




BURWOOD PS

TERM 2 2023

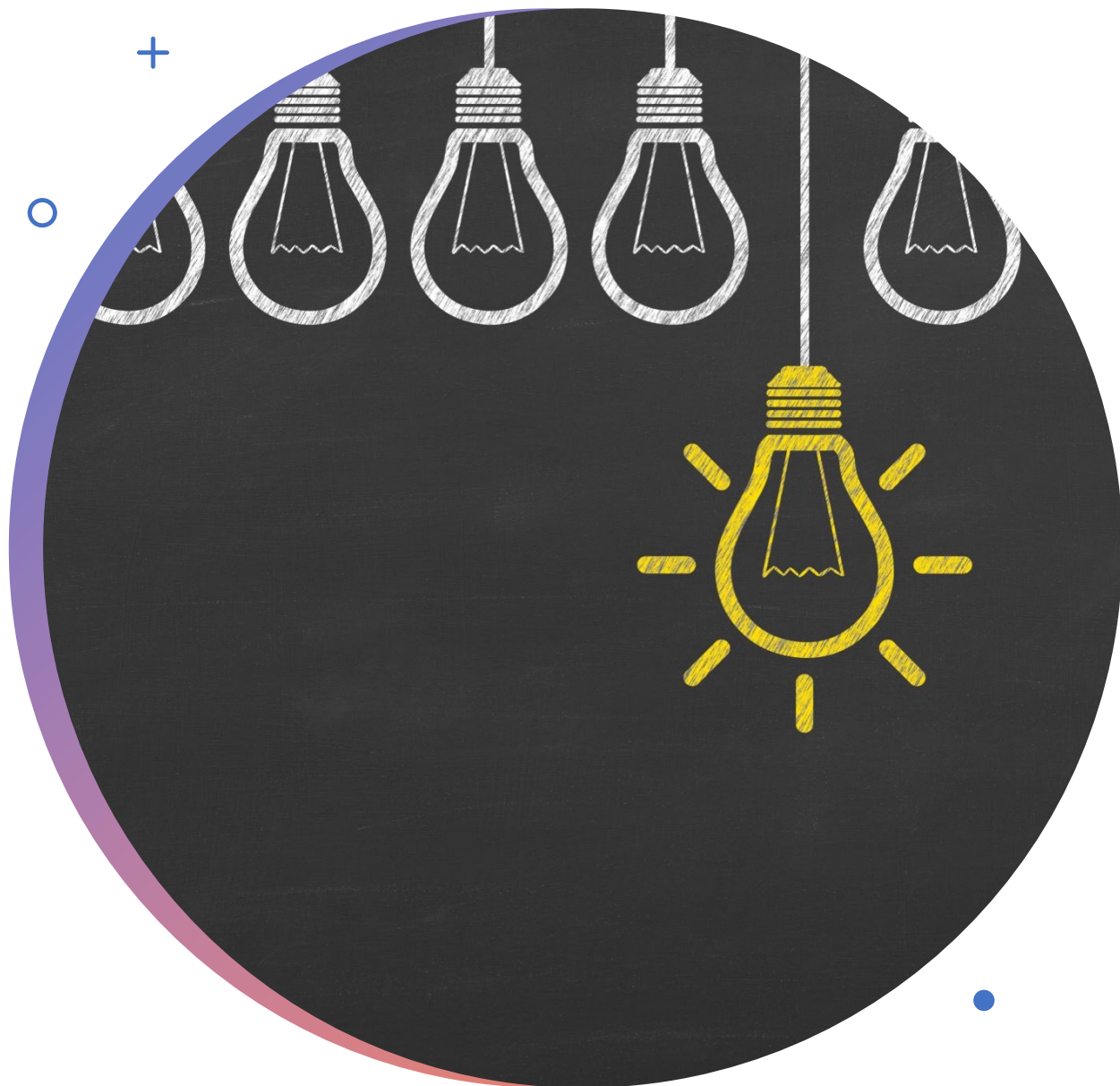
*Creating a Path Instructional Rounds
Network*





In Australia, mathematical systems have been developed over tens of thousands of years

Dr Tyson Yunkaporta, Senior Lecturer Indigenous Knowledges Deakin University



Learning Intentions

- Through engagement with the research and discussion we are deepening your understanding of the worthwhile maths lesson in relation to Burwood's PoP focus.

