



# The Wilkie Way

## Newsletter April 2025

[www.wilkieway.co.nz](http://www.wilkieway.co.nz)

### Teaching Thinking

I once asked a young student what is thinking? He came back with an immediate answer.

“Thinking is when you put your finger on your chin and look up”

His classmates added to the conversation with ideas like:

- Looking out of the window
- Scratching your head
- Don't put your hand up

This is an excellent example of young students trying to explain an abstract concept. Ideas are firmly based in the material world.

Just like numbers are an abstract idea - they only exist in representing something. Two cats, three dogs

One is a number seldom used to represent a quantity as in the English language we are more like to say “a cat” instead of “one cat”.

Zero is another difficult number as it is only relatively recently (about 2000 years) in the history of mathematics has zero been accepted as a number. To be a number it must represent something so it must represent nothing of something e.g zero cats

Zero allows us to have our number system - zero ones, zero tens etc depending on the position of the zero in the number. It is more than just a place holder, it represents nothing of something.

The numbers zero and one can cause the most difficulty for young learners of mathematics. They play an important role in the properties of arithmetic.

**Zero is the additive identity** - when you add zero to a number it doesn't change the number

**One is the multiplicative identity** - when you multiply a number by one it doesn't change the number.

#### What is the role of knowledge in our ability to think?

You can't get to thinking conceptually except in terms of how the abstract idea has a material form. To understand an idea, you must first have the idea and see how the idea presents itself in the material world. This is the reason for using material representatives when teaching mathematics which is a subject based on abstract ideas. Once a student has the concept, they can apply it to other material expressions - transfer of learning. A curriculum requires both content (knowledge) and concepts. Our refreshed curriculum is knowledge rich, not a bad thing, but we could be in danger of ending up with a content list approach to mathematics if teachers do not pay sufficient attention to the actual teaching of concepts alongside the development of knowledge.

To be educated, the knowledge must serve the purpose of bringing life to ideas. If you know nothing, how are you able to think? To think you must engage with things that make you think. It is ideas that make you think.

For teaching and learning conceptually - students must be presented with ideas to promote thinking and at the same time have sufficient knowledge to engage with thinking about the idea.

Rich tasks should not be a nice add on to explicit teaching of knowledge but an integral part of the classroom programme.



## What is the role of language in our ability to think?

While we all know language is the instrument of communication it is also the instrument of thought. Language must not just be the lists of specialised vocabulary associated with mathematics but it must also include the grammar of the language specific to mathematics.

Going back to number words in a sentence they have a specific position. When you have two descriptive words, for example a fat black cat, you can alter the order of the adjectives, a black fat cat. However if a number word is included then it must always go first. Two black cats and not black two cats. "Black cats" materially represents the idea of two.

When we talk about zero we must always use the language of what is materially represented by the number zero, zero black cats, If students do not come to understand zero as nothing of something they will struggle with the place value system and regard zero as nothing and can therefore be ignored.

Mathematics has it's own written communication through the use of symbols, expressions and equations. These represent ideas and how often do we tell students to "show their thinking"?

One time I asked students working on an activity to provide me with a material representation for the purpose of teacher professional development to ensure they recorded all their thinking. The activity was deliberately well within their knowledge level as I wanted to focus on the communication of thinking. One student told me the activity would be exceedingly difficult for him as his thinking was very messy and he couldn't see how he could communicate it in symbols. His working partner made an excellent job of communicating his thinking as he could express in words but not in the language of mathematics. Another pair of students recorded a division equation as their starting point (which was correct) but they couldn't see what the answer to the division equation represented so could go no further with the problem.

## Do we actually teach students how to think?

Students are only able to think if teachers engage them with ideas that force them to think. Thinking is difficult and most of us don't like to think. It is demanding, challenging and hard work so why bother?

Do our actions in the classroom protect students from engaging in thinking? For example, provide them with material than can already do to make them "feel good" by getting everything right.

Do we allow students to avoid thinking? For example by giving them work to complete on their own or in situations where they can copy someone elses work. (N.B. Individual practice time is still important) Using digital platforms for students to "challenge themselves" or practice what they already know.

We need to consider the following aspects of task design:

Emotional engagement - of meaningful interest to the student

Behavioural engagement - sufficient knowledge in order to be able to engage with the task

Cognitive engagement - an idea that forces thinking

From my classroom observations - teachers are generally quite good at both emotional and behavioural engagement - they know their students. I see students on task.

Rarely do I observe cognitive engagement - this requires the teacher to think and be knowledgeable about the conceptual mathematics.

Teacher handbooks available from [wilkieyay.co.nz](http://wilkieyay.co.nz) online store.

\$45 each

\$120 for all three



# New Resources for Wilkie Way Members

## Annual Subscriptions purchased at the online store at [www.wilkieway.co.nz](http://www.wilkieway.co.nz)

Individual \$55 - paid via paypal

NZ School paid via invoice - complete form at online store

Under 30 Students \$60 + GST 30 to 100 students \$160+GST

101 - 300 students \$260 + GST 301- 500 students \$360 +GST

501 - 700 Students \$460 + GST 701+ Students \$560 + GST

Non NZ School \$660 - paid via paypal



### A Wilkie Way Measurement Activity

#### Teacher Notes

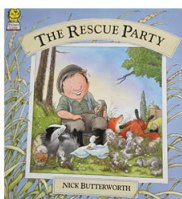
These activities could be used as an assessment for understanding the concepts of measure. (The concepts are the same for all measurements)

The idea for this activity came from the story book *The Rescue Party* by Nick Butterworth. The rabbit gets stuck down the well and needs to be rescued.

