



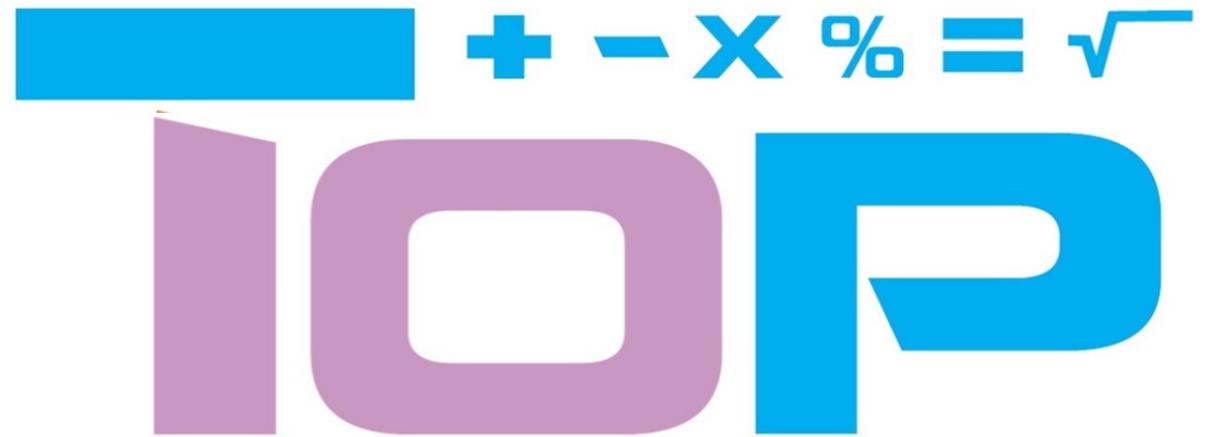
TOPTEN

The Power and Joy of Hands-on Numeracy

www.toptenmaths.com

Years 3-6

**Planning
Package**



Tip 1: The diagnostic assessments change everything.

Tip 2: Consistently implement high expectations and a growth mindset through your classroom culture and routines.

Tip 3: Organise the materials.

Tip 4: Use your own teacher grid book to model what excellent work looks like.

Tip 5: Record, record, record.

Tip 6: Record more ways/in more forms to make connections and extend.

Tip 7: Repeat lessons two days in a row, with more extending prompts on the second day.

Tip 8: Immediate feedback mechanisms.

Tip 9: Concrete-pictorial-abstract – materials at the start of all units.

Tip 10: Maths reflection journals.

Critical tips summary – Top Ten Tips

- Use the diagnostic assessments to cultivate growth mindset; the school will not achieve the same level of growth using the units alone (without the assessments first). Fill the gaps first, because these hold back any future learning from being retained.
- High expectations – of bookwork, of work rate, of reasoning and understanding, of persistence and grit. If you have too low expectations of students, then will lower their effort to meet them, but the reverse is true as well.
- Repeat lessons more than once and slow down your scope and sequence for longer, deeper blocks, like Singapore. Spaced retrieval cannot retrieve what has not been conceptually understood yet.
- Use materials for conceptual understanding (CPA model) and articulated oral and written mathematical reasoning, prior to focusing on fluency/speed or abstract practice.
- Use like-ability buddies on mixed-ability tables for the ideal blend of at-point-of-need-practice with positive peer role models and flexible differentiation.
- Use enabling and extending prompts, pre-planned for every lesson, for flexible and instant differentiation.
- Record, record, record – every lesson students must record.
- Formatively assess using provided cross-checks, exit tickets and problem-solving prompts linked to each unit, to determine when to progress forward, and when to pause to dig deeper.
- Plan together and model for one another (team teach and watch without ‘observation lists’) – the best support lives within your school and within your daily maths teaching for each other as fellow teachers.
- Have fun – if you enjoy maths, the students will too. Fake it till you make it if you don’t yet, and choose the lessons that excite you and your team the most, because the units are menus, not prescriptive bibles, as long as the diagnostic assessments have been used first to guide you in direction of the highest impact unit from which to start instruction.

Tip 1: The assessments change everything

The diagnostic assessments are critical. These highlight which units match your cohort's points-of-need, as well as extending and enabling prompts best-suited for particular students in your class.

Use other assessments (click-the-bubble versions online) at your school's peril! We have seen from hundreds of schools starting Top Ten that online assessments frequently leave critical gaps and are not sufficiently rigorous, driving you and students down the path of least resistance (focusing on answers and processes without reasoning, understanding or developing strong mental number sense).

Critical tip 1: Use the diagnostic assessments

Without the diagnostic assessments:

- Your teams will not know how to navigate the unit plans effectively and efficiently. The linked spreadsheets show which units to use, based on points-of-need highlighted. Without these, you are ‘lost in the woods,’ before you even set out from base camp!
- Your teams will not know which conceptual and developmental gaps you need to target first. We have worked with hundreds of schools where [online assessments have left critical long-term gaps \(view our NAPLAN results, which are Australian-leading\)](#). In our opinion, bubble-based online assessments are quick and easy, but that is the full extent of the ‘benefit’ they offer – convenience and danger. Only oral interviews, rich assessment tasks and paper-based diagnostic assessments focused on strategies and reasoning work in the long-term for the exceptional results Top Ten has achieved.
- Your teams will not see the growth that they have achieved by focusing on mental strategies and reasoning, not answers alone. Your assessment style needs to match the teaching focus – using assessments that focus on vertical algorithms and answers, when your teaching is focused on mental strategies, number sense, reasoning and problem-solving is not consistent or sustainable in the long-term. If you want students who are numerate (showing understanding, reasoning, problem-solving and fluency), you must assess in a way that measures all those proficiencies – not just fluency.

Diagnostic, developmentally-sequenced, reasoning-focused assessments developed by numeracy coaches are time-consuming to implement (an hour-long session), but are worth it, to avoid wasting the rest of the unit focusing on developmentally inappropriate content without the opportunity to measure genuine growth.

Just like packing for a long overseas holiday! “It’s going to take too long to pack my bags for my 3-month trip to Europe, I’ll just take my handbag/online click-the-bubble assessment instead, because that’s quicker and easier...” What about in the long-run?

What about when students have gaps from content three years below their level, or in rounding and estimating, or mental number sense, and those assessments do not show it?



Cultivate a growth mindset by showing students how the brain learns, why mistakes are valuable and critical for success. Success is the result of learning from many mistakes. Failure is the result of not being willing to make enough mistakes for long enough – taking the easy road for too long.

Also emphasise how productive struggle is important for forming strong neural pathways and constructing long-term conceptual understanding.

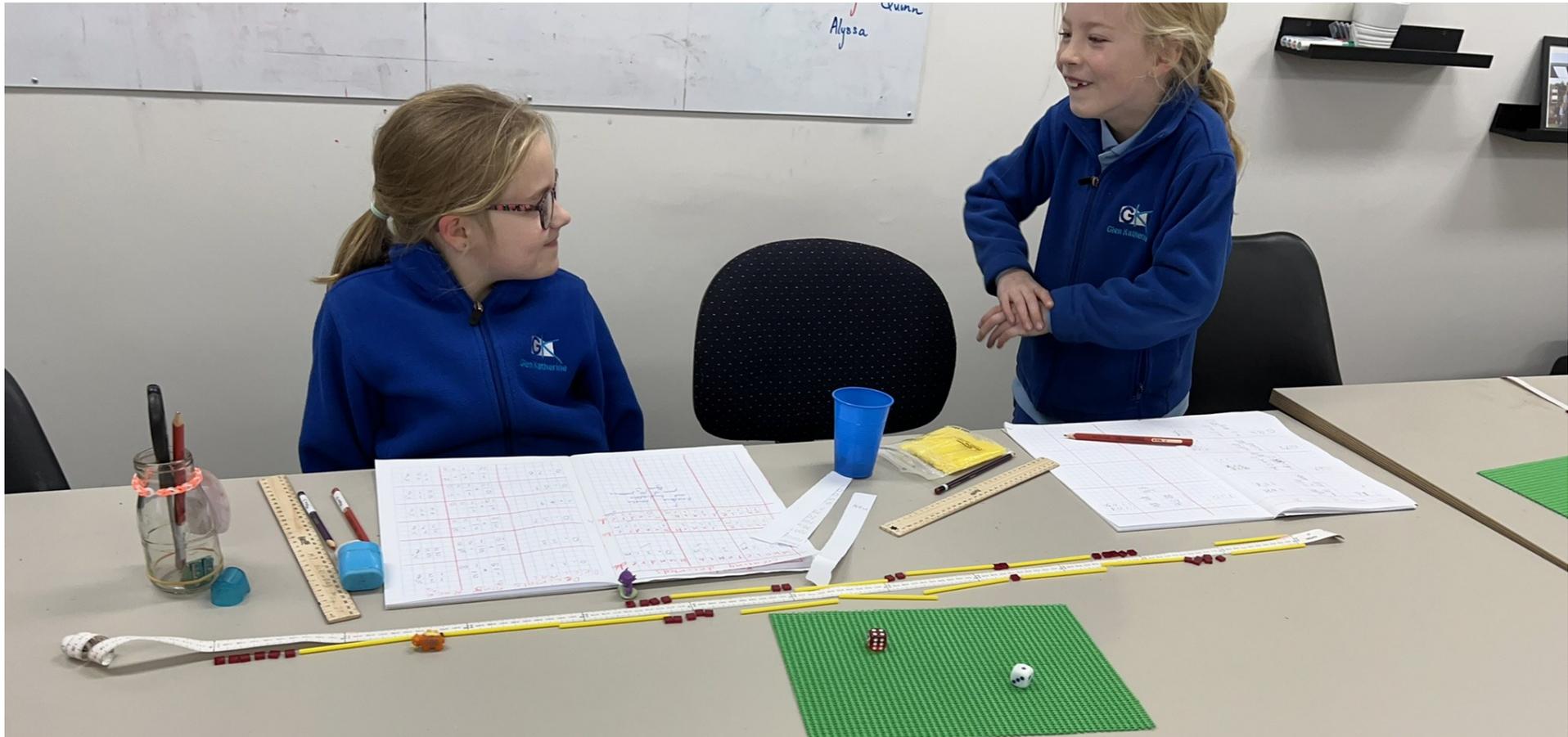
Growth mindset culture and clips

- **You only really fail if you don't try:**
<https://www.youtube.com/watch?v=qHIsMGDaeFw>
- **The power of 'yet' – I can't do it YET!**
<https://www.youtube.com/watch?v=hiiEeMN7vbQ>
- **Muscle memory takes time to build:**
https://www.youtube.com/watch?v=_nWMP68DqHE&t=66s
- **Growth v. fixed mindsets:**
https://www.youtube.com/watch?v=KUWn_TJTrnU&t=18s

Growth mindset culture and clips

- **The defining quality for success:**
<https://www.youtube.com/watch?v=H14bBuluwB8>
- **Set sail!** <https://www.youtube.com/watch?v=EXVPDg4C7hY>
- **Mistakes:** <https://www.youtube.com/watch?v=jBaHlmYwvdc>
- **The psychology of failure:**
<https://www.youtube.com/watch?v=eBz7iUJu9UM>
- **Self talk:** <https://www.youtube.com/watch?v=iNyUmbmQQZg>
- **It's practice, not innate/born talent:**
https://www.youtube.com/watch?v=CxEIql_hOTE

Learning how to communicate with a partner, as well as losing and winning games with grace and resilience is part of the process – embrace this as a way of teaching life skills (grit, resilience, problem-solving, cooperation, humility) and emotional intelligence through the vehicle of maths instruction!



