Karakia Timatanga

Pou Hihiri	May clarity be yours
Pou Rarama	May understanding be yours
Pou o te whakaaro	Through reflection
Pou o te tangata	Through respect
Te pou e here nei i a tātou	The virtues that bond us as one
Mauri ora ki a tātou	May we be filled with well being
Haumi e, hui e, tāiki e	Bound together, unified!

Shane Buckner
Rob Proffitt-White
Heidi Hayward
Blair Dravitski

NEW ZEALAND PRINCIPALS' FEDERATION
Ngā Tumuaki o Aotearoa

THE Learner First™

Monitoring – Part One

Knowing- is what we do right for our tamariki?

Rob Proffitt-White

Executive Director of Mathematics & Numeracy

Knowing and Doing are interrelated in our curriculum

Knowing

Surface Tasks: single explicit skills

when **how** **what** **why**

Doing

Rich tasks: proficiency in using skills

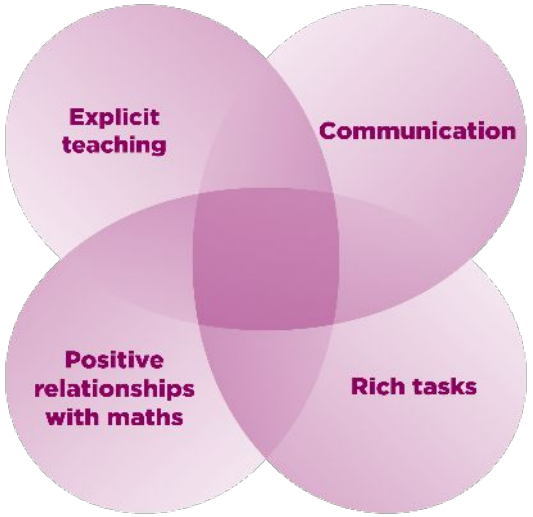
investigate **generalise** **justify** **represent**

Structured Explicit Instruction

skills & concepts

Explicit is **interactive** – it is not teacher talk.
Rich discussions between teachers and students and amongst students, to check understanding (p. 21)

Eg guided, independent, extended



Problem Solving Inquiry

Problem solving & reasoning

Rich and meaningful designed to invoke curiosity and engagement. Pivotal to development of knowledge, processes, and dispositions (p. 22)

Eg rich tasks book end every unit

Rich Routines

notice – recognise – respond

Teachers provide multiple opportunities to practise, review, consolidate, and using previous learning alongside new learning.
Students must be taught to communicate. (p. 21)

Some countries have had a century of unhelpful wars

Drill Theory

e.g. Thorndike 1922

Instruction should focus on ensuring the rote memorization of computational skills.

a) children must learn to imitate adults

b) understanding is not necessary for these connections,

c) the most efficient way to accomplish connections is through direct instruction and drill

Discovery Learning

e.g. early Dewey 1920s

Instruction should focus on knowing that mathematical learning should be the incidental result of satisfying their natural curiosity

a) free to explore the world, notice patterns,

b) actively construct their own understanding and procedures.

100 years later we still swing between these extremes often through products.

Not because they work..... but because they are quick to announce, easy to package and easy to 'signal' action.

The illusion of reform returns – and history quietly repeats.

*Programmes play a **contributory** role*

Knowing

Surface Tasks: single explicit skills

when **how** **what** **why**

Doing

Rich tasks: proficiency in using skills

investigate **generalise** **justify** **represent**

Children who have mastery develop fluency without resorting to rote learning and are able to solve **unfamiliar problems.** **Problem Solving** is central to mastery and teachers will develop mathematical thinking and consistently monitor and respond to learning

Commercial Website, 2024

Learning practices of Top-performing Nations

- **Problem solving** is central to mastery
- Development of **mathematical thinking**
- Consistent formative assessment
- Concrete-Pictorial-Abstract approach

