



The Mathematical Association
of Western Australia

Oh No Maths!!

Growth Mindset

Presenter: Paula McMahon
MAWA Executive Officer



Acknowledgement of Country



MAWA acknowledges the Traditional Owners and Custodians of Country throughout Australia, and pays respect to their Elders past, and present. We honour all Aboriginal and Torres Strait Islander peoples, their cultural heritage, customs, and beliefs. We recognise their ancient knowledge and contribution to education and mathematical understanding over time.



Commitment Statement

Our responsibility is to drive a cultural shift to make a systemic difference in mathematics education for Aboriginal and Torres Strait Islander learners.

We commit to:

- truth-telling which recognises the past and builds capacity for the future
- building relationships by listening to and learning from and with Aboriginal and Torres Strait Islander Communities
- creating sustainable partnerships based on trust and respect
- leading and supporting culturally responsive practices and
- advocating for a shared understanding of success

In doing so, we agree to be unwavering and accountable in actioning this commitment to achieve positive outcomes for Aboriginal and Torres Strait Islander learners.



Artwork: Kaurna Yerta by Bryce Cawte





Important Stuff

The information provided in this presentation is intended for educational purposes only and is reflective of the current curriculum and, where possible, references to research are current.

It is important to note that curricula, educational practices and research evolve over time. MAWA advises users to exercise their professional judgement when applying this information to their specific educational context.

Thank you
The MAWA Professional Learning Team



Welcome! 😊

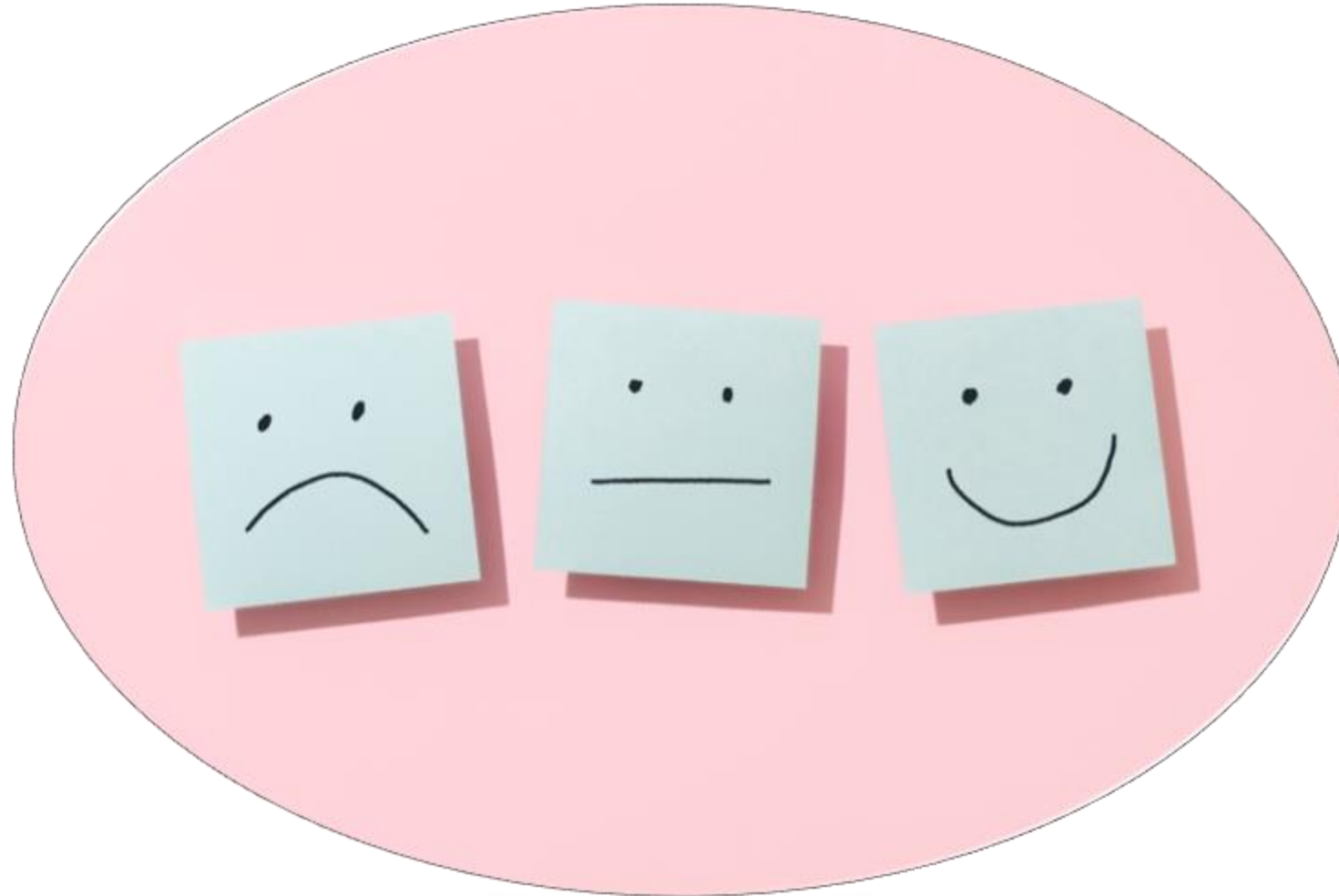
Session Features

- **Neuroscience and Learning**
- **Difference Between Mindsets**
- **Activities**
- **Where to Learn More?**





How Do You Feel About Mathematics?



