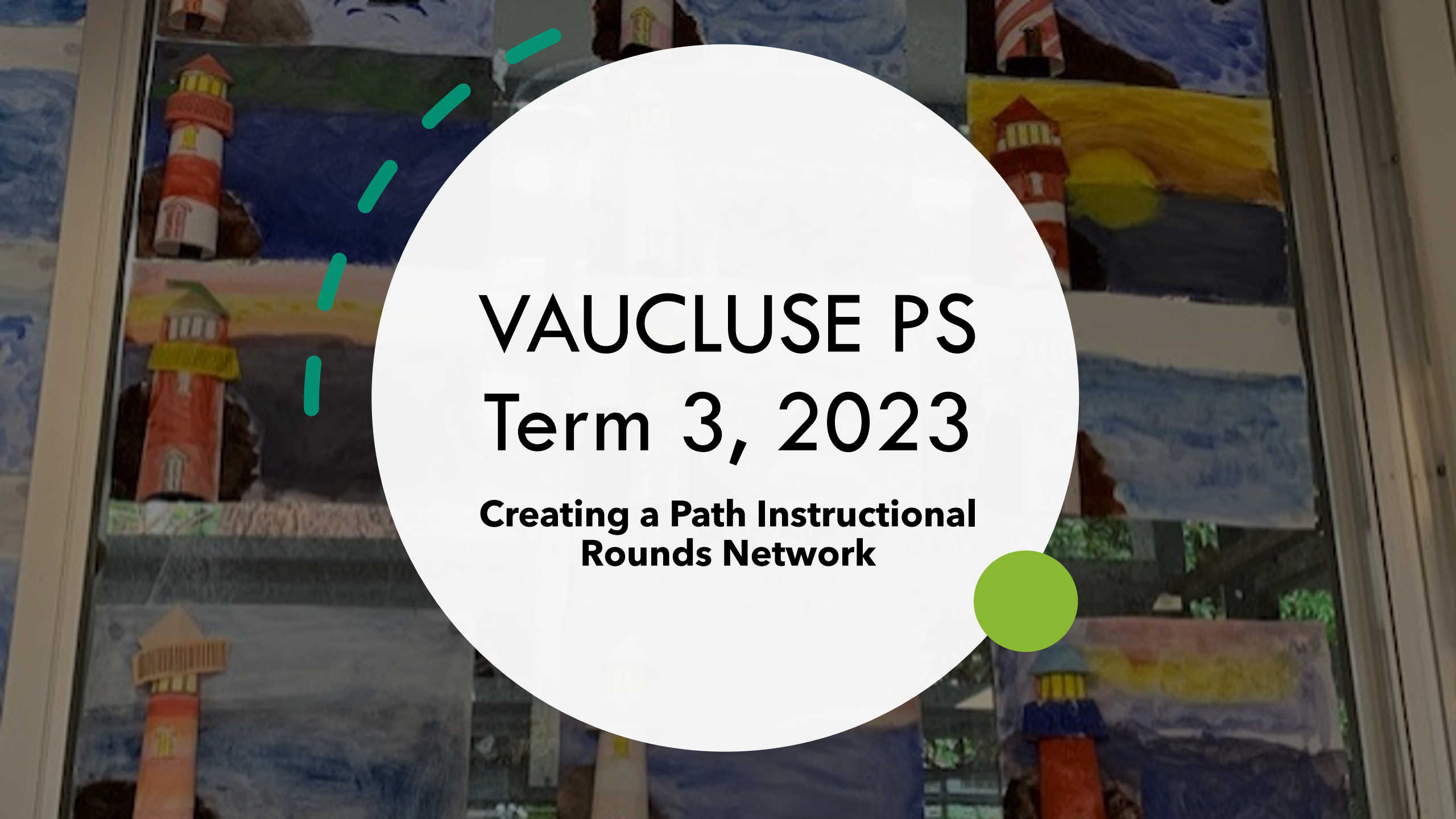


VAUCLUSE PS
Term 3, 2023

Creating a Path Instructional Rounds Network

The Power of Rounds

- Helps us all get a grip on what our theories of action look like in real time.

“I know this is what you hoped to happen,

but what is actually happening?”

The Power of Rounds

What is actually happening

in the interaction between teachers and students

in the presence of content.

Elmore said: “task predicts performance.”

Elmore would always say,

“If the students did exactly what the teacher asked them to do, what would they know and be able to do?”