(Any story requiring the rescue from the bottom of a well could be used)

To carry out the activities you will need:

- Lengths of ribbon/ till roll or similar to represent the depth of the well. (I use 3m lengths of 3cm wide ribbon.)
- Varying lengths of cord that can be tied together. (I used approx 50cm, 60cm and 75 cm lengths - at least 10 of each)
- Sets of cuisinaire rods



The first two activities could be a lesson each, giving time for discussion with groups and whole class. (especially with younger students who are just learning the concepts of measure). For older students the first two activities may only take an hour giving time for discussion and conscious consolidation and/or assessment of measurement concepts.

The third activity is an extension activity requiring higher number knowledge.

How far you go with the follow up discussions with each activity will be dependent on the phase of the curriculum you are working at.

#### Getting started:

Read the story up to the point where a rescue party is called for. This sets the scene and gives a meaningful purpose to the activities.

Allow students to work in pairs, groups of three or four (max). Discussion whilst carry out the activities is good learning time.

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I started creating this activity for a bit of fun - but it ended up being a much deeper activity that I have used for teacher professional learning around the concepts of measure.

The activity can be used as a formative assessment tool (as well as a summative assessment) to see if your students actually understand the concepts of measurement as opposed to be able to measure.

Even some teachers had to stop and think about what actually constitutes "a measure".

#### Measurement Activity 1

Create a rope that will measure the depth of the well.

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#### Measurement Activity 2

Use the coloured rods to find the length of one of your units.

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#### Measurement Activity 3

How many of your units would you need to reach the bottom of a well 13 metres deep?

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### Look here to find new resources



- Measurement Activity
- Conceptual Progressions (Set against Te Mātaiaho progressions)
- The Invention of the metric system
- Developing standard units of time

The Measurement Activity can also be found under the Assessment tab at the bottom of the directory page.

### Notice of price increases:

Due to the website hosting increases of 33% from July this year I am having to put up the prices for subscription to the website. Spreading the cost I have decided that an approximate 12.5% increase is required.

**From July 2025** subscription prices will be as follows:

Individual membership \$60 inc of GST payable via paypal

School membership: On invoice

Under 30 Students \$65 + GST (This allows all staff in the school, if only one then request an individual membership on invoice)

31 - 100 students \$180 + GST

101 - 300 students \$290 + GST

301 - 500 students \$400 + GST

501 - 700 students \$520 + GST

701+ students \$630 + GST

Non NZ School \$750 paid via paypal

**Subscriptions at current prices taken out between now and 1 July are valid for the full 12 months.**



# The Wilkie Way Teacher Challenge



## Magic Squares

Using the digits 1 - 9 to make a square of digits where the rows, columns and diagonals all add up to the same number:

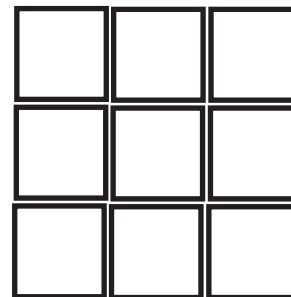
### Ask yourself the questions:

What is the total of the digits 1 - 9?

Why must the row totals be 15?

What number must go in the centre?

Find 4 different magic squares.



An article was put out by government on 21 March that the use of the funded resources is a support for the curriculum and not a replacement for the curriculum. It makes me wonder why such an announcement has been necessary - are there unintended consequences happening?

An article from Heather Lewis at Evaluation Associates makes a very good read in understanding the role of the resource:

“Textbooks are tools, but relying too heavily on them can stifle a teacher’s creativity and decision-making. It’s crucial that teachers remain in control of the learning process, adapting lessons to fit their students’ needs rather than following a one-size-fits-all approach. Engaging students with relevant, meaningful tasks is key to fostering a love for mathematics.

One way to make mathematics lessons more purposeful is by incorporating a “hook” to engage students at the start of a unit and a “product” to work towards by the end—whether it’s a project, performance, or solution to a complex problem. This brings a real-world context to the learning.

While these funded programmes offer a structured path, our curriculum highlights the importance of students developing positive relationships with maths. Create an inclusive learning environment where students take risks and collaborate and “model personal engagement in maths processes, so that you build knowledge, curiosity and enjoyment in maths while teaching.” Effective teachers use data and evidence to adapt the teaching to students’ needs. A well-designed practice book with varied tasks that align with the learning objectives may support the overall programme and help teachers reduce planning time.

Ultimately, effective mathematics teaching comes down to the teacher’s ability to notice, understand, and respond to students’ learning needs. A teacher’s deep understanding of mathematical concepts and learning progressions is key—and that’s something no textbook alone can provide.

When evaluating mathematics resources, schools should focus not only on the materials but also on the teaching approach that will best serve their students. While textbooks can be useful tools for supporting learning, great teaching is at the heart of an effective mathematics programme. Use resources that enhance your teaching, but don’t be afraid to make decisions based on the unique needs of your students and your school.”

It was great to see so many teachers at the recent PMA conference in Auckland and the response to seeing the Maths Aotearoa teacher guides, text books (including activity cards at level 1) and supporting wilkie way workbooks was unanimous in asking the question

### Why could we not choose this resources as one of the funded options?

Go ask the Ministry of Education why?

A closed tender did not allow Maths Aotearoa to even be considered for funding but it can still be purchased by the discerning schools who engage in thinking.

Available from [edify.co.nz](http://edify.co.nz)

**Written to support the curriculum not replace the curriculum.**