Productive struggle is learning

Research extract from Dr Bern Long:

“Interestingly, my work has led me to believe that students that have experienced mathematical anxiety and learn about the idea that confusion is the brain’s way of saying it is learning something new, become the most enthusiastic learners.”

“They also need to be aware that their actions affect their learning success.”

“The brain has billions of neurons. As learners, we are constantly building neural pathways. These pathways link what we know with new concepts. When we are confused, the brain is doing its best to build a neural pathway. Therefore, **confusion tells us that the brain is learning something new.**”

Long, B. (2023). In a nutshell: It all makes sense – The importance of brain education. APMC, 28 (1) 39-40.

Growth mindset culture

- “It’s no fun going 4-wheel driving on the asphalt road. The whole fun of most things in life is that they are challenging. Challenge gets you into a state of flow – without challenge, life is boring! Make sure that, every day, your brain goes ‘bush bashing’ to forge new brain/neural pathways. If you stay on the easy asphalt road, you’ll never discover anything new – the most exciting days are when you venture out onto new tracks that you haven’t travelled on before...”
- “While doing something easy keeps your brain the same size, even just attempting – but not necessarily succeeding at – something new and challenging, makes it grow!” *Top Ten Numeracy Coach*

Building growth mindset and a classroom culture of productive struggle and resilience



Robert Kaplinsky Ted Talk on productive struggle:

<https://www.youtube.com/watch?v=fdtAcrlm6l0>

You don't learn to swim purely by watching others do it, or by swimming with flotation devices, and never learning to paddle in a pool that is 'just right' for your current ability. You need to get in the water and be challenged to try tasks just at the edge of your ability, every day or regularly, until you develop confidence, and then try harder challenges. Watching a higher ability person swim right in front of you only helps so much. What helps is planned challenges, with supports at the ready to assist, but only when you need them, and the instructor's trust to take away support as you improve...
That is what makes you progress.

You can't learn to ride a bike, if your training wheels are always on...

What good learners do – making this explicit for all students

Actions of good learners	Date:
Look and listen to the teacher when she speaks	
Look and listen to other students when they are sharing their learning ideas	
When I don't understand something, I ask a classmate or the teacher	
Fully participate in group activities by sharing and listening and doing	
Persist with my work even when it is difficult	
Choose carefully where I sit on the floor	

Dr Bern Long



Our fishbowl expectations

1. Listening ears.
2. Keeping our hands to ourselves.
3. Raising our hand to speak.
4. Sitting carefully on the chairs.
5. Standing up straight.
6. Eyes on the teacher. If you can't see the teacher, you can't see the work!
7. Hands off the table.
8. Ask questions.



Chirnside Park PS

Teaching ‘learning behaviours’ explicitly

Research extracts from Dr Bern Long:

“All students are expected to answer when asked a question.”

“Every week, the teacher will choose a lesson for student to self-evaluate their learning actions, but which lesson will not be communicated until the end, so students must be prepared at all times.”

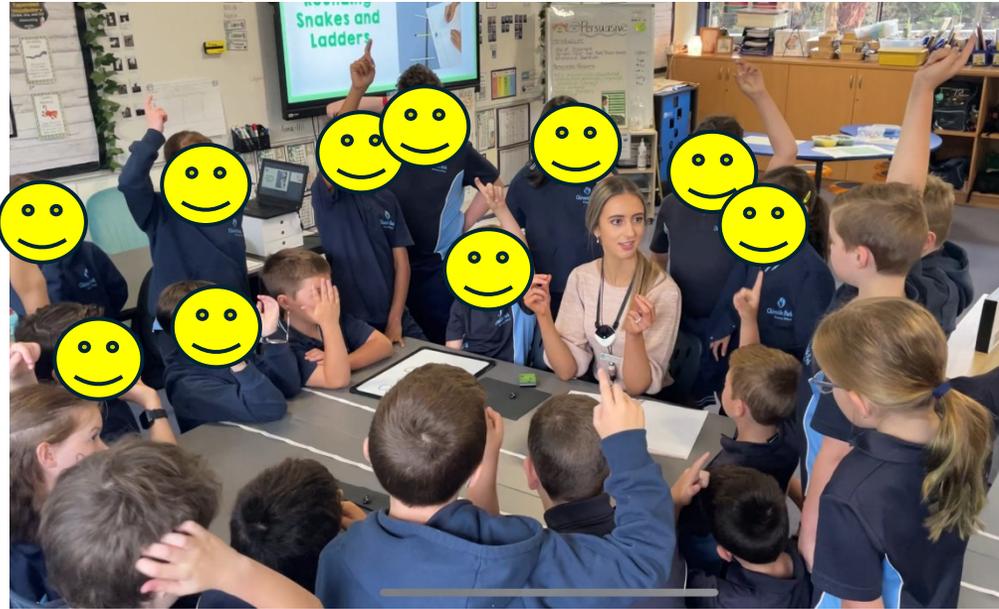
“Students need to understand **deep thinking is expected in a mathematics classroom** – confusion is an indication of learning something new.”

“Students that go well in mathematics have learnt strategies to make the mathematics easier – it is not innate.”

“Students need to understand that you, the teacher, are going to continue to make things harder, once they grasp a concept [so that their brain continues to grow].”

Long, B. (2023). In a nutshell: It all makes sense – The importance of brain education. APMC, 28 (1) 39-40.

What good learners do – making this explicit for all students

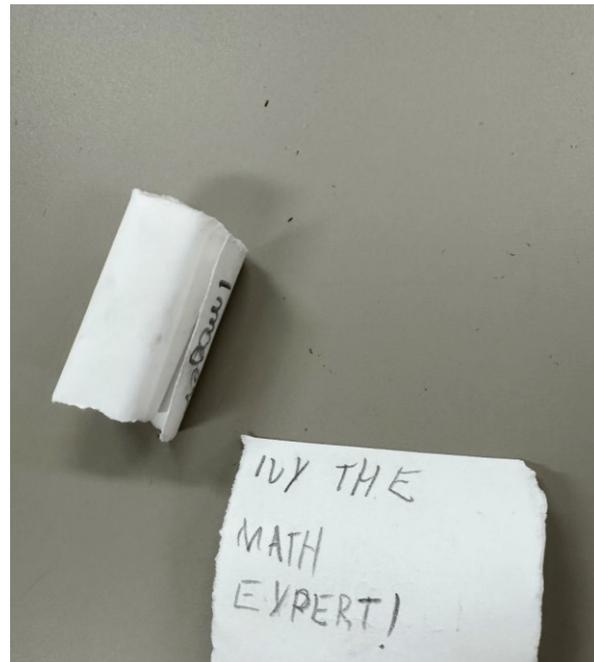


FISH BOWL EXPECTATIONS

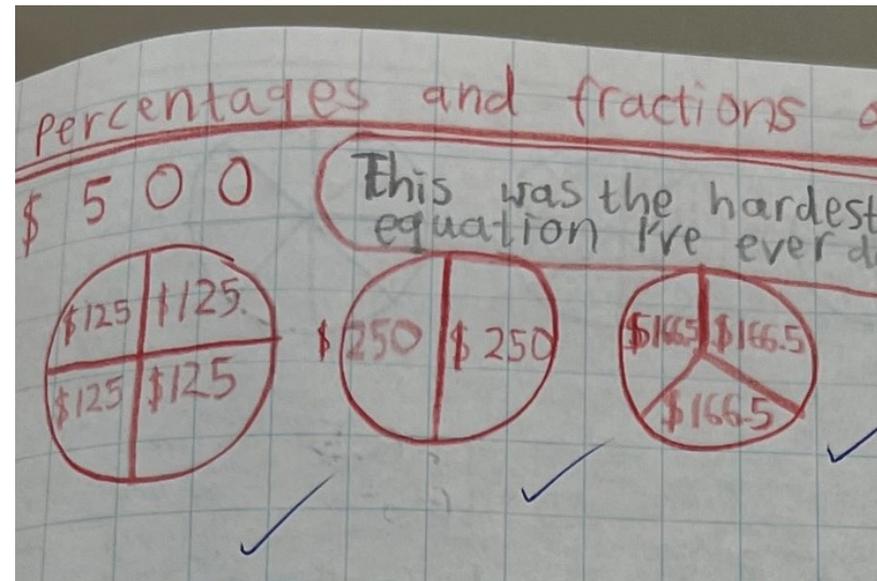
- *Whole body listening*
- *Showing engagement and enthusiasm*
- *Organise yourself around the table calmly.*
- *Being in a good choice spot where you can see clearly.*
- *Putting your hand up to contribute ideas.*



Growth mindset is built by the teacher providing students with the opportunity to make mistakes and bounce back – trusting that students can take on challenging tasks and providing time to overcome them. That is how to set and allow students to rise to high expectations. **Choosing not to set students challenging tasks is a sign that the teacher has a low estimation of the ability of their students.**



A student's given name for themselves after taking on a challenging task and seeing a pattern – growing a positive maths disposition.



A student's reflection on "the hardest equation I've ever done," after persisting with a challenge for 30 minutes and two pages of attempts.

Tip 2: Set a higher standard for all mathematicians in your class - **require reasoning** (not answers alone)

- *Professor Matthew Sexton:* “An answer is good...but an answer with reasoning is so much better.”
- Play the sceptic: “I don’t think that’s right. You’ll have to prove it to me.”
- “Instead of calling them maths books, we should call these brain books, because students need to understand that we want to see their brain on the page.” *Heather from Russel Island State School in Queensland*
- “Download your brain to the page. I want to be able to see inside your maths brain, to hear and see how you thought about it.” *Anna, Top Ten numeracy coach*
- “I can’t extend you until you show me how you can do it and prove you understand it. Can you explain it to a partner so they understand it as well as you do – that’s when you know you have really learnt it.” *Jenna, Year 5/6 teacher at Kananook PS*



Prioritise estimation from *Emeritus* Professor Doug Clarke:

Clarke, D.M., Roche, A., & Mitchell, A. (2008). Ten practical tips for making fractions come alive and make sense. *Mathematics Teaching in Middle School*, 13(7), 372-380.

Surveys completed by two hundred adults over a twenty-four-hour period found that more than 60 percent of all calculations carried out in daily life only required an estimate (Northcote and McIntosh 1999). We believe that the curriculum emphasis should reflect this finding. This is one reason why teaching fraction algorithms for the four operations does not prepare students for real-life encounters with fractions, where mental estimation is the key skill.

Always have an 'estimate' column prior to the working out or 'answering' column.

Estimates should be rounded numbers (not precise answers).