He believed that those most proximate to the work should guide the work.

According to Elmore, *"We learn the work by doing the work."*

He pushed, "The practice of leadership requires suspension of judgment and evaluation.

It requires you to think in terms of growth and development and to be committed to the principal (person)" because "it has to be a learning enterprise in order to keep people engaged."

He reminds us:

That leadership relationships are a lot like real-life relationships.

"*There are rough spots, smooth spots, times when it feels very energizing, times when it feels a little bit threatening, and time when it feels bumpy,"*

Elmore said:

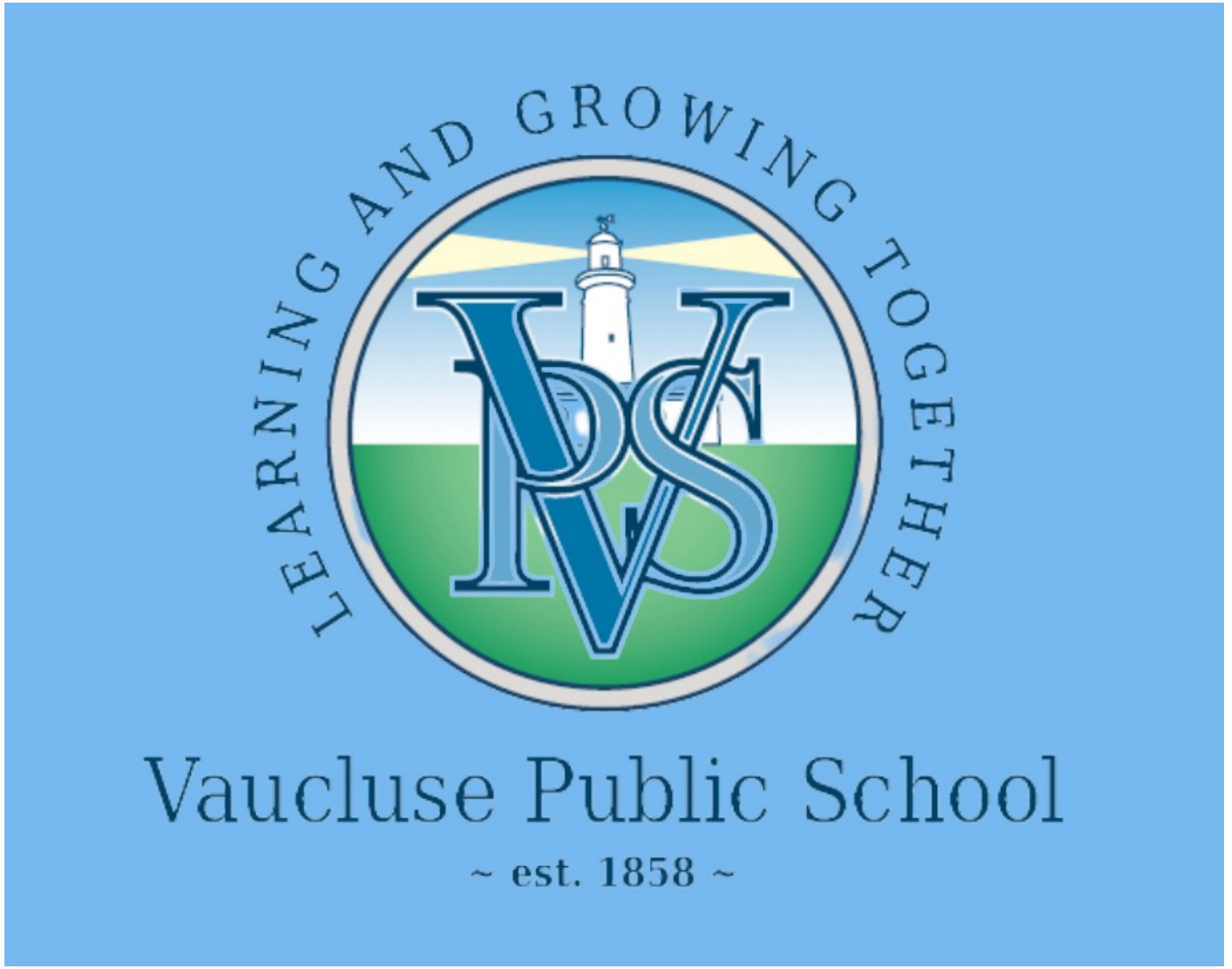
“If your ego is bound up in your prior success, you will struggle.