Consider This Strategy



Think!



Pair!



Share!



Busting The Brain Myth

MYTH:

- We only use 10% of our brain!
- People are either left brain or right brain people!

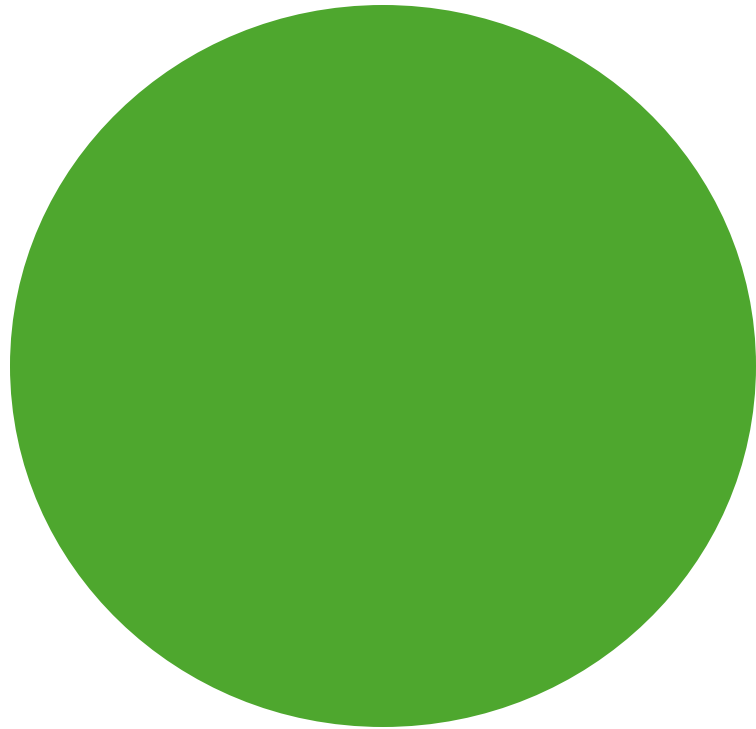
FACT:

We use all our brain even when we are sleeping.

Different parts of the brain enable us to act and think in different ways.

