

Leadership for Learning Project 2017-18

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Tower Hamlets CPD Centre

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Welcome to Day 3

Straight to the take-away tasks.

- Noticing
- Wondering
- Reflecting

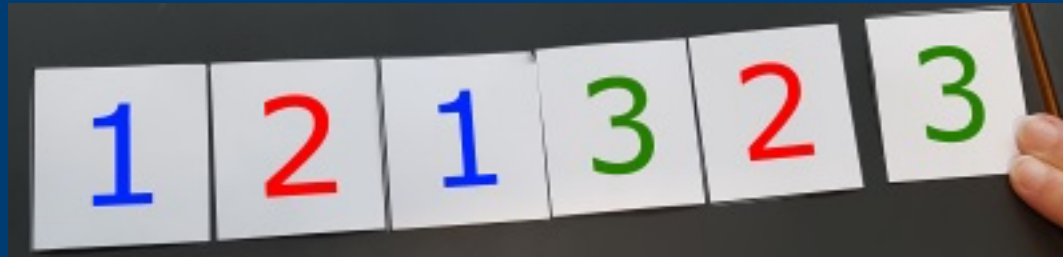


Teacher Takeaway

1. Try Number Sandwiches (522)
2. Try Which Scripts (774) **and/or** Reach 100 (1130)
3. Use your rubric to assess the tasks
4. Reflect on your assessment
5. Bring your completed rubrics to Day 3 along with any reflections/evidence you would like to.



Sandwiches (522)



Is it possible to rearrange the digits to have three digits between the pair of 3s as well as two digits between the 2s and one digit between the 1s?



Which Scripts? (774)

There are six numbers written in five different scripts.

Can you sort out which is which?

Can you write 51 in each script?

Can you name the scripts?

Do you know any other scripts?



Reach 100 (**1130**)

Draw a grid like this

5	2
1	9

Write a digit in each box

This gives four two-digit numbers

How many solutions can you find where these four numbers add to 100 exactly?



The journey so far!

- We explored problem solving *strategies*
- We critiqued PS *scaffolds* together
- You created your own *bespoke* rubric
- We *tested* it with NRICH tasks
- You *revised* it
- You took it away and tested it in school – with adults and *children*
- You had opportunities to *talk* and *share* (speed dating)



What happens next?

- Let's return to the point and purpose of this CPD ... formative assessment
- What is assessment ... of problem solving?
- Why do we assess ... problem solving?
- How do we assess problem solving?



The problem solving rubric

- What positive outcomes has the rubric created?
- What challenges has it presented?
- Where next...?



Task

- Rubric speed dating to explore the three questions with as many other people as possible
- Please complete the sheets so that we can copy them at lunchtime



What is

Thinking

Reasoning



What is the difference between thinking and reasoning?

- Discuss
- What are the skills of reasoning?



Progression in Reasoning

- Describing
- Explaining
- Convincing
- Justifying
- Proving



Reach 100 (**1130**)

Draw a grid like this

5	2
1	9

Write a digit in each box

This gives four two-digit numbers

How many solutions can you find where these four numbers add to 100 exactly?



Notice, wonder, reflect ...

2	3
1	8

2	4
0	8

2	2
2	8

2	1
3	8



Which Scripts?

What opportunities are there for reasoning within this task?

What describing, explaining, convincing and justifying would you be hoping to observe? (Proof is possible too.)

Could you model some vocabulary/sentence scaffolds?