You need to be a learner.”

Elmore said:

“I don’t want to see you giving off–the–cuff, unsolicited advice and suggestions to teachers and leaders who are there every single day. Do you think you know more about their community than they do after you’ve visited for 30 minutes?”

BACKGROUND TO THE PROBLEM OF PRACTICE



VPS's Problem of Practice

Are we supporting our students to think mathematically?

- *Are children students talking about their learning?*
- *Are our tasks challenging and supporting learners?*
- *How is formative assessment used to elicit student thinking and move the learning forward?*

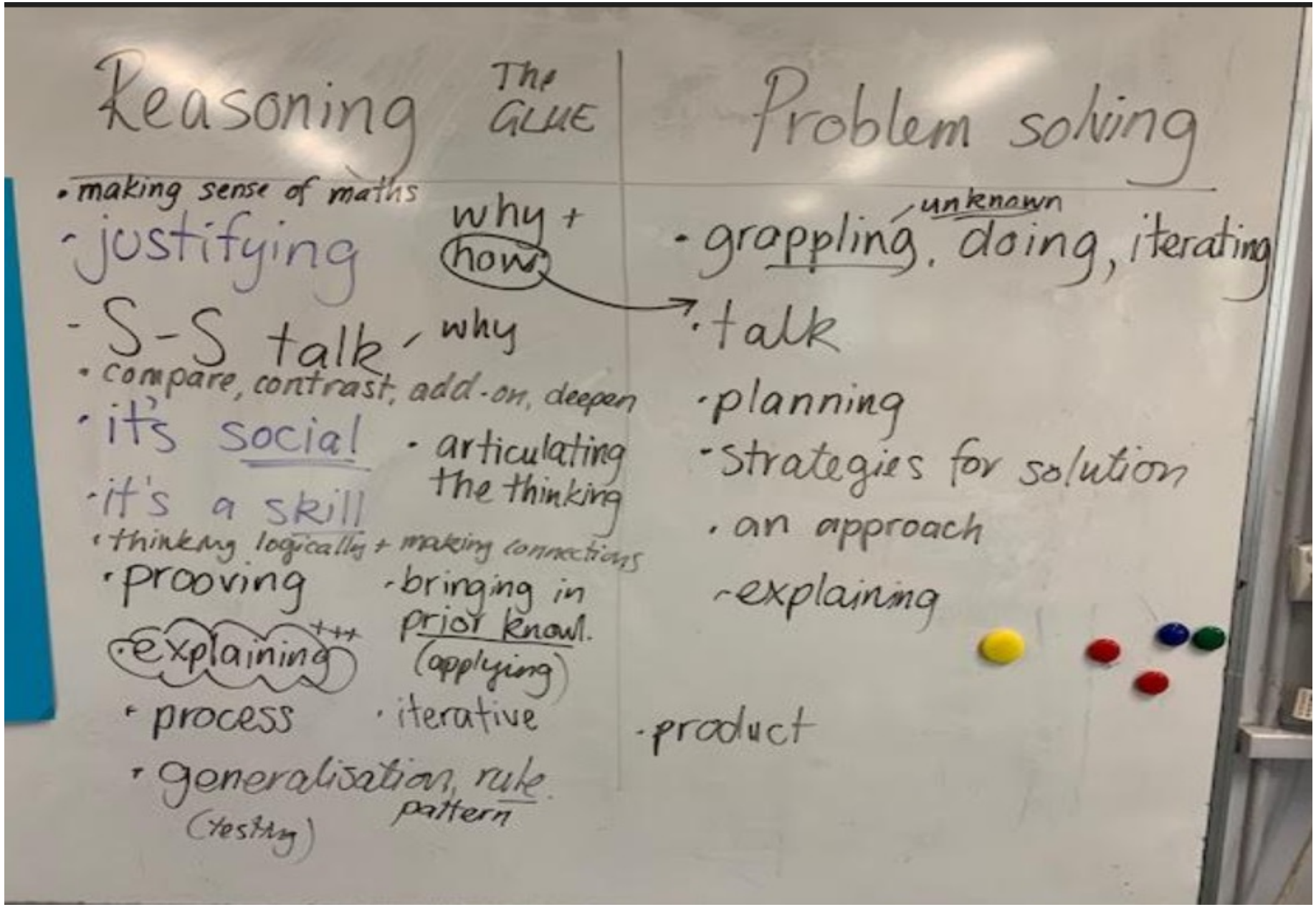
Five Practices for Orchestrating Productive Classroom Discussions

