CURRICULUM, PEDAGOGY AND BEYOND

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Supporting students with mathematics learning difficulties (MLD).

Dr. Jennifer Sze
(she/her)

Acknowledgement of Country

I acknowledge the Wurundjeri Woi-wurrung people as the Traditional Custodians of the land on which La Trobe University Bundoora Campus stands. I pay my respects to their Elders past and present and remain committed to working together to care for this land.

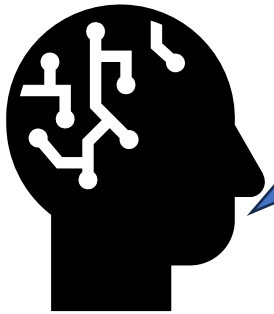
Key Take-aways

- Learn the overlapping nature of MLD
- How to use CRA model to teach students
- Introduce the Bar Model to solve word problems

“We teach who we are” (Palmer, 2019, p. 16)

I am a Mum, Teacher and Academic

Think Pair Share: Please explain what you know about MLD in your context.



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The overlapping nature of LDs (Grigorenko et al., 2020; Hendren et al., 2018)

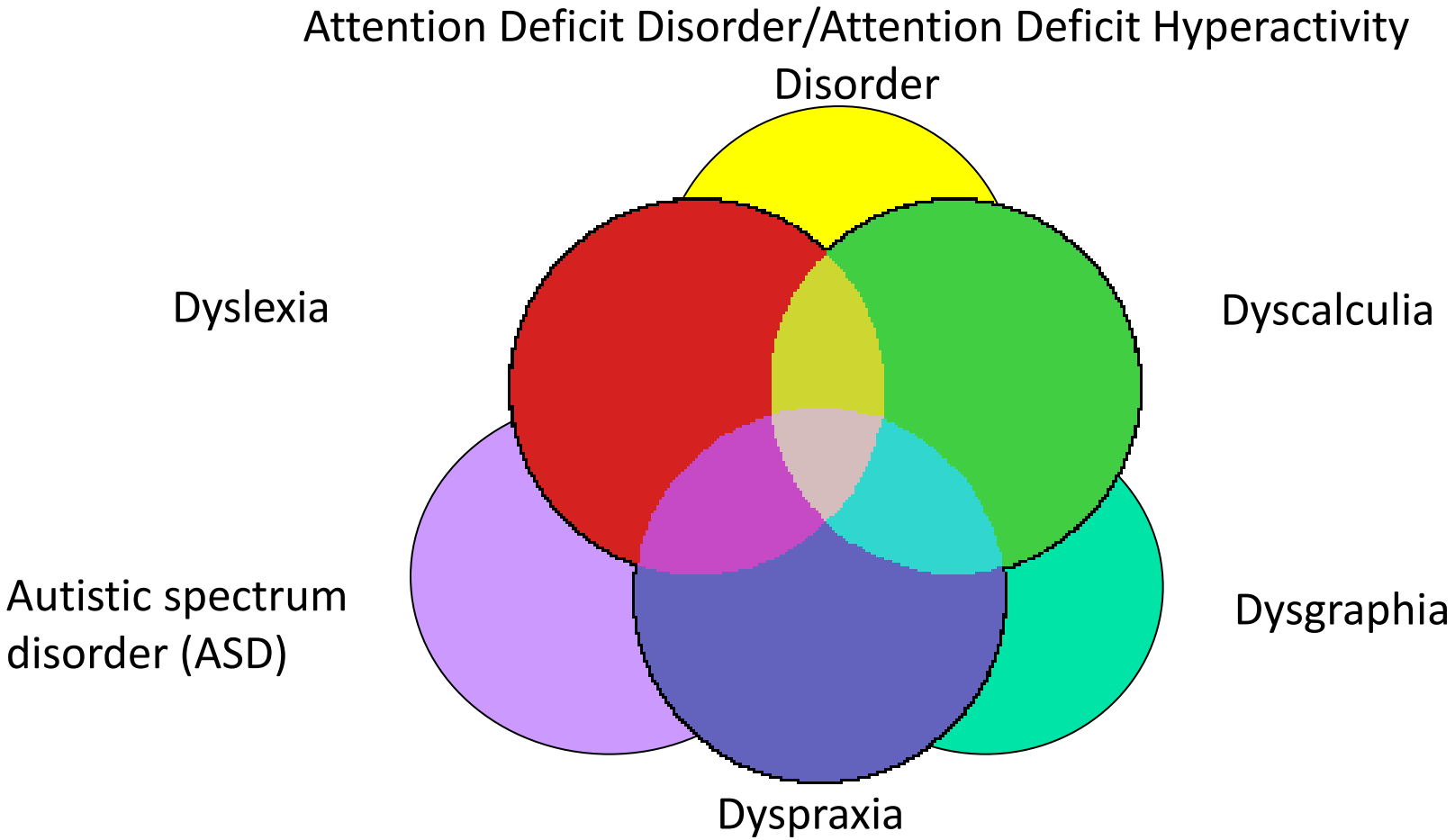
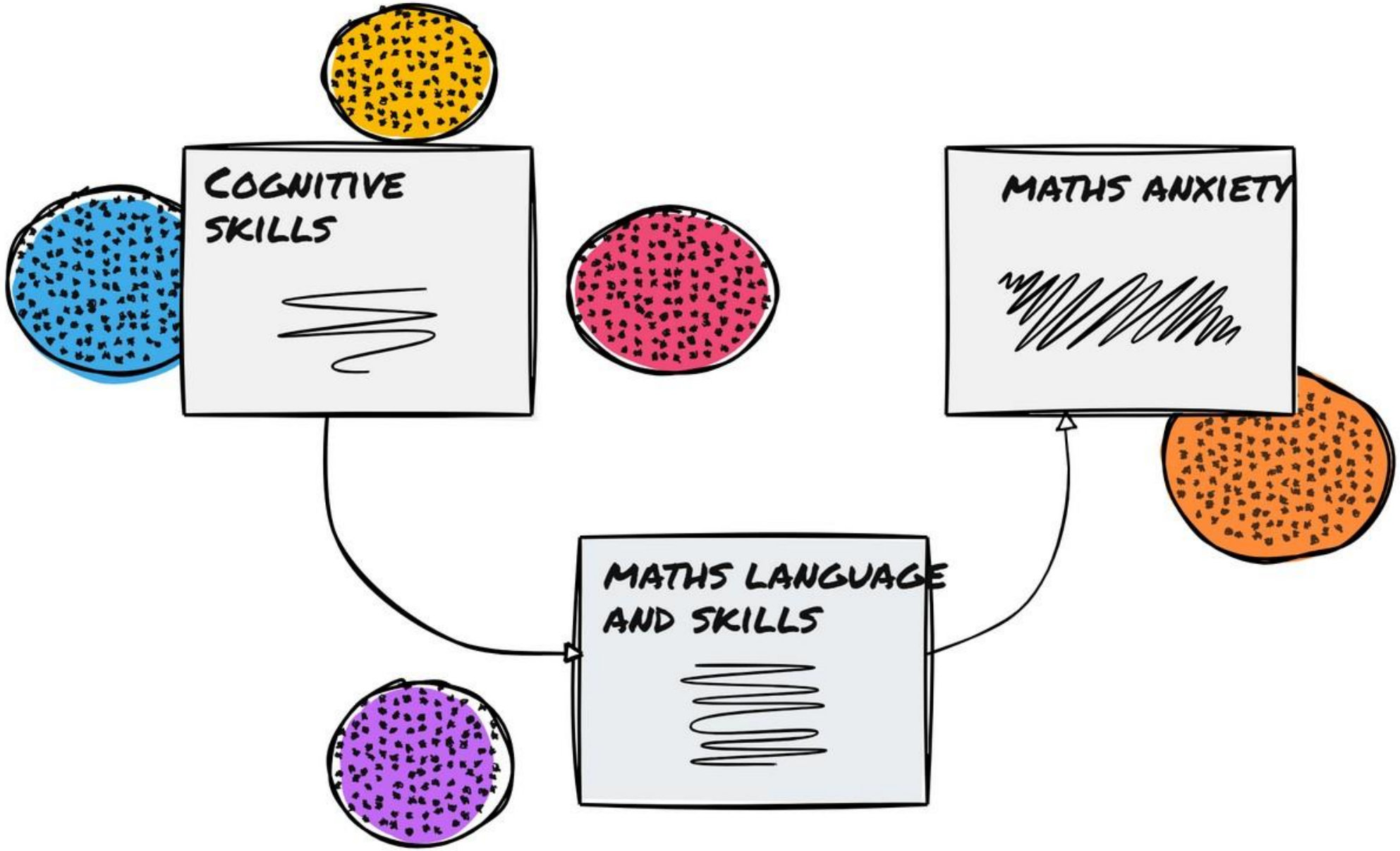