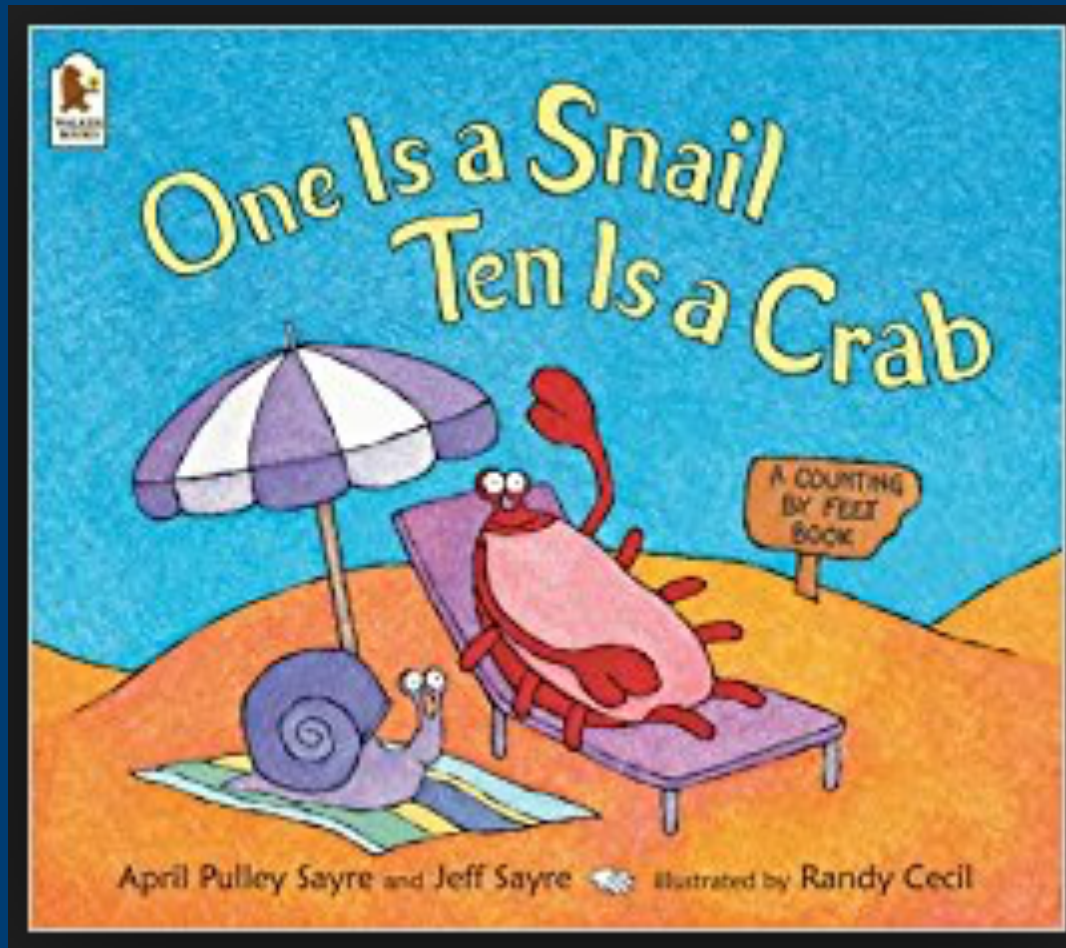


Progression in Reasoning

- Describing
- Explaining
- Convincing
- Justifying
- Proving



One is a Snail, Ten is a Crab



Maths Story Time (9718)



Maths Story Time

Solving problems



Children enjoy the challenge of being asked to help solve a problem, especially if it has big numbers and involves injustice.

Adults could introduce story problems with a large group of three and four year olds. The story can involve sharing with toy characters and a familiar context which will provoke mathematical discussion, language and reasoning. Having another character come along creates a new problem and remainders present options involving fractions, addition or subtraction.

The Activity

Pirate Panda has taken all the treasure, 20 golden coins. Cat, Dog and Rabbit jump about excitedly, "Can we have some too?"
"No! No! No!" says Pirate Panda.
Can the children suggest what Panda ought to do?

Encouraging mathematical thinking and reasoning:

Describing

Is it fair? Have they all got the same amount?
Is it fair now?

Reasoning

Why is this fair/not fair? How do you know?

Opening out

What if we give them another one each?
Sheep comes along - what should we do now?
Bear comes too, so what could we do about the remainder?
What else could we do?

Recording

Could you draw a picture to show panda what to do in order to be fair?

Created by NRICH (rich.maths.org)

The Mathematical Journey

Counting

- cardinality - the last number gives how many there are
- counting for a purpose - to see if everyone has the same number

Number symbols

- matching numerals to amounts, or recording amounts informally

Comparing

- saying who has more or not as many
- saying which numbers are more or less than others

Adding and subtracting

- saying how many there will be if we give them one more each
- saying how many there will be if we take one away

Dividing

- sharing practically, using one-to-one and many-to-one
- understanding how 'dealing' results in equal shares and the same number each

Problem solving

- starting again and redistributing
- using adding and subtracting to make it fair
- creating fractions to solve a remainder problem
- finding alternative solutions
- checking to make sure they all have the same

Development and Variation

You could start the story with Panda sharing unfairly, provoking the children to comment. The numbers chosen determine the level of challenge: 20 shared between four toys encourages counting up to 5 for younger children. You might simplify the problem by having two then three characters, but use larger numbers for expert counters. Deliberately choosing numbers which create remainders, like 4 or 5 shared between three, offers opportunities for alternative solutions such as fractions, subtracting some or adding some more.