Success Criteria

Your collaboratively developed affinity maps will describe the most important elements and strategies you would expect to see if a maths lesson was worthwhile. You will:

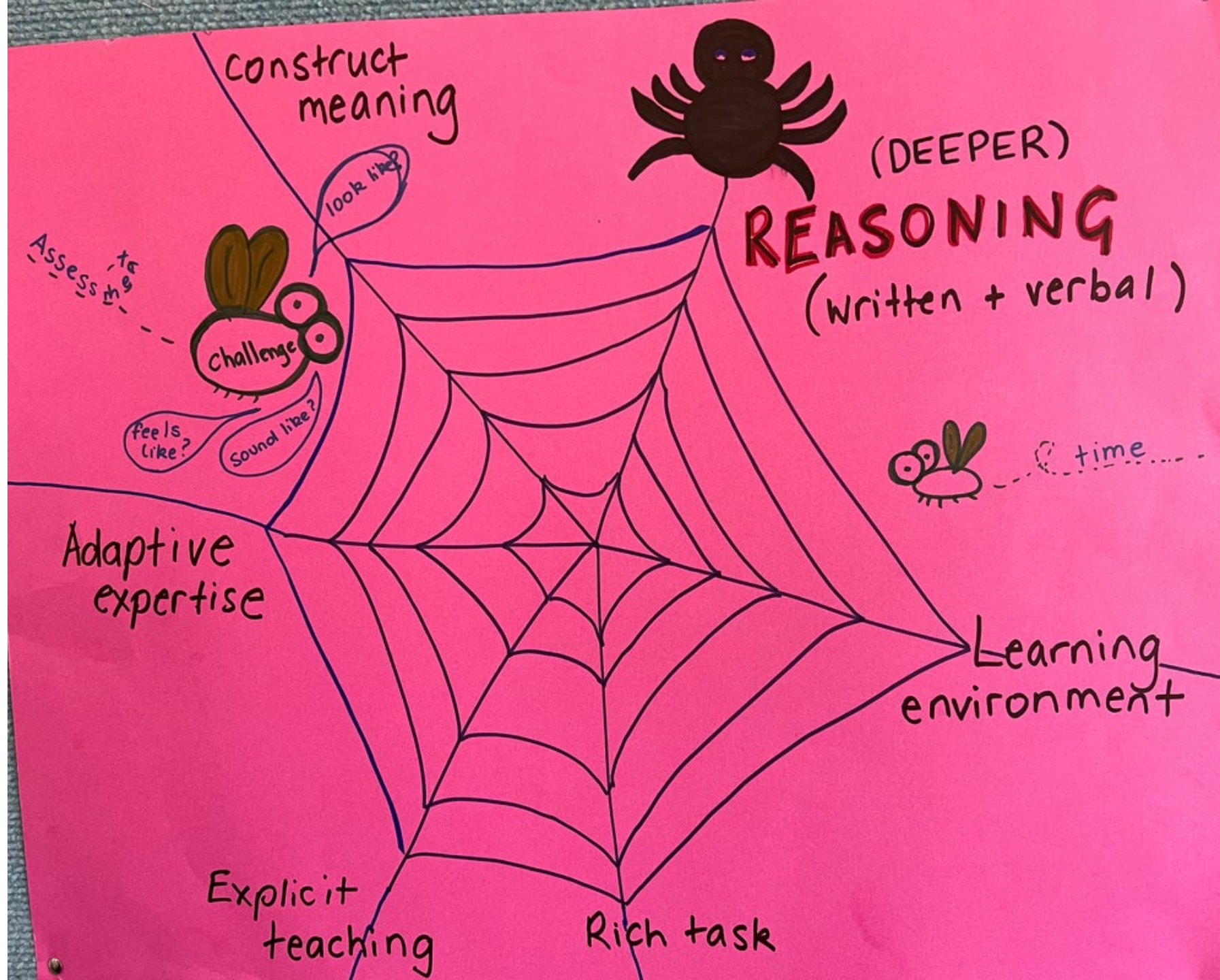
- Demonstrate connections you have made between the reading and your beliefs and experiences about the worthwhile maths lesson.
- Pose questions about the ideas that are still challenging or puzzling you about the PoP
- Articulate the effective strategies teachers can use to facilitate student reasoning

2022 Enfield's Problem of Practice

Are we supporting our students to think mathematically?