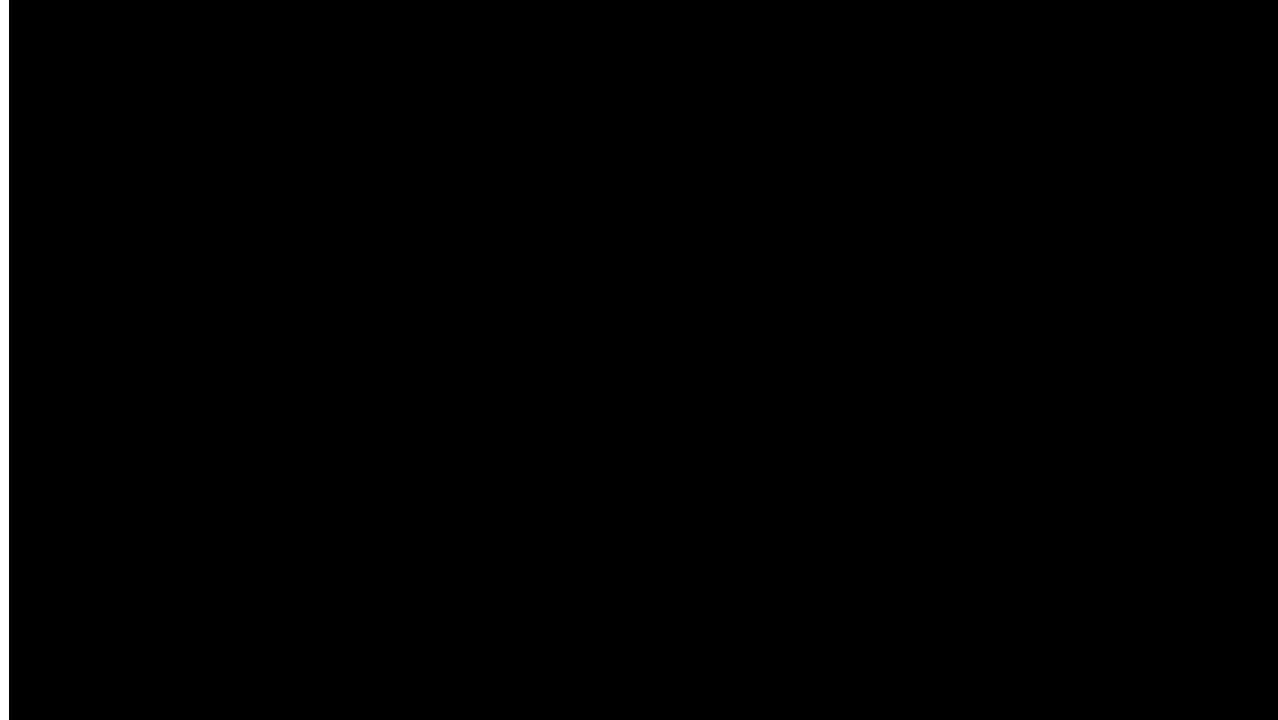


Activity – Left Brain, Right Brain





Brain Science – Jo Boaler



https://www.youtube.com/watch?time_continue=2&v=pxru8H6XbR4&feature=emb_logo

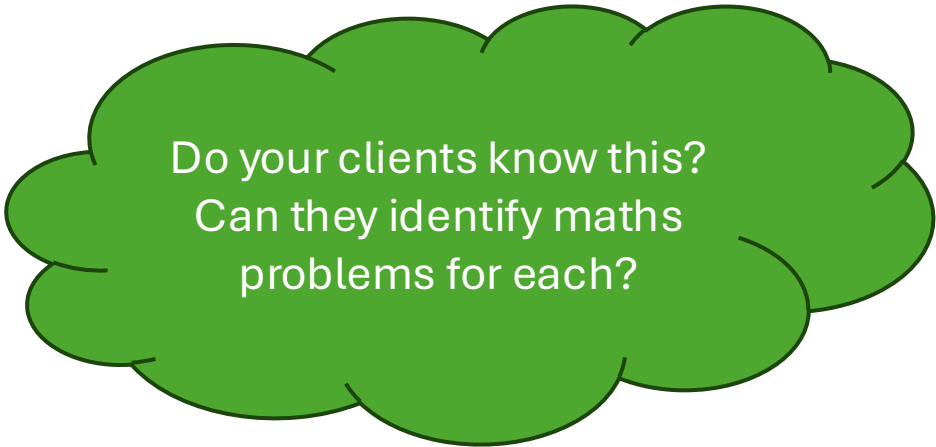


Fast versus Slow Thinking!

There are two basic modes of thinking we use daily:

System 1 Intuitive – involuntary and is instantaneous

System 2 Cognitive – deliberate, concentrated, requires effort and reasoning



Do your clients know this?
Can they identify maths
problems for each?





Teacher Activity

The next two slides will allow you to experience the two forms of thinking.

Call out the answer to the question as soon as you can solve it.





$$2 + 2$$



28 × 17



Disadvantages of Fast Thinking

Certain tasks can take advantage of our different systems of thinking and can encourage people to answer involuntarily without their conceptual thought processes.

Example

A bat and ball together cost \$1.10. The bat costs \$1 more than the ball. How much did the bat cost?



Types of Mindset

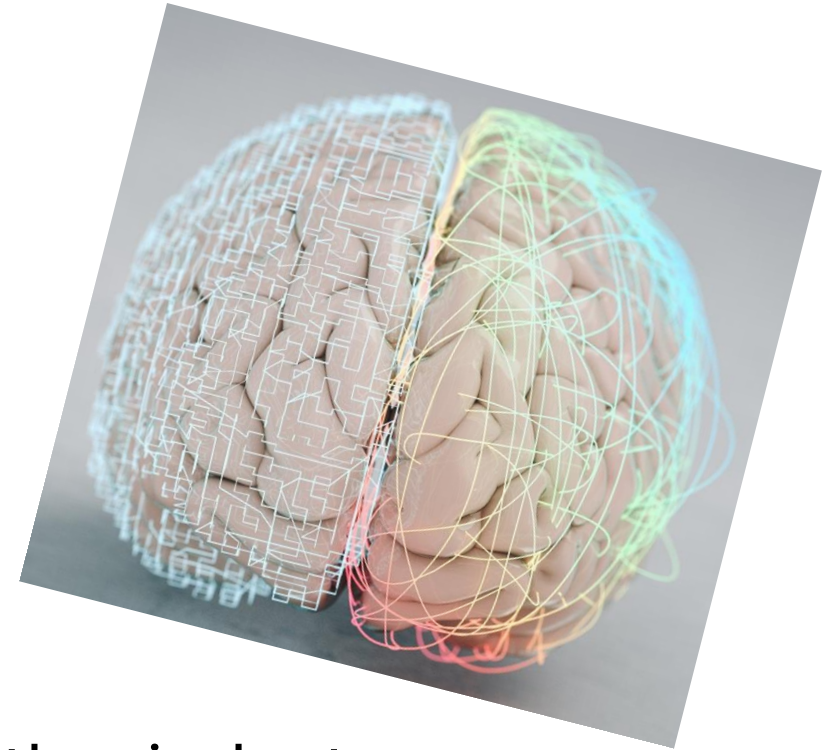
There are two main types of mindset;



Fixed Mindset



Growth Mindset



You will most likely demonstrate both mindsets in different situations or at different stages in your life.