Problems such as 7 shared between four offer more challenging multistep solutions. Toys and objects could fit with a current interest, such as a teddy bear party.

Use a real context such as sharing fruit. This would encourage discussion of fractions, especially if there was a 'bigger half'!

Other contexts include sharing bulbs between containers or sharing resources for art work. You could use Numicon or ten frames to check that everyone has the same amount, or arrange coins on trays or plates.

Large numeral cards will emphasise whether everyone has the same number and encourage discussion about comparing numbers if the sharing is unfair. These could be supported by dot patterns on card, Numicon or other representations of amounts.

Resources

Puppets or toy animals
Things to share e.g. gold coins, treasure
Large numerals and dot cards
Trays, plates



With thanks to Kim McDonagh and Janine Davenall, from a North London school, who inspired this activity.



rich.maths.org/early-years

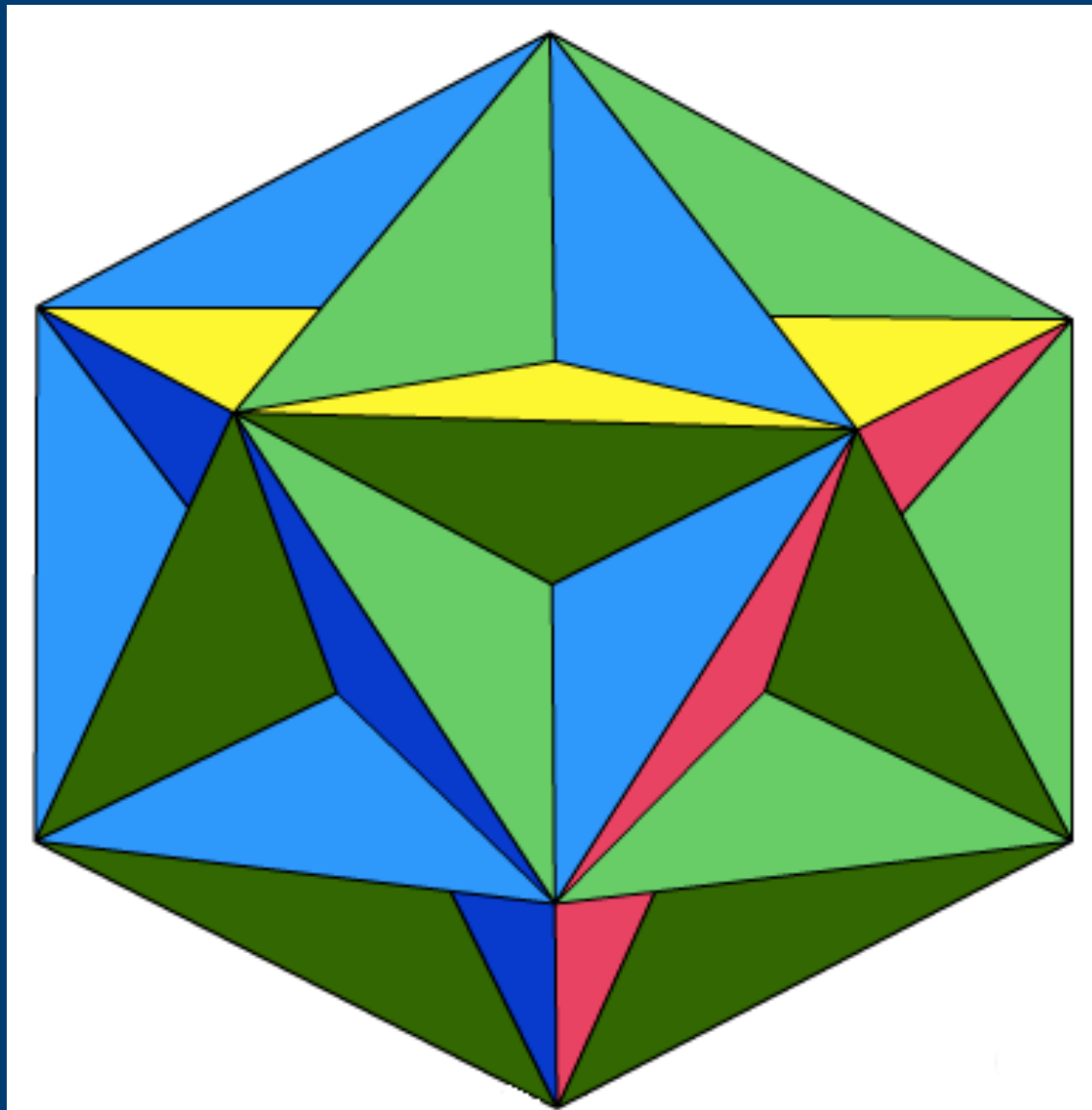
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Reasoning frameworks