Image (Kirby, 2024)



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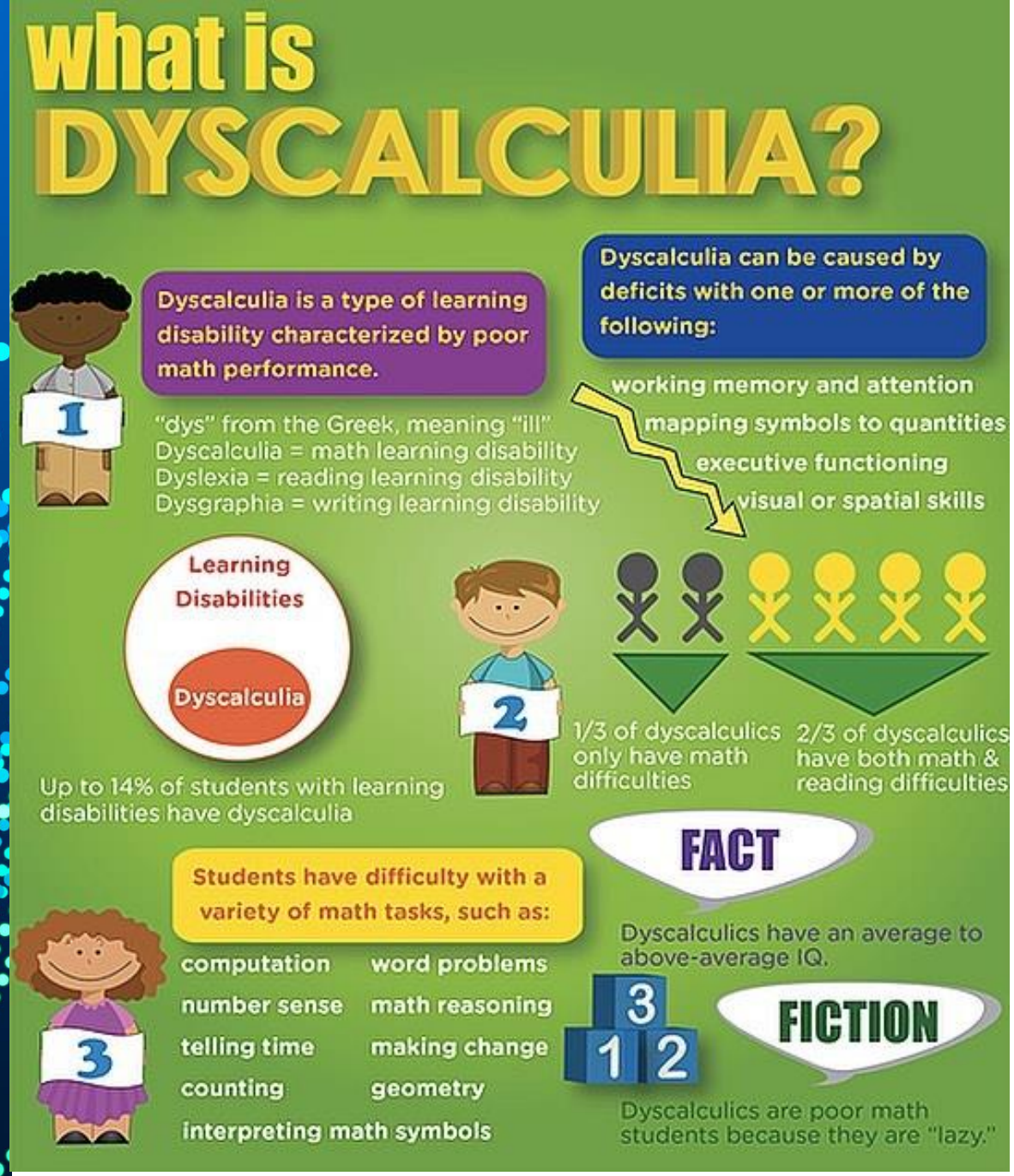

Think Pair Share: Please explain what you know about dyscalculia.

Image Orton Gillingham Academy (2024)

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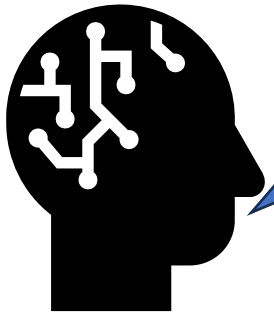
Think Pair Share: Please explain what you know about the connection between dyslexia and MLD.



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Dyslexia and MLD (Grant et al., 2020)

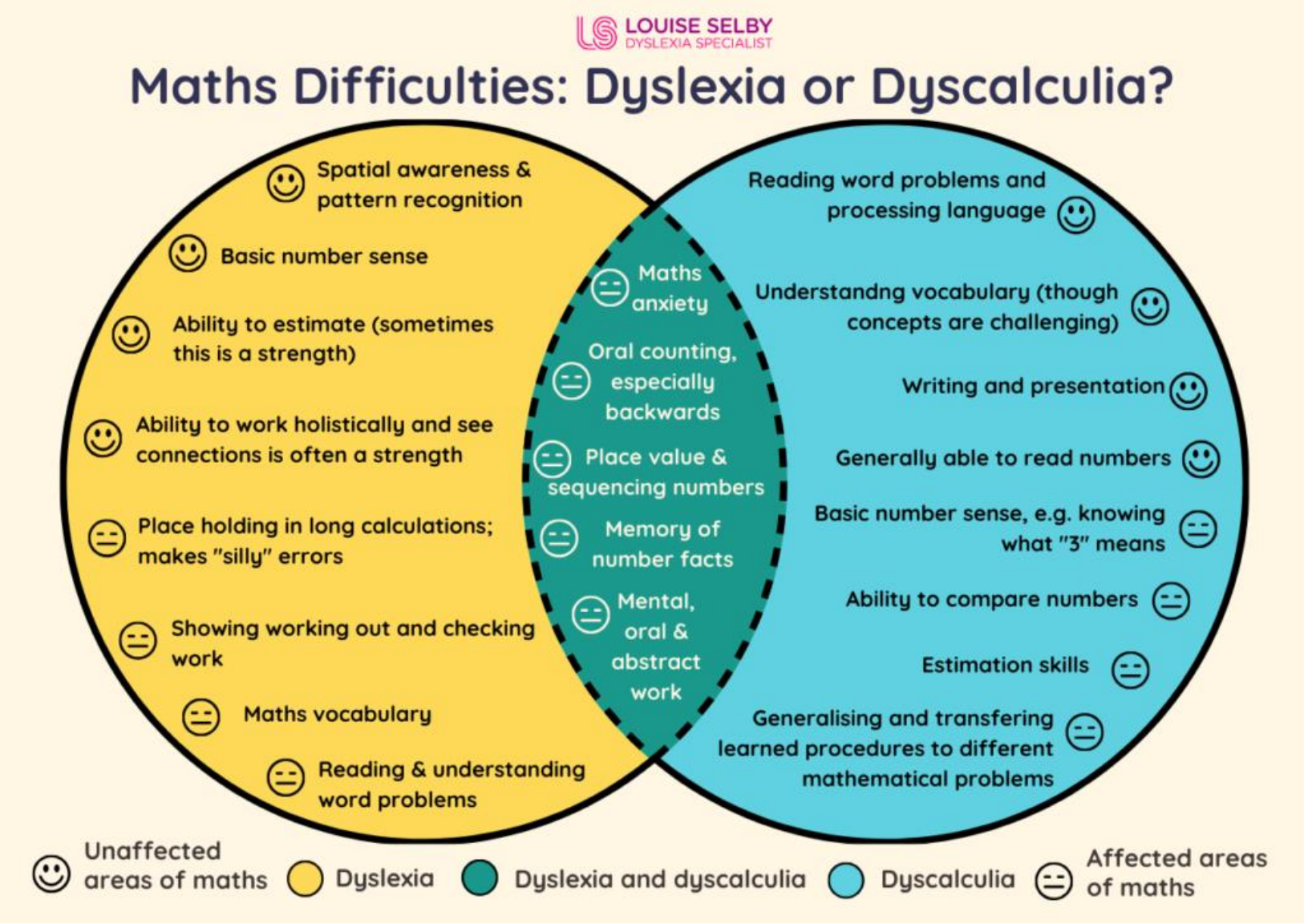

Image Louise Selby (2024)