Types of Mindset



https://www.youtube.com/watch?v=KUWn_TJTrnU

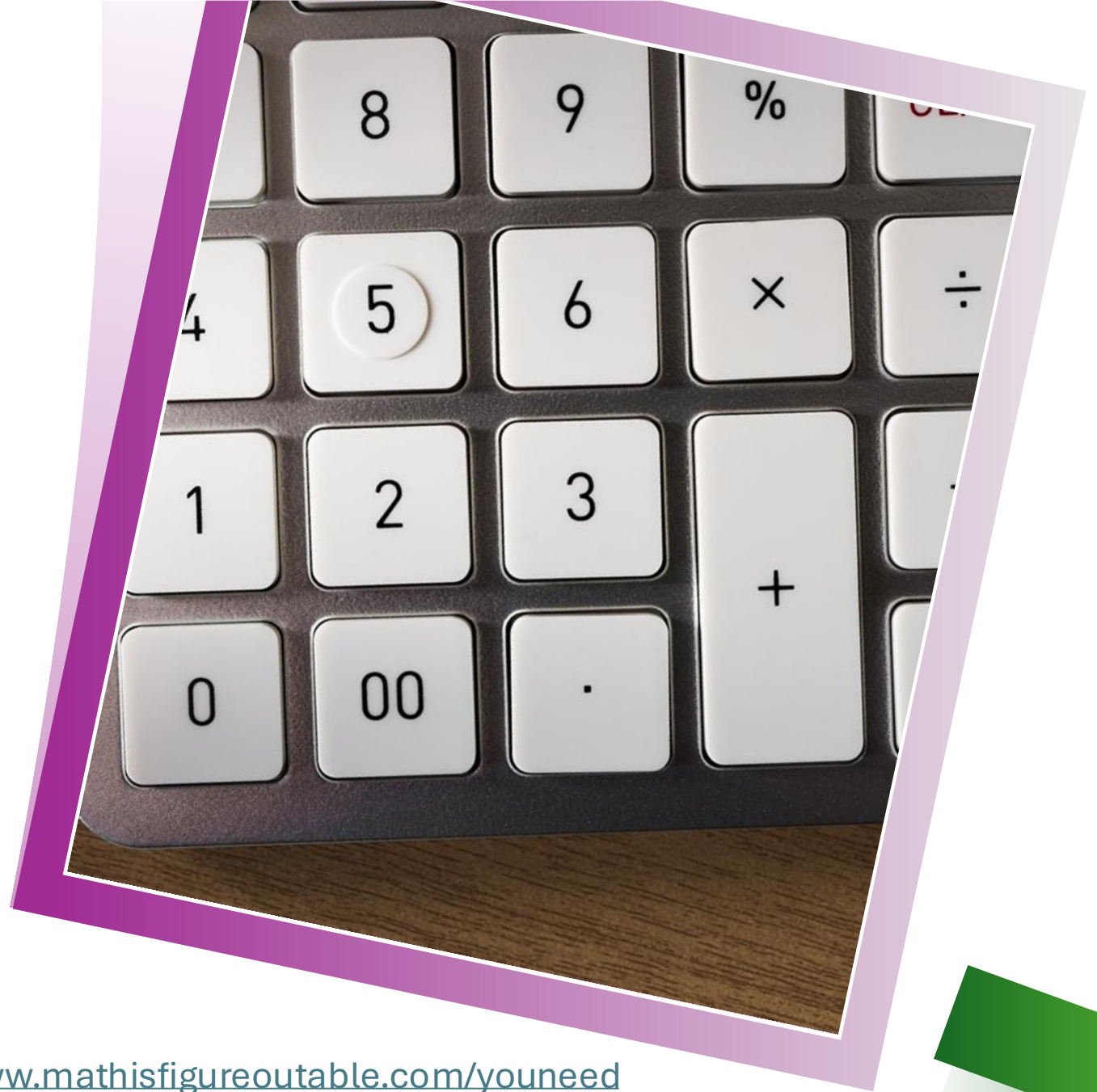


Activity Time

I Have; You Need!

Building Basic Fact Fluency

- 10
- 100
- 1000
- Doubles
- Halves
- 1 (decimals)
- 1 (fractions)



<https://www.mathisfigureoutable.com/youneed>



How Often do You Draw a Picture to Help You Think?

- New brain research tells us that visual mathematics even helps students learn numerical mathematics.

Model,
(re)teach and
encourage
visual thinking.



- Good mathematics teachers typically use **visuals**, **manipulatives** and **motion** to enhance students' understanding of mathematical concepts,

-Jo Boaler (Mathematical Mindsets)



Why Should We Use Visuals?

The different evidence that is coming from the neuroscientists tells us that our brain wants to think visually about maths. Building students' mathematical understanding doesn't just mean strengthening one area of the brain that is involved with abstract numbers, it means strengthening connections between areas of the brain and strengthening the visual pathways.

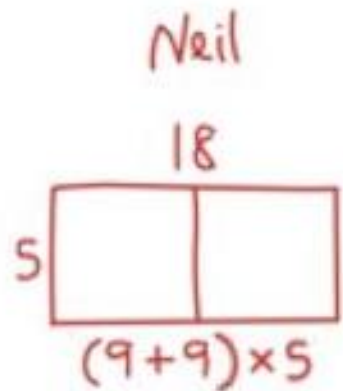
Neuro-imaging has shown that even when people work on a number calculation, such as 12×25 , with symbolic digits (12 and 25) our mathematical thinking is partly visual.



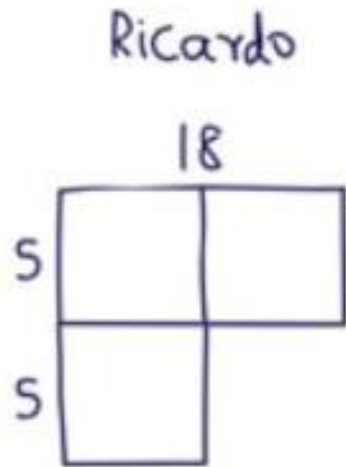
[Visual Math Improves Math Performance – YouCubed](#)

What is Visual Mathematics?