Commercial website, 2024

Schools using these resources must also value, teach and monitor 'knowing' and 'doing' mathematics

Leaders should ensure they are used as intended- if needed

Knowing

Surface Tasks: single explicit skills

when **how** **what** **why**

Doing

Rich tasks: proficiency in using skills

investigate **generalise** **justify** **represent**

Anchor Investigation (open or unfamiliar)

A motivational hook to introduce new concepts or procedures and inform planning

Explicit Instruction (I do, we do)

Guided teaching of skills and concepts

Routine tasks (You do)

Independent and Extended Practice of skills)

Rich Tasks (open or unfamiliar investigations)

Guided and independent experiences that can start a unit and are what all students can transfer their skill practice too

Rich Routines & Relationships

Closing Investigation (open or unfamiliar)

to apply, consolidate and monitor learning of concepts & processes

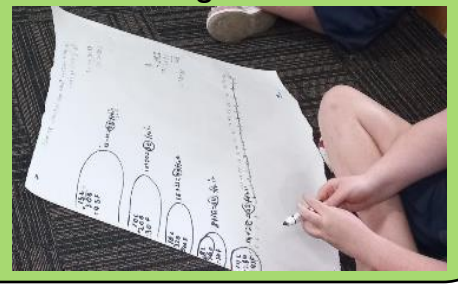
What high quality instruction could look like

Pre unit rich task

Explicit Instruction (I do, we do)

Routine tasks (You do)

Rich Tasks (open or unfamiliar investigations)



Post unit rich task

Rich Routines

(non unit related to maximise retention)

Powerful affirmation for those NE leaders

Russell Bishop's research affirms that students sense when tasks are surface-level or passive—this indicates a lack of confidence in their capability.

Real learning happens in relationship—in dialogic, interactive classrooms—not just through worksheets and scripted tasks. Real commitment to equity comes through relational teaching, not resource substitution.

Sources: Bishop & Berryman (2009); Bishop (2020); Te Kotahitanga Research Programme (2003–2010)

Our context is arithmetic- a central stem for tamariki

Much time is spent on arithmetic- sadly with mixed results

Knowing

Surface Tasks: single explicit skills

when **how** **what** **why**

Solution

Strategy

Arithmetic needs fluency to be monitored

Definitions

Conceptual understanding

The comprehension of mathematical and statistical concepts, operations, and relations by:

- connecting related ideas
- representing concepts in different ways
- identifying commonalities and differences
- communicating thinking
- interpreting information.

Procedural fluency

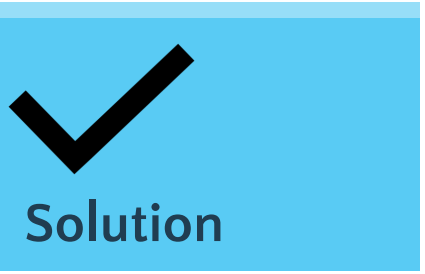
Choosing procedures appropriately and carrying them out flexibly, accurately, and efficiently.

accurately

efficiently

appropriately

flexibly



Explicit teaching means checking the solution **(what)** and the choice and use of strategy **(how)** and the ability to estimate and defend their answer **(why)**

Yet in every school today some tamariki are being let down by a sole focus on the solution

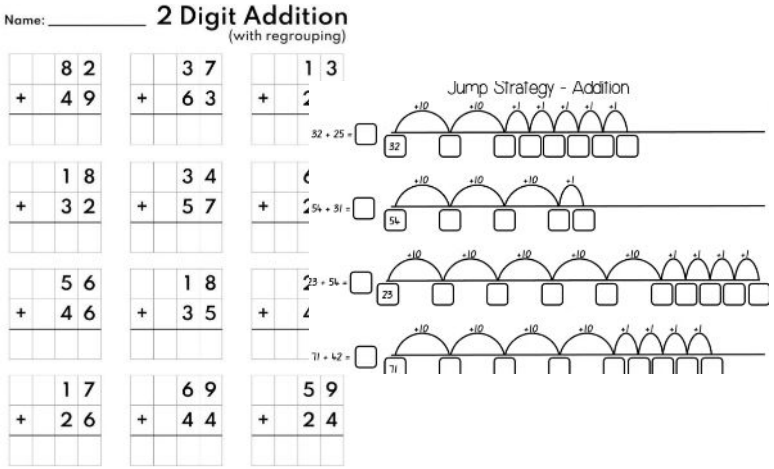
This is nothing new- it is what we need to do