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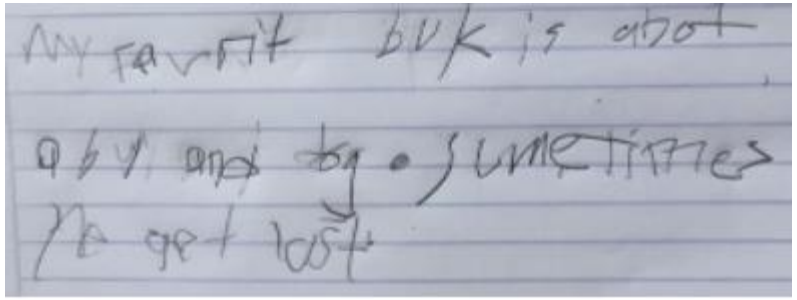
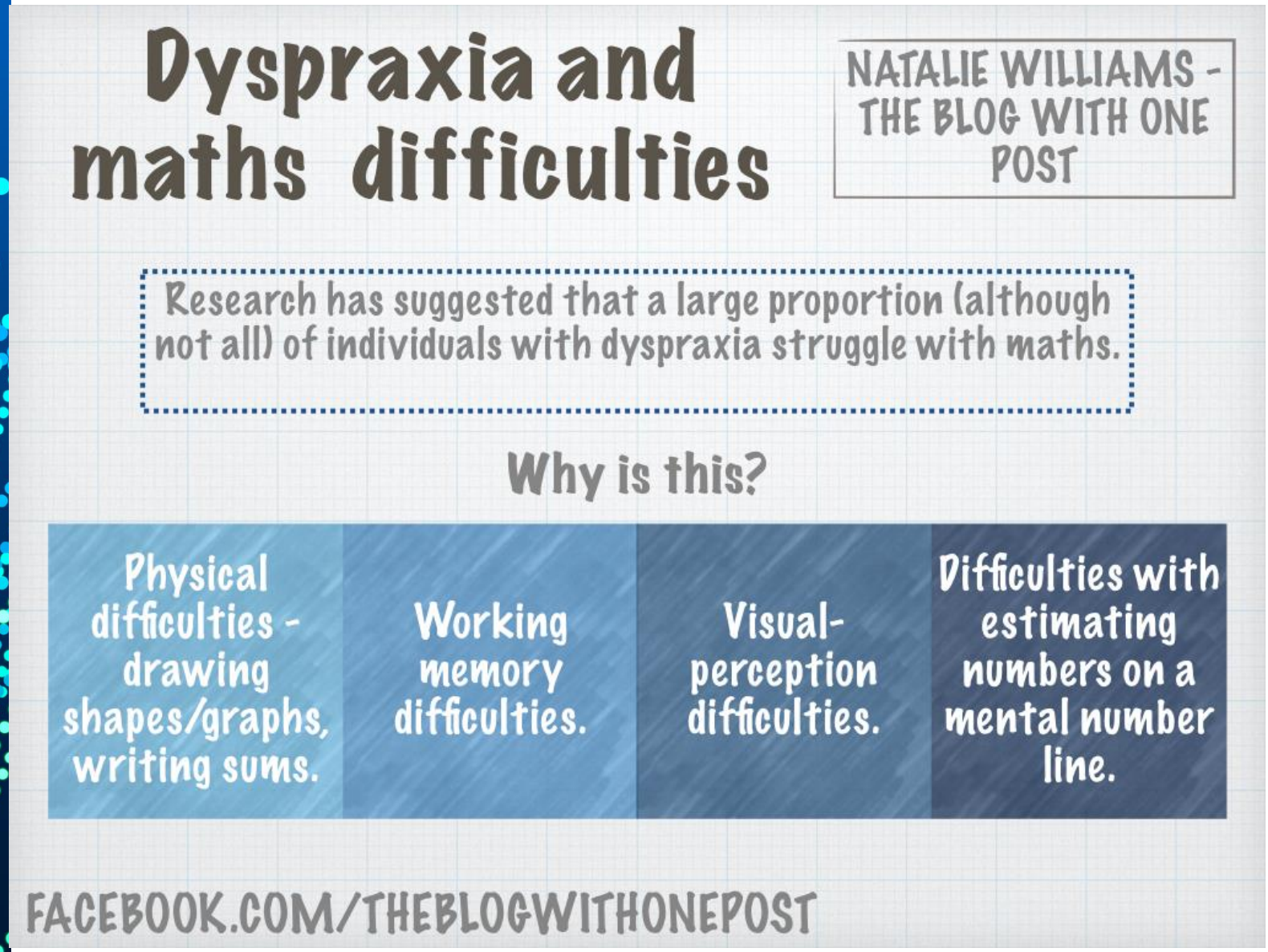
Dysgraphia and MLD (Gomez et al., 2017)

Dysgraphia is a learning disorder in written expression.



It is estimated that 5 to 20 percent of all children have some type of writing deficit like dysgraphia (Dohla & Heim, 2016; McCarney et al., 2013; Rosenblum et al., 2010).

Dyspraxia and MLD (Gomez et al., 2015)



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ADHD and MLD (Kuzmina et al., 2021)

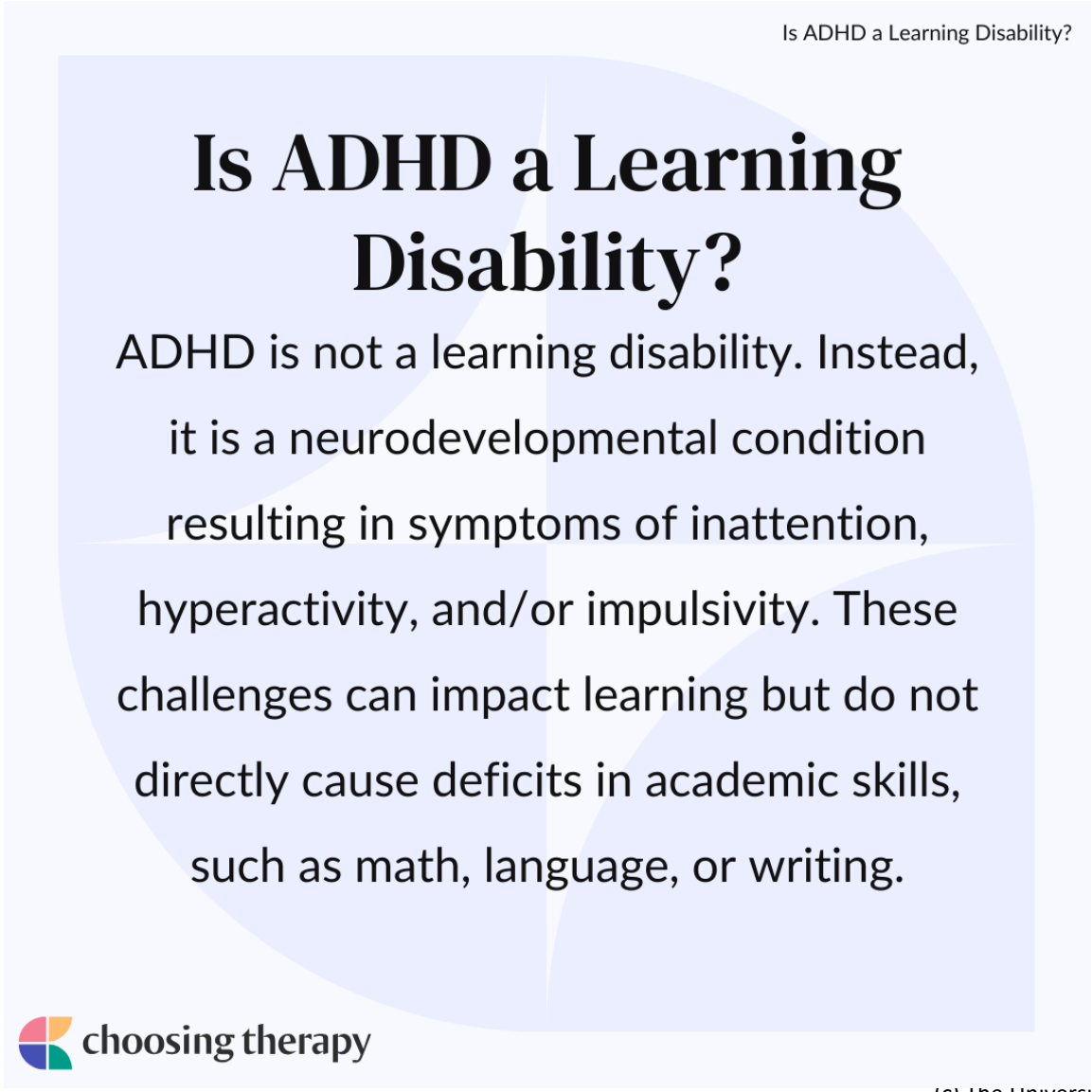

Image Choosing Therapy (2024)