- NRICH 5 stages
- Bloom's taxonomy
- Using question stems
- See, think, wonder





Create your own *reasoning* rubric

- Opportunity for a bespoke template/framework/rubric

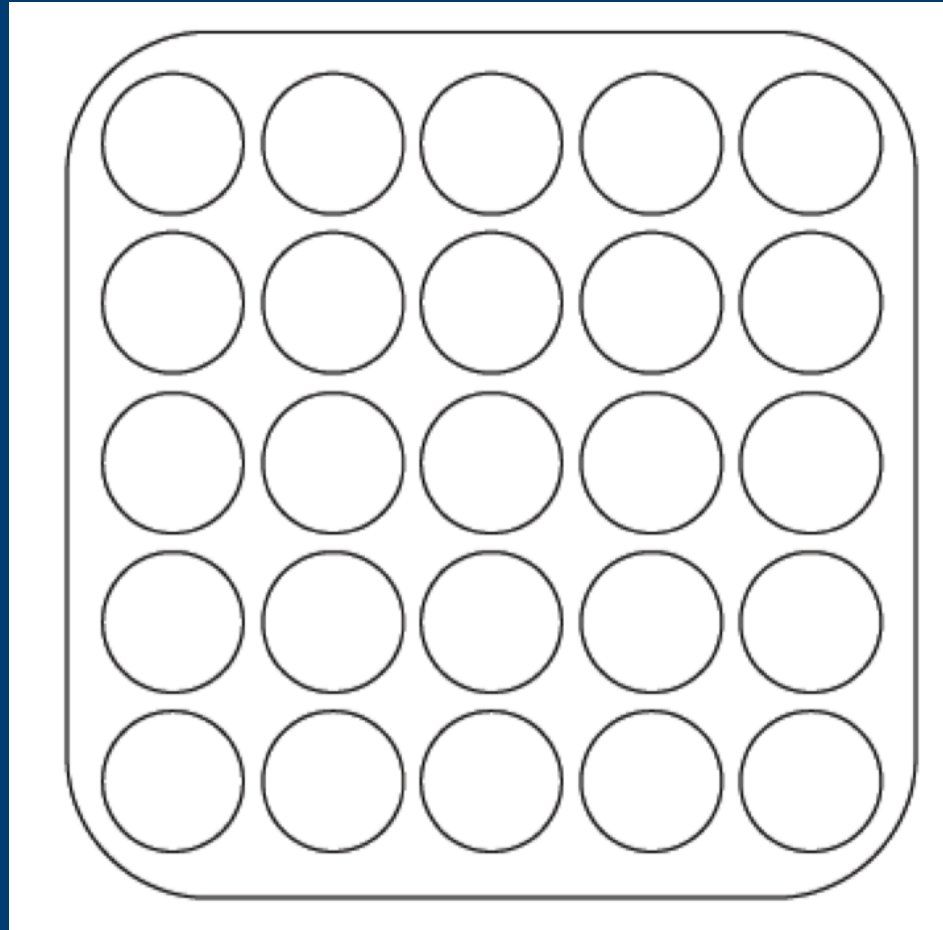


Test your rubric

1. Try Poly Plug Rectangles
2. Use your rubric to assess the tasks
3. Reflect on your assessment



Poly Plug Rectangles (7511)



Teacher Takeaway

1. Try Poly Plug Rectangles and one other task to try before Day 4
2. Use your rubric to assess the tasks
3. Bring your completed rubrics to Day 4 along with any reflections/evidence
4. Read P43-53 from Transforming Primary Mathematics (stop before Fluency – Days 5 & 6!)



Share revisions

- How robust was your rubric?
- What changes do you need to make and why?



References/mentions

Link to See, Think, Wonder video

<http://pz.harvard.edu/projects/visible-thinking>