Solution

Strategy

Sequences

Add and subtract two- and three digit numbers



Teaching Considerations

- Explain and represent
- Horizontal and vertical methods
- Make estimates
- Use change unknown 25 + [ ] = 41

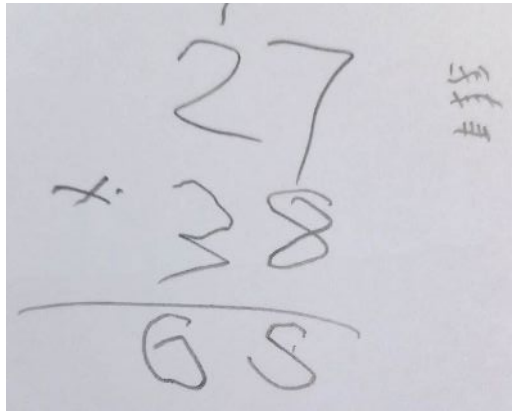
End of Phase KNOWs

- Estimation and rounding
- support checking the reasonableness

Explicit teaching means checking the solution **(what)** and the choice and use of strategy **(how)** and the ability to estimate and defend their answer **(why)**

Scrap Paper Question on 27 + 38 : A year 4/5 insight

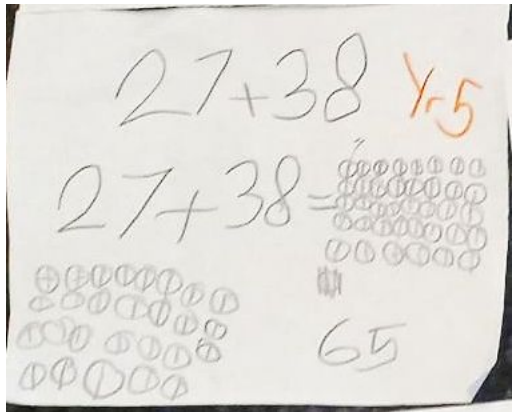
Solution



Y4 Hidden counting

Strategy

79%



Y5 Visible counting

43%

Cowan et al. (2011) showed that students who keep counting for basic facts risk falling behind in later maths because they don't build the **fluency** and mental **flexibility** needed for bigger ideas — and this limits their confidence"

Russo and Bobis (2023) highlight the same monitoring issues

Full breakdown of 27 + 38 (9739)