- Are students showing their mathematical thinking using the WM processes of reasoning, problem solving & communicating?
- Is our teacher questioning assessing and promoting mathematical thinking and reasoning?
- Are our tasks challenging and supporting all learners? Are students learning rather than doing?





planning

Before

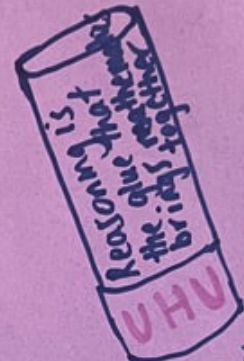
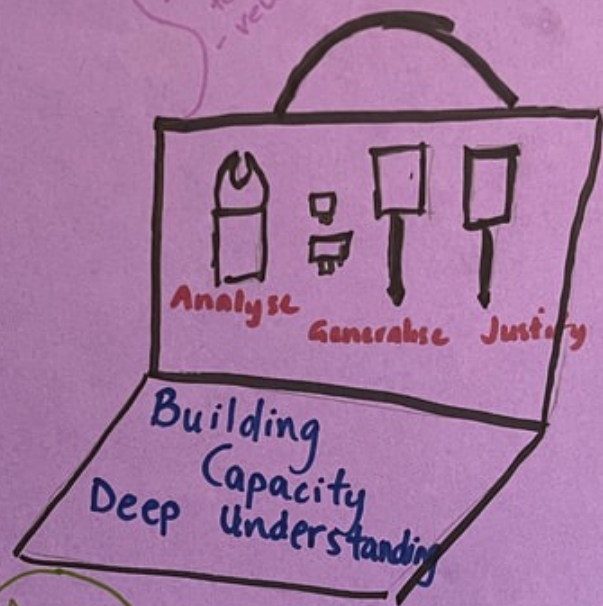


More than one way to get to the task

After

- Turn & Talk
- Think Pair Share
- ABC
- highlight a student doing it well.
- accountable talk
- voice

Reasoning and sense making go hand in hand



planning & embedding Questioning

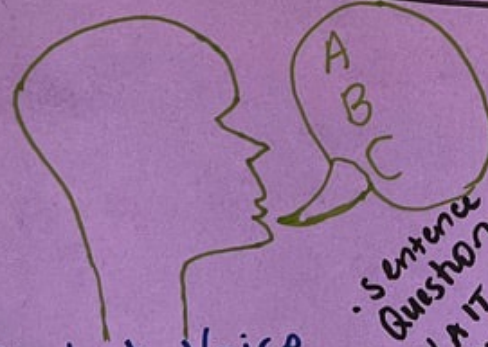
1. How did you work it out?
2. Why did you do it that way (Teacher prompt)

Do teachers + leaders...

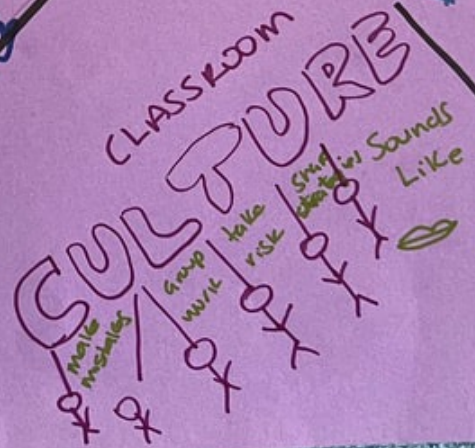
* Walls that teach

Looks Like

Student Voice



- sentence starters
- Question Prompts
- W A I T time
- How?
- Model it.
- class structures (Grouping)



Feels Like

- task design
- planning
- collaboration

FOCUSING QUESTIONS

Supporting students to do the cognitive thinking.

Lessen teacher talk to enable
DEEP LEARNING

How did that work?

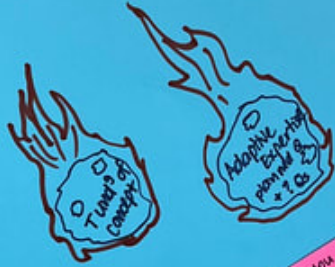
How is that connected to?...



