

Maths at St Nicholas

Primary Parent Workshop

Tim Unwin - MaST



The Project...

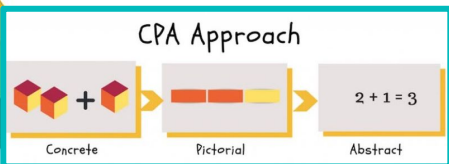
THE HOW

Mathematics Improvement Project (MaST project)

Catholic Schools Office, Diocese of Armidale

VISION: To raise student achievement in Mathematics in the Armidale Diocese through a system approach, based on high impact instruction and gradual release of responsibility, to improve the learning experiences for our students in Mathematics.

AIM: To raise student achievement in Numeracy and Mathematics through a system approach based on high-impact instruction and gradual release of responsibility, to improve learning experiences for our students in Mathematics.



Strengthen mathematical knowledge

KNOW YOUR CONTENT

A DEEP FOCUS ON MATHEMATICAL KNOWLEDGE AND SKILLS BEYOND THE CONTENT IN THE SYLLABUS

Strengthen curriculum knowledge

KNOW YOUR SYLLABUS AND PROGRAM EFFECTIVELY

A DEEP UNDERSTANDING OF THE K-10 SYLLABUS ACROSS ALL STRANDS AND ALL STAGES TO SUPPORT PLANNING FOR A RESPONSIVE AND DIFFERENTIATED LEARNING ENVIRONMENT

Strengthen pedagogical knowledge

STUDENTS LEARN THROUGH A GRADUAL RELEASE OF RESPONSIBILITY

EFFECTIVE MATHEMATICS TEACHING & LEARNING INCORPORATING THE GREAT MATHEMATICS SEQUENCE, SUPPORTED BY POWERFUL ASSESSMENT & FEEDBACK WITH PLTs FOCUSING ON REFLECTION



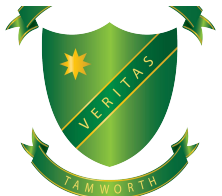
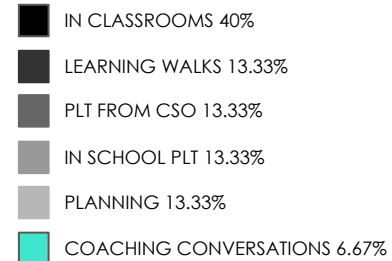
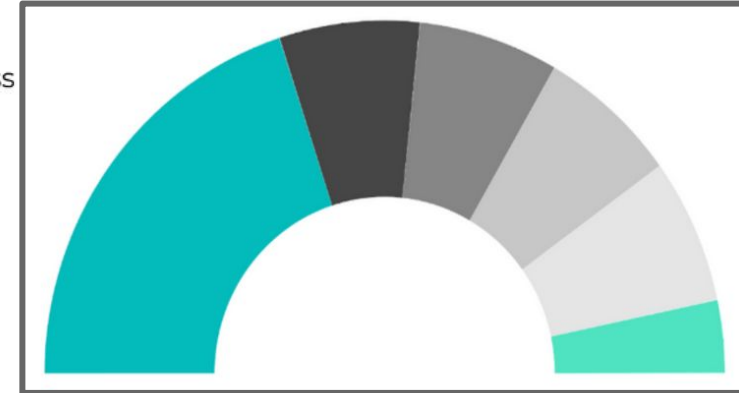


MATHEMATICS SPECIALIST TEACHER (MaST)



- Is selected according to their skills & knowledge of Mathematics and effectiveness in leading the Project in their school;
- Enhance mathematics teaching and learning in the school by developing and sustaining a culture of continued improvement in the teaching and learning of Mathematics;
- Build teacher capacity by implementing the Great Maths Learning Sequence;
- Models lessons and co-teaches in the classroom;
- Complete regular Learning Walks with the leadership team;
- Lead PLTs and disseminate information and knowledge from Professional Learning.
- Unpack each mathematics unit of work to ensure teachers have a deep understanding of the content and skills to be learnt in the targeted outcomes.
- Analyses data with staff and apply the analysis to direct learning.