Rounding			Exact		
Numbers			Estimation		
6 7 8	7 0 0		1850		1 8 0 4
2 5 0	2 5 0				
8 7 6	9 0 0				
5 8 2	6 0 0				
7 4 0	7 5 0		1 9 5 0		1 9 4 3
6 2 1	6 0 0				
3 2 9	3 5 0				
8 3 3	8 5 0		1500		1 4 7 3
3 1 1	3 0 0				

E ≈					
E ≈	6	0			
E ≈	9	5			
E ≈	4	23			
E ≈	250				
E ≈	4	0			
E ≈	4	5			
E ≈	8	0			
E ≈	8	0			

Estimating

Gallery Name

add 2

28 / 2 / 20 23

Estimate

≈ 100 ml

Reasoning

Comparing the container with the 100mL jar I could see the width be used add

Close or

add 1

≈ 30

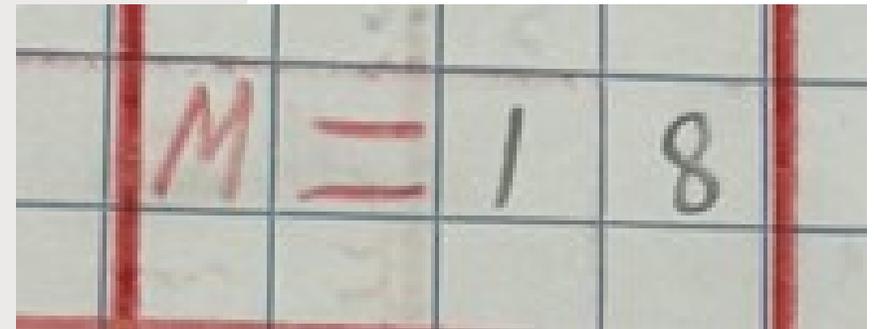
Lids



If students struggle to estimate, because they prefer to be precisely correct, implement a 'M' = Mental answer, below the estimate.

The estimate is marked wrong if it is not rounded, but the mental answer can be precise. This is an ideal compromise, and helps distinguish an estimate from a mental answer, so that students see the difference between the two.

Mental answers are also a great strategy to build number sense mentally, prior to students using written strategies.



Leave the vertical algorithm as a strategy of last resort – it is an over-emphasised process that has been proven to erode students’ number sense and mental place value.

There are so many other options that activate students’ number sense, place value and preferred learning styles to take its place, making the vertical methods consistently amongst the least efficient strategies to use, to solve most real-life problems:

Mental Subtraction – 4 Strategies and an Estimate

Jump back
 $5078 - 3463$
 $5078 \xrightarrow{-3000} 2078 \xrightarrow{-400} 1678 \xrightarrow{-63} 1615$
 $= 1615$

Jump the difference
 $5078 - 3463$
 $3463 \xrightarrow{+37} 3500 \xrightarrow{+500} 4000 \xrightarrow{+1078} 5078$
 $= 37 + 500 + 1000 + 63 + 15$
 $= 100 + 1500 + 15$
 $= 1615$

Estimate first
 $E \approx 1500$

Pump it up transformation
 $5078 - 3463$
 $\begin{array}{r} +37 \quad +37 \\ 5078 - 3463 \\ +500 \quad +500 \\ 5115 - 3500 \\ 5615 - 4000 \\ = 1615 \end{array}$

Drop it low transformation
 $5078 - 3463$
 $\begin{array}{r} -79 \quad -79 \\ 5078 - 3463 \\ 4999 \\ -3384 \\ \hline = 1615 \end{array}$

Split strategy
 $473 + 667$
 $\begin{array}{r} 1000 \quad 130 \quad 10 \\ 1000 + 130 = 1130 + 10 \\ = 1140 \end{array}$

Switch strategy
 $473 + 667$
 $\begin{array}{r} 667 \quad 473 \\ \underline{640} \quad \underline{500} \\ 640 \quad 500 \\ 600 \quad 540 \\ = 1140 \end{array}$

I chose this one because at the start I did not know what to do but I did it the quikes, and it was

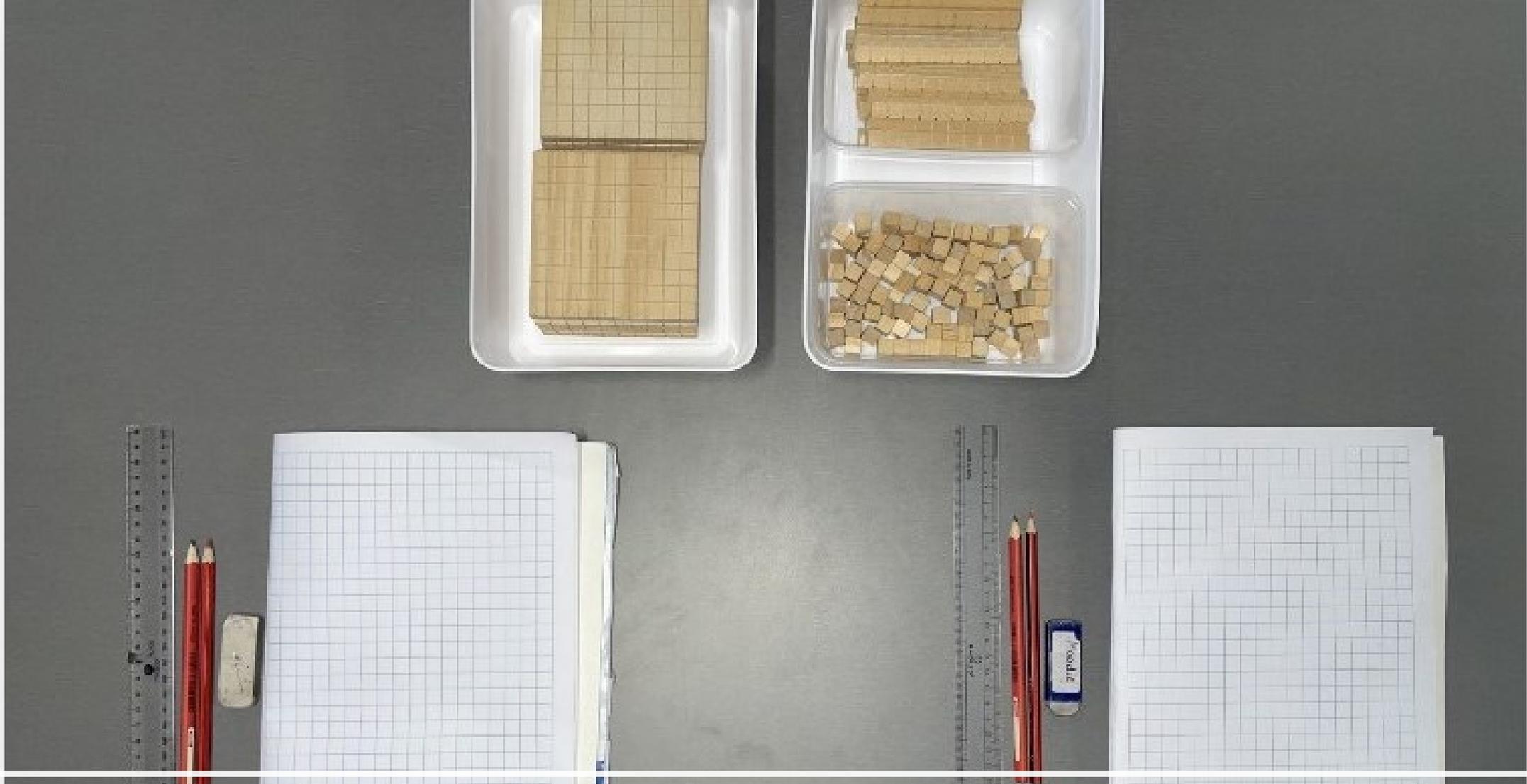
Tip 3: Pre-organise your materials for easy set-up and pack-up



Top Ten numeracy coach:
“Learning maths without
materials
is like learning to read
without books.”



Tip 3: Organised storerooms with commonly used ‘craft’ items for lessons organised by Lee at Herberton State School. There is a *Whole-school craft cupboard* shopping list, as a one-page overview, in the *Implementation Support Folder*.



Tip 3: Show students how to set up precisely, including clear desks (no pencil cases; only grey-lead, red pencil, ruler, eraser and sharpener). All materials are set-up **prior to** the fishbowl instructions.



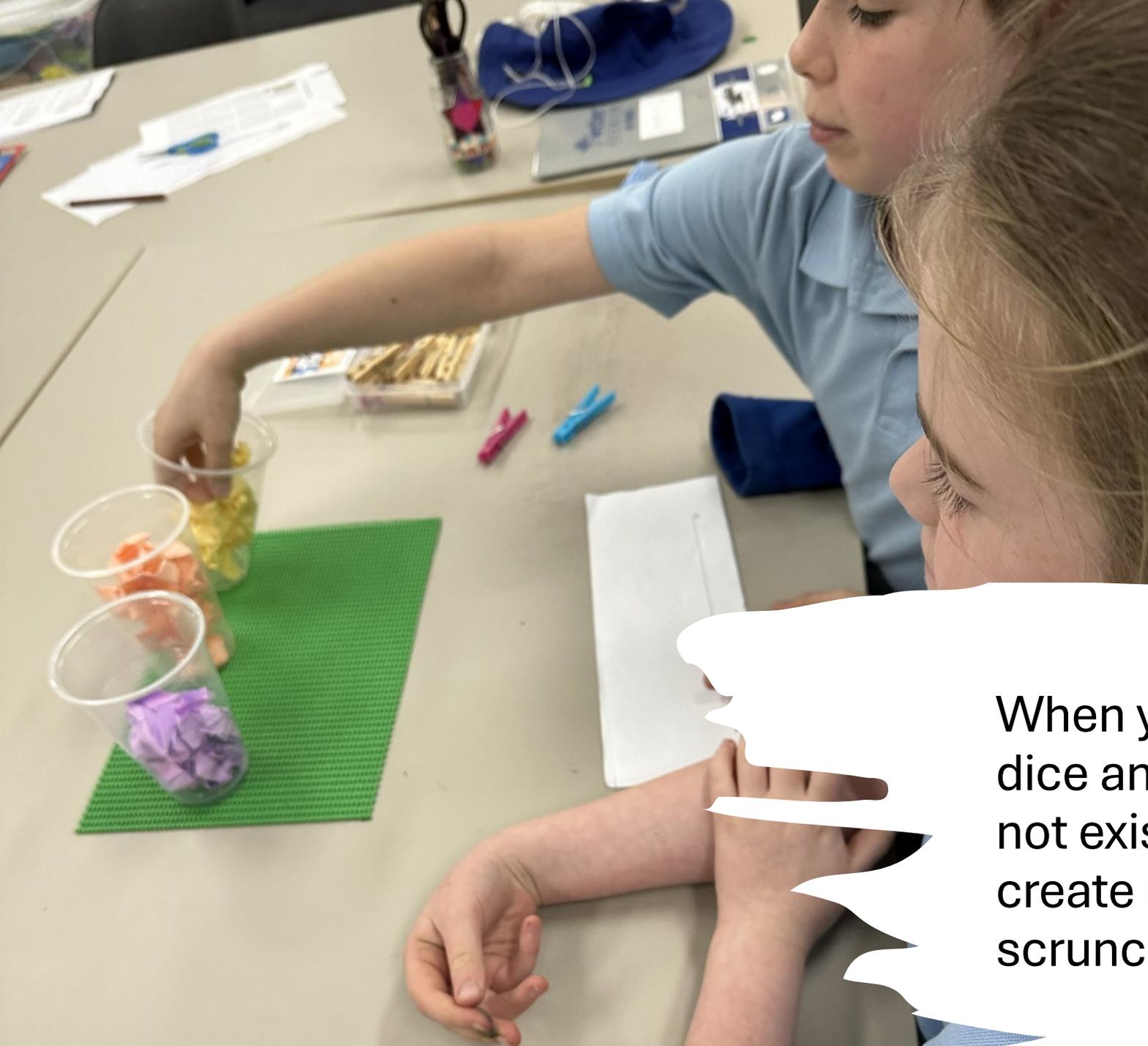
Tip 3: It can help to provide students with transparent ‘jars,’ such recycled glass juice bottles, to hold the essentials (grey-lead pencil, red pencil, eraser, ruler and perhaps a sharpener).

