UNIVERSITY OF CAMBRIDGE

The Language of Mathematical Problem Solving, Reasoning and Fluency

26 February 2019
Tower Hamlets CPD Centre

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2018-19 Project Overview

Developing mathematical language through the three aims.

13 Nov and 13 Dec – Problem Solving
29 Jan, 26 Feb and 2 Apr – Reasoning
25 June – Fluency

nrich.maths.org/towerhamlets2018

Tasks to talk about

Ken Kens
Poly Plug Rectangles (**7511**)
The Remainders Game (**6402**)
and
What's It Worth? (**1053**)
…now called
Different Deductions (**14164**)

Sentence starters

I think this because…
If this is true then…
I know that the next one is … because…
This can't work because…
When I tried… I noticed that…
The pattern looks like…
All the numbers begin with…
Because… then I think…
It will never work because…

Reflecting on classroom experiences

- What went well?
- Were there any surprises?
- What would you do differently next time, or what additional guidance would you give to a colleague?

Looking to learn

How did you go about the checking?

Progression in reasoning

Describing
Explaining
Convincing
Justifying
Proving

Amy's Dominoes (1044)

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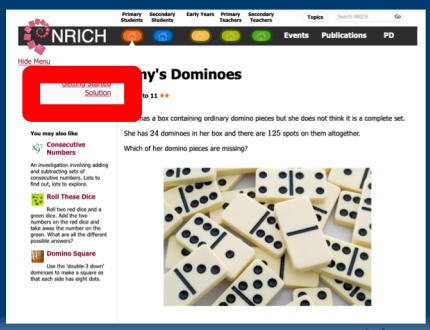
Amy has a box containing ordinary domino pieces but she does not think it is a complete set.

She has 24 dominoes in her box and there are 125 spots on them altogether.

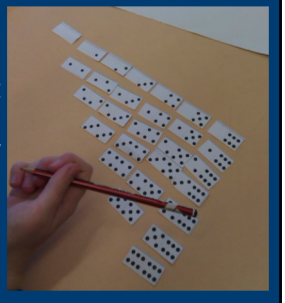
Which of her domino pieces are missing?

Amy's Dominoes solutions (1044)

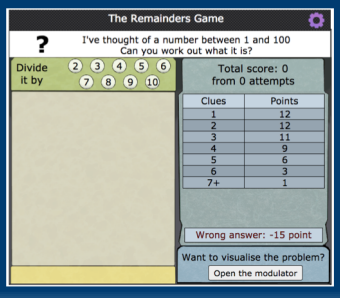


Lyneham Primary solutions

Each group used a complete set of paper dominoes to learn about the system of numbers on the dominoes (barely any students had played dominoes). It didn't take them long to lay it out in the photo shown.

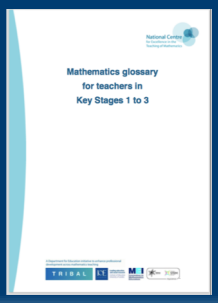


The Remainders Game (6402)

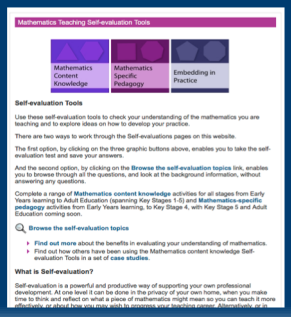


- Read for understanding first – does the description make sense, do you have questions?
- If you understand what they're saying, does their explanation make sense also? What questions do you have?
- Are you convinced or do you have questions/things you'd like to draw attention to?
- Are you seeing evidence of a completely sound logical progression of argument, without any 'holes'?

Multi-choice misconceptions



NCETM Mathematics teaching self-evaluation tools



Hundred Square (2397)

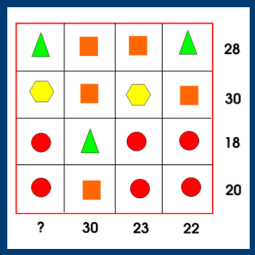
A hundred square has been printed on both sides of a piece of paper. One square is directly behind the other.

What is on the back of 100? 58? 23? 19?
Can you see a pattern?

Different Deductions (14164)

Each symbol has a numerical value. The total for the symbols is written at the end of each row and column.

Can you find the missing total that should go where the question mark has been put?

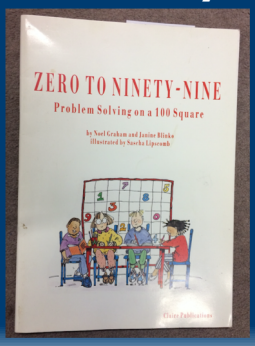


Getting the best out of rich tasks – where next?

Making the most of opportunities

People maths

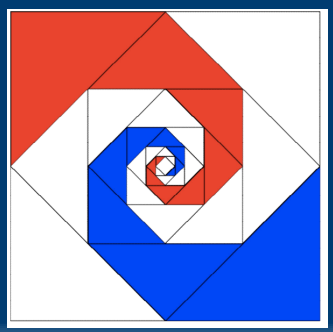
Zero to Ninety-Nine



Plan for dissemination

After	Trialling NRICH tasks with:
Day 1	Your own class
Day 2	Your own class + 1 other
Day 3 (and before Day 5)	Colleagues (staff meeting input + feedback/reflections)
Day 5	Participate in NRICH Webinar 11th June &/or submit solutions to a live task

Baravelle (6522)



Reasoning feature (11018)

Hundred Square
Amy's Dominoes

Poly Plug Rectangles
Which Scripts?

Teacher takeaway

- Try a task from today in your setting, invite a colleague to do so too and then talk about the outcomes
- Contribute to a staff meeting and conduct a reasoning walk (evidenced with pictures where possible)
- Read "Reasoning: the Journey from Novice to Expert" article (11336)
- Optional reading (very short) "Reasoning: Identifying Opportunities" (10990)

Please be prepared to discuss all the above on Day 5

References

Blinko, J. and Graham, N. (1989). *Zero to Ninety-Nine: Problem solving on a hundred square*. London: Claire Publications.

National Curriculum Glossary available on the NCETM website https://www.ncetm.org.uk/public/files/17308038/

National Numeracy Strategy in Cumbria 100 ideas for using a hundred square (see link on www.nrich.maths.org/towerhamlets2018)

NCETM Self-evaluation tools https://www.ncetm.org.uk/self-evaluation/