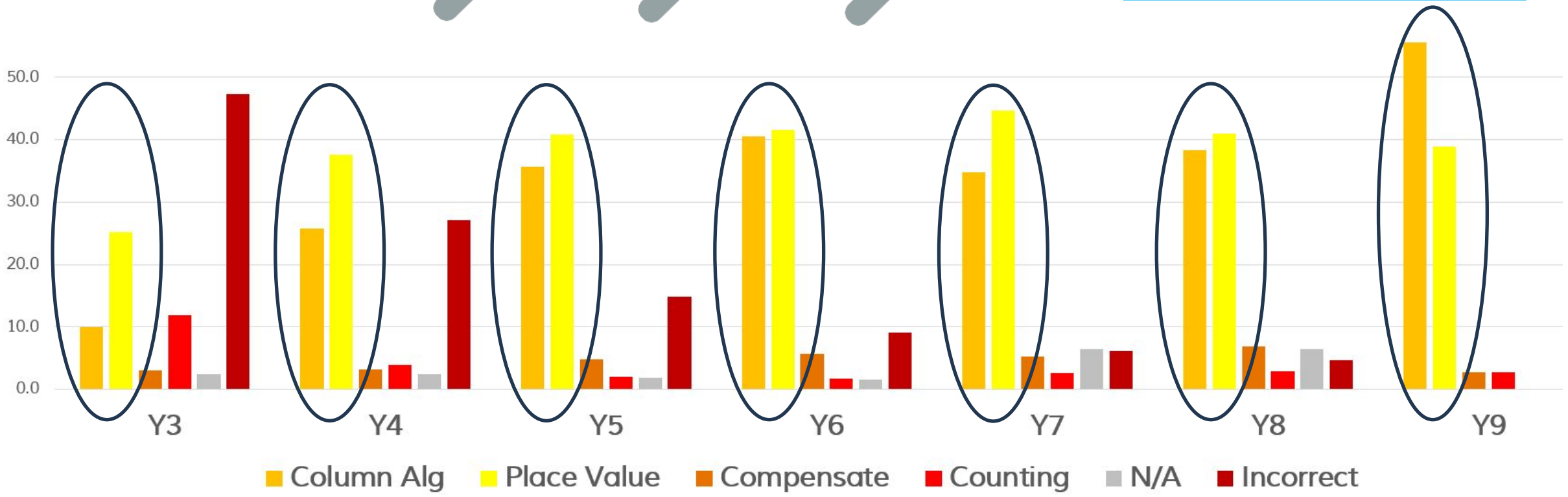
Solution

Year 3
53%

Year 6
91%

Year 8
95%

Strategy



How are you ensuring all your staff are monitoring fluency as intended?
How are staff noticing, recognising and responding to this?

Explicit instruction works but needs the right training

Clear Goals

Modelling with think alouds

Guided Practice With feedback

Checking for understanding

Practice to deepen

Archer & Hughes (2011), Hattie (2009), Rosenshine (2012)

Misinterpretation of this powerful approach remains a cause of the problem

Effective Pedagogy in Mathematics *Anthony and Walshaw*

Explicit Instruction

Explicit Instruction

Explicit Instruction

Explicit Instruction

Explicit Instruction

Teachers may believe they are providing explicit instruction, when in fact their teaching lacks the clarity, structure, and responsiveness that explicit approaches require. Without sustained professional learning, these misunderstandings persist."

Effective Pedagogy in Mathematics *Anthony and Walshaw*

One question you see all kids do, not 20 you see none do

Administer	• One purposeful (+ - x ÷) is completed on scrap paper
Facilitate	• Eliciting evidence through purposeful observations
Analyse	• Categorise responses and run a Number talk

Visible and effective school leadership in action

Data snapshot – Week 9 Term 2

Please return to me by Friday 12pm (after you have determined next steps from monitoring stage/strategies etc) – let me know if you would like me to complete with your class 😊.

Y1 - Y2	Y3 - Y4	Y5 - Y6
4 + 9 + 6	**36 + 85**	**254 + 38**

- tell students they are going to be doing a scrap paper question
- tell them to do their working out on the paper
- write question on the board
- give them 2 minutes (observe students and note the strategies – info below)
- this will help guide your addition focus for remainder of semester
- forward to me for collation 😊

Observe the Strategies (fluency with understanding)

Counting **all** (cannot visualise or hold a number in their mind)

Counting **on** (holding in head – students need to construct this strategy for themselves)