From the Burwood PD Round

- 1. Anticipating student responses prior to the lesson
- 2. Monitoring students' work on and engagement with the tasks
- 3. Selecting particular students to present mathematical work
- 4. Sequencing students' responses in a specific order for discussion
- 5. Connecting different students' responses and connecting the student responses to key mathematical ideas. (Smith and Stein, 2011)

Let’s get on the same page!

What is the difference between a student who is problem solving and a student who is reasoning?


Reasoning
The GLUE
Problem solving
• making sense of maths
- justifying
why + how
- grappling with unknown, doing, iterating
- S-S talk
- why
• talk
• compare, contrast, add-on, deepen
• it's social
• articulating the thinking
• planning
- strategies for solution
• it's a skill
• thinking logically + making connections
• an approach
• proving
- bringing in prior knowl. (applying)
- explaining
• explaining +++
• process
• iterative
- product
• generalisation, rule, pattern (testing)

Students formulate and **solve problems** when they use:

- use mathematics to represent unfamiliar or meaningful situations
- design investigations
- plan their approaches
- apply their existing strategies to seek solutions
- verify that their answer are reasonable.

Students are reasoning mathematically when they:

- explain their thinking
- deduce and justify strategies used and conclusions reached,
- adapt the known to the unknown, transfer learning from one context to another
- prove that something is true or false
- compare and contrast related ideas
- explain their choices.

Problem Solving and Reasoning

Problem Solving

Students develop the ability to

- make choices
- interpret
- formulate
- model and investigate problem situations
- communicate solutions effectively