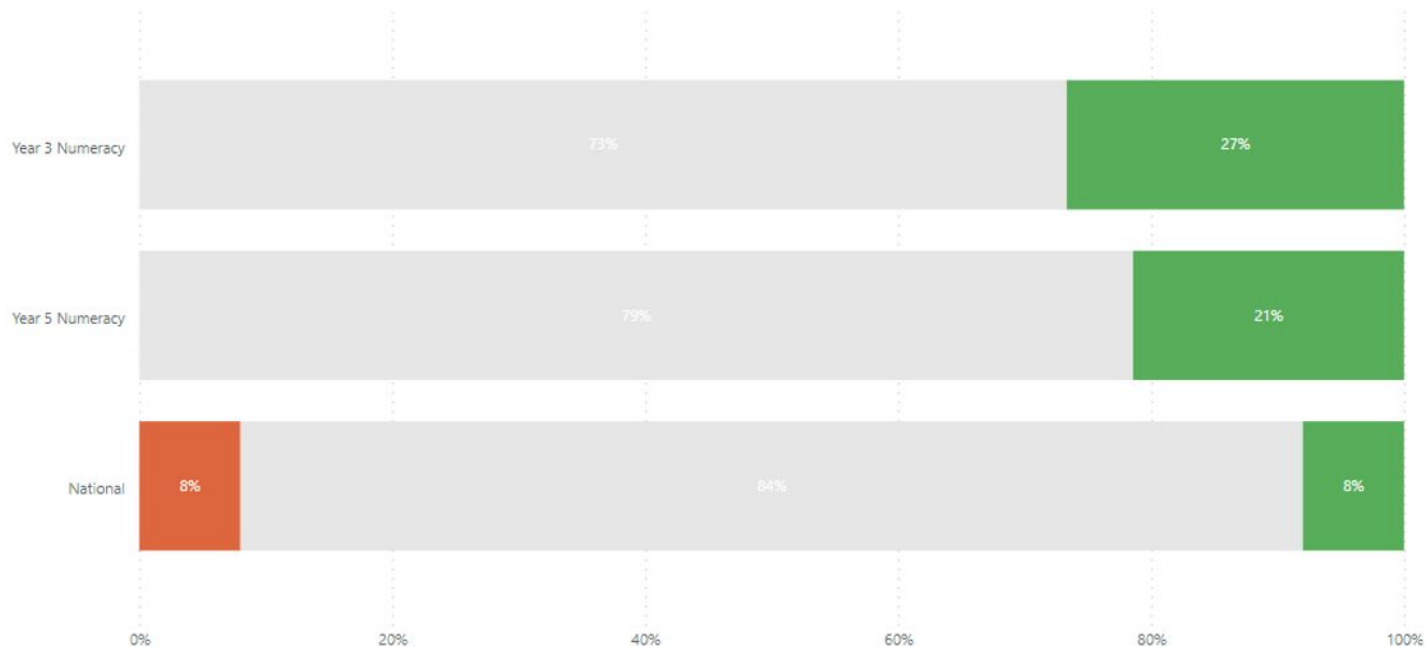
BREAKDOWN OF MAST ALLOCATION PER WEEK



CSO Armidale Outperforms Students with Similar Backgrounds in NAPLAN Year 3 Numeracy and Year 5 Numeracy

Selected System Average when Compared to Students with a Similar Background

Category ● Below ● Close To ● Above



WALT and WILL

WALT: Understand the concept of “reasoning” in mathematics

WILL: I can identify strategies to assist building mathematical reasoning for my child.



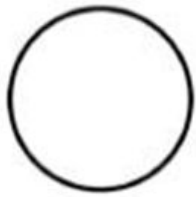


Figure 1. Which of these shapes is the odd one out?

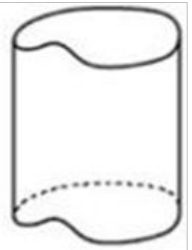
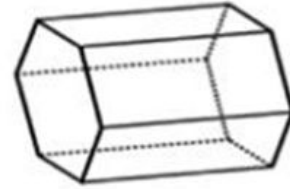
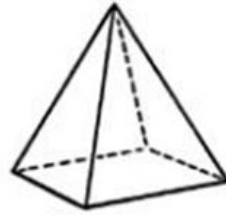


Figure 2. Which of these 3-D objects is the odd one out?

For each, justify your answer.

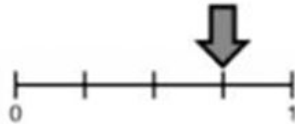
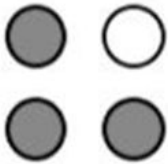


Figure 3. Which of these is the odd one out?

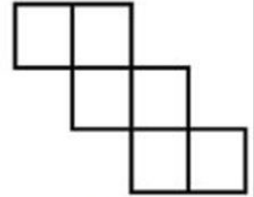
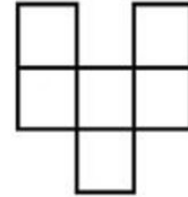
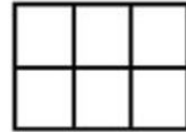


Figure 4. Which of these shapes is the odd one out?