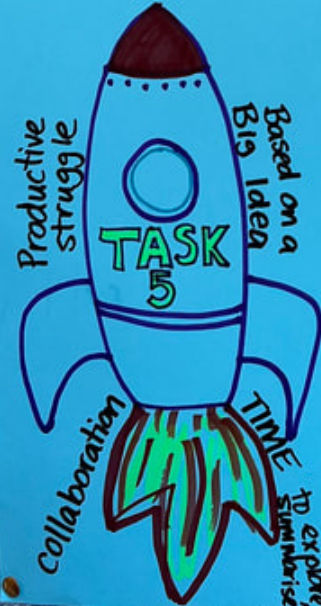
Can you justify your thinking...

What did you notice?

Can you say what _____ said? (revoicing)



Can you say what _____ said?



The teacher

Why/when.....?

The school
Whole school.



Productive struggle

Demands of being a mathematician.

Prompts and cues.

- show them where to look.
- What to see

Questioning
Funnelling
Focussing
Wait time

Phases of learning
1. Surface
2. Deep
3. Transfer

VISIBLE LEARNING
Mathematical Talk

BURWOOD TEAM

BACKGROUND TO THE
PROBLEM OF
PRACTICE



2. Can We Agree

Our teaching must be based on ongoing assessment

The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly.

David Ausubel

quodlibet

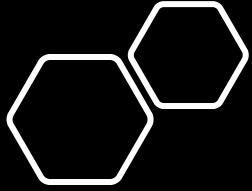
DYLAN WILIAM

FORMATIVE
ASSESSMENT

Minute-by-
Minute, Day-by -
Day

WHAT DO WE NEED?

- If educators are serious about using assessment to improve instruction, then we need more fine-grained assessments, and we need to use the information to modify instruction as we teach.
- Teachers need to pose effective questions and listen interpretively rather than evaluatively.
- Teacher questions should prompt students to think and/or provide teachers with information that so that they can adjust instruction to meet learning needs



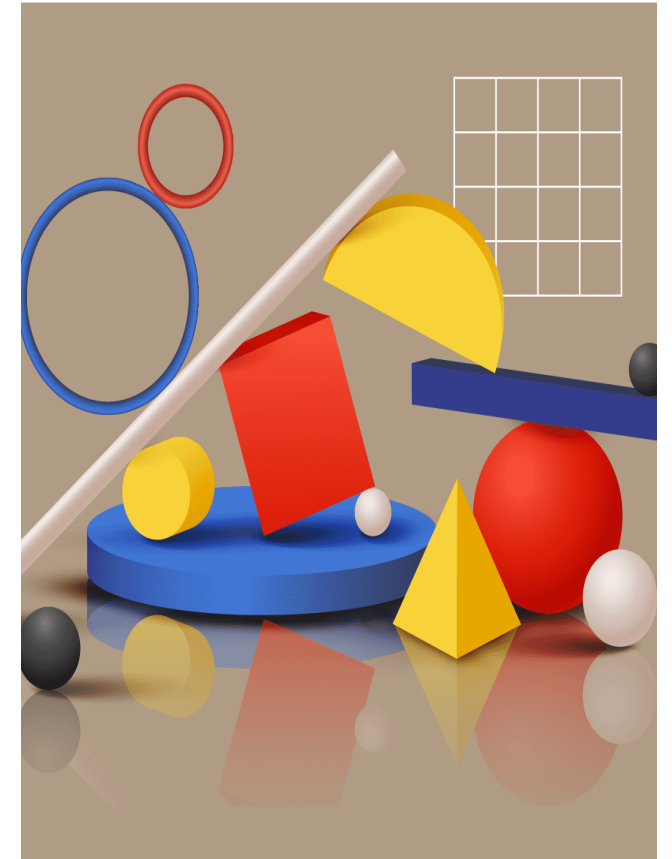
The “Model Minority”. US Research

- Teachers hold higher academic expectations for Asian students
- Teachers held higher expectations for Asian students’ future educational attainment
- Asian students were more likely to be referred by their teachers for “advanced placement”

Burwood's Problem of Practice

Are our mathematics lessons worthwhile?

- Are there opportunities for students to pose questions, solve problems, explain their thinking and use reasoning to justify their answers?
- Are teachers using effective strategies to facilitate students to reason?
- Who is carrying the cognitive load? Are the students learning or doing?



Let's get on the same page!