Tip 3: Clear the desks – everything off! Look at the floor under the desks – that is where everything that is not needed for the lesson belongs (or in students' tubs or similar – but definitely off desks).





Keep all daily-use resources in each classroom – resources that are seen...are used!
Classroom at Billanook PS



When you need a specific kind of dice and you do not have it (or it does not exist), simply instruct students to create it using post-it notes scrunched up and shaken in cups.

Tip 4: Model bookwork in your own 'teacher modelling grid book' and set extremely high standards – holding students to a personal best (and beyond) standard of neatness

Raise your standards regularly, to avoid a gradual downward slide throughout the year.

- 42 HONOUR DE COUPS
- ✓ Shows our best and neatest work the first time
 - ✓ Shows our best writing for all numbers and words
 - ✓ One digit (and no more) in each grid box
 - ✓ Date at the top of each page in red pencil/pen
 - ✓ Lesson title at the top of each page in red pencil/pen
 - ✓ Written in grey lead pencil and erasers rub out any mistakes that are not part of the working out
 - ✓ Lines are ruled in red pencil/pen
 - ✓ Lines are ruled under each completed part in red pencil/pen

Signed: Rachel Date: 01/02/22

1	6	1	7	1	8
2	2	2	3	2	4
2	8	2	9	3	0
3	4	3	5	3	1
4	0	4	1	4	2
4	6	4	7	4	3
5	2	5	3	5	4
5	8	5	9	6	5
6	4	6	5	6	6
7	0	7	1	7	7
7	6	7	7	8	8
8	2	8	3	9	9

MATHS BOOKWORK EXPECTATIONS



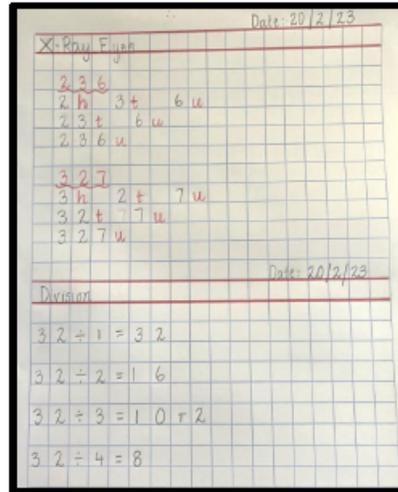
Only use pencil
to write



Use a ruler to
create
straight lines



Use an eraser
to fix errors.
No crossing out.



- Your work must be neat, clear and it must make sense to someone else!
- One digit per box to show the place value.
- Words are written across the boxes. Not one letter per box as it takes up too much space.
- Leave one row of space or rule off between each example.

I, _____, will do my best and my neatest
work in my grid book. Signature: _____

Bookwork contract –
Located in the Implementation
Support folder – Organising the
materials and bookwork contracts
subfolder.

**Having students sign it and
practising on day one of the year
is the first step – but holding
students to high standards all
year is what makes all the
difference to the standards and
classroom culture of excellence
you cultivate in your room.**

Split Strategy		15/5/23	
Problem	$E \approx$	Split	
$(2)(1)(2) + (2)(3)(3)$	440	$200 + 200 =$ <u>400</u> $10 + 30 =$ <u>40</u> $2 + 3 =$ <u>5</u>	$400 + 40 + 5 =$ 445 ✓
$(3)(6)(1) + (4)(1)(2)$	800	$300 + 400 =$ <u>700</u> $60 + 10 =$ <u>70</u> $1 + 2 =$ <u>3</u>	$700 + 70 + 3 =$ 773 ✓

One digit per box.

Rule up in red pencil.

Neat headings.

Date at the top.

Take pride in your work!
Your book should be like
a work of art.

If not:

“Rub it out, do it again.”

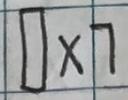
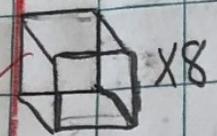
Number

MAB

Expanded form

8 7 7 5

rounded =



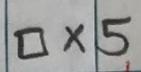
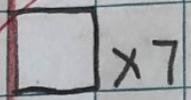
8 0 0 0 +

7 0 0 +

7 0 + 5

9 0 0 0

rounded =



8 0 0 0 +

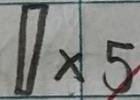
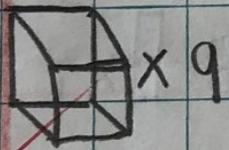
7 0 0 +

5 0 + 1

9 8 5 3

rounded: 10,000

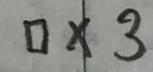
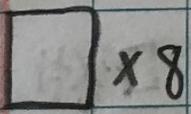
1 0,000



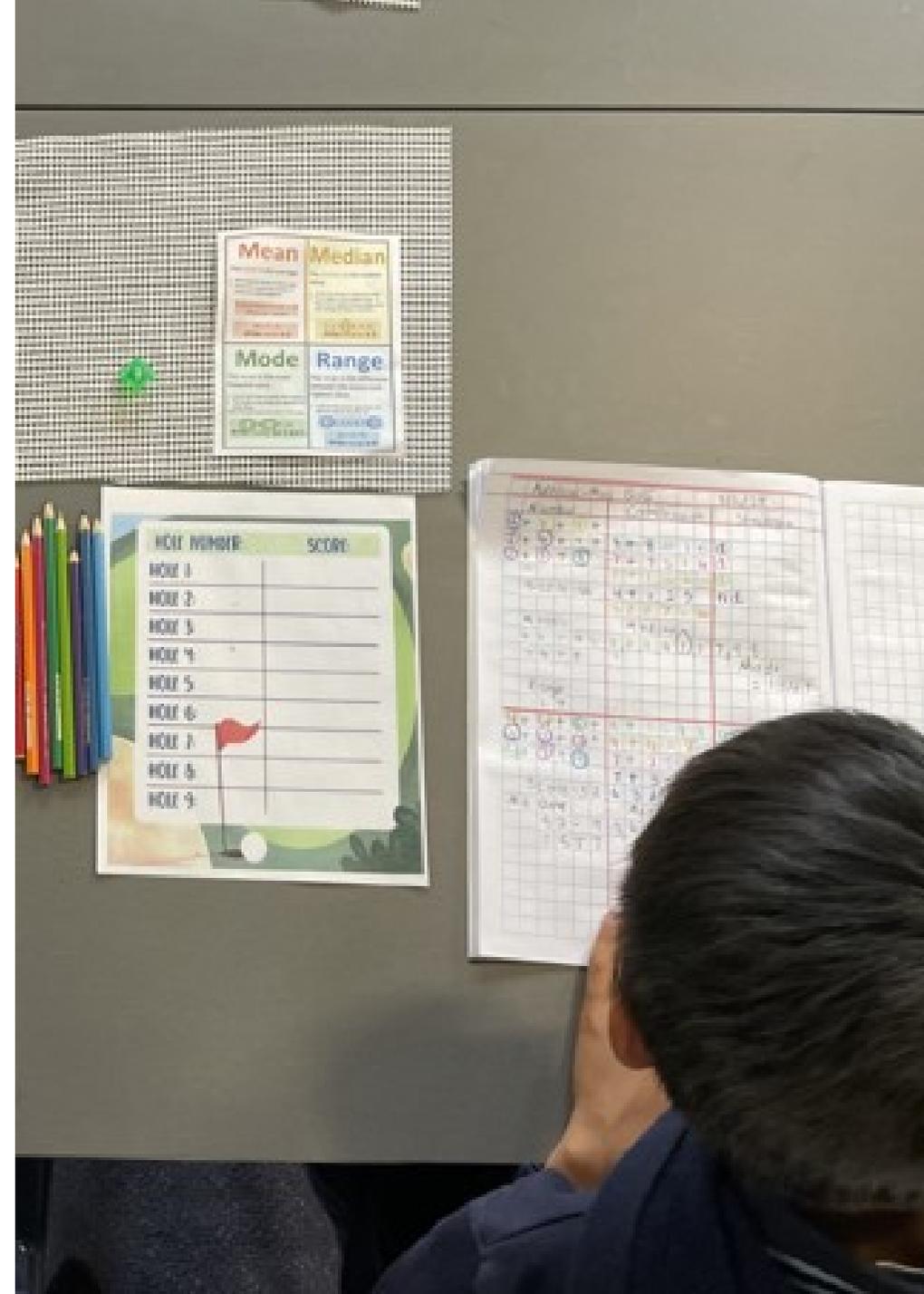
9 0 0 0 +

8 0 0 +

5 0 + 3



Students working with a teacher modelled grid book photographed and displayed on the iPad in the centre of each pair.