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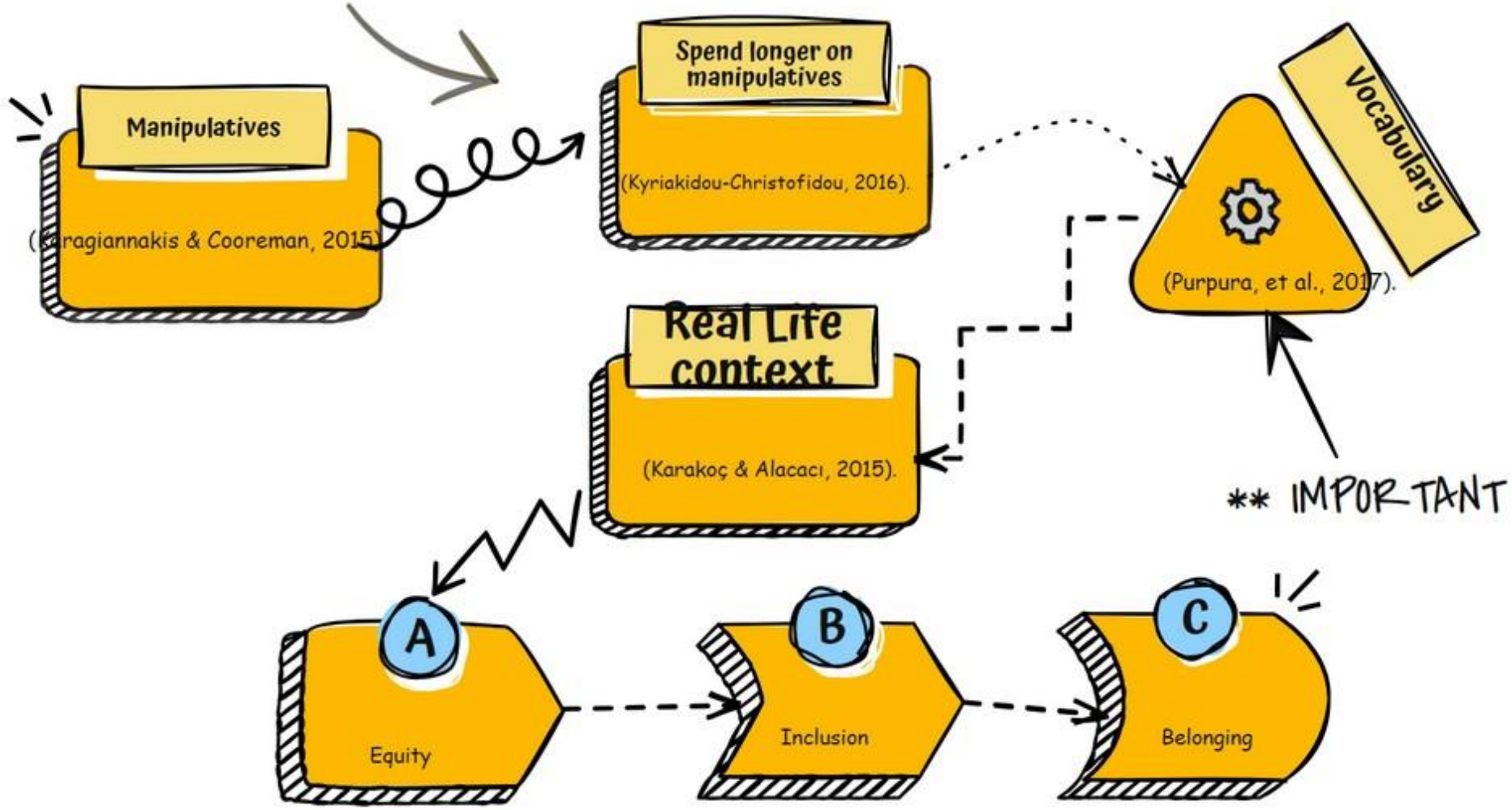
Supporting Students with MLD



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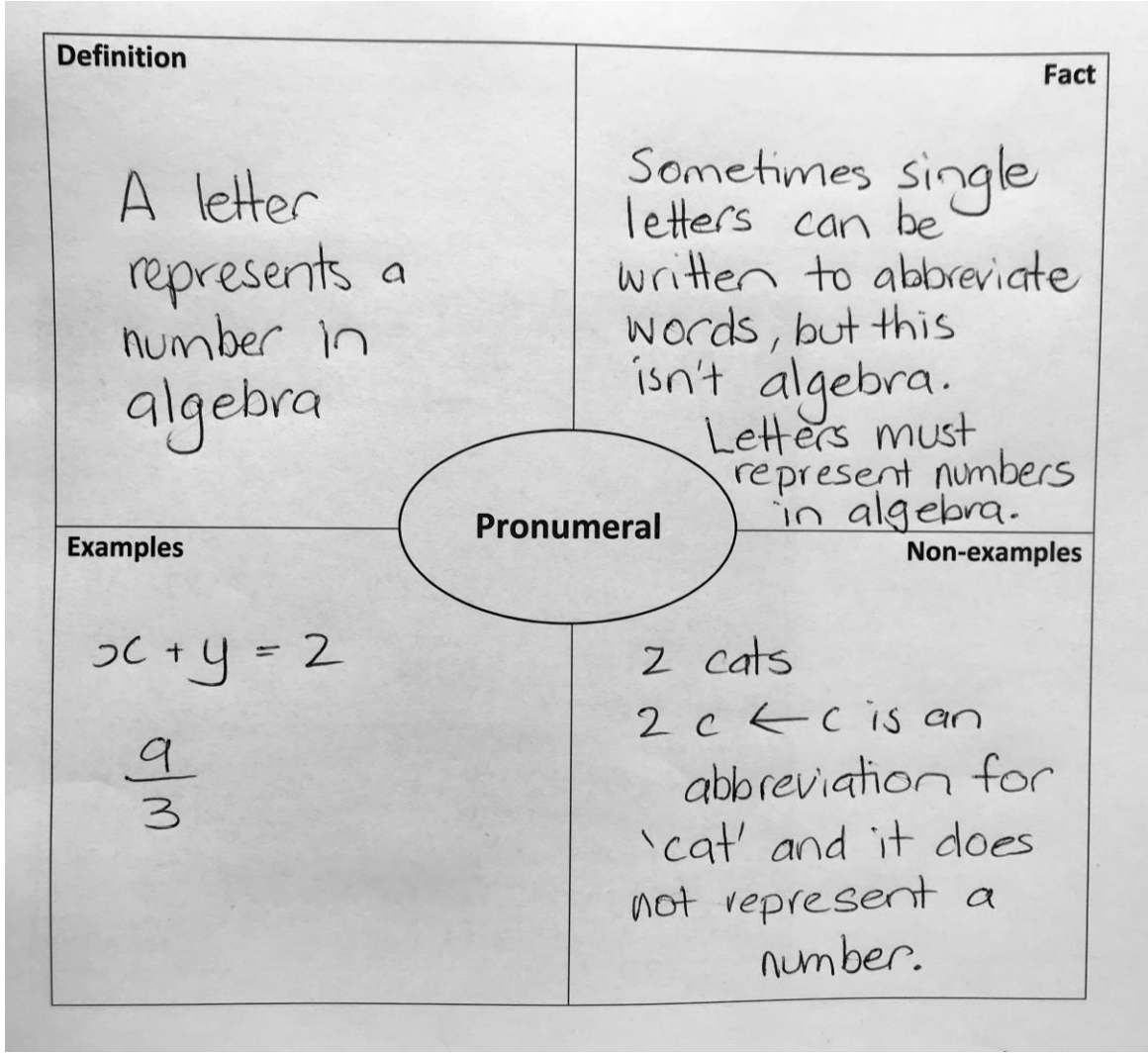
Explicit teaching of vocabulary