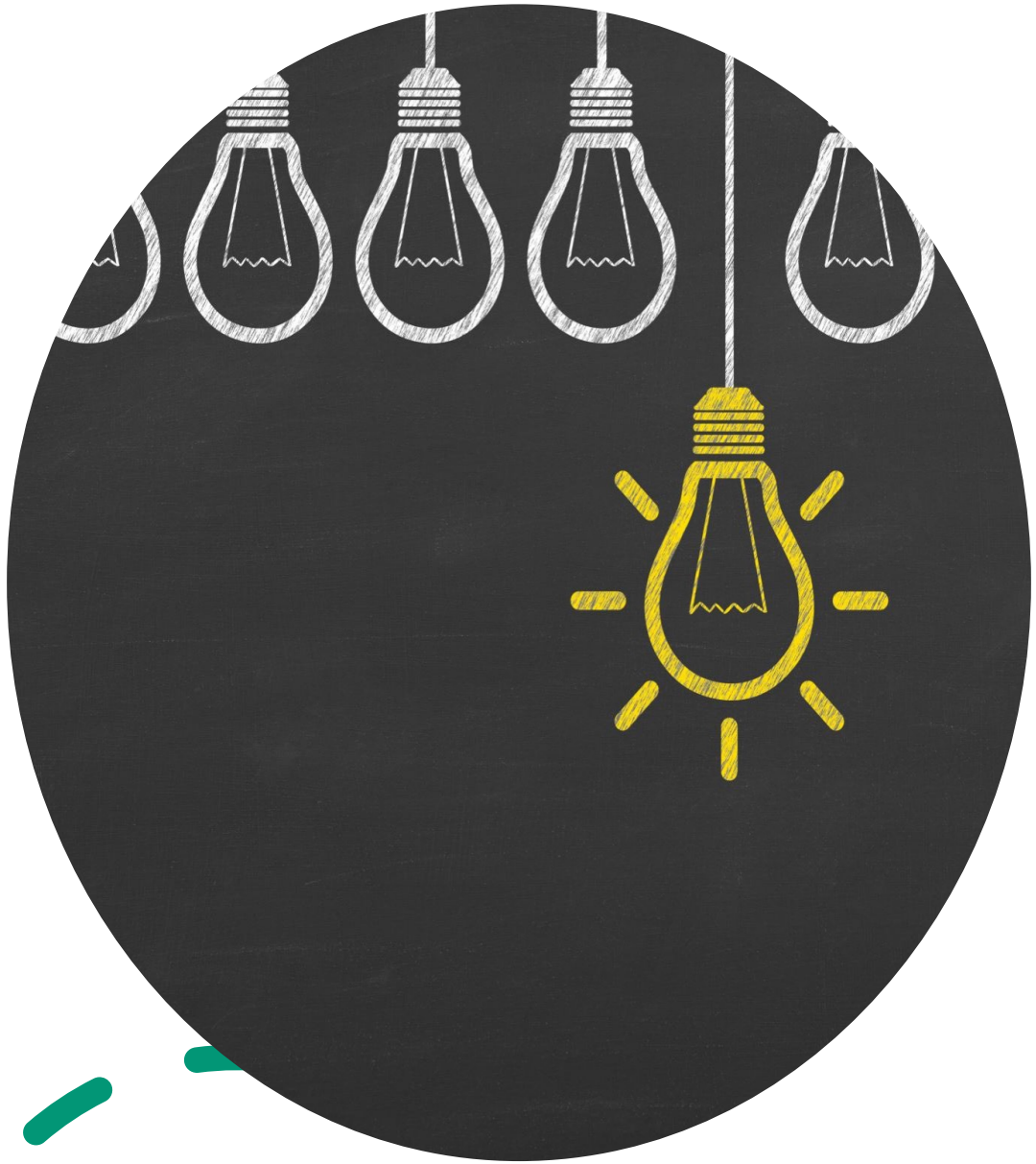
Reasoning

Students develop an increasingly sophisticated capacity for logical thought and actions, such as:

- analysing
- evaluating
- proving
- explaining
- Inferring
- justifying
- generalising

Key aspects of teaching reasoning

- Reasoning should be an **explicit** part of each lesson.
- Probing questions assist in promoting reasoning.
- Allow wait time for reasoning to occur.
- Reasoning is a social activity.



Learning Intentions

- Through engagement with the research and discussion we are deepening your understanding of teaching and learning mathematics particularly in relation to Vaucluse's PoP.

Success Criteria

Through your discussion and collaboratively developed “charts / posters” you will:

- Identify and justify some important concepts, key practices and behaviours (from the reading of your choice), that you would expect to see if learning and teaching supports students to think mathematically.
- Demonstrate connections you have made between the readings, discussion, your prior knowledge and VPS’s progress when interpreting their observation data.
- Plan an action related to the teaching and learning of mathematics you will take following the round and give reason for your choice.

What resource do you think might guide Vaucluse?

- What reading/ idea/ resource did you think would be helpful?
- What are its big key ideas? (be succient – 3- 5 points)

In a NUTSHELL

3 Big Ideas about the Practice

Design a picture, symbol or metaphor the practice

What the teachers' behaviours of the practice?

What are the students' behaviours of the practice?

Let’s do maths

questions to promote reasoning - Cartwright

Subtracting three-digit numbers

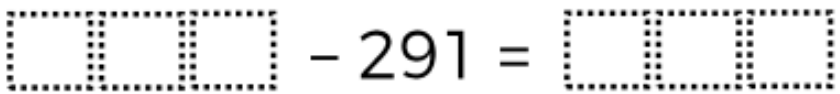
- **Problem One**

  Solve.

  $812 - 357 =$

Problem Two

Using the digits 1 to 9 at most one time each, fill in the boxes to make two sets of three-digit numbers that form a true number sentence. You may reuse digits for each set.



Problem Three

Using the digits 1 to 9 at most one time each, fill in the boxes to make a difference that is as close to 329 as possible.

