

Session 2 - Building Math Learning Pathways

Family Webinar Series

Session Topics

Depth, not speed

Visual math

Flexible thinking



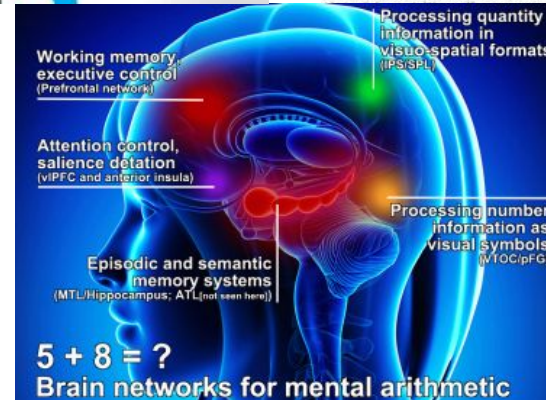
THINKING,
FAST AND SLOW



DANIEL
KAHNEMAN

VINNER OF THE NOBEL PRIZE IN ECONOMICS

"[A] masterpiece... This is one of the greatest and most compelling collections of...

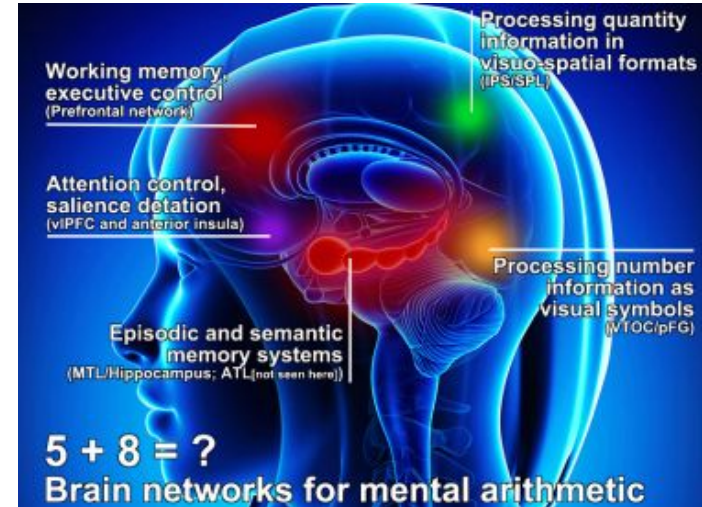


Emphasize Depth, Not Speed

- Ongoing successful math learning, especially at high levels is about comprehending the ‘why’
 - Analyzing/synthesizing information in context (eg word problems)
 - Memorization is not the same as learning why
- Do not ***emphasize*** speed
 - Instead, use visual math to support learning
 - The core of math is about reasoning
 - Number sense is a priority (more on this shortly)
 - Efficient thinking is important

Math is Visual

- Math is not a 'plug and chug' or 'drill to skill' subject
- Light up the brain with thinking
 - Use fingers
 - Use visuals/representations
 - Concrete, Representational, Abstract
- [Virtual manipulatives](#)
- Memorizing facts \neq Math Success

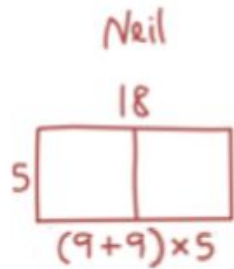


Retrieved from:
<https://youcubed2.wordpress.com/wp-content/uploads/2017/03/Visual-Math-Paper-vF.pdf>

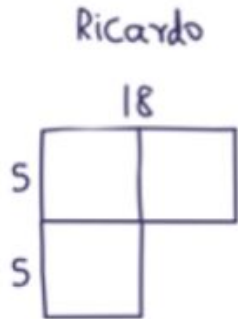
More on [visual math here](#)

Visual Math Example

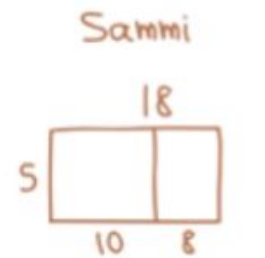
Work out 18×5 and show a visual solution.



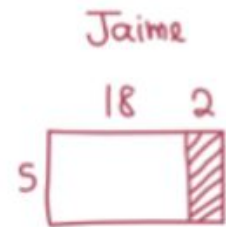
$$45 + 45 = 90$$



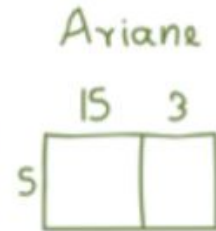
$$18 \times 5 = 9 \times 10$$



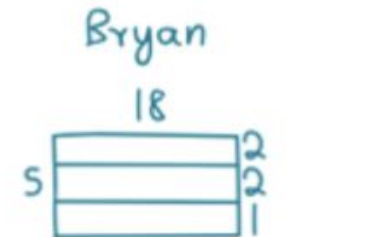
$$50 + 40 = 90$$



$$2 \times 5 = 10$$
$$100 - 10 = 90$$



$$3 \times 5 = 15$$
$$75 + 15 = 90$$



$$36 + 36 + 18 = 90$$

Flexible Thinking

- Not always 'how I/we were taught'
- Strategies to support student learning
 - Read-Draw-Write (Eureka Math, K-5)
 - Number Bonds (Eureka Math, K-5)
 - Various Paths to Understanding/Learning



Retrieved from:
<https://whoknowsanyhow.com/2019/11/04/how-can-psychological-flexibility-bring-us-peace/>

How do each of 5 students below demonstrate flexible thinking?