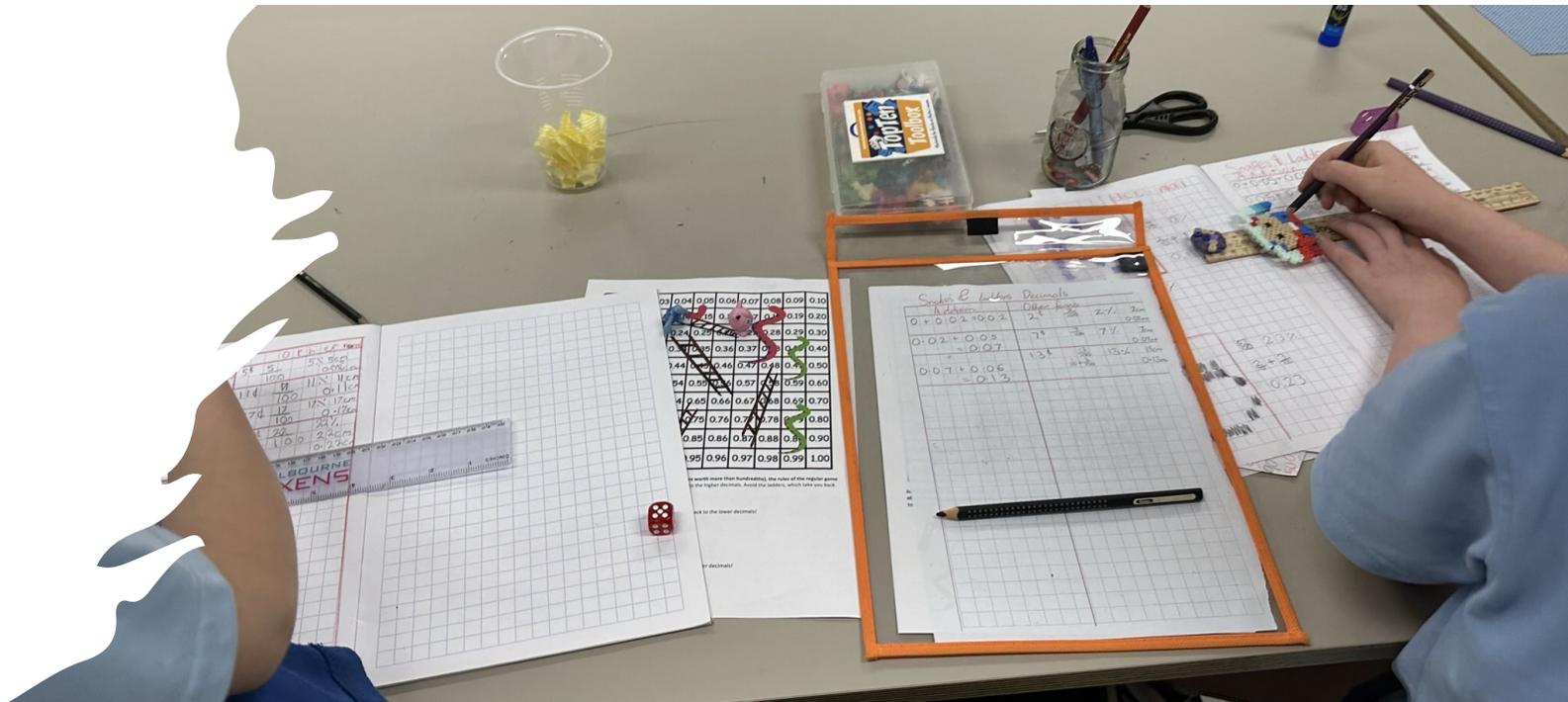
27/2/2023

Rounding Rate	Snakes	and	Ladders
M a t i l d a			
7 → 10			8 → 10
17 → 20			17 → 20
26 → 30			26 → 30
36 → 40			36 → 40
49 → 50			49 → 50
56 → 60			68 → 70
72 ← 70			77 → 80
71 ← 70			87 → 90
78 → 80			97 → 100
89 → 90			117 → 120
95 → 100			128 → 130

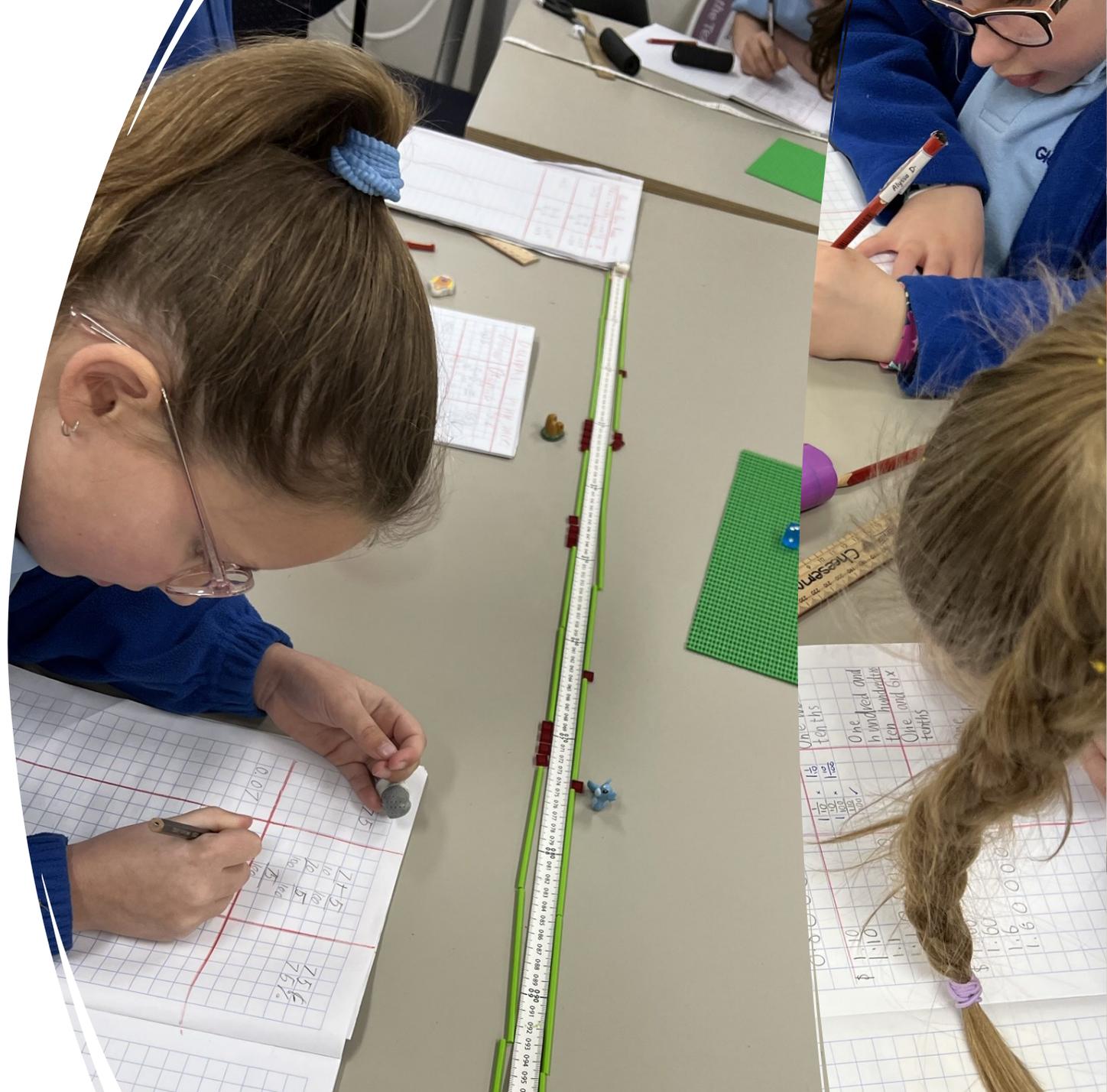
Number	Place	Value	Form
2	0 th	0 h	0 t 2u
22	0 th	0 h	2 t 2u
622	0 th	6 h	2 t 2u
1,122	1 th	6 h	2 t 2u
600	0 th	6 h	0 t 0u
1,200	1 th	2 h	0 t 0u
600	0 th	6 h	0 t 0u
1200	1 th	2 h	0 t 0u
1204	1 th	2 h	0 t 4u
1804	1 th	8 h	0 t 4u
2204	1 th	2 h	0 t 4u
2224	2 th	2 h	2 t 4u
2824	2 th	8 h	2 t 4u
2924	2 th	9 h	2 t 4u
2954	2 th	9 h	6 t 4u
3004	3 th	0 h	0 t 4u
3404	3 th	4 h	0 t 4u
3405	3 th	4 h	0 t 5u
4005	4 th	0 h	0 t 5u
4305	4 th	3 h	0 t 5u
4505	4 th	5 h	0 t 5u
5006	5 th	0 h	0 t 6u

One of the best teachers in Victoria with consistently high expectations that students raise theirs to meet – Natalie's Year 3/4 students' books at Chirnside Park PS

Tip 4: Keep a worked example on the classroom screen and also place a photocopied version (or your own workbook) directly in front of support students.



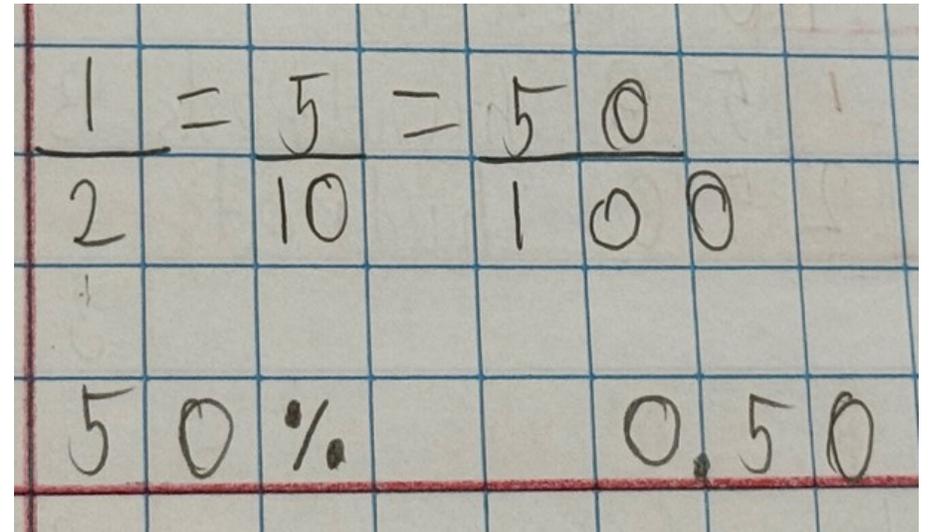
Tip 5: If you don't record, you cannot take your next turn...



Tip 5: If you don't record, you cannot take your next turn...



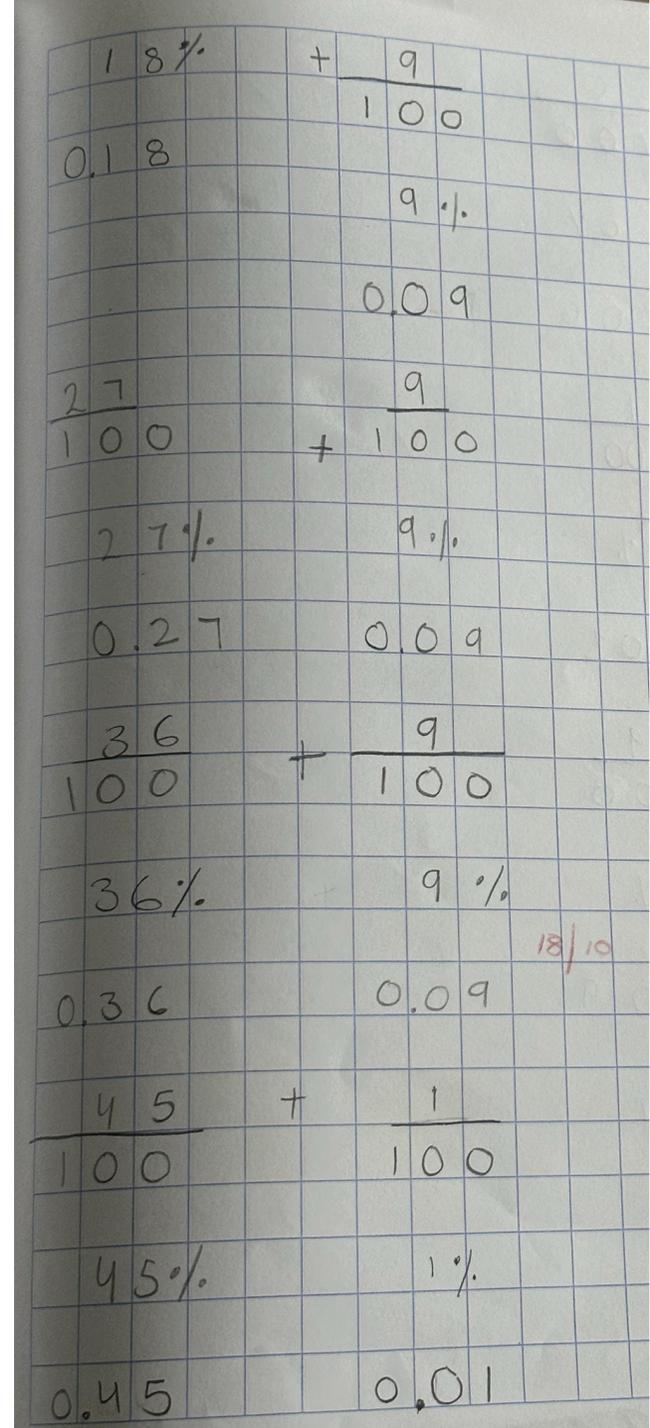
Tip 6: Record in as many forms as possible to build conceptual depth and connections between content!