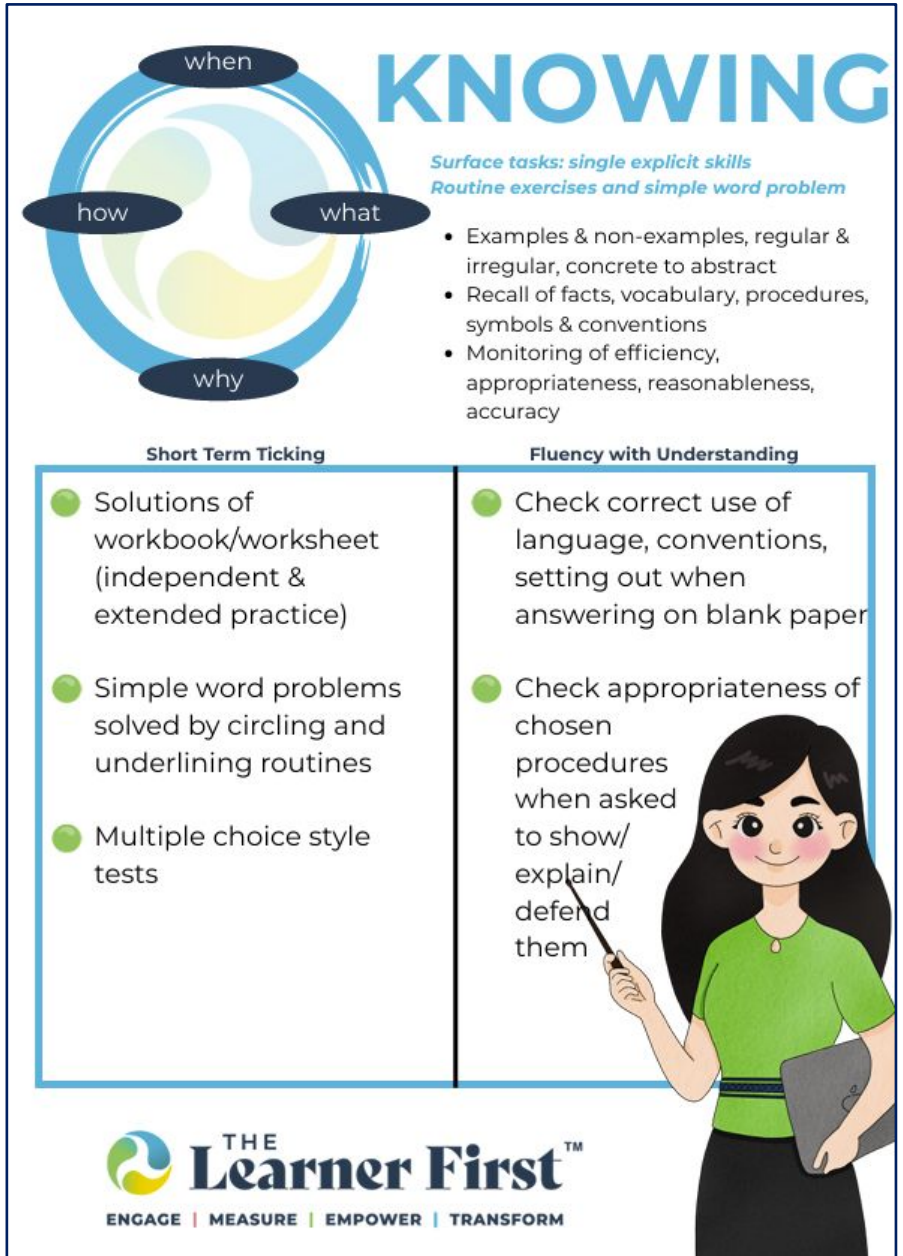
Derived facts **-** doubles/near doubles; making tens (eg: finding them in strings of numbers); making landmark or friendly numbers.

Known facts **–** indicates they "just know the answer".

Similar to term 1 please categorise them into: algorithm, place value strategies, compensating, other

Nuanced leaders understand that this is a non-negotiable for any school chasing the "North East"

Take away tip for empowering everyday arithmetic



Estimate before calculate

Articulate your strategy

Validate Your solution

An over-reliance on [Smart tests] and short-answer assessments risks narrowing the curriculum. Students need opportunities to engage with rich tasks and show depth of reasoning and strategy use.

