbers between 1 and 10
- Roll 3 or 4 dice. Try to get as close as possible to a particular total using any operations.



Keep an eye out for our **Technology Issue** next edition!

Great teaching and how to create it...

Margery Jorgensen, with over fifty-five years of teaching all levels of Primary School, shares three simple thoughts on good teaching:

1. Don't assume anything!

Teachers must create a classroom environment where students feel comfortable admitting that they don't know how, and need further/different instructions. Discouraging classmates' comments such as, "Don't you know that?" or, "That's easy!" together with teacher comments such as, "I've told you before!" is vital.

My motto is:

A person who asks a question is a fool... for a minute!

A person who never asks a question is a fool... forever!!!

Once a great classroom climate is created, the students are well on the way to accepting responsibility for their own learning, our ultimate goal.

guest article by Margery Jorgensen

2. The teacher must develop high quality questioning skills.

Putting students to work on a computer program or giving them worksheets is fine for practice, but teachers *must* find time to question each student in a large variety of ways to learn how that student thinks and what he/she knows. Written examination papers do not supply sufficient information!

3. Accept that lack of understanding is not always the fault of the student

It is not always the students' fault if they don't understand. Sometimes it is the teacher's fault.

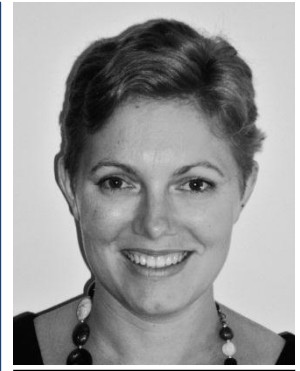
It is the teacher's job to find out how the student thinks and to adapt to that student's needs.

I explain to students, that as an adult, I use many words that they may not know or understand. Therefore they must tell me if I am using words that don't make sense, or, if I am working too fast for them to follow. They must be able to point to the exact point where their understanding stops. This skill takes a little while to develop but it is worth the effort and patience.



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

Training your staff... Some personal thoughts

In administration there is a necessary balance between financial constraints and providing high quality professional development opportunities for staff. We all want to focus on getting the most value out of our budget, so how should we go about making changes? Here are a few principles that I would like to share from making long-term changes in schools:

When implementing whole-school PD:

1. If it is not directly applicable to their situation, the teachers will not value the professional learning. Consider forming a network in your cluster and asking the best practitioners in each school to run PD sessions in each of the schools rather than investing in outside providers.
2. Teachers often learn best by watching quality teaching. Invest in PD that is based in classroom observation, or consider using some of your PD budget for teachers to observe the best practitioners in your school. When observing classroom practice, always give the observers a list of observations to take or else they will just watch the behaviour management.
3. If the professional learning is not fully supported by the administration then it will be very quickly lost. Spreading your budget too thinly over multiple projects ends up becoming ineffective. Choose only one or two focus areas per year and invest in these heavily. Consider mentoring and using facilitators.

When sending individual staff members to PD:

4. If sending staff off-campus for a PD session, always send at least two staff members, three if you can afford it. Your school will get more out of having two staff members who can support each other in the same area than spending money on sending one person to two different sessions.
5. Choose PD sessions that incorporate a "train the trainer" model, especially those that run for more than a single day. Teachers usually need time to process new learning and attending a PD session over a few days often results in higher-quality outcomes than going to multiple different sessions each lasting for a single day. It allows reflection time over night before starting with new questions the next day.
6. Consider investing in a supply teacher for a whole or half day after sending a teacher off for PD to release that teacher to make a school-wide implementation plan or to reflect on what would be useful for your staff. Useful time would be spent discussing with the HOC or administration, writing implementation plans or going to other classrooms to observe teachers in light of the new learning.
7. Any time spent in PD should save your teachers that same amount of time in another area. It should improve the whole of teaching, not just little bits and pieces. PD paired with supportive resources tend to have a higher up-take by staff.



In The Next Issue: Technology

- *Engagement versus entertainment: why we can't teach maths by You Tube*
- *Why most interactive software doesn't meet the Australian Curriculum requirements*
- *Timely thoughts on analogue time*

Professional development sessions that are supported by classroom resources, ongoing mentoring, school-based expertise and an administration with a high commitment to a single focus tend to have the highest success rates in all schools that I have seen. An outside provider, having ongoing contact with staff over a period of a time, is often in a good position to see the growth in the whole school. Consider finding someone that you can trust to work with your teachers.

Tierney

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



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Facebook Group!

Maths Matters is a Facebook group designed especially for teachers. We have discussion boards which offer tips as well as space to ask real questions from real teachers. Search for **Maths Matters** and choose "like" to be a part of it. Look for the picture of the year 7 kids building 1 million MAB.