□□□ − □□□ =

Problem 1

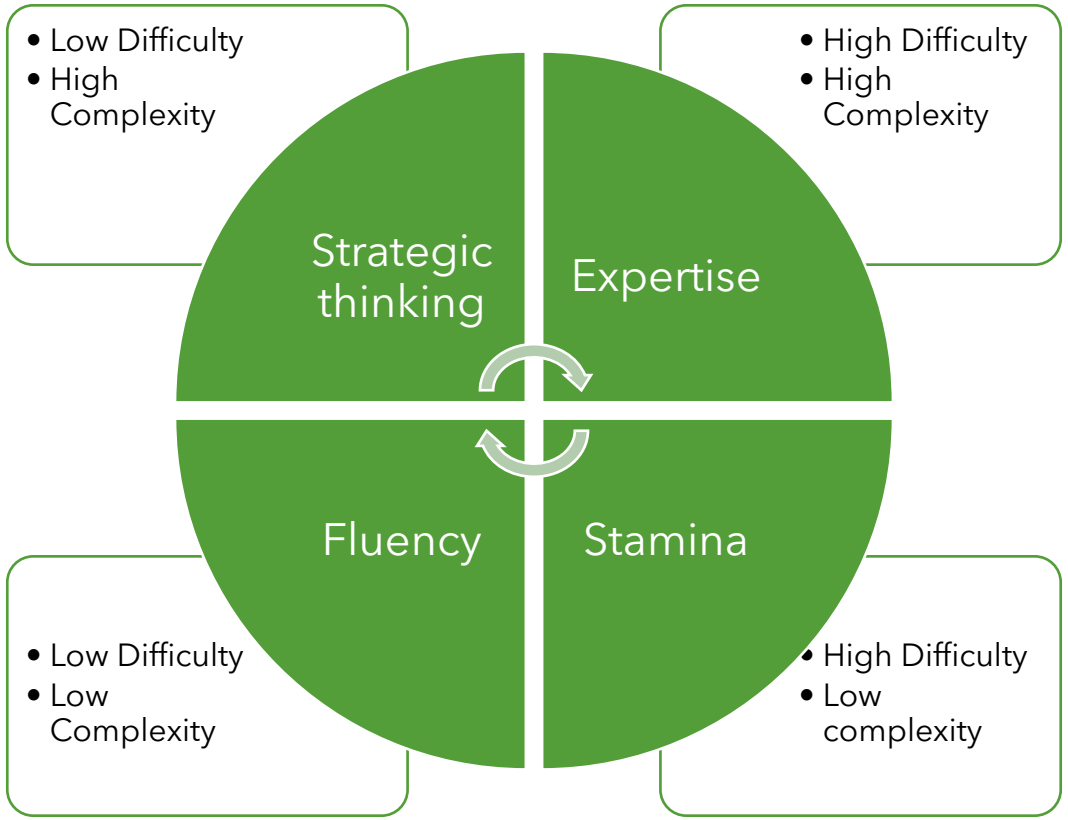
62% of Grade 3 students got it correct
36% got problem 2 correct
29% got problem 3 correct

Could give you false positive results
Problems 2 & 3 – variety of strategies to solve them.
Only the beginning and end are closed.

Was it difficult or complex?
Was it challenging?

- Difficult the amount of effort or work one must put in.
- Complex is the level of thinking, the number of steps, or the abstractness of the task.

More Complex



Easy

Hard

Less Complex

Levels of Demands

Lower-level demands (memorization): • reproducing previously learned facts, rules, formulas, definitions or committing them to memory • Cannot be solved with a procedure • Have no connection to concepts or meaning that underlie the facts rules, formulas, or definitions	**Lower-level demands (procedures without connections):** • are algorithmic • require limited cognitive demand • have no connection to the concepts or meaning that underlie the procedure • focus on producing correct answers instead of understanding • require no explanations
Higher-level demands (procedures with connections): • use procedure for deeper understanding of concepts • broad procedures connected to ideas instead narrow algorithms • usually represented in different ways • require some degree of cognitive effort; procedures may be used but not mindlessly	**Higher-level demands (doing mathematics):** • require complex non-algorithmic thinking • require students to explore and understand the mathematics • demand self-monitoring of one's cognitive process • require considerable cognitive effort and may involve some level of anxiety b/c solution path isn't clear

Leinwand, S., D. Brahier, and D. Huinker . *Principles to Action. Reston, VA*: National Council of Teachers of Mathematics, 2014 (pg 18)

How do tasks and teaching impact mathematics learning?

- Tasks with high cognitive demands are the most difficult to implement well, and are often transformed **into less demanding tasks during instruction** (Stein, Grover, and Henningsen 1996; Stigle and Hiebert 2004)

PRODUCTIVE STRUGGLE

Valuable student growth and learning won't come from struggle alone.

There is little purpose in persistence that yields no tangible benefits in increased knowledge, understanding, or skill.

But giving students an opportunity to struggle through a difficult problem with a clear learning goal in mind, combined with just enough stretch and strategic assistance, students can develop lasting connections about important ideas, increased capacity for productive struggle, and durable skills for solving novel problems in life.

Formative assessment is like the GPS.

1. Where are we going?

2. Where are we?

3. How are we getting there?