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



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:

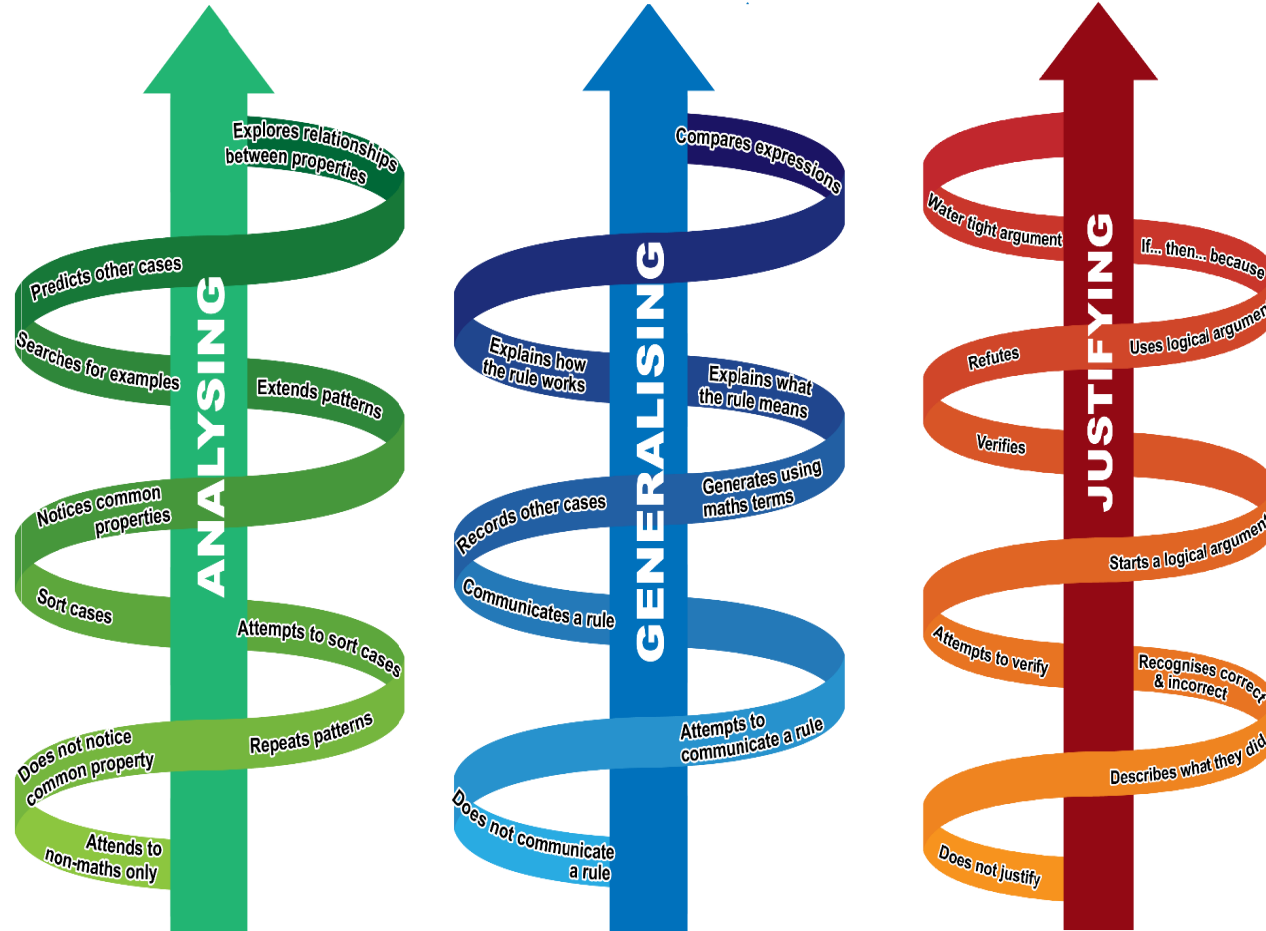
- analysing
- evaluating
- proving
- explaining
- Inferring
- justifying
- generalising



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.

Reasoning Trajectories



Peter Sullivan



Jo Boaler Mathematical Mindset (2016)

- Research shows that question asking is linked to high achievement – yet as students move through the grades they ask fewer and fewer questions.