What is mathematical reasoning?

1. Reasoning involves thinking logically about relationships, both spatial and quantitative.
2. The capacity to think logically about the relationships among concepts and situations. Reasoning stems from careful considerations of alternatives, and includes knowledge of how to justify the conclusions.
3. The process of manipulating and analysing objects, representations, diagrams, symbols or statements to draw conclusions based on evidence or assumptions. It reflects genuine understanding of ideas or concepts and makes mathematical ideas 'feel' clear, logical, valid and obvious.



Implications for teachers

The 'Working Mathematically' outcome is no longer reported on independently, instead students are required to demonstrate these skills within each focus area of the curriculum.

[NESA Working Mathematically Outcome](#)

[Expanding on Working Mathematically](#)



Explaining \neq Reasoning

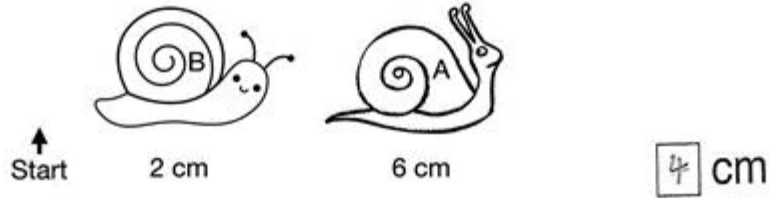
To demonstrate reasoning, a student would explain WHY their approach can solve a problem. It draws on an understanding of the relationships in a mathematics problem.

\neq

Explaining an answer involves describing the steps of a procedure a student followed to achieve the answer.



Q1. These two snails started from the same place. They travelled in the same direction. Snail A went 6 cm. Snail B went 2 cm.



Correct answer,
but no reasoning

How far apart are the two snails?

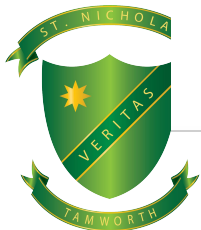
Q1. These two snails started from the same place. They travelled in the same direction. Snail A went 6 cm. Snail B went 2 cm.



Evidence
provided
to justify
response

How far apart are the two snails?

Supporting reasoning with number line diagrams



Sample question - What else belongs

36

12

18

- These numbers belong together because
- Other numbers that belong with this group are ...
- How do you know that all these numbers belong and fit with your reason? Use words, numbers or drawings to explain.



Questioning strategies for supporting reasoning

Use **enabling** prompts: (what to ask to build this skill)

- How do 6 and 8 belong together?
- How do 12, 18 belong together?
- List what you know about the number 36 [or 12 or 18].
- Can you think of three numbers that are...
[even/multiples of 3].



Use **extending** prompts:(what to ask to extend this skill)

- Is it always true? Is it true for all ... [numbers /shapes]?
- What happens in general?
- What is the rule?
- Is that ... (pattern) always going to work?
- What if...?





OUR REASON

These numbers belong together because ... they are all even numbers
and from the threes counting pattern

Other numbers that belong with this group are ...

3, 6, 9, ~~12~~, 15, ~~18~~, 21, 24, 27, ~~30~~ ✎
2, 4, 6, 8, 10, ~~12~~, 14, 16, ~~18~~, 20, 22, 24, 26, 28, ~~30~~

How do you know that all these numbers belong and fit with your reason? Use words, numbers or drawings to explain.

GENERALISING: Communicates a rule about a *property* using words.

GENERALISING: Extends the number pattern using an example to explain how the rule works.
Explore two rules – even numbers and counting patterns.

ANALYSING: Notices more than one common property by systematically generating further cases and/or listing and considering a range of known facts.
Even numbers and 3s counting pattern.

JUSTIFYING: Verifies truth of statements by using a common property, rule or known facts that confirms each case. May also use materials and informal methods.
Identifies each number from the group in the '2s' and '3s' counting patterns.

ANALYSING:
Consolidating
GENERALISING:
Developing/
Consolidating
JUSTIFYING:
Consolidating
Teacher Prompt
Is there another reason that these numbers could fit together in a group?
What do you notice about the numbers in the two groups that you have made?



Top tips

- Keep questions open
- Ask for more - we want justification
- ‘How do you know’ is a great starter to encourage thinking
- Think about what we’re encouraging *“I really like the way you explained your thinking”* vs *“That is a clever answer”*

