

## Leadership for Learning Project 2017-18

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Tower Hamlets CPD Centre

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## Welcome to Day 5

Straight to your take-away tasks

Reflect on the use of the task and your rubric



## Teacher takeaway (day 4)

1. Try two reasoning tasks
2. Use your rubric to assess the tasks
3. Bring your completed rubrics along with any reflections/evidence
4. Read Chapter 5 of Transforming Primary Mathematics



## Possible tasks to talk about:

- Ken Ken
- The Doorbell Rang
- Rectangle Tangle
- Robot Monsters
- Sealed Solution
- Square Subtraction/Odd Times Even
- Guess the Dominoes
- Play to 37



## Share revisions

On your table choose:

- one positive outcome
- one challenge

to share with everyone



## Reflections on reading

Thoughts?

What did you like?

Surprises?



## Chapter 5 p57-66: Mathematical activity

- Goals for the collective are important as well as for individuals
- Learners can take on habits of mind by being immersed in group activity
- Reasoning as a collaborative activity rather than in individual's heads
- Focus on reasoning rather than allowing other distractions (e.g. recording)



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## Chapter 5 p67-73: Fluency

- Some aspects of mathematics best done fairly automatically so working memory is freed up
- Crucial that it is clear what the activity of 'being fluent' involves in any context and to share this with children
- Way that activities are structured is key
- Being mindful is supported by being fluent in certain skills



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What do you understand by the term 'fluency'?



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## Being fluent

At NRICH, we believe that 'being fluent' means being fluent with:

- Facts
- Calculation strategies
- Concepts
- Representations
- Using mathematical content in new contexts
- Making connections across mathematical content
- Problem-solving strategies
- If I know this, then I know that ...
- Explaining and reasoning



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## Key aspects of fluency

Accuracy  
Efficiency  
Flexibility  
Understanding  
Reasonableness



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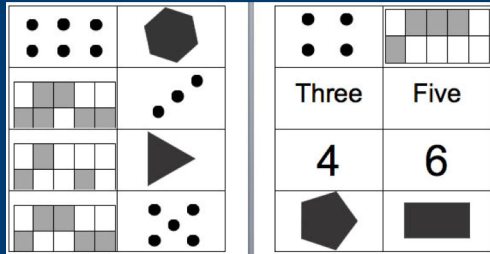
Compare your initial thoughts about fluency with NRICH's ideas and the aspects from research

- What is the same?
- What is different?
- Add to your own thoughts if you wish



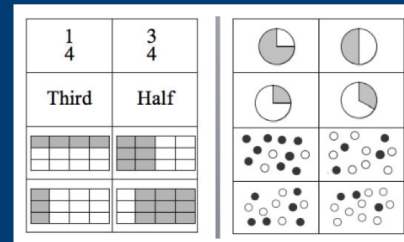
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## Number Match (6937)



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## Fraction Match (6938)



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## Which aspects of fluency do these tasks address?

Accuracy  
Efficiency  
Flexibility  
Understanding  
Reasonableness

Begin to create a framework that supports assessment of the fluency aspects of these tasks

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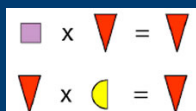
## Fluency tasks used in 2016-17

Brush Loads (4911)      Shape Times Shape (5714)  
Poly Plug Rectangles (7511)      Mystery Matrix (1070)  
Shape Draw (10368)      Sort the Street (5157)  
Stringy Quads (2913)      Olympic Measures (8318)  
Little Man (4789)      M, M and M (6267)  
How Many Times? (981)      Match the Matches (4937)  
Galley Division (6276)      Slow Coach (1162)  
Totality (1216)      **Who's Who**  
Method in Multiplying Madness? (5612)  
Five Steps to 50 (10586)

See [nrich.maths.org/towerhamlets](http://nrich.maths.org/towerhamlets)

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## Number Fluency Feature (10821)



- Tasks which promote numerical fluency in an engaging way
- An article looking at the meaning of fluency in the context of number (10624)

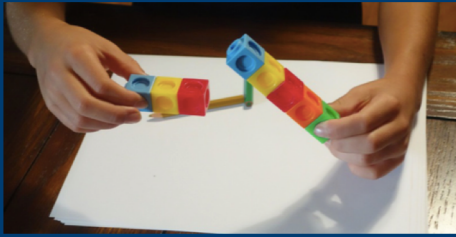
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## Factors and Multiples Game (5468)



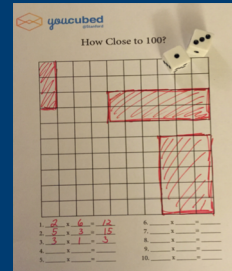
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## You Cubed 'Snap It'



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## You Cubed 'How Close to 100?'



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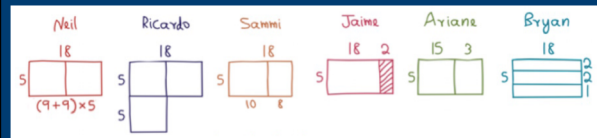
## How would you do it?

$$5 \times 18 =$$

From youcubed.org

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## Can you spot yours?