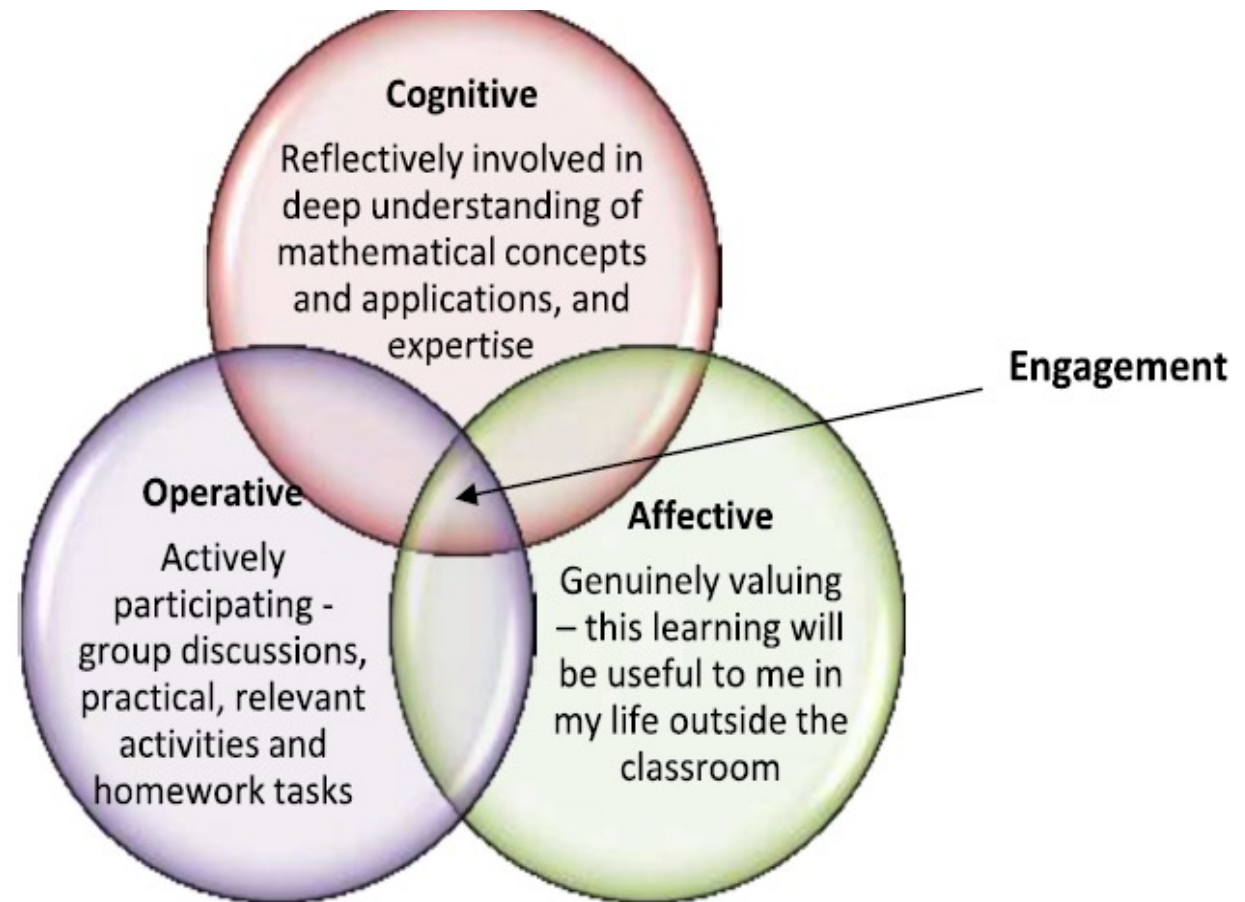


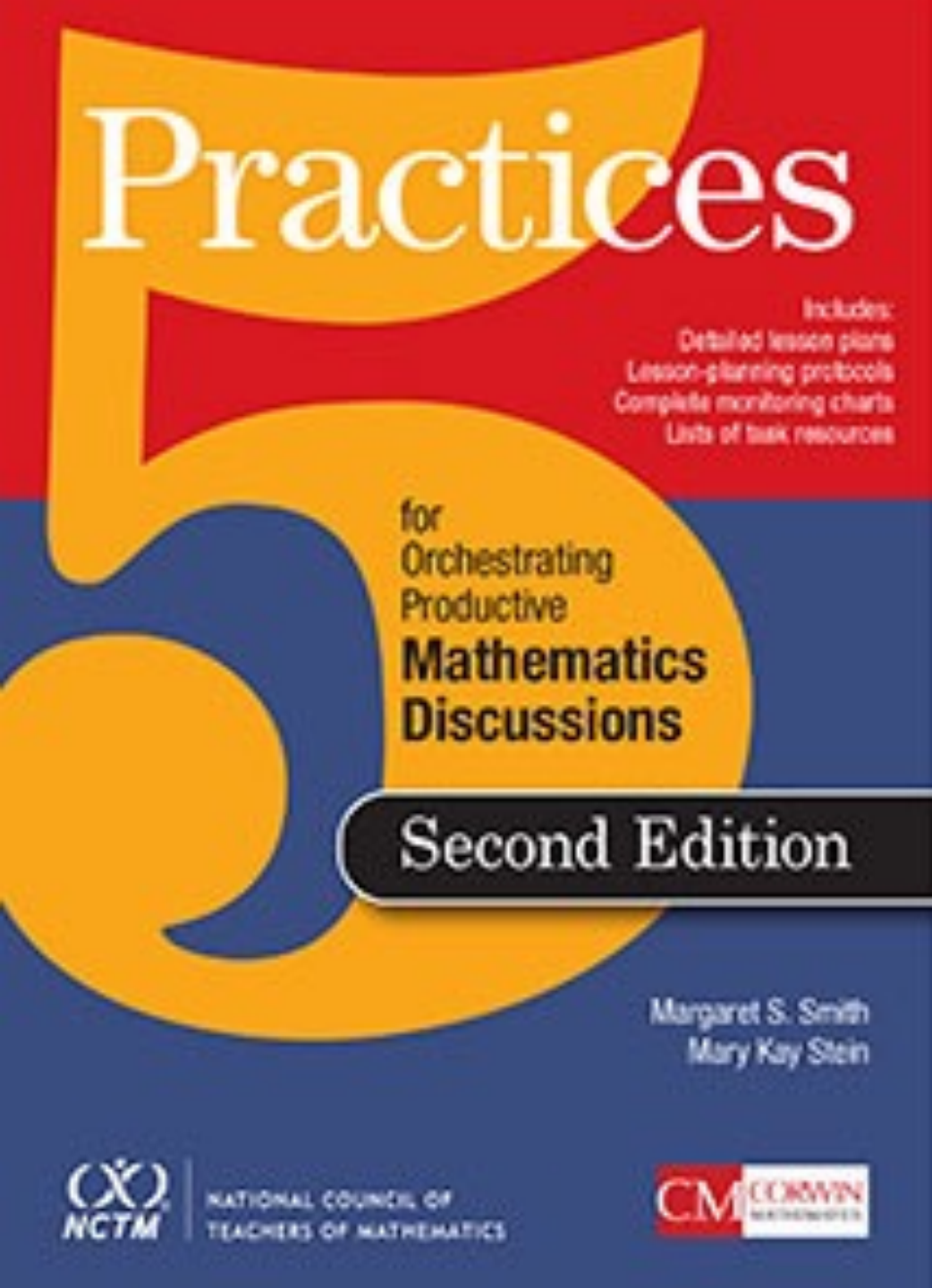
Think, Pair, Share



- Involving students in creating and representing mathematics
- Or
- Questions to promote reasoning.
 - Concepts: What key concepts or ideas do you think are important and worth holding on to from the text?
 - Challenges: What changes in attitudes, thinking, or action are suggested by the text, either for you or others?

FRAMEWORK FOR
ENGAGEMENT
WITH
MATHEMATICS
Catherine Attard





5 Practices for Orchestrating Productive Mathematics Discussions

Smith, Hughes, Engle,
Stein

GROUP JIGSAW ACTIVITY

If you truly wanted a maths lesson to be worthwhile?

**What would
you commit
to do?**

**What would
you resolve not
to do?**

WORTHWHILE LESSON

- Tied to a Curricular Goal
- Important lesson content
- Meets the need of students



What do worthwhile lessons include?

- **Learning Target (Learning Intention)**
- **Student Look Fors (Success Criteria)**
- **Performance of Understanding (task)**
 - **PoU that both teaches and formatively assesses**
 - **Students do, make, say or write something that they clearly develops their understanding whilst giving evidence of it?**
- **Feedback that feeds student learning forward**
- **Student self-assessment**
- **Effective questioning**

Student Questions

What are you learning ? LI

What helps you explain your maths
thinking/problem solving?

Are you a good mathematician? Why? (prompt - i.e.
what does a good mathematician do?)

Each observer asks only one student.