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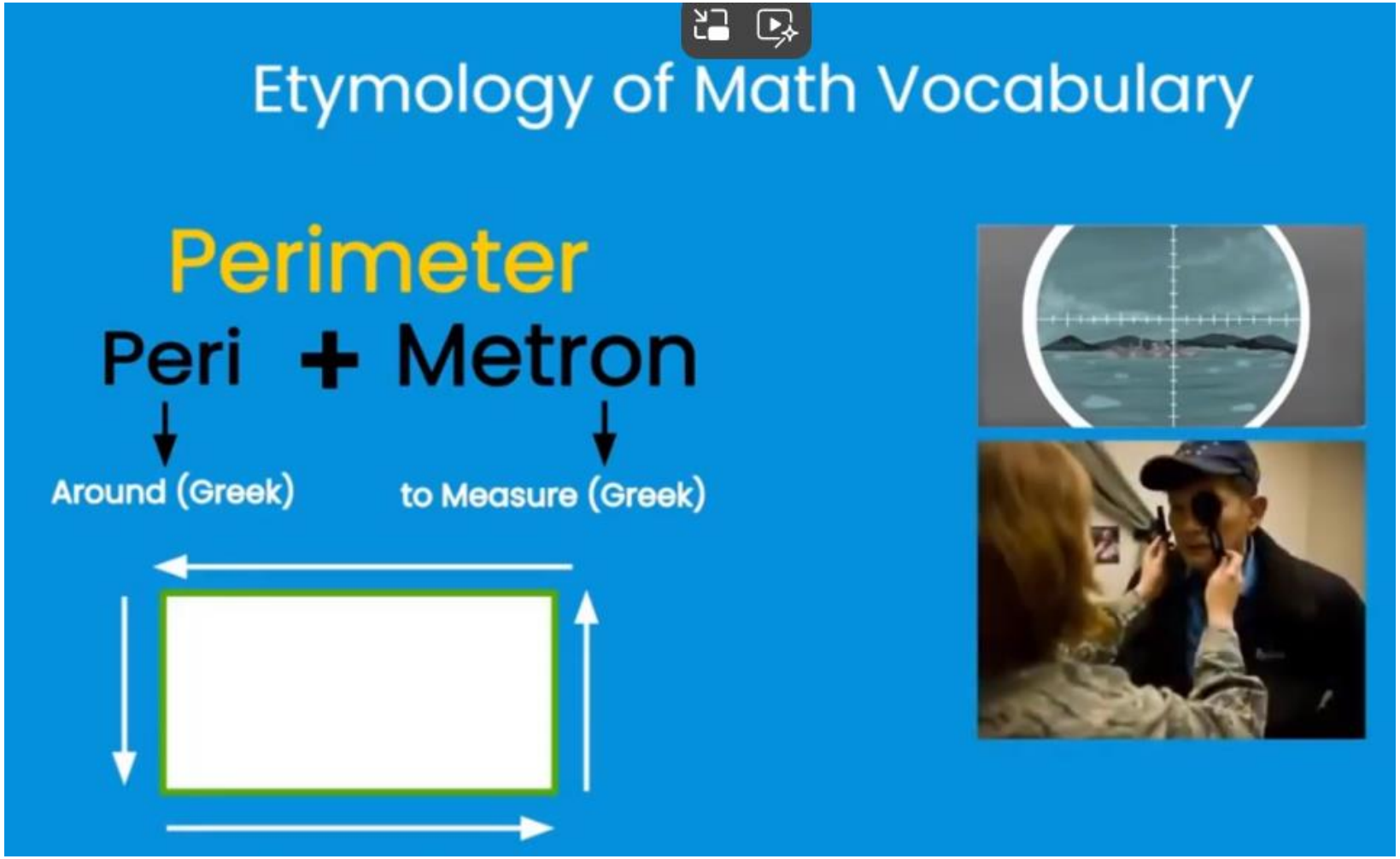
Explicit teaching of vocabulary



Images from Made for Math (2024)

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Multiplication

13 x 12 =

Please turn and talk as to how you would teach multiplication to a child with MLD.

Multiplication

13 x 12 =

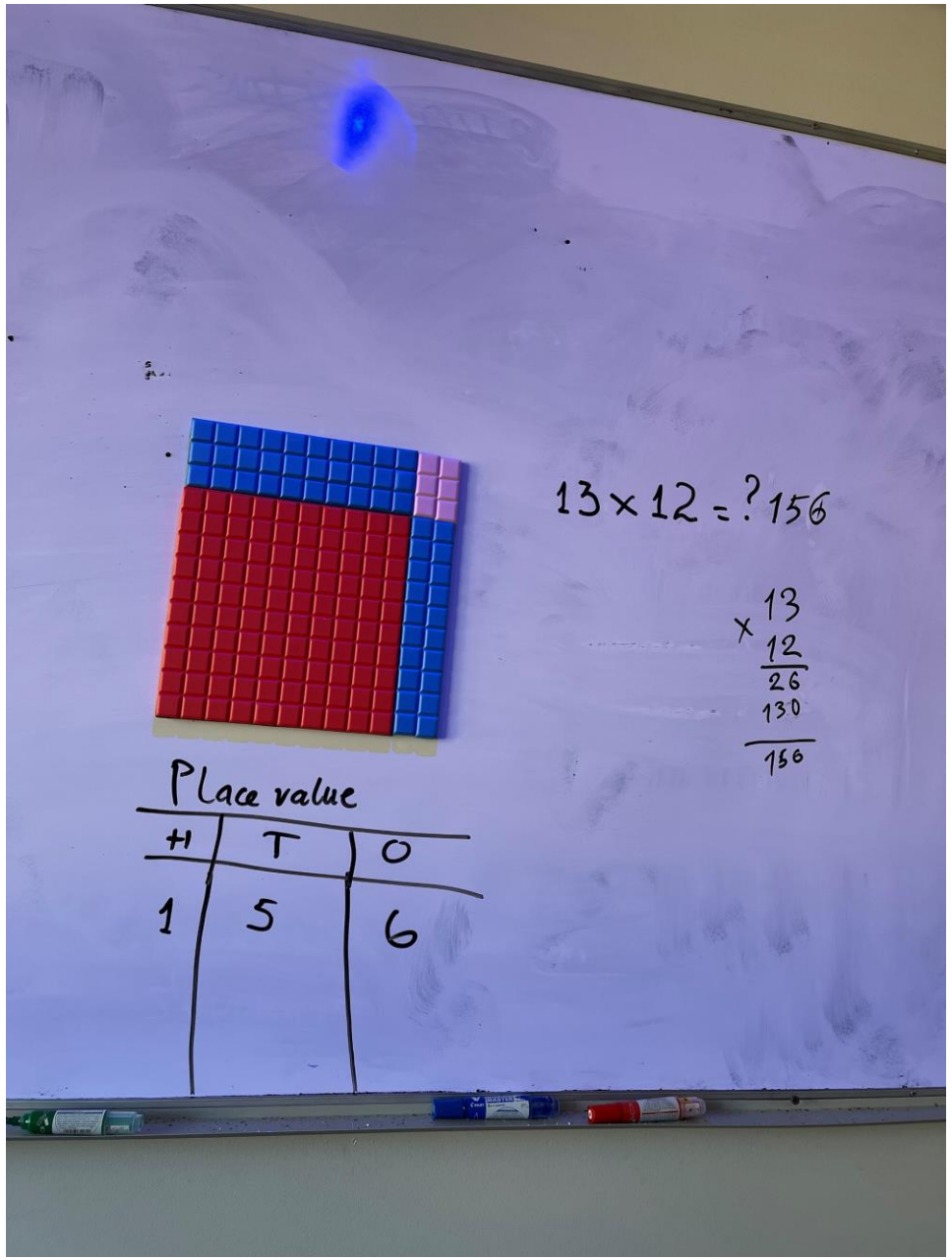


Image Sze (2024)

Teaching Fractions

2/5 + 1/3 =

How have you taught your students fractions?

