Research project reminder

Please do contact Ems Lord on ell35@cam.ac.uk if your school would like to participate.

Current visits are planned for the 25th and 26th February.

1

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Going deeper to develop whole class reasoning

4 February 2020
Tower Hamlets CPD Centre

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2

2019-20 Project overview

Going deeper to develop whole class reasoning.

9 Oct – setting the NRICH scene
26 November, 4 February, 17 March, 19 May and 23 June

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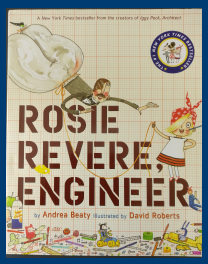
3

Rosie Revere by Andrea Beaty



4

Tasks to talk about

Sealed Solution (1177)
100 Square Jigsaw (5572)
Robot Monsters (2404)
Poly Plug Rectangles (7511)

5

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?

6

Sentence stems

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…

7

Amy's Dominoes (1044)

8

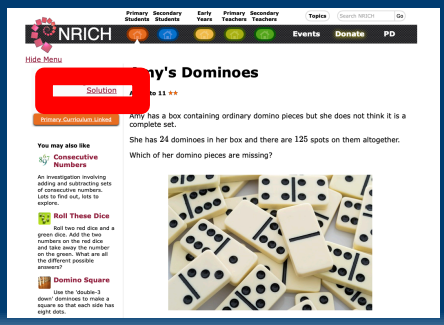
Amy's Dominoes (1044)

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?

9

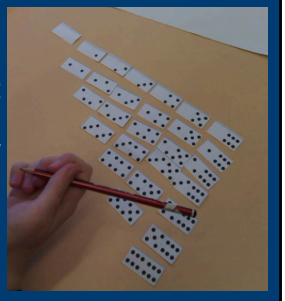
Amy's Dominoes solutions (1044)



10

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.



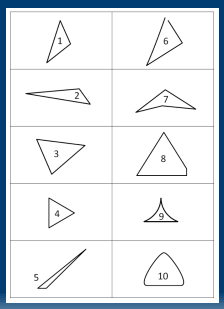
11

Progression in reasoning

Describing
Explaining
Convincing
Justifying
Proving

12

Triangle or No Triangle? (14041)



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13

Dissemination feedback

You chose an option from the following:

- A handout for staff
- 10mins input at a team meeting/staff meeting
- Meeting with a parallel colleague in your phase/year.

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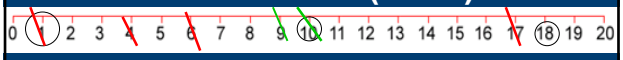
14

Strike it Out (6589)



6 + 4 = 10

10 take away 9 makes 1

1 add 17 is 18

18……

Competitive aim – stop your partner from going

Collaborative aim – cross off as many as possible

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15

Exploring Proof

Is it possible to create a string of number sentences that uses all the numbers on the:

0-20 number line?

1-20 number line?

Any number line with a set of consecutive whole numbers?

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16

0-20 number line

If zero is included in the number sentence then all three numbers are not distinct.

This is true whether you use addition or subtraction in your number sentence.

This does not obey the rules of the game.

Therefore, on 0-20 number line we cannot ever use up all the numbers.

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17

1-20 number line

The first number sentence uses up three distinct nos.

The second number sentence uses up 2 new nos.

The third number sentence uses up another 2 new nos.

The total number of numbers used so far is 3+2+2 = 7.

Each subsequent number sentence will use 2 more new nos.

Therefore, the total number of numbers used will go up in twos from seven.

The 1-20 number line has 20 numbers on it.

Going up in 2s from 7 we will never get to 20 exactly – only 19 or 21.

Therefore, it is impossible to use exactly all the numbers on the 1-20 number line.

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18

Any number line

The first number sentence uses an odd number of distinct nos.

Each subsequent number sentence uses an even number of distinct new nos.

Odd + any number of even numbers is always odd.

Therefore, the total number of numbers used is always odd.

Therefore, we will never be able to use all the numbers on any number line that has an even number of consecutive distinct numbers on it.

However, this does not prove that we can always use all the numbers on a number line with an odd number of consecutive distinct numbers.

We only know that we have the correct number of numbers to make it a possibility but not a certainty.

This does not give us any insight into the individual number sentences and the order in which the numbers need to be used.

19

Stringy Quads (2913)

Try to make a quadrilateral which has exactly one line of symmetry.
Is it possible?
How could you convince someone else that your shape has just one line of symmetry?
Can you make any other quadrilaterals with just one line of symmetry?

Try again, but this time answer the same questions for a quadrilateral with exactly two lines of symmetry … exactly three lines of symmetry … exactly four lines of symmetry.

20

Teacher Takeaway

- Try a task from today in your setting including using published solutions in some way (and bring artefacts/notes to discuss next time how this went) id12940
- Jot down some things in your journal about the task you tried and things you noticed
- Plan for your second dissemination method
- Read Mark Chubb's blog post (see next slide for link)

21

References

Browning, J. and Meirick, C. (2019) Different Types of Shape and Nonexamples to Spark Geometric Learning https://earlymath.erikson.edu/using-different-types-of-shapes-and-nonexamples-to-spark-geometric-learning/

Mark Chubb's blog post https://buildingmathematicians.wordpress.com/2019/10/28/an-example-of-teaching-through-problem-solving/

Ruthven, K. (1989) 'An Exploratory Approach to Advanced Mathematics' *Educational Studies in Mathematics* **20** 449-467

James Nottingham's 'Learning Pit' see https://www.jamesnottingham.co.uk/learning-pit/

Wigley, A. (1992) 'Models for Teaching Mathematics' *Mathematics Teaching* **141** 4-7 (copy available here: https://nrich.maths.org/content/id/7768/Models.pdf)

22