Tip 7: Repeat lessons twice, with more extending prompts on day two: TBC!
Date your work and continue the next day...

“Repetition makes a mathematician.”

You cannot fully learn a strategy or deeply understand something the very first time you try it (unless it was too easy for you in the first place; in which case, the assessments would not have led you towards it).



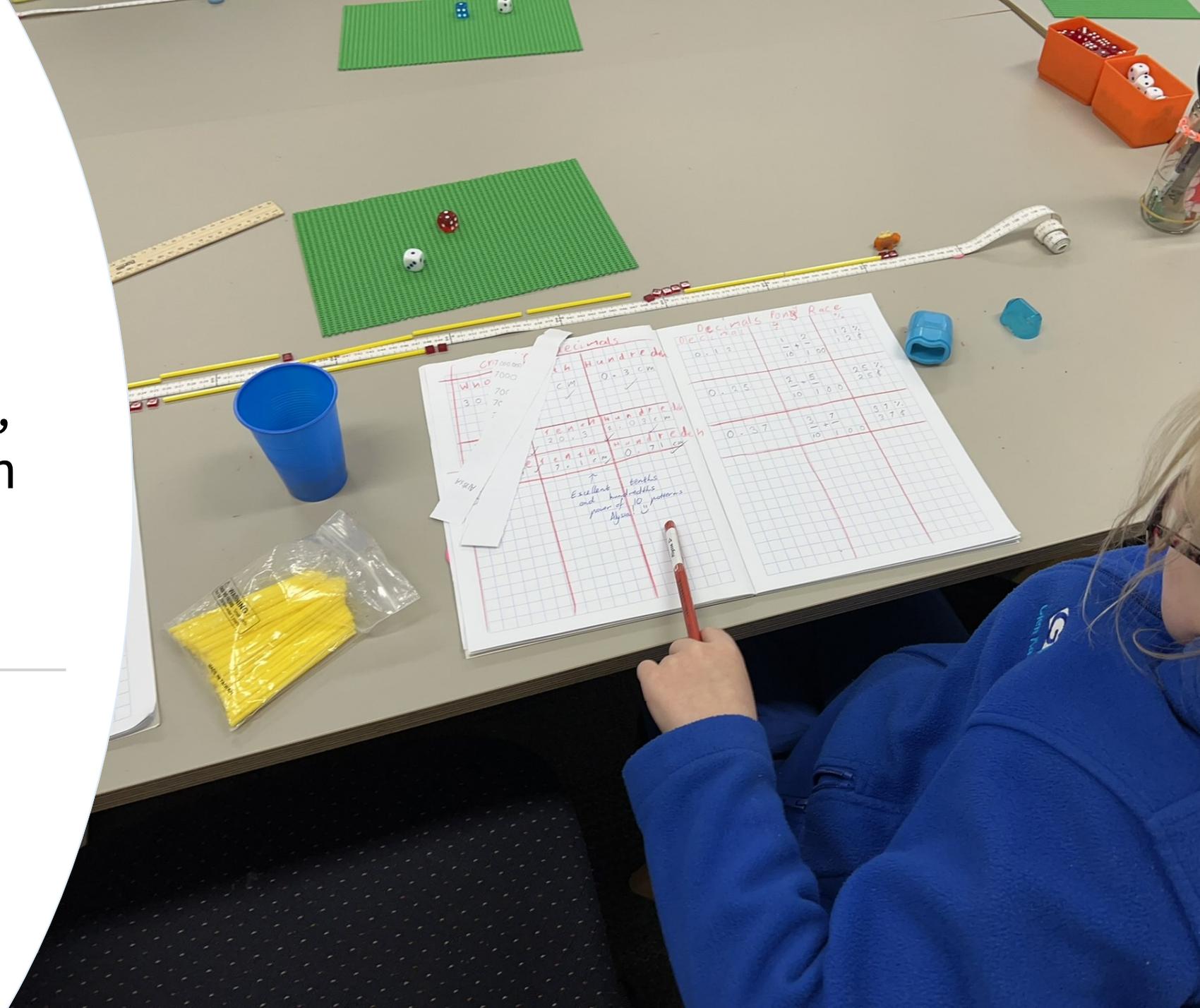
Tip 7: Repeat, Repeat, Repeat...

True mastery (not topic coverage) takes time, but saves more time in the long-run.

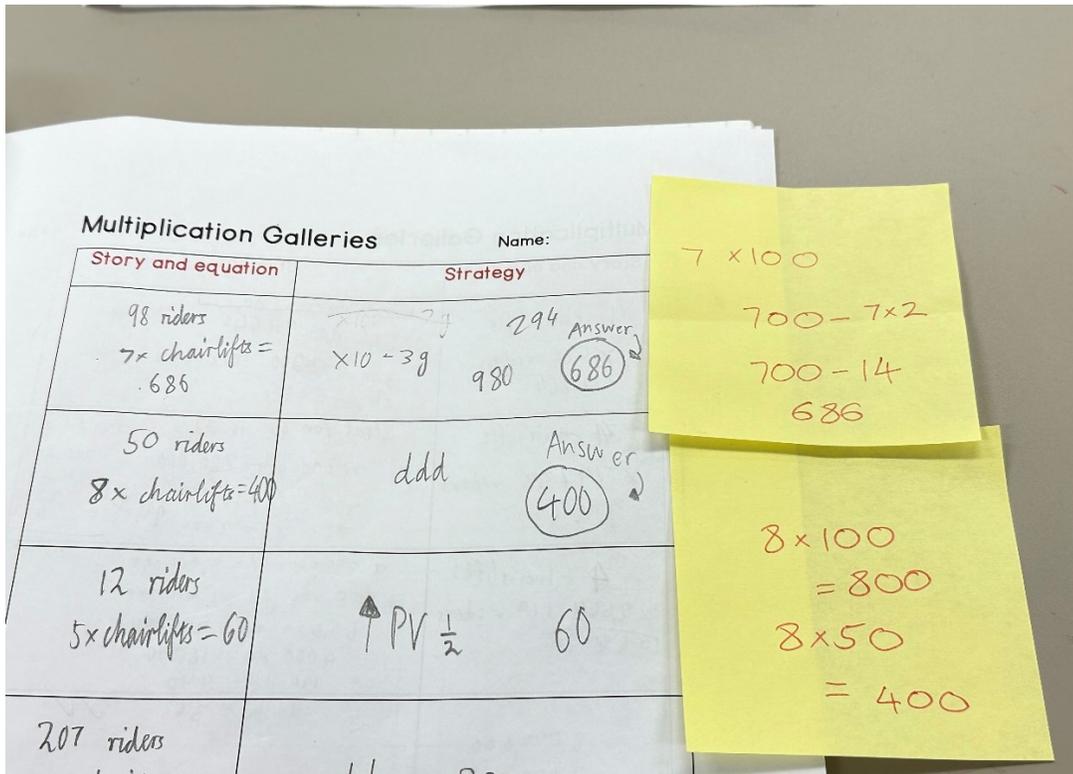
Go slow to go fast!

Be the chuga-chuga, don't board the bullet train to nowhere!

Tip 8: Use as many immediate feedback mechanisms as possible – and not at the end of the session, or the next day through marked books (that is too late)!



Tip 8: Build immediate feedback mechanisms into every lesson



- Peer feedback – stop and peer teach/correct midway through the session.
- Calculator – check after every three examples.
- Calculator soup for more unique calculators (simplifying fractions, equivalent fractions, rounding):
<https://www.calculatorsoup.com/calculators/math/roundingnumbers.php>
- Lingo jam for worded form:
<https://lingoam.com/NumbersToWords>, and similar online resources available for immediate feedback.

Calculator soup examples

(free online calculators as immediate feedback mechanisms):

Rounding Numbers Calculator

The screenshot shows a web-based calculator interface. At the top, there is a red header with the text "Round Numbers Calculator". Below the header, there is a text input field labeled "Round:" containing the number "5328039". Below that is a dropdown menu labeled "To:" with "Ten Thousands" selected. There are two buttons: "Clear" on the left and "Calculate" on the right. Below the buttons, the "Answer:" is displayed as "5,330,000". At the bottom, there is a text explanation: "Rounded to the nearest 10,000 or the Ten Thousands Place."

<https://www.calculatorsoup.com/calculators/math/roundingnumbers.php>

Simplifying Fractions Calculator

The screenshot shows a web-based calculator interface. At the top, there is a red header with the text "Simplifying Fractions". Below the header, there are two input fields: the top one contains "21" and the bottom one contains "49". There are two buttons: "Clear" on the left and "Calculate" on the right. Below the buttons, the "Answer:" is displayed as the simplified fraction $\frac{3}{7}$. At the bottom, there is a section labeled "Solution" with a horizontal line below it.

<https://www.calculatorsoup.com/calculators/math/fractionssimplify.php>

Order of operations immediate feedback mechanism (free online calculators):

Order of Operations Calculator

Type in your sum to see how to solve it step by step. Examples: **2+3*4** or **3/4*3**