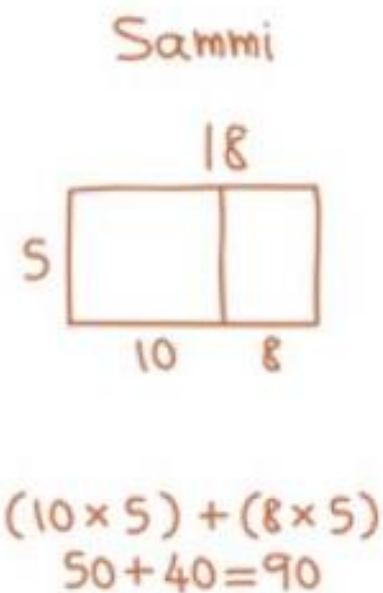
18 × 5



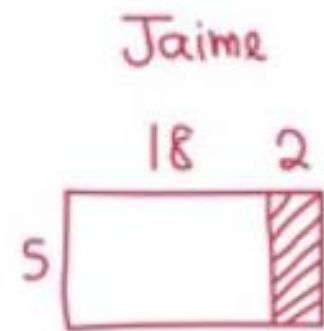
$$45 + 45 = 90$$



$$18 \times 5 = 9 \times 10$$



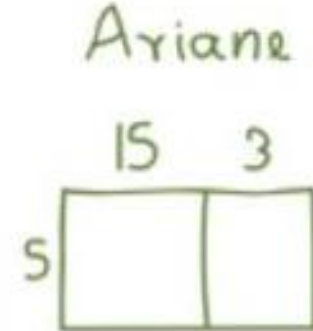
$$50 + 40 = 90$$



$$20 \times 5 = 100$$

$$2 \times 5 = 10$$

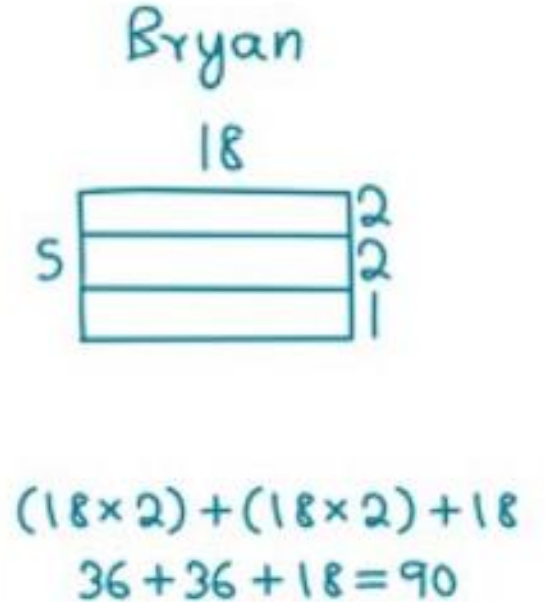
$$100 - 10 = 90$$



$$15 \times 5 = 75$$

$$3 \times 5 = 15$$

$$75 + 15 = 90$$



$$(18 \times 2) + (18 \times 2) + 18$$

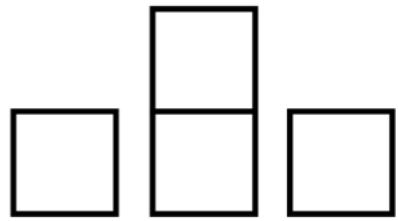
$$36 + 36 + 18 = 90$$



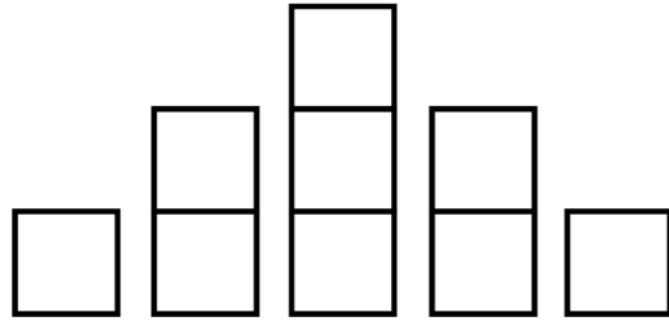
Activity Time

How Do The Shapes Grow?