Slide with two columns of content

- Step 1: Make the first fraction
- Step 2: Make the second fraction
- Step 3: Place the two fractions together

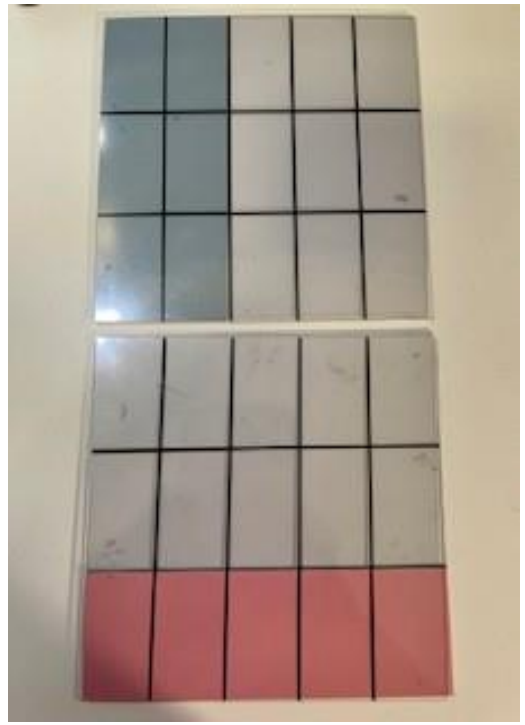


Image (Sze, 2024)

Teaching Decimals

1 + .4 + .02 =

How have you taught your students decimals?

Image (Sze, 2024)

Teaching Decimals

1 + .4 + .02 = 1.42

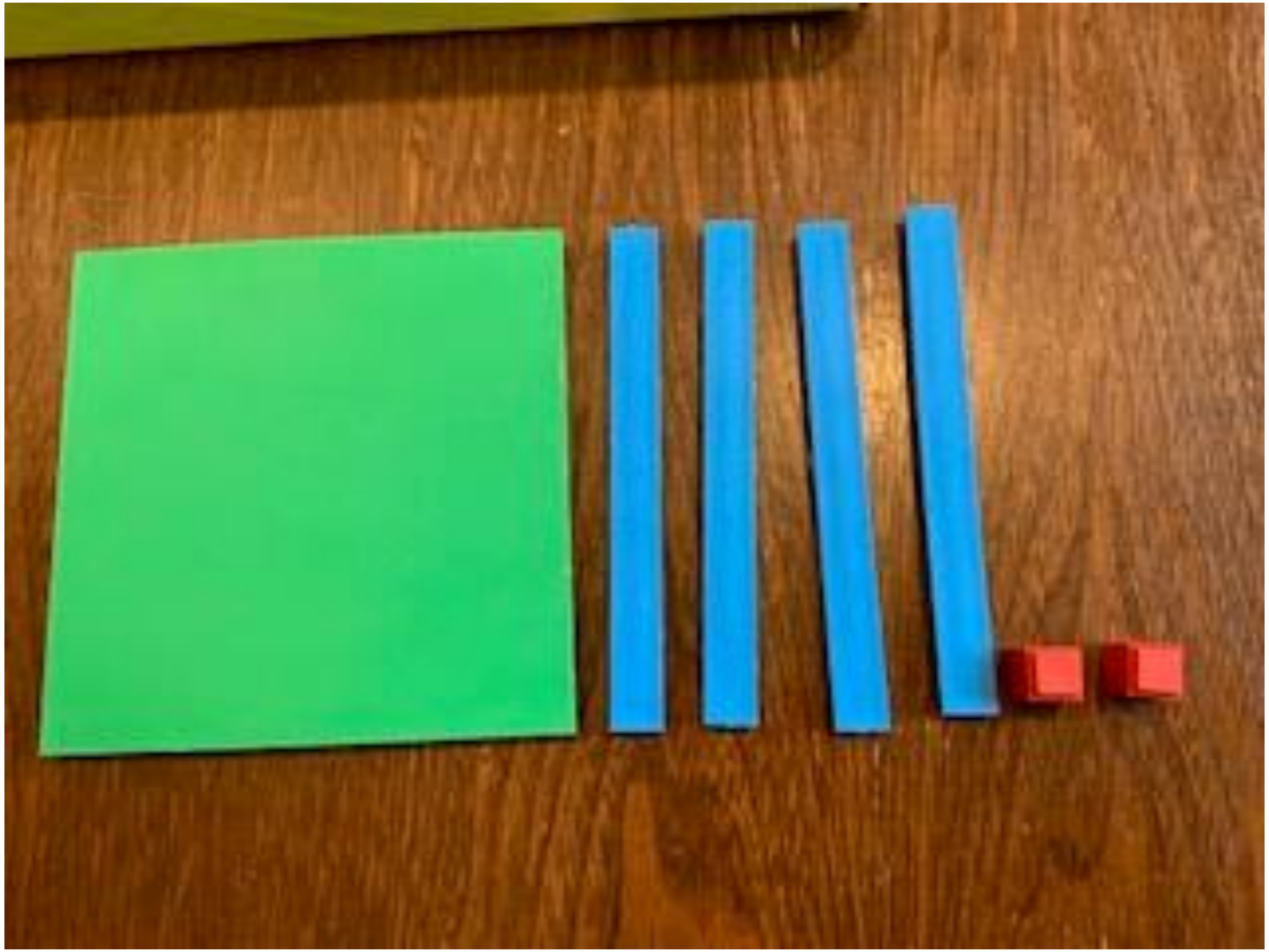


Image (Sze, 2024)

Teaching Decimals

2.13 + 1. 54 =

How have you taught your students decimals?

Teaching Decimals

2.13 + 1. 54 = 3.67

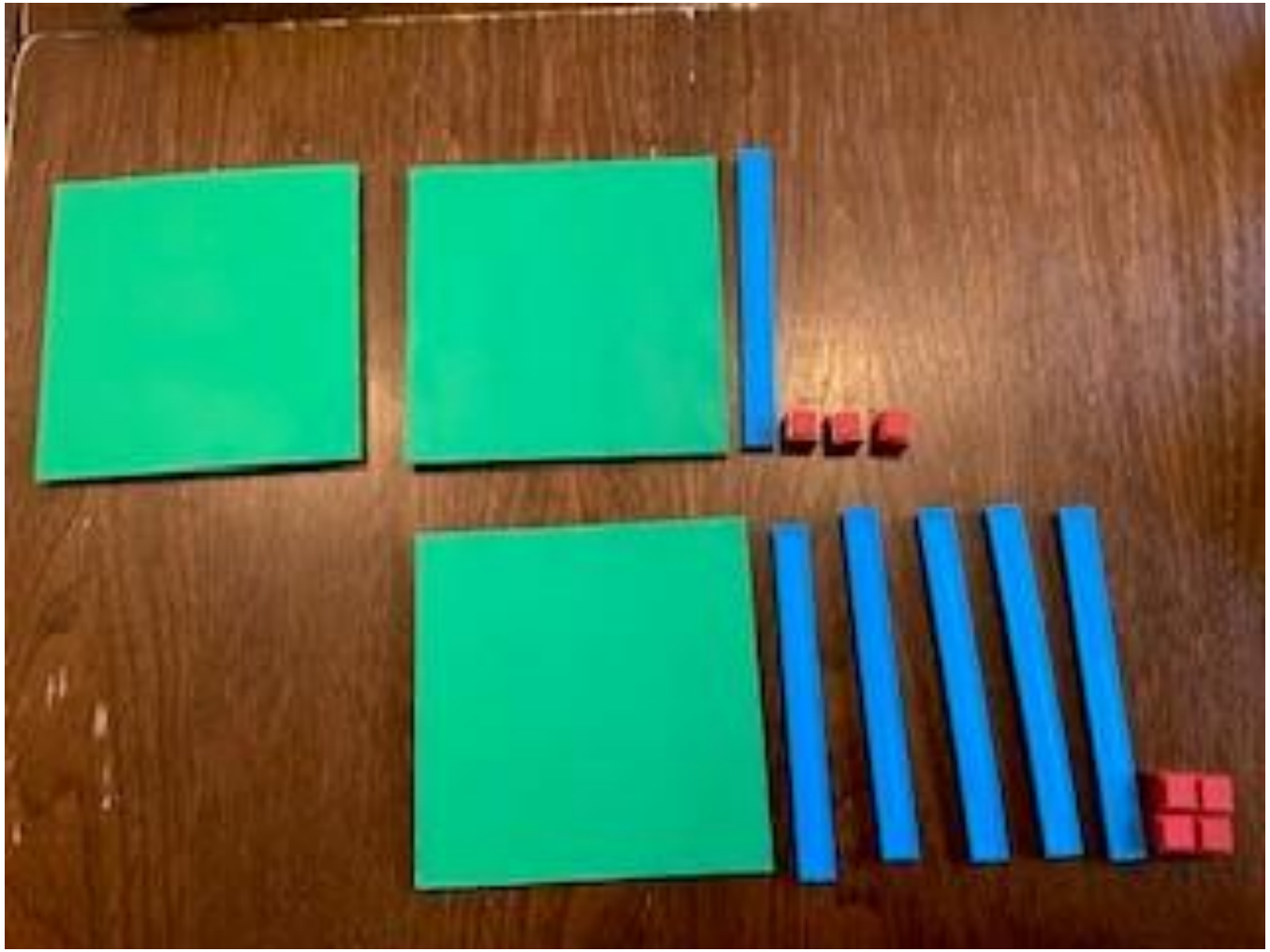


Image (Sze, 2024)

Teaching Decimals

1.3 x 1. 2 =

How have you taught your students decimals?