$$3^4-3\times 4+(3-4)$$

$$(3^4-3\times 4)+(3-4)$$

$$(81-3\times 4)+(3-4)$$

$$(81-12)+(3-4)$$

$$69+(3-4)$$

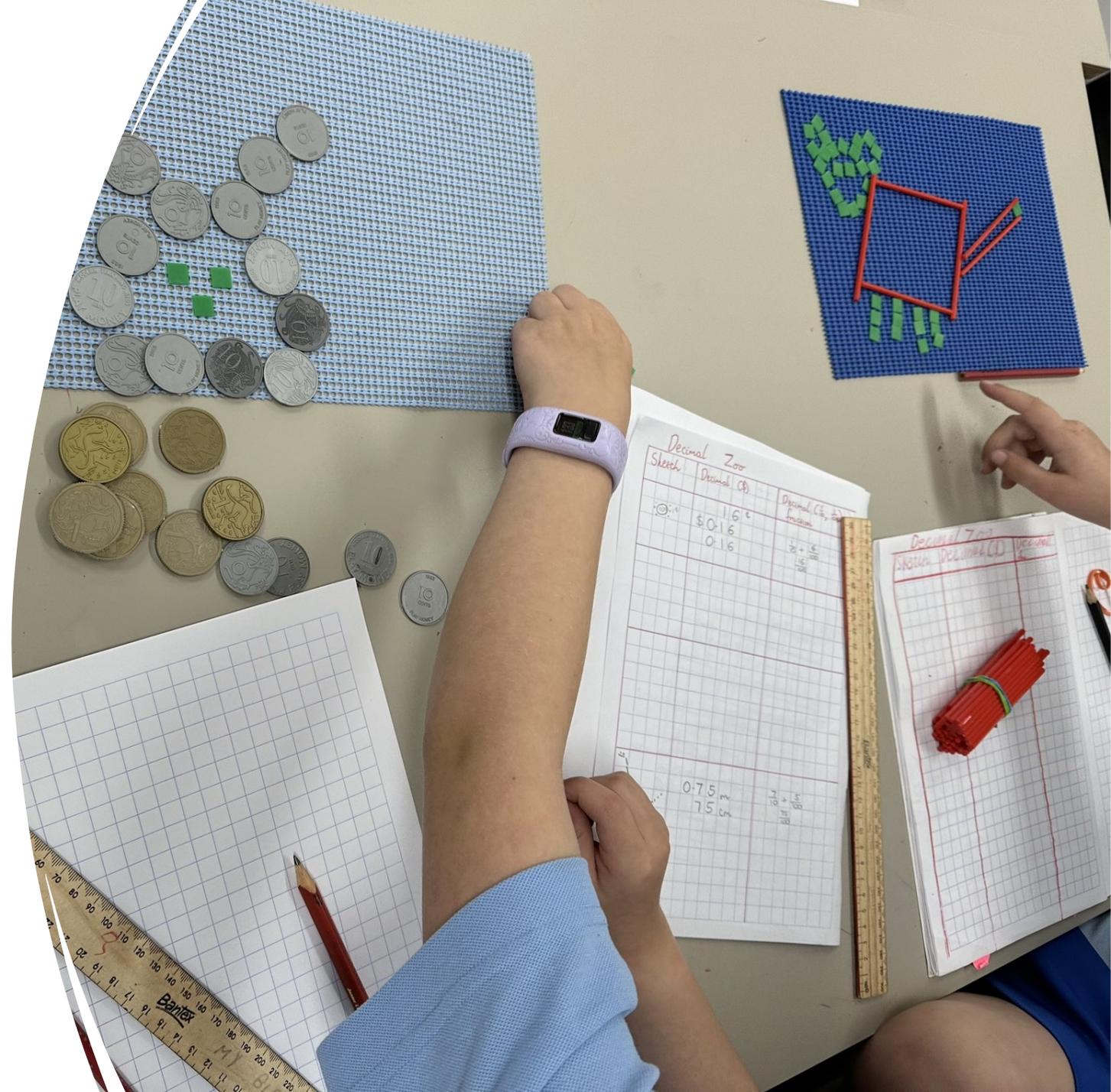
$$69+-1$$

$$68$$

<https://www.mathsisfun.com/algebra/operations-order-calculator.html>

Tip 9: Require that every student sets up materials, but then allow students a choice of materials and strategies as the unit progresses.

The Singapore Model – Concrete, Pictorial, Abstract



This is what
engagement
looks like...

Mernda Park PS

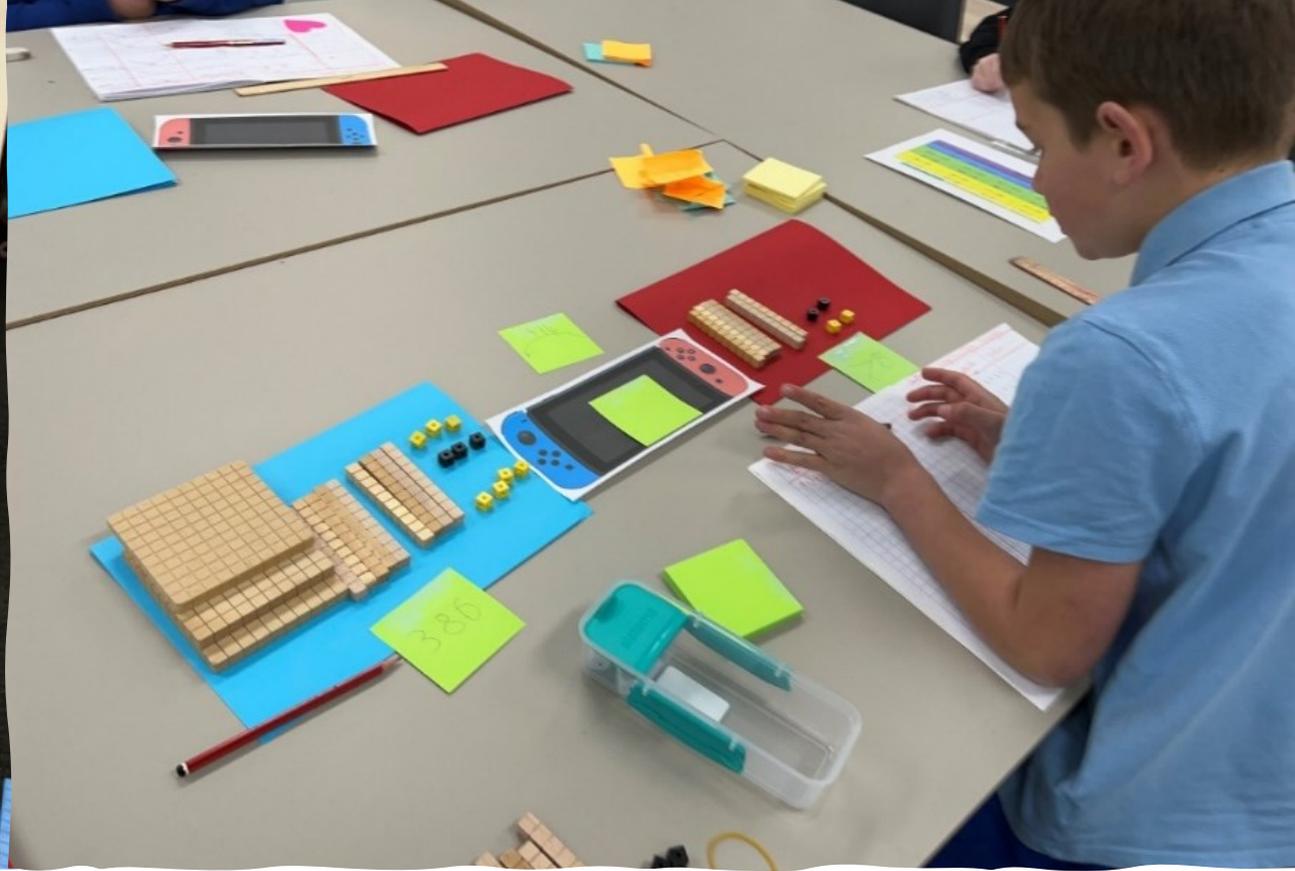


This is what
engagement looks
like...

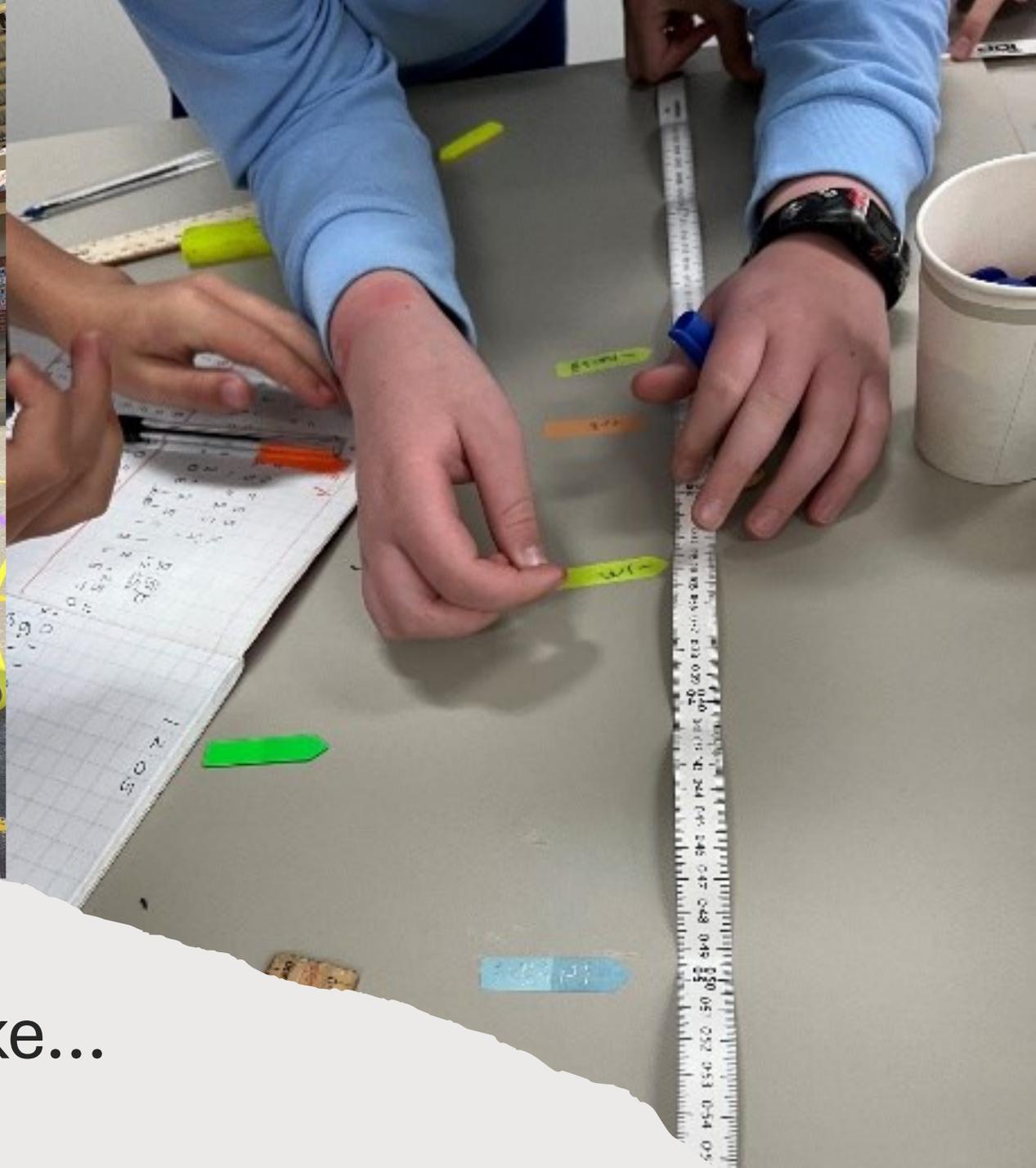


This is what engagement looks like...





This is what engagement looks like...