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Neil	Ricardo	Sammi	Jaime	Ariane	Bryan
$(9+9) \times 5$		$(10 \times 5) + (8 \times 5)$	$20 \times 5 = 100$ $2 \times 5 = 10$ $100 - 10 = 90$	$15 \times 5 = 75$ $3 \times 5 = 15$ $75 + 15 = 90$	$(18 \times 2) + (18 \times 2) + 18$
$45 + 45 = 90$	$18 \times 5 = 9 \times 10$	$50 + 40 = 90$			$36 + 36 + 18 = 90$

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## Who's who?



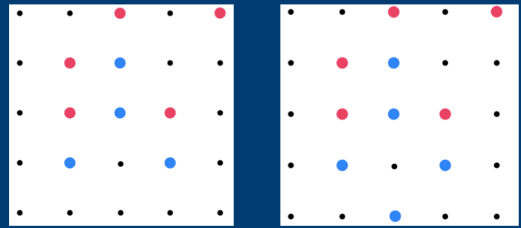
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## Mathematical orchestra



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## Square Surprise (13662)



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## Estimating Angles (1235)

Target Angle:  $13^\circ$

Stopped at  $11^\circ$ , 10 points  
Click to continue

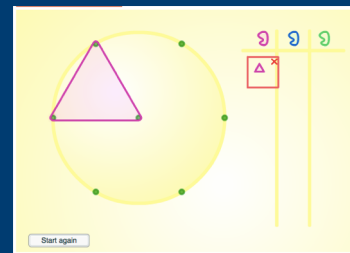
Round: 1  
Score: 10  
Average: 10

Restart

level = 1	Players = 1	Error	Score
●	●	0-5°	10
●	●	6-10°	5
●	●	11-15°	2

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## Board Block (2871)



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## Cops and Robbers (6288)

Full Screen

New game

Level 1

Enter coords  
(x, y)

Test coords

Guesses so far

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## Guess the Houses (6983)



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## Reflecting on and updating your *fluency* rubric

- What works well?
- Is anything missing?
- What would X say?

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NRICH searching mathematics

Home Students Teachers Roadshow Events

### Tower Hamlets Leadership for Learning Project 2017-18

Stage 1 and 2

NRICH has been invited to lead six face-to-face PD days for primary teachers in the London Borough of Tower Hamlets over the academic year 2016-17, focusing on Leadership for Learning in mathematics. Two teachers from each of 18 primary schools will come together on each day with two members of the NRICH primary team to explore ways of assessing the three aims of the primary mathematics curriculum and to consider how best to support their colleagues in developing appropriate strategies for problem solving, reasoning and fluency in their classrooms and assessment of the progress of these skills.

Each session will offer opportunities to explore the role of NRICH tasks in nurturing confident, resourceful and enthusiastic teachers and learners of mathematics, and gap tasks will encourage the development and embedding of these ideas in their schools throughout the year.

This page summarises the content and discussions during each day. If you would like anything uploading to this page, or have any queries about the project, please contact the [NRICH primary team](#).

**Day 1: Wednesday 04 October 2017**  
Here is a pdf of the PowerPoint slides we used on the day: [20171004TH\\_Day\\_1.pdf](#)

The tasks were:  
[Foot Product Sudoku](#)  
[Foot 3-Towers Puzzle](#)  
[Magic 3x3](#)

**Day 2: Wednesday 29th November 2017**  
Here is a pdf of the PowerPoint slides we used on the day: [20171129TH\\_Day\\_2.pdf](#)

The tasks were:  
[Sarcophagus](#)  
[Which Square?](#)  
[Search 100](#)

**Day 3: Tuesday 9th January 2018**  
Here is a pdf of the PowerPoint slides we used on the day: [20180109TH\\_Day\\_3.pdf](#)

The tasks were:  
[Rings 100](#)  
[Which Square?](#)  
[Maths Story Time](#)  
[Poly Plug Rectangles](#)

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## Teacher takeaway

1. Try at least one fluency task
2. Use your rubric to assess the task
3. Refine your assessment tools ready for 'real' usage on day 6
4. Prepare a five-minute presentation (see next slide)
5. Read chapter 11 of Transforming Primary Mathematics (Talk)

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## Presentation guidelines

Focus on learning journey over the six sessions rather than necessarily on outcomes

Please include reference to all three assessment elements (i.e. problem solving, reasoning and fluency)

Absolute maximum length of five minutes

No IT facilities but can prepare handout (we can copy)

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## References

Boaler, J. (2015) Fluency Without Fear: Research Evidence on the Best Ways to Learn Math Facts (see <https://www.youcubed.org/evidence/fluency-without-fear/>)

Kilpatrick J., Swafford J. and Findell B. eds (2011) Adding It Up: Helping Children Learn Mathematics. Washington DC: National Academy Press (see <https://www.nap.edu/catalog/9822/adding-it-up-helping-children-learn-mathematics>).

National Council of Teachers of Mathematics. (2000). Principles and Standards for School Mathematics. Reston, VA: NCTM.

Russell, Susan Jo. (May, 2000). *Developing Computational Fluency with Whole Numbers in the Elementary Grades*. In Ferrucci, Beverly J. and Heid, M. Kathleen (eds). Millennium Focus Issue: Perspectives on Principles and Standards. The New England Math Journal. Volume XXXII, Number 2. Keene, NH: Association of Teachers of Mathematics in New England. Pages 40-54.

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