$20 \times 5 = 100$ $2 \times 5 = 10$ $100 - 10 = 90$	$10 \times 5 = 50$ $8 \times 5 = 40$ $50 + 40 = 90$	$18 \times 5 = 9 \times 10$ $9 \times 10 = 90$	$18 \times 2 = 36$ $2 \times 36 = 72$ $18 + 72 = 90$	$9 \times 5 = 45$ $45 \times 2 = 90$
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Example: Read, Draw, Write

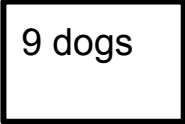

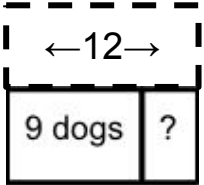
Nine dogs were playing at the park. Some more dogs ran in. Then there were 12 dogs

in all. How many dogs ran in?

Student Response:

$$9 + 12 = 21$$

Twenty-one dogs ran in.

Read	Draw and Write
Nine dogs were playing at the park.	
Some more dogs ran in.	
Then there were 12 dogs in all.	
How many dogs ran in?	$9 + ? = 12$ $? = 3$ <p>Three dogs ran in.</p>

Example: Number Bonds

Check out this video of [number bonds in action](#) for student learning

Example: Place Value & Operations

$4,278 \div 3 =$

thousands	hundreds	tens	ones
••••	••	•••••• ••	•••••• ••

3	4	2	7	8
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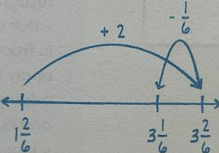
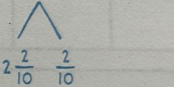
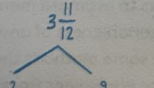
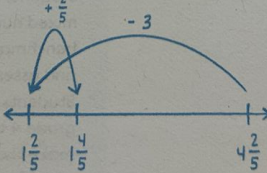
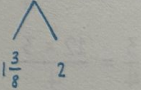
$486 \div 2$ 	$396 \div 3$ 	$630 \div 3$ 	$480 \div 4$ 	$836 \div 4$
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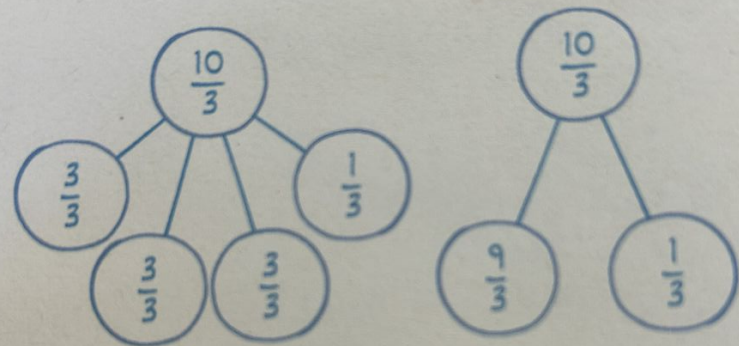
$2,184 \div 6 = 364$

thousands	hundreds	tens	ones
••	••••	••••••	••••

			4
		6	0
		3	0
6	2	8	4
-	1	8	0
		3	8
-		3	6
			2
-			2
			0

Example: Fraction Concepts

Add or Subtract by Counting On by Using the Arrow Way	Add or Subtract by Using Compensation on an Open Number Line	Add by Decomposing a Part or Subtract by Decomposing the Total
$5\frac{5}{12} \xrightarrow{+1} 6\frac{5}{12} \xrightarrow{+\frac{7}{12}} 7 \xrightarrow{+\frac{2}{12}} 7\frac{2}{12}$	$1\frac{2}{6} + 1\frac{5}{6} = 3\frac{1}{6}$ 	$2\frac{4}{10} + 3\frac{8}{10} = 6\frac{2}{10}$ 
$5\frac{9}{12} - 1\frac{10}{12} = \underline{\hspace{2cm}}$ $1\frac{10}{12} + \underline{\hspace{2cm}} = 5\frac{9}{12}$ 	$4\frac{2}{5} - 2\frac{3}{5} = 1\frac{4}{5}$ 	$3\frac{3}{8} - 1\frac{6}{8} = 1\frac{5}{8}$ 



$$\frac{10}{3} = \frac{3}{3} + \frac{3}{3} + \frac{3}{3} + \frac{1}{3}$$

$$\frac{10}{3} = \frac{9}{3} + \frac{1}{3}$$

Share your feedback

- Questions or experiences you would like to share with the PK Team? [Click here](#) or scan the QR Code.
- Similar questions may be used (anonymously) to inform future webinar content



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