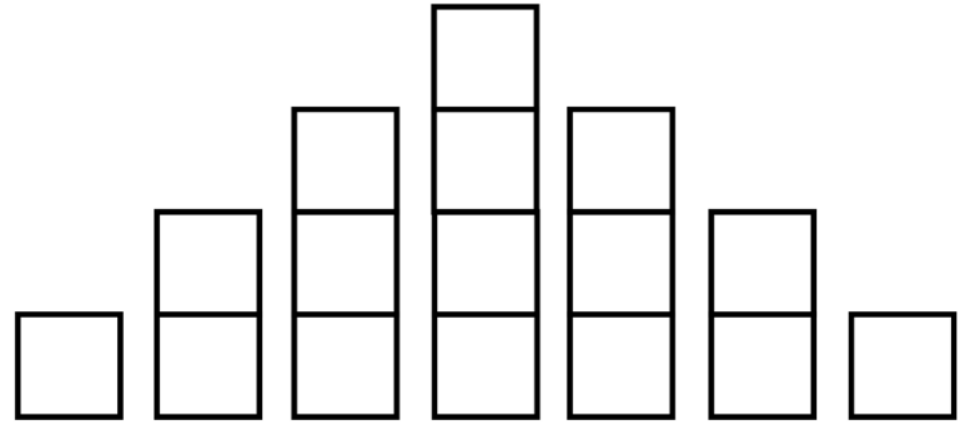




Shape 1

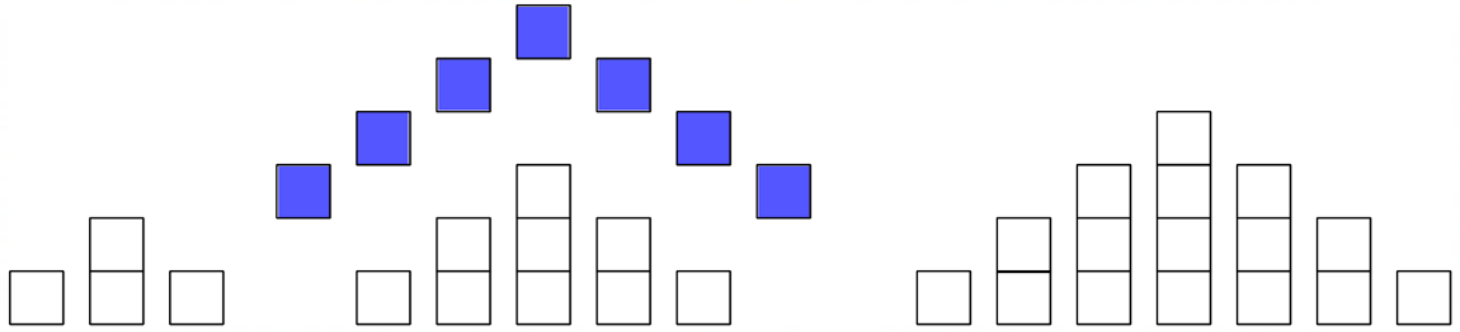


Shape 2

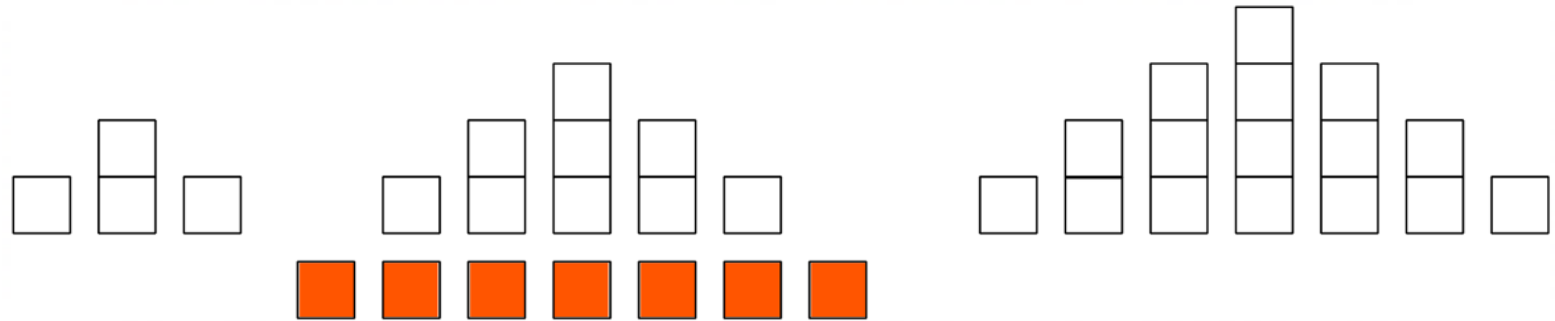


Shape 3

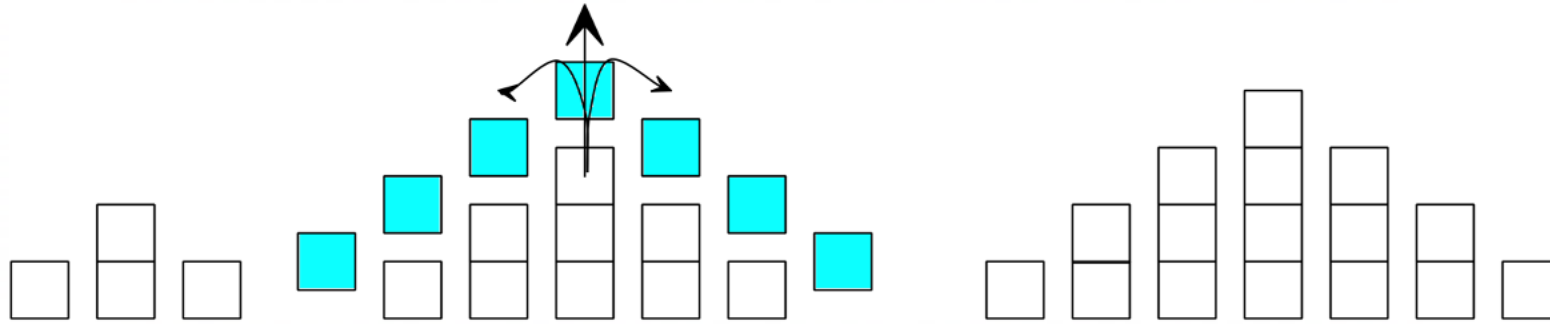
Raindrops



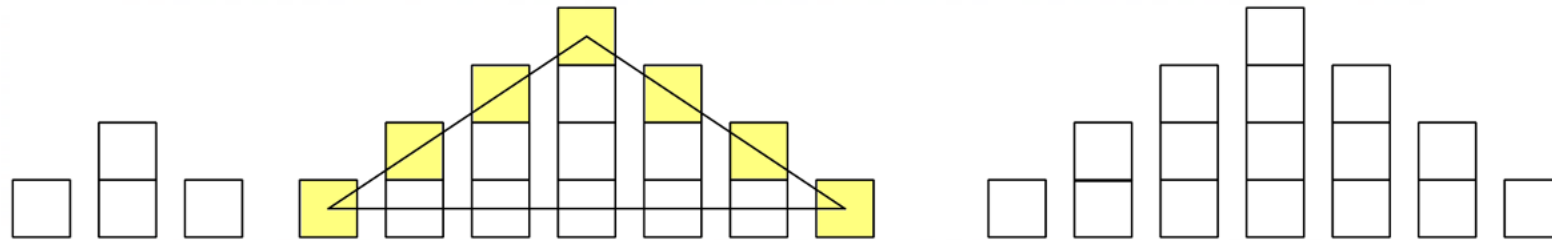
The Bowling Alley



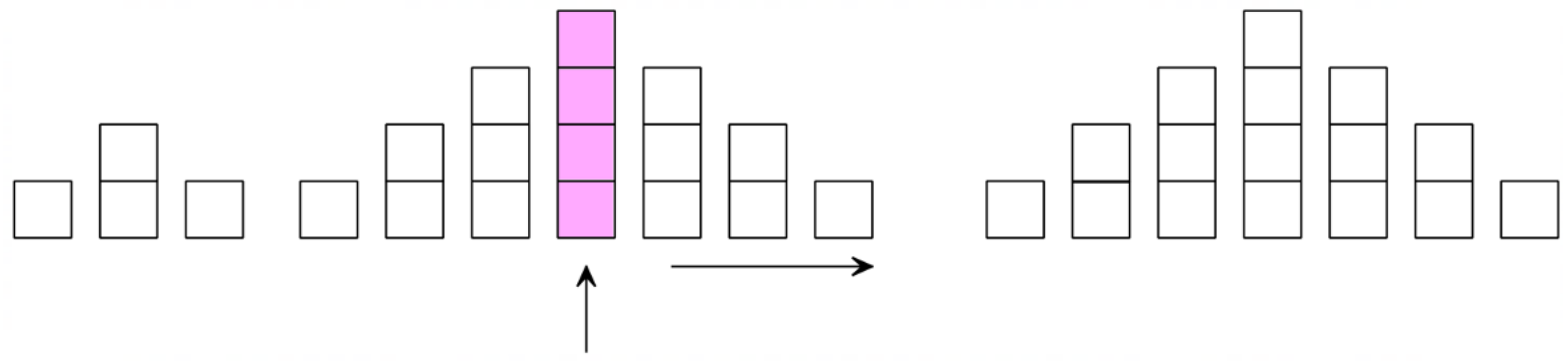
The Volcano Eruption



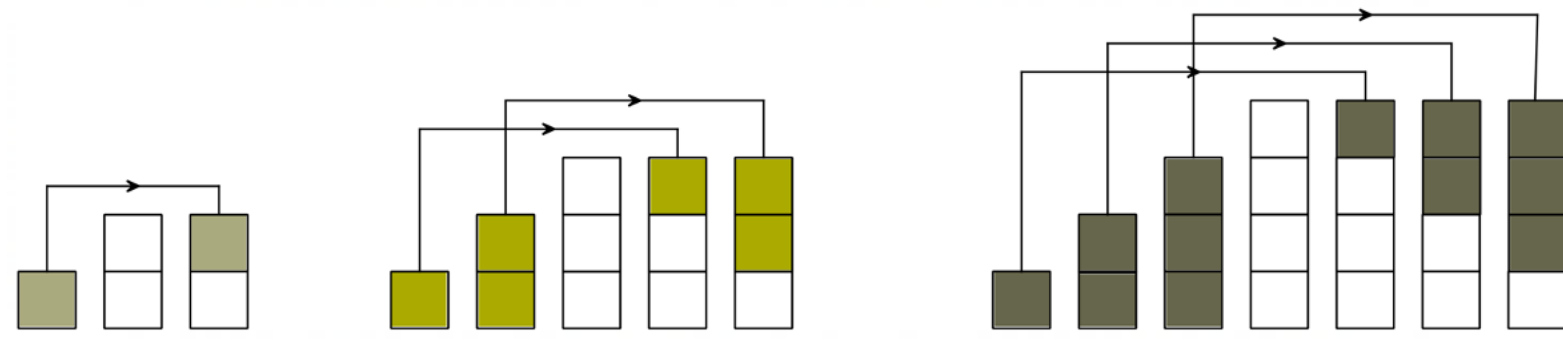
Triangular Growth



Insert and Move



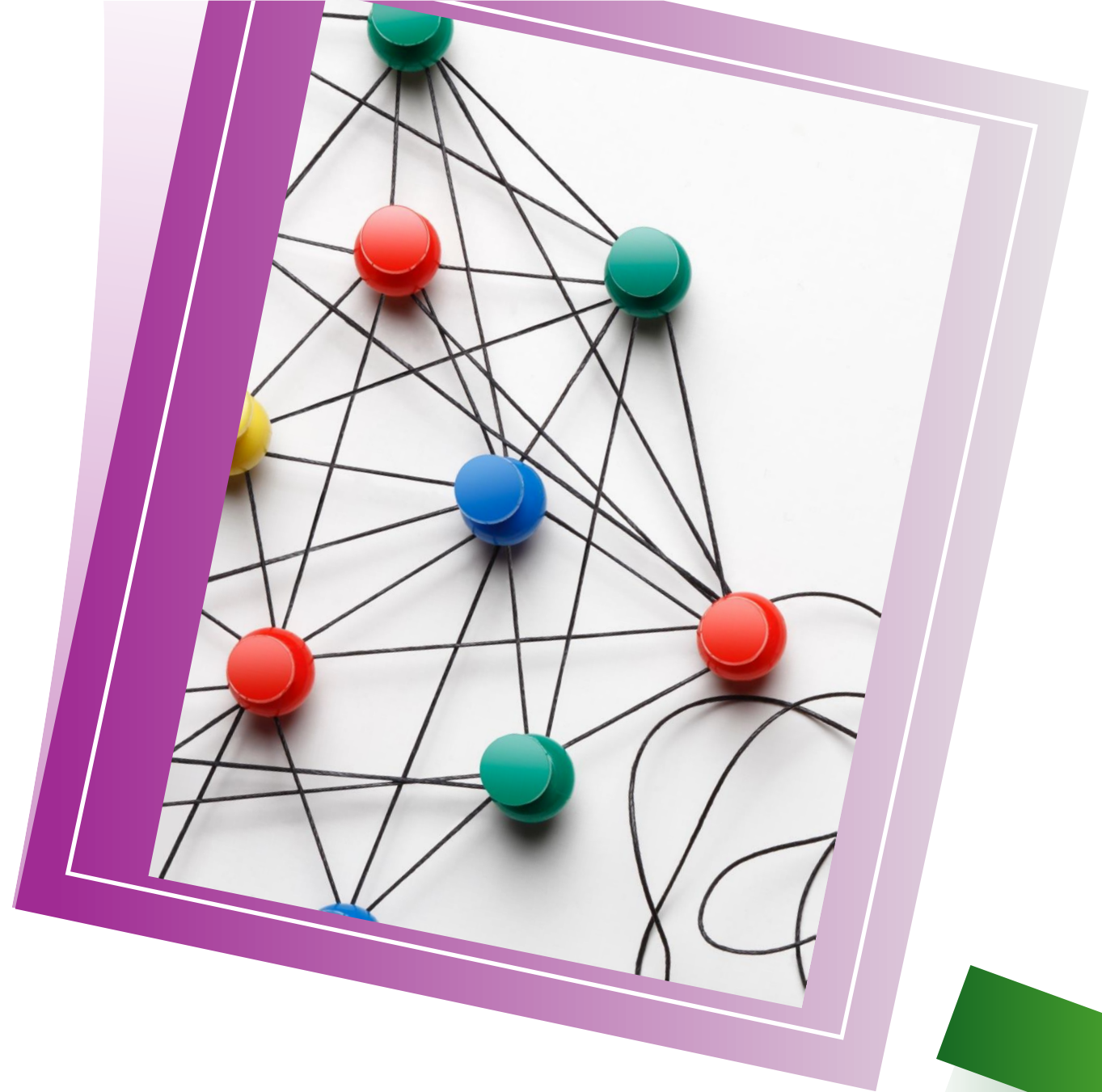
Making Squares





Activity Time 😊

Create Connections!



Creating connections