Image (Sze, 2024)

Teaching Decimals

1.3 x 1. 2 =

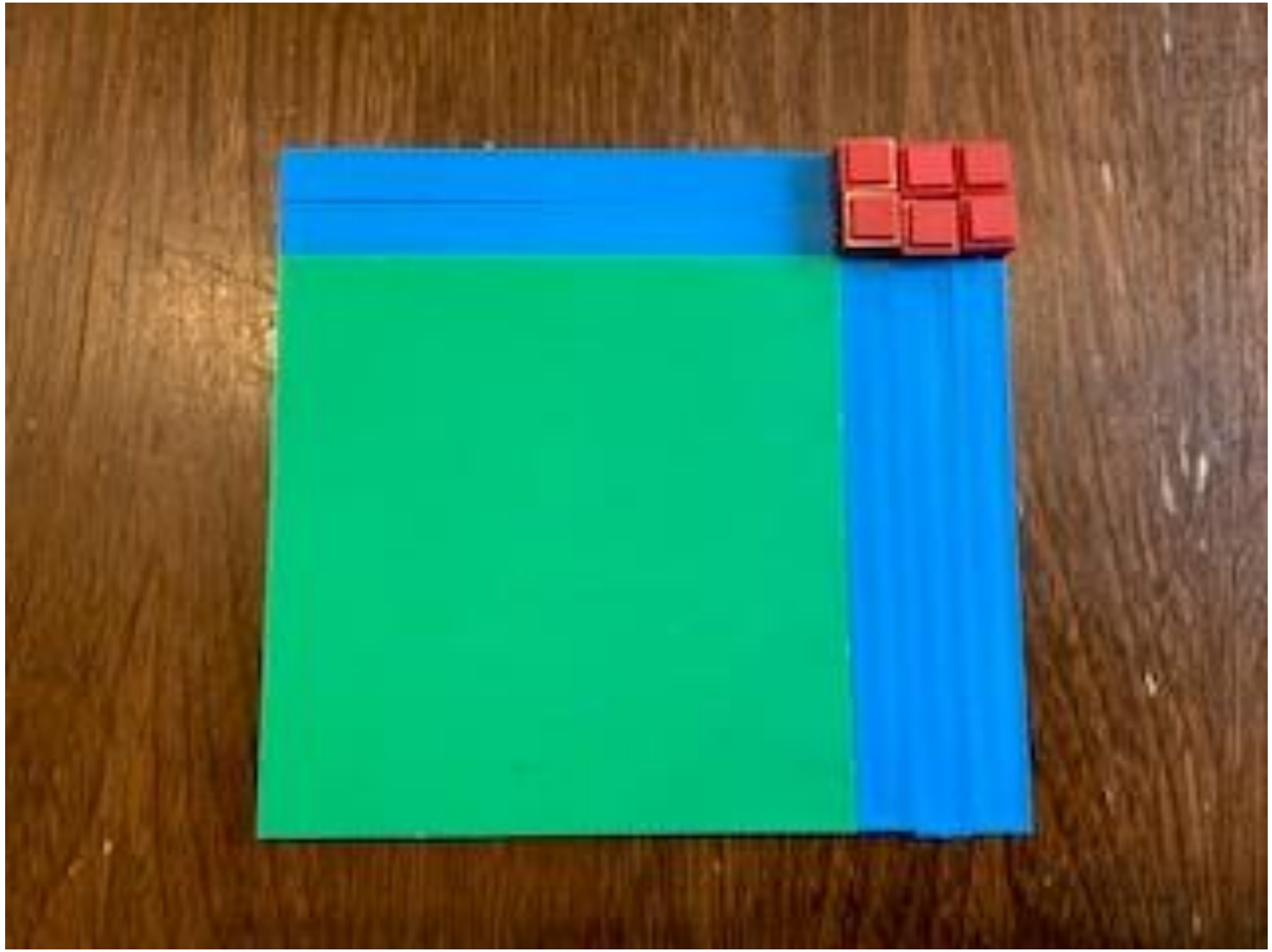


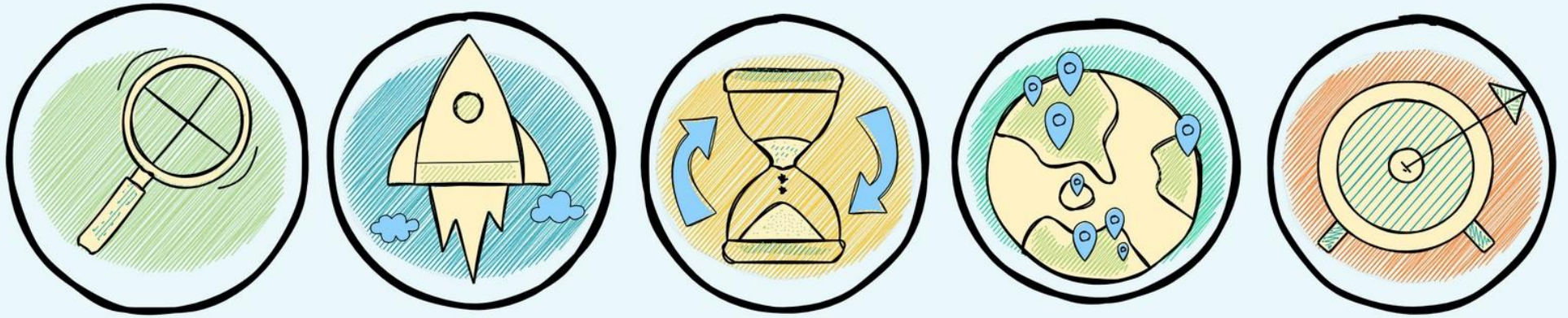
Image (Sze, 2024)

Multisensory Manipulative-based Mathematics (Dyscalculia UK, 2024; Yoshimoto, 2024)

- Warm up – maths facts (fluency), number talk etc.
- Review – review of previously learned concepts, skills or operations.
- New concept
- Word problem
- Summary

Image (Sze, 2024)

5 Singapore Maths and MLD



01

Number Sense

Mastery of number sense is the hallmark of Singapore maths.

02

'seeing maths'

Teaching maths using manipulatives (CPA/CRA)

03

Language of maths

Singapore maths encourages communication and collaboration among students

04

Connections & Finding Patterns

Using the Bar model to show students to find connections & finding patterns

05

Less reliance on procedures

Students are encouraged to think about their own thinking.