Reference: New Zealand Curriculum Math Refresh Drafts (2022–2024), and NZCER Assessment Position Papers.

Tips to take away today

- ✔️ Programmes can support explicit instruction- teacher guides key
- ✔️ Programmes don't replace unpacking – ensure staff understand it
- ✔️ Teaching considerations will help tamariki get the teaching they deserve
- ✔️ Teaching considerations must be used – alongside all programmes
- ✔️ MoE creating some powerful maths resources- staff meeting to promote

Where resources and programmes dominate, students often engage in completing tasks with little evidence of deeper reasoning or sense-making.

Hunter, Hunter & Anthony (2021), p. 62

Great leaders know….. and need…..

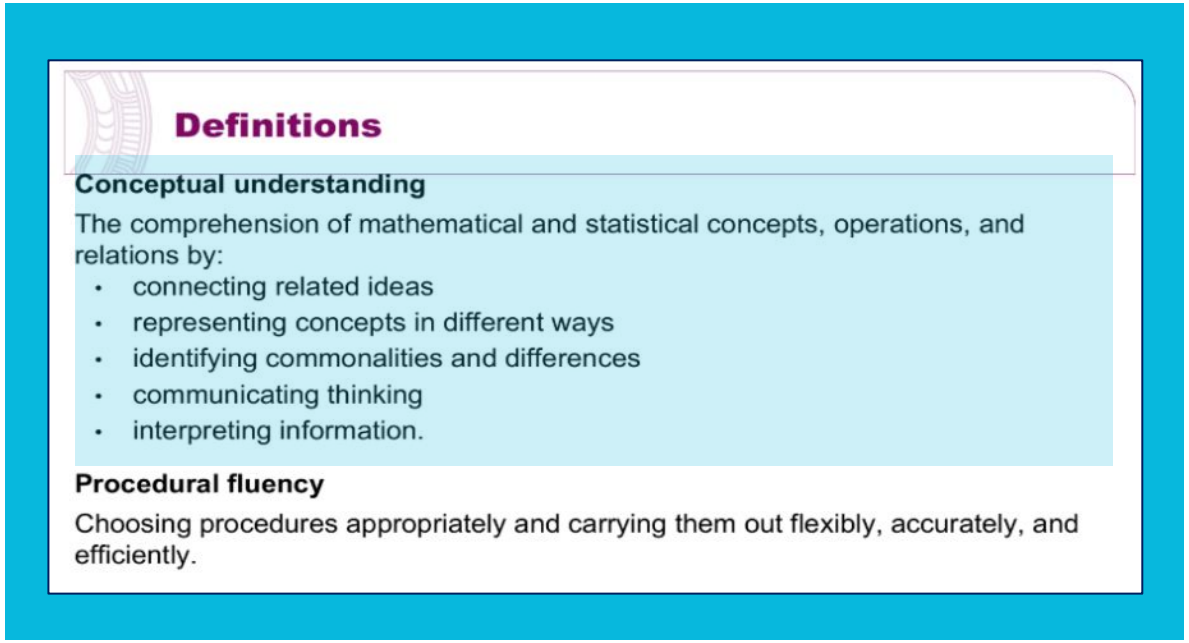
Real Success = **Knowing** × **Doing**

*Teachers know that successfully completing spelling and grammar drills **[knowing]** means very little if students can't apply it to authentic writing **[doing]** — so why do we often assess, and defend, maths at the workbook level?*

My NZPF Conference workshop

Stronger conceptual understanding through drawing and symbols

5 types of student in a typical class. Do you actually know them? *



Why too many children just don't read word problems *

Recognising procedural and conceptual errors for targeted teaching

Why do we have such extreme positions from government support?

Teacher
Evidence + Insight + Action

ACER :Scaling up and sustaining maths leaders PD

THE Learner First™
ENGAGE | MEASURE | EMPOWER | TRANSFORM