Using one metre of paper tape to represent a number line from 0 to 100. Mark the following key positions in these units of measure:

Number

Fractions

Decimals

Percentage



Measurement

Centimetres

Millimetres

Metres

Cents is a dollar

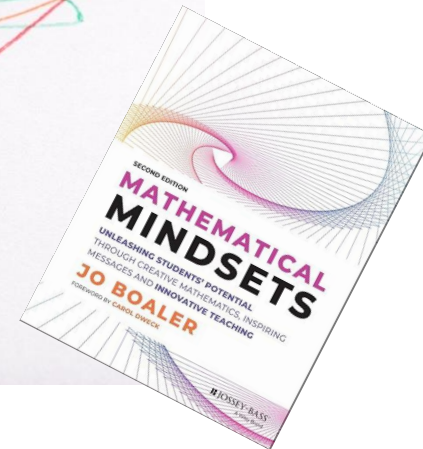
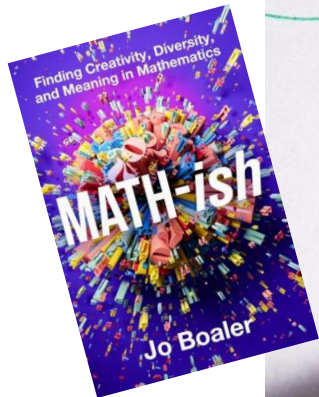
Grams

Kilograms

Millilitres

Litres

Celebrating Diversity in Mathematics





References and Useful Websites

You Cubed - <https://www.youcubed.org/resource/growth-mindset/>

Math is Figureoutable - <https://www.mathisfigureoutable.com/blog/i-have-you-need>

Math is Figureoutable Podcast - <https://podcast.mathisfigureoutable.com/1062400/episodes?search=true>

Australian Core Skills Framework - <https://www.dewr.gov.au/skills-information-training-providers/australian-core-skills-framework/download-acsf>

Adult Learning Australia - <https://ala.asn.au/>

Developing a Growth Mindset with Carol Dweck - https://www.youtube.com/results?search_query=carol+dweck+growth+mindset



Explore Later 😊

Are you an X, Y or Z Person?



<https://www.mathisfigureoutable.com/xyz>



Any questions?

Don't be shy!



Your feedback is appreciated.





Thank you!

Paula McMahon
eo@mawa.edu.au



Make sure you follow us on socials ☺