Image (Sze, 2024)

Bar Model (Osman et al., 2018)

- Bar modelling helps students to decide which operation to use (Bruner's pictorial part)
- Students learn to complete the calculation once the bar model has been constructed
- Can be used across different mathematical strands

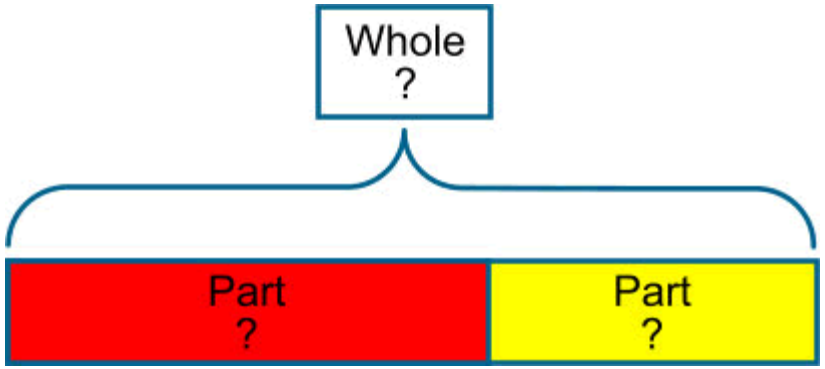


Image (Third Space Learning, 2024)

Bar Model (Aust. Academy of Science,2022)

- Step 1: Read the problem
- Step 2: Rewrite in a sentence
- Step 3: Who and What?
- Step 4: Draw the unit bar
- Step 5: Chunk the problem
- Step 6: Solve
- Step 7: Write in a full sentence

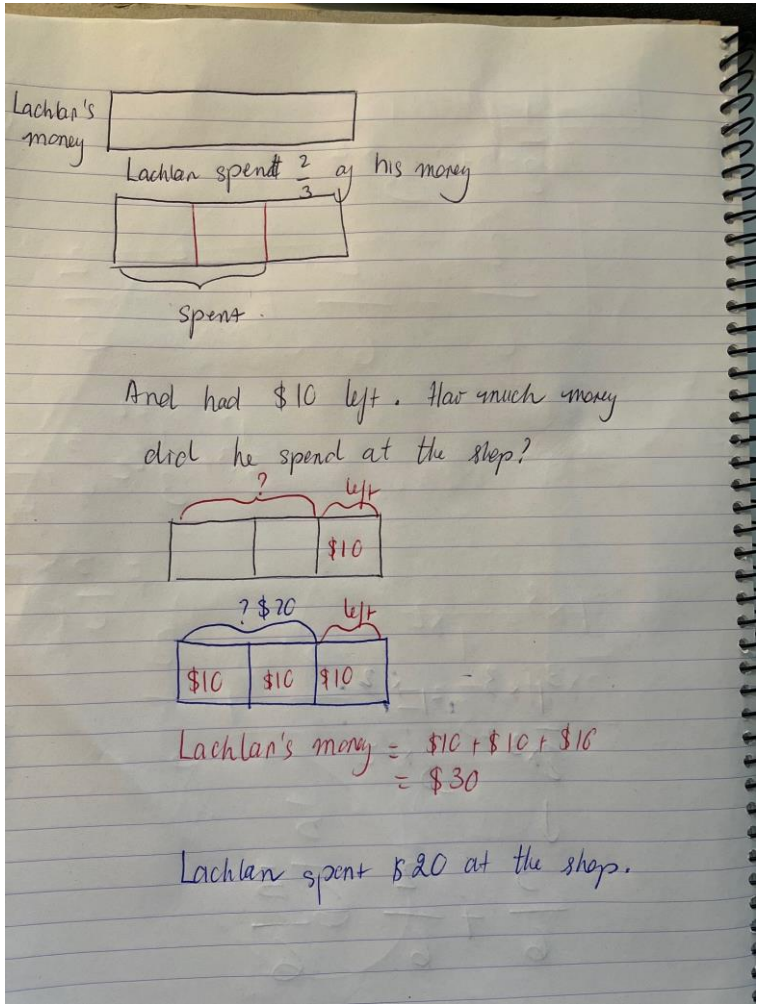


Image (Sze, 2024)

Example (Aust. Academy of Science,2022)

- Mariko spent 2/3 of her money at the shopping centre and had $10 left. How much money did she spend at the shopping centre?

Image (Third Space Learning , 2024)

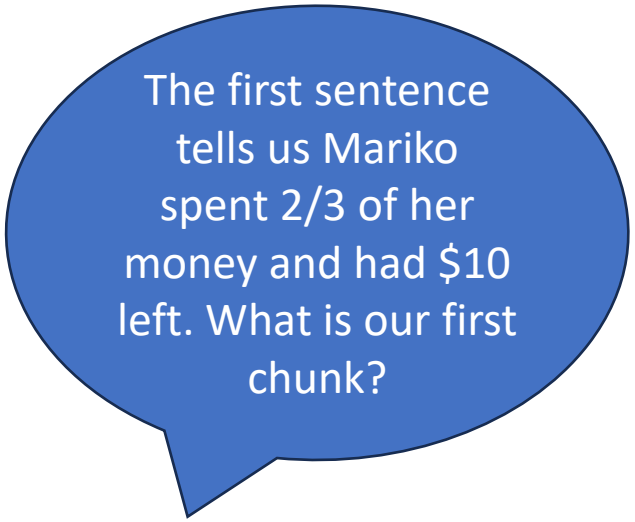
Example (Aust. Academy of Science,2022)

- Step 1: Read the problem
- Step 2: Rewrite the question as a sentence
- *Markiko spent $10… at the shopping centre*

A method of representing maths problems pictorially. It has been popularised by the Singapore Maths teaching method.

Example (Aust. Academy of Science,2022)

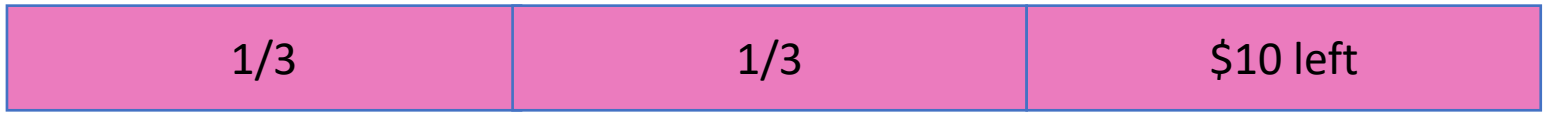
- Step 3: Who and What?
- Step 4: Draw the unit bar
- Step 5: Chunk the problem



Mariko's money

Example (Aust. Academy of Science,2022)

- Mariko spent 2/3 of her money at the shopping centre. She had $10 left. How much money did she spend at the shopping centre?



Example (Aust. Academy of Science,2022)

- Step 6: The final unit has a value of $10.
- $10 + $10 + $10 = $30
- Step 7: Write the answer in the sentence:
  - *Mariko spent $20 at the shopping centre*

What you can do for your school…

Staying in touch

Please stay in touch with me and let me know what you are doing with your students in your maths class.

Dr. Jennifer Sze PhD

Lecturer in Learning Intervention | Dyslexia & Dyscalculia | Foundatio...

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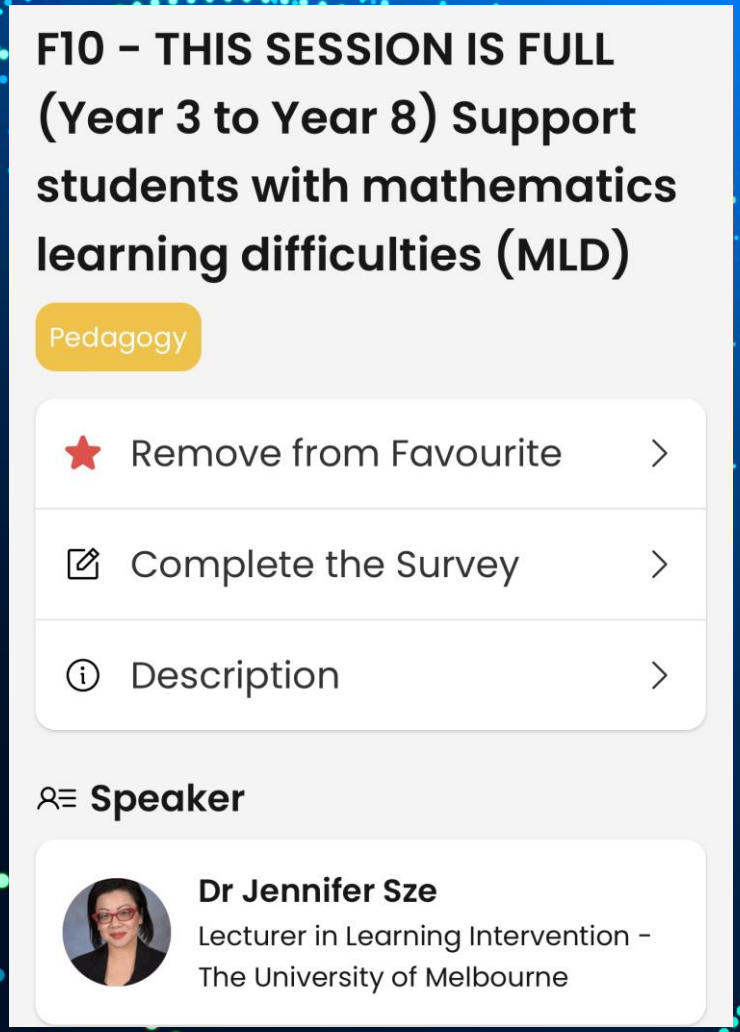
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