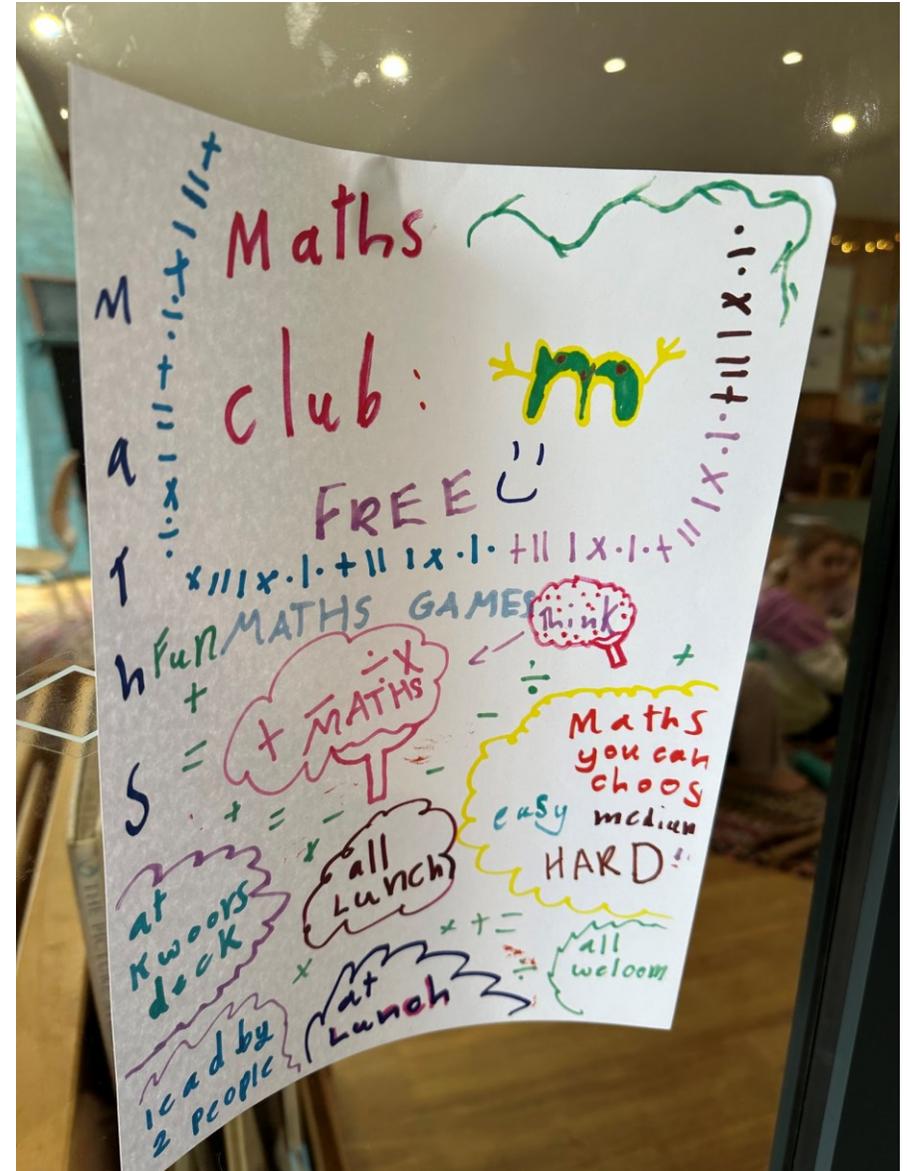


This is what engagement looks like...

Students at Kwoorabup choosing to run their own maths club at lunchtimes!

“We have a problem at Kwoorabup... The best kind of problem! Our students are so deeply engaged in their learning, they don't want to stop... even for recess! We even have a group of students who have planned to hold 'Maths Club' at lunchtimes!”

Maths has been a huge hit this term, with our addition inquiry capturing the curiosity and energy of the whole class. The Kwilas have been asking for more maths – even during break times! We've explored various strategies for solving addition problems, and it's been wonderful to see the enthusiasm grow.



Tip 10: Student Reflection Journals

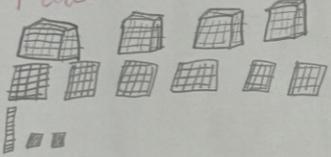
Place Value. 6.02.03

Th	H	T	O
4	6	1	2

Standard Form - 4,612

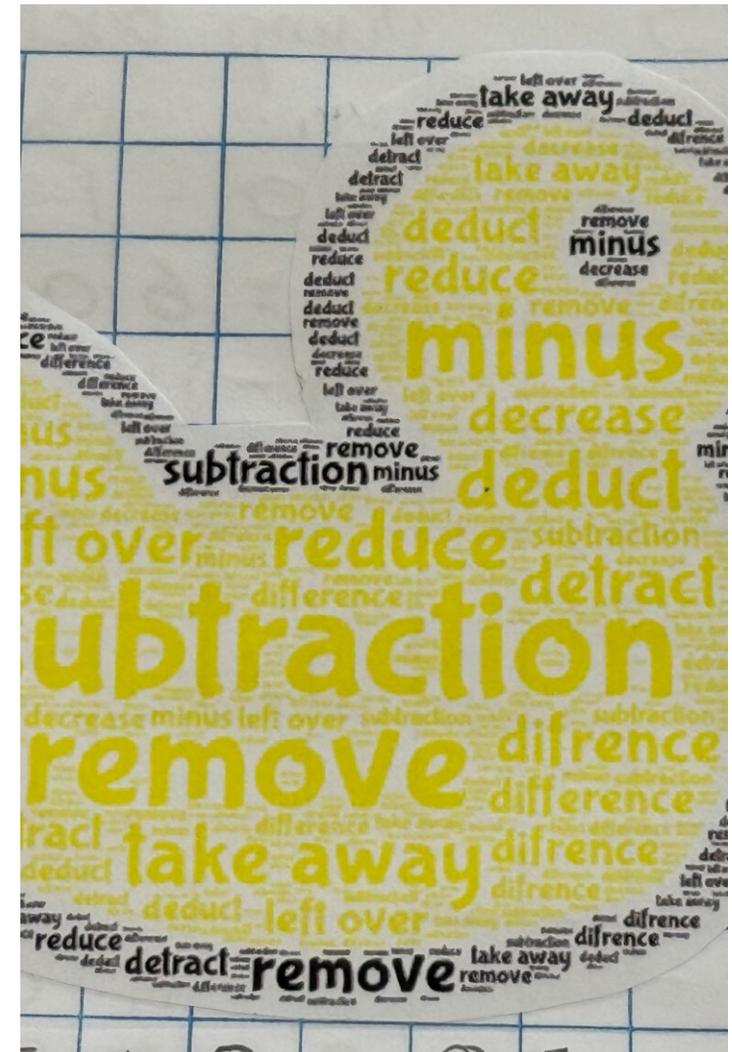
Expanded Form - eeeeeee - Slinky
 $4,000 + 600 + 10 + 2$

Place value Blocks/MAB -



Worded Form -
Four Thousand Six Hundred
and Twelve.

MILLIONS.	THOUSANDS.	ONES!
T O	H T O	H T O
8	5 6	4 1 2



A word cloud on a grid background featuring various terms related to subtraction, such as 'subtract', 'minus', 'deduct', 'remove', 'take away', 'difference', 'decrease', 'left over', and 'deduct'.

an idea come from

Tip 10: Use maths journals to activate prior knowledge with vocabulary-building unit launch pages, and regular student notes to reflect and help their future forgetful self remember what they wish to recall next year. Start in Year 3 and retain until Year 6 – graduating with their maths journal!

Squaring the Circle Algebraic Solution

Squaring the circle was proved to be impossible in 1872 when German mathematician Ferdinand von Lindemann proved that π was a transcendental number.

If we relax the problem to allow an algebraic solution we can solve it like this:

First work out the area of the circle:
 $\pi r^2 = 78.54 \text{ cm}^2$

Then find the square root of that number:
 $\sqrt{78.54} = 8.86 \text{ cm}$

That is the length of the square. write an expression.

To find the length of the square:
 $\sqrt{\pi r^2}$ but anything squared and then square-rooted is the same as what we started with. So we can just do: $\sqrt{\pi} r$.

Perth Steiner School

DATA

Data is information collected throughout investigation.

Numerical Data
weight kg

Categorical Data
dog, fish, cat, bunnies

Plot	Table	F	Tally chart
0	Dog 7	7	Dog 7
0	cat 12	12	cat 12
0	fish 9	9	fish 9

Bar chart

Pie chart

Bar chart

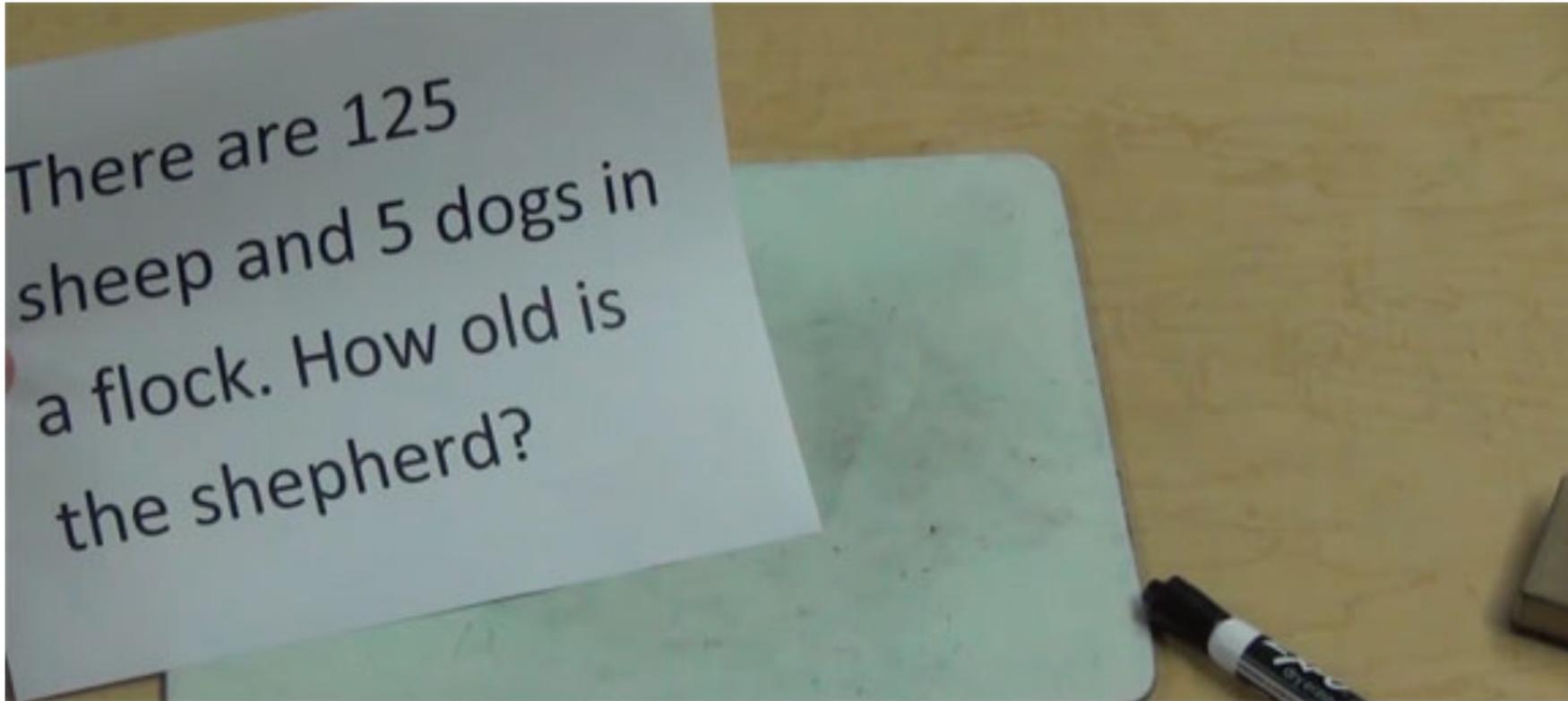
Chirnside Park PS

Remember the ultimate goal...

Numeracy for life,
not just maths processes/tricks for
school or tests.

How many of your students would answer this problem using a rule or procedure?

The ultimate goal is numeracy (real-life understanding and problem-solving skills for life), not procedural fluency!



Procedural fluency without understanding is worthless!

<https://robertkaplinsky.com/how-old-is-the-shepherd/>

Join our online community –
sharing practical tips and
lesson snapshots weekly:

[@toptenmathematics](#)



10P

The Power and Joy of Hands